

THE JOY OF THE WALL  
NEPAL - THE IDEAL SCHOOL

Ege Baki



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2: Dolakha, Panorama

## INTRODUCTION



3: Lalidad, main street

## THE JOY OF MAKING, LEARNING AND TEACHING

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*The ambition of the workshop is about the (re)construction of school buildings and the re-vitalizing of the schooling process. Therefore an elaborate research on traditional and local Nepali building-methods and ways of living is an important part of this project. It aims not only at designing structurally strong, aesthetically pleasing, functionally efficient and economical/ecological attractive schools, but also to build them in such a way that the local population can relate to them. 1*

TC Plus, Tom Callebaut, 2017

The following book describes my Master dissertation in Architecture, a research is about „The ideal school“ in Nepal. The combination of the research on site and the evaluated design according to observations in Nepal and theoretical studies leads me to the following results. The thesis is raised out of a collaboration between the faculty of Architecture, Sint Lucas Gent - KU Leuven and the Nepali NGO CEPP (Centre for Educational Policies and Practices), which is working on the improvement of the public educational system in Nepal.

After the fatal earthquake in Nepal in 2015, it is the governmental goal to rebuild 8.000 schools in the next three years. The idea is to elaborate a broad research on how to design those schools. Starting with questioning the existing school systems, and how the educational system in Nepal can be improved by the means of architecture and how to deal with tradition and heritage. The 20 international students from Belgium were spread through three different locations in Nepal in order to cover the huge diversity of the country in terms of topography, climate and culture.

*„When educating the minds of our youth, we must not forget to educate their hearts.“ 2*

Dalai Lama

## WHAT IS THE IDEAL SCHOOL?

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Reflecting on our topic „The Ideal School“ I am asking myself: What is The Ideal School? Children have to go to school every day in order to learn about many different topics to be prepared for life. Since we are spending a large part of our life in school it becomes an important place for several years and it characterizes children. When we start to go to school in the age between five and seven we are still very young and formable, like a piece of clay which gets sculptured by the parents, the teachers, the environment and by the school.

To enjoy what we are doing is always a good starting point for success. The same principle applies to learning. To learn at school in a sustainable way it is highly important that children are going to school with a positive mindset. That is the reason why I am answering my initial question with: the ideal school for me is filled with joy!

To achieve a joyful environment in school I want to provide an open and flexible space where children can move and learn. This space will be created between two different kind of walls, a *Mauer* on the one hand side to give stability to the building and create a protected and safe atmosphere and a *Wand* on the other side which describes a light and more flexible layer to execute a space in between. The different dealing of the wall is based on observations I have made in Nepal.

If we achieve to create a joyful environment in school, and if children, as well as teachers, enjoy going to school we will succeed in designing „The Ideal School“!

*„Education is not learning of facts, but the training of the mind to think.“, 3*

Albert Einstein

Thinking about myself planning a primary school in Nepal rises immediately one simple but at the same time complicated question: What is the purpose of me – as a European architecture stu-



4: Kalidhevi primary school

dent – to go to Nepal to design a school?

The answer for me lies in connecting the very different knowledge the local people have in contrast to me, exchanging knowledge and skills, learning from each other and respecting the particular approaches. The diversity between locality and universality will lead us in the best case to a very open and diverse result. My goal is to reach a sustainable school solution through the synthesis of traditional building techniques and local materials – which has been developed and imparted from generation to generation – and my more theoretical and western background I have gained during my education at the University. This narrative somehow also reflects my own development – coming from a practical background and studying architecture.

When the moment came in my life to think about my profession I strongly had the feeling after school to do something practical with my hands, so I decided to do a carpenter apprenticeship. What impresses me a lot in crafts is the close connection to the material and practical solutions which are always developed out of the very specific characteristics of wood for example. All the design decisions are based on the properties of the material. To design a furniture or a building is for me in the end almost the same. In both cases, we start with the human. The human gives the measurements we are working with and the specific needs.

During my studies I decided to change my study location and school three times, first I started to study at the ETH in Zurich, and then I finished my Bachelors at the Technical University in Berlin and now my masters at Sint-Luca in Gent. Although it is always a bit an effort to change the location, I encountered a new approach to architecture in each school and city. I remember the opening speech of the architectural dean at the ETH, he was saying that the main goal is to open up the student's eyes, to discover the architectural world by really looking at the things and by doing so studying architecture always and everywhere. To study in a foreign country is very different and the fact to be a foreigner makes me look at many things more precisely since things are different than at home.

This is also a reason for me to travel for my master thesis to a foreign country. I was staying for five weeks in Nepal, which almost seemed too short, but I tried to absorb as many impressions as possible to translate them later into my design.

During my Bachelor, I was able to follow a Design Build studio with Professor Ralf Pasel in Bolivia, which was an immeasurable important experience. The term 'Design Build' describes the combination of designing and building, mostly in an international context. Which means to design something in school which the students itself are going to realize later on the site. I think every architecture student would profit by participating at least in one of those projects.

The agricultural school we build in Bella Vista is a great success but also showed me many difficulties. Practical difficulties on site but furthermore also huge cultural difficulties between us, a group of 25 German students, the local people in the village and the youths at school. The approach of the design process for the project in Bella Vista and now in Nepal has been very different. Looking back to the design process the biggest difference was that we did not go to Bolivia before we started the design, except for our professor. The fact that now for the master dissertation we went to the villages in advance, was very helpful. I understood the importance of visiting the site in advance in order to understand the context and the people better.

In the final design of 'My ideal school,' I want to bring together many aspects out of observations in Nepal to build a school filled with joy. People in Nepal are generally very keen on having a modern and safe building, which means for them mainly the use of a lot of concrete. A designing process is always a balancing act between providing enough concrete that people feel safe and can be proud and still incorporate as many local materials and skills as possible. In the framework of designing a school in a developing country for me, it is very important to develop solutions people can easily adapt and rebuild with the available materials, and woman and men power.

Beside pure architecture, I was also trying to find out what my school specifically needs. One huge problem is the fact that some children



3: Dolakha

cannot come to school because they don't have enough food to be concentrated the whole day. Therefore a part of my design is a school garden where the children can grow their own food and learn about the environment. According to teachers serving food will be an effective trigger to make children come to school.

The use of the existing building with three classrooms allows me to design a very flexible and open space for the new school building. Besides the everyday school routine, the community can use the open space. Furthermore, the connections between outside and inside enlarge the effective area and will be used according to the different climate conditions as outdoor classrooms.

To sum up the master thesis, it would be of course amazing to go back to Dolakha again and to realize our ideas together with the local community. Me, as an architect, want to understand the issues of people's daily life and improve them through architecture. For me, good architecture is when the user is pleased and proud of the end result.

While designing the school we should never forget about the words of the Dalai Lama.



5: Camping site

EXPERIENCES IN NEPAL



6: Trip to Dolakha

## ALL THE WAY UP TO OUR CAMP



7: Location Nepal

Even though our case study Lamidada is only 113 kilometers from the capital city Kathmandu, it took us almost eight hours - including a break to eat „Daal Bhat“, the most basic traditional food in Nepal - to reach our destination by Jeep.

Nepal is located between two very big and influencing neighboring countries: India in the south and China (Tibet) in the north. Geographically the country can be divided into three main groups:

Mountains	< 2500 m, harsh Himalaya climate
Hills	500 - 2500 m, temperate climate
Terai	> 500 m, subtropical flatland

The diversity of the country is also reflected in the culture. The main religion is Hinduism, but also a decent part of the population are Buddhists, Muslims, Kirati or Christians. I had the impression that the tolerance between the different ethnic groups is exemplary high, even though it of course also creates difficulties. In Dolakha the main casts are Newari and Tamang, which can both be Hindus or Buddhists.

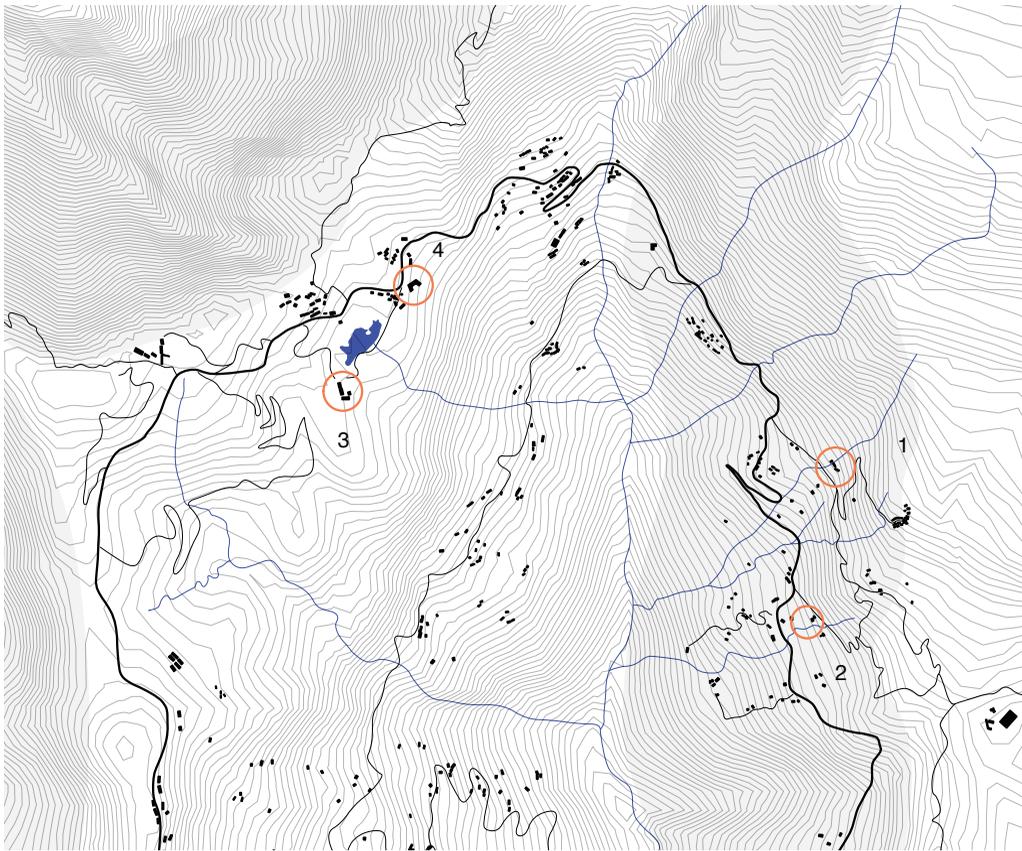
To understand the diversity of the country better our group of 20 students had been divided into three groups to visit the three different climate zones, looking for architectural solutions for those divers areas.



8: Nepal

I went with my fellow students to the mountain area in Dolakha. Differently as expected we learned two days before the trip that we had to stay one week in tents instead of staying with local families. Regarding the very extreme cold weather conditions in Dolakha in February this information was a little shock at first. We packed all our warm clothes to survive this camping trip and Micheal, our CEPP organizer bought us a big role of insulation material which we could use as mattresses.

After the very exciting Jeep trip through the countryside of Nepal up to Dolakha (2500 m),



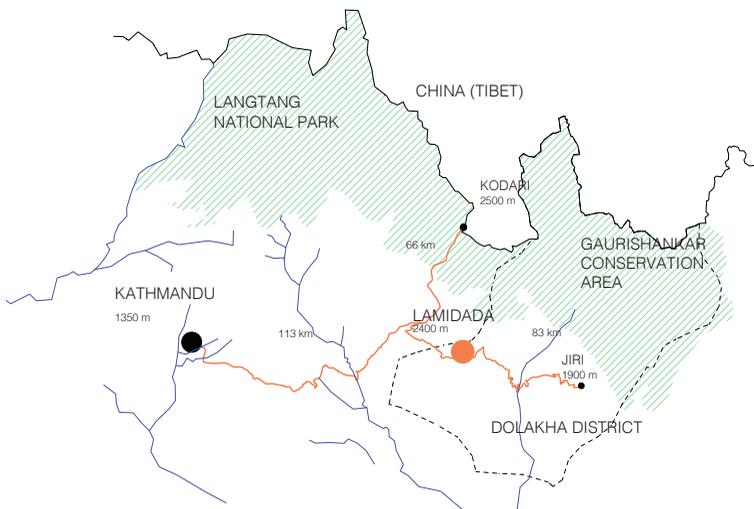
- 1 Kalidevi Primary school
- 2 Camping site
- 2 Existing secondary school
- 4 New secondary school

9: Mapping Lamidada

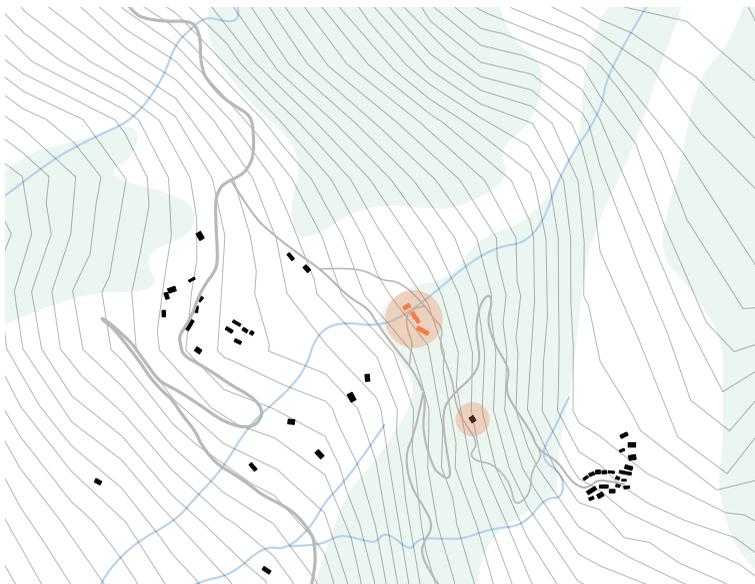
we realized how much this area has been damaged by the earthquake in 2015. Hardly any single house was still standing. Since two years the local population lives in very primitive corrugated sheet huts, which immediately turned the perspective of our sleeping conditions to the opposite and we realized that it was not reasonable to complain about it anymore.

The main street of Lamidada connects the village with Kathmandu in the east, Jiri in the west and Kodari in the north next to the border of China (Tibet). The north of Nepal is characterized by an astonishing nature. The view to those impressive mountains is a never forgettable impression. Just a few kilometers up north, there is Lang Tang national park and the Gaurishankar Conservation area. Furthermore, the very fresh and clean air seems like a big relief after some days in Kathmandu. The strong sun creates a very comfortable climate during the day but as soon as the sun sets, the temperature drops immediately. Comparing the water situation of Lamidada with other places in Nepal it seems like water is one of their biggest goods. The landscape has been sculptured over time by many water streams and gives people access to fresh and clean drinking water everywhere. One of those small and beautiful streams even goes through our site for the school and adds a very beautiful and important value.

The private houses create small clusters, spread over the valley. There is not a real center of the village for trade or exchange. Those small clusters are always in a strategic good location, next to a water stream and with a good orientation to the sun.



10: Location Dolakha



11: Location school



12: After the earthquake in 2015

## AFTER THE EARTHQUAKE

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*"There is so much unknown under the earth that you trust in the heavy and expensive building (...)." 4*

Andrea Palladio

The words of Andrea Palladio about the foundation and the choice of a site for the building becomes in the earthquake region of Nepal highly important. The choice of the location and the used construction in this environment is of the highest importance.

After the two big earthquakes in April and May 2015, some regions of Nepal have been completely destroyed. The epicentrum of the earthquakes was situated in the north-west of Kathmandu and quaked huge parts of the Himalaya. Among others, Lamidada and the region of Dolakha have been badly destroyed. In our Village, it was hard to find one single old building, which is still in use. Most of the traditional stone buildings entirely collapsed or were partly damaged but not any more safe enough to use. The earthquake was a huge disaster that brought the already very poor country even more into struggles. Still, the people in Dolakha were in a way very lucky. Since the quake happened on a Saturday, the only school free day and most of the people economy is based on agriculture the adults, as well as the children, were working on the field. The fact that also the little children need to work already at home a lot to grow enough food for the family saved their lives. Although there was almost no stone standing on top of the other afterward nobody died.

Traditional constructions were made out of natural stone with using clay as mortar without any reinforcement to protect the constructions against horizontal forces. It is understandable that people lost confidence in their own traditional construction methods and building materials. For most of the people, the only solution to be safe in case of another earthquake is to



13: Exterior of an first aid shelter

build with a lot of concrete, which is also promoted by the government.

The first structural aid, which reached the population in Lamidada after the earthquake were the U-shaped buildings. A very basic steel structure with one continuous corrugated steel sheet to cover the space. With the time people started to build more buildings with a wooden structure, again covered only with steel sheets. Those constructions have the worst conditions in the strong weather conditions in the mountains. The sun during the day is very strong and heats up the shelters enormously while during the night as soon as the sun sets the temperature drops drastically and since the buildings have no thermal mass at all, also the temperature in the inside drops immediately.

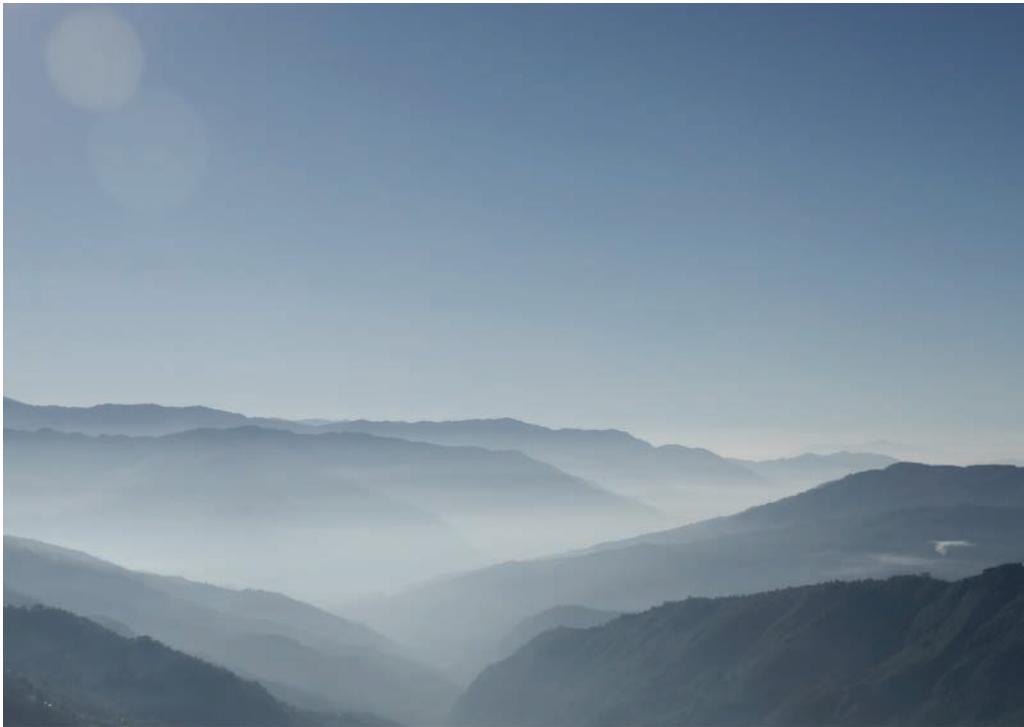
Now some of these buildings were used for animals or as storage room because of the bad climate conditions in the inside.

As we can see on the pictures, Nepalis are very keen on decorating their environment as colorful as possible. The construction itself is very sad and it must be unbearable cold in the inside during the night, but the girl living in this shelter spends a lot of time to hang several pictures and fake flowers, which are very popular in Nepal, to make it feel more like a home.

Furthermore, the SOS Foundation is building several houses, but it also goes rather slow.



14: Interior of an first aid shelter



15: Valley Dolakha

## THEORETICAL FRAMEWORK



16: Vernacular architecture, Dolakha

## WHAT DOES ARCHITECTURE MEAN IN A RURAL CONTEXT LIKE DOLAKHA?

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Vernacular architecture in rural areas can be also called „native architecture“. It describes the architectural design which is grounded on local needs, local materials and local traditions and is made according to the skills and traditions of local builders and not designed by architects.

The main goal of vernacular architecture is always to satisfy the very basic human needs. A basic dwelling means a physical space of security surrounded by walls and covered with a roof to protect the inhabitants from natural forces like rain, wind, sun, cold and heat but also from animals or enemies. How it is built, positioned and oriented is highly important within the microclimate.

Vitruvius is describing the choice of a good construction site as a “healthy situation” to eliminate as many problems as possible in advance.

*“In setting out the walls of a building the choice of a healthy situation is of the first importance: it should be on high ground, neither subject to fogs nor rains; its aspects should be neither violently hot nor intensely cold, but temperate in both respects.”, 5*

Vitruvius

The Himalayan vernacular architecture describes the area of Nepal and Bhutan including the Mount Everest (Sagarmatha - the roof of the world in Nepali). The private dwelling is seen as an important tool to show everybody’s state in the society. The wealthier Nepalese are, the higher they want to build. In rural areas like Dolakha, two stories out of stone or brick was already a very high status. In general, the dwellings do have small and only a few openings. This is because people want to keep as much heat as possible inside the buildings but also to protect their eyes from the very strong and damaging sun in the high mountains. Traditionally the kitchen is the heart of the buildings and is not accessible for everybody. The fireplace in the middle of the house is an open fire, which

produces a lot of smoke and causes many inflammations of eyes and thousands of fatal victims every year.

If we look closer to the vernacular architecture in Nepal we can see a highly beautiful and specific dealing with the walls of the buildings. Dwellings are mainly made out of stone and clay, using wood for the roof construction, floors, and balconies. Especially in the mountain areas, people paint their buildings with beautiful and detailed patterns.

In general, after the earthquake, there is a tendency to use more and more high-cost materials that often need to be imported instead of local low-cost materials. This phenomenon is also part of showing the own status of the family because only richer families can afford imported materials.



17: Ozefant, Les Constantes

## WALL: WAND OR MAUER?

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Observations about the dealing and use of a wall in Nepal led me to a deeper analysis of the meaning and the function of a wall. The following schemes show how important and diverse the wall is for Nepali vernacular architecture. A fast historical overview of the wall as an element of buildings:

Starting with the translation and meaning of the wall, in German, we have two words to express different kinds of walls: *Wand* and *Mauer*.

*Die Mauer* (lat. murus) is mostly a massive stonework build out of bricks or stones but later also out of concrete. In any case, it is a heavy and strong construction and has always a protective purpose, either for inside spaces of buildings but also for entire cities like the ‚*Berliner Mauer*‘ or even countries.

*Die Wand* describes more the creation of an enclosed room. The German art historian Gottfried Semper defines *Die Wand* as *Gewand* (Engl. robe). For him, a wall is a mesh to define a space. Looking back to the first dwellings humans started to weave huts out of thin wood or reed, covered it with fiber and grass to create a closed space. Gottfried Semper always distinguishes between the structural scaffold and the filling of wall construction, as for example traditional Himiş buildings in Turkey or timber frameworks (Fachwerk) in Europe from the middle ages. These methods have been developed to use as less wood as possible and were filled with straw and clay, bricks or stone. Stone fillings were only made for noble people.

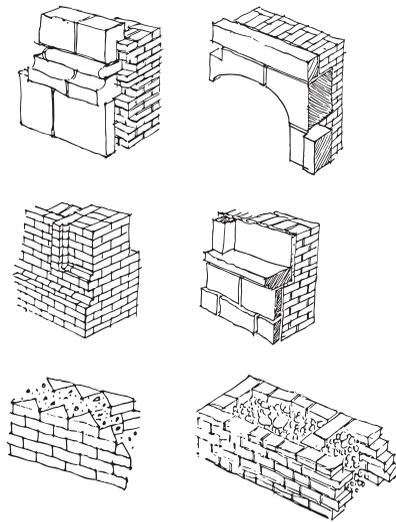
Massive stone walls need to be separated into two categories: traditional dry masonry is made out of stone or bricks - depending on the region, or a bound masonry, a connection of stone and cement.

The first construction method for a solid wall was the so-called „Pisé-wall“ by Jean-Baptiste Rondelet in France. In this case, earth material needs to be compressed in a formwork. With this method, it was possible to think about very different shapes of buildings.

Further development on the wall allowed bigger and wider openings. By doing so the wall



18: Primitive hut



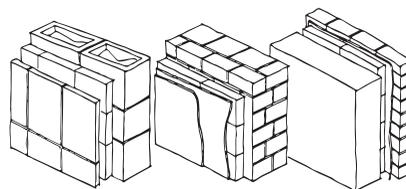
19: Masonry

turned to be more a pattern of pillars instead of a load-bearing wall. Three different ways of closing space were developed: the wall in front of the pillars, between the pillars and behind the pillars.

The contemporary architecture of the 20th century is highly influenced by Le Corbusier with his principle of the 'Plan libre' of 1927, which explains the complete independence of the load bearing structure and space creating walls.

Over time the wall itself was made out of more and more elements and layers. So today in times of the energy crises and the wish of having constant temperatures always and everywhere the wall became a very complex element. Beside the structure and the creating of spaces, the wall turned into a very complex construction element. We need to add several layers to our walls, like insulation, vapor barrier, ventilation, etc. Moreover, a wall can be loaded with many different uses, like electricity, water pipes, sewage systems, etc. even a cabinet wall, book wall and living wall is possible.

The historical background and comparison of the *Wand* and the *Mauer* are everywhere visible in the very complex Nepali walls. Using these two elements with their contrary features in terms of material, atmosphere and their climatic properties as the main design tool will create very specific spatial qualities in-between.



20: Layering of the wall



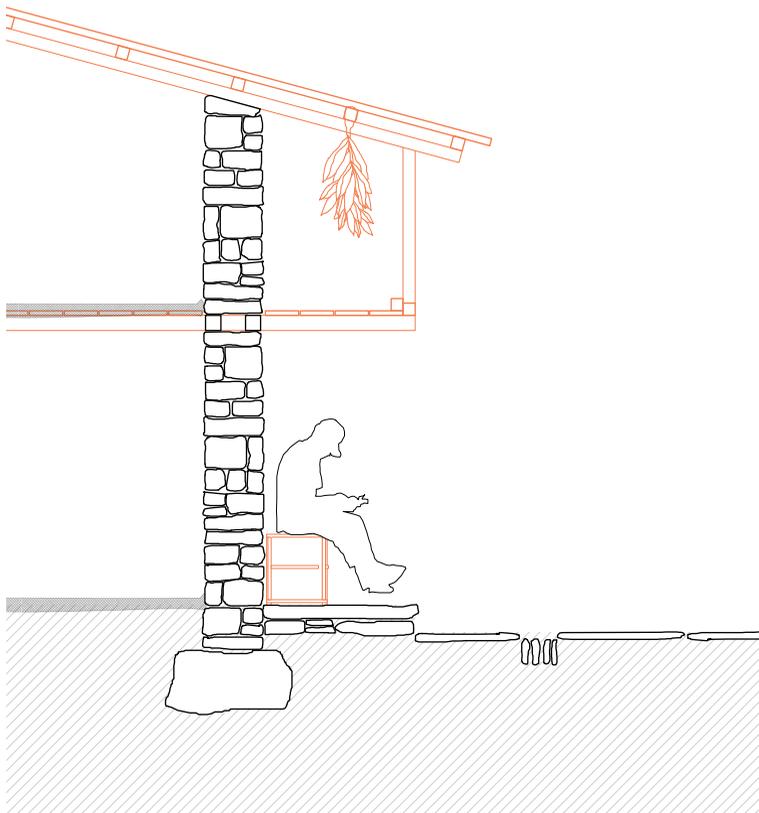
21: Traditional building, Lamidada

## THE WALL IN NEPALI ARCHITECTURE

One of the most impressive observations in Dolakha but also in other places of Nepal is the importance of the wall including the pavements and plinths of buildings. Old and traditional walls are loaded with several uses and become part of people's life. Instinctively they are creating with very simple methods various spatial qualities. Highly elaborated details of little steps and different levels are creating a huge importance to the transition of the foundation and the wall. Thereby the entrances of buildings become very individual and alive. Although they are all similar but still always perfectly adapted to the very specific local needs. The combination of various materials, mainly natural stone, brick, mud, and wood underline every elements importance.

On the following pages, I am explaining several examples of creative ways to use walls in Nepal.

The first example is a picture taken in Dolakha. It shows the joy of the old woman sitting in front of her massive stonewall enjoying the direct heat of the sun as well as the absorbed heat of the stone wall behind her. On the upper level, she is drying her corn in a rain-protected space. The overhang of the little balcony also protects the wall and the entrance from the rainwater, while the water coming from the roof is drained through the little stone ditch.



22: Section 1:50

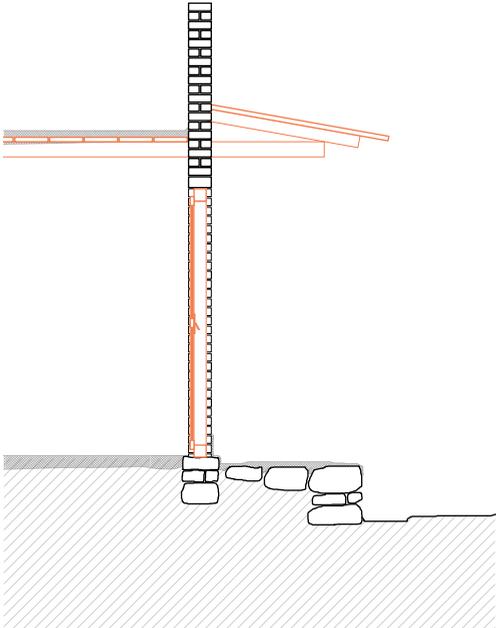


23: Plinth, Nepal

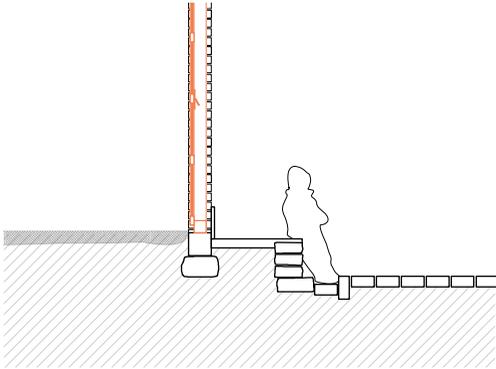


24: Plinth, Nepal

The elevated plinth out of stone or brick protects the building flooding during the Monsoon season and the water will be drained via the ditches in front of the building. In both cases, the plinth and the lower part of the wall are covered with either clay or concrete.



25: Section 1:50

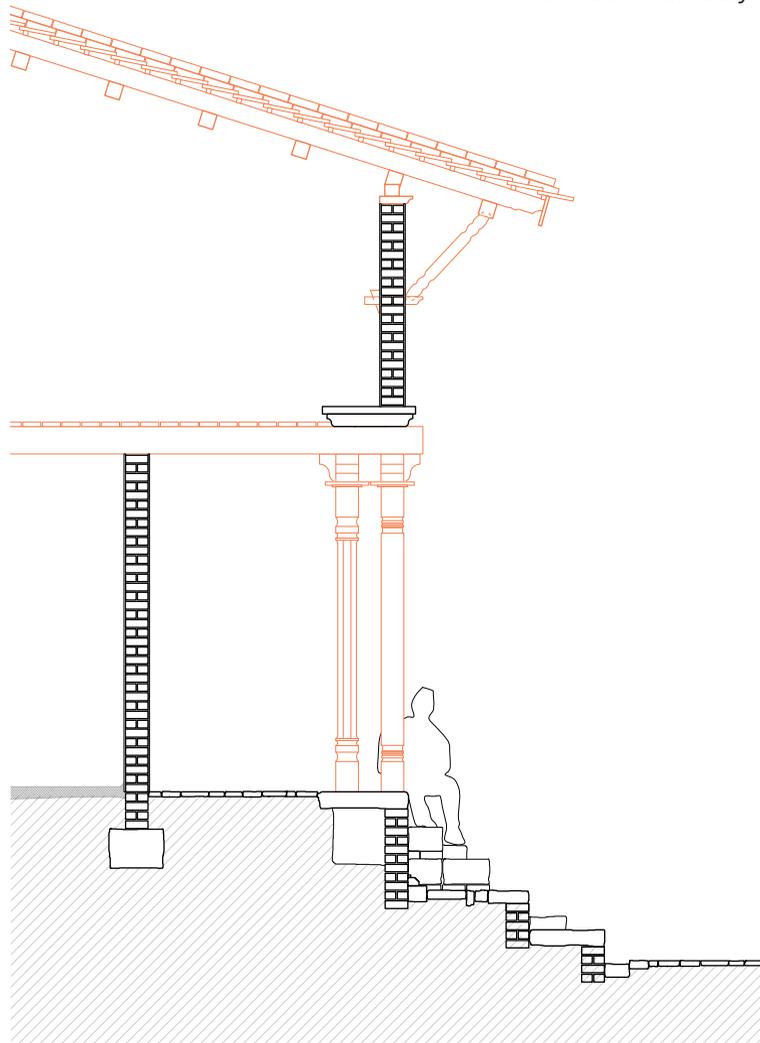


26: Section 1:50

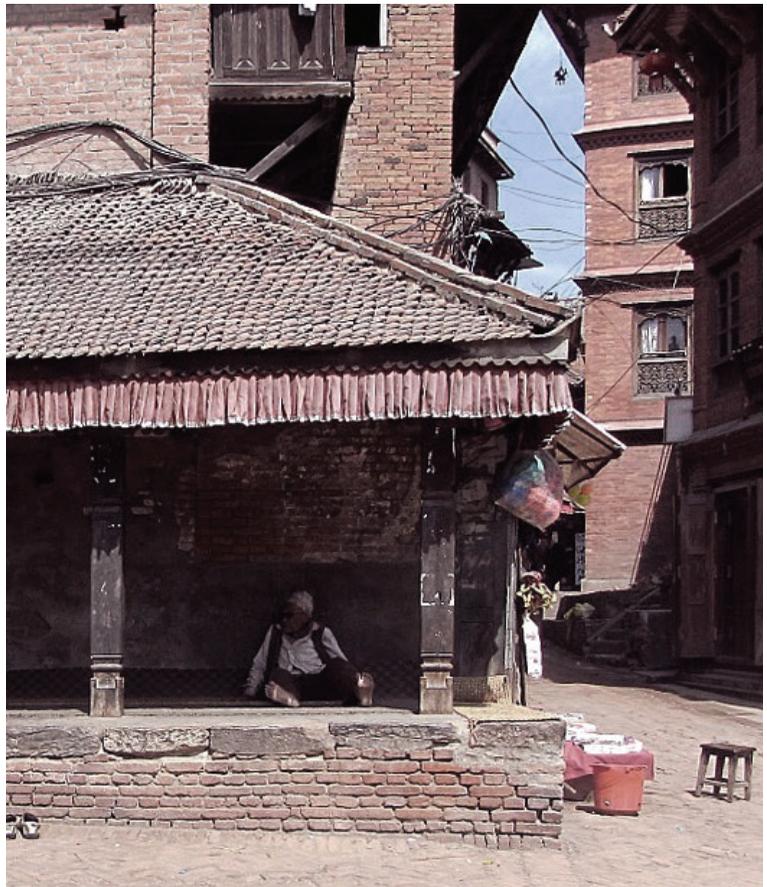


27: Pati, Nepal

Pati's are public rest places, located in a central position of cities or villages for people to gather. It is always a covered but open-air, an elevated place in front a house or a temple. People meet in a Patis to talk, to play or to mediate. Sometimes a Patis also becomes a small market-place to present the products. Especially older men sit there for many hours just to enjoy being in the middle of happenings, watching people walking around and having small chats with the neighbors. A Patis is a peaceful place of rest in the middle of the rush of the busy surrounding.

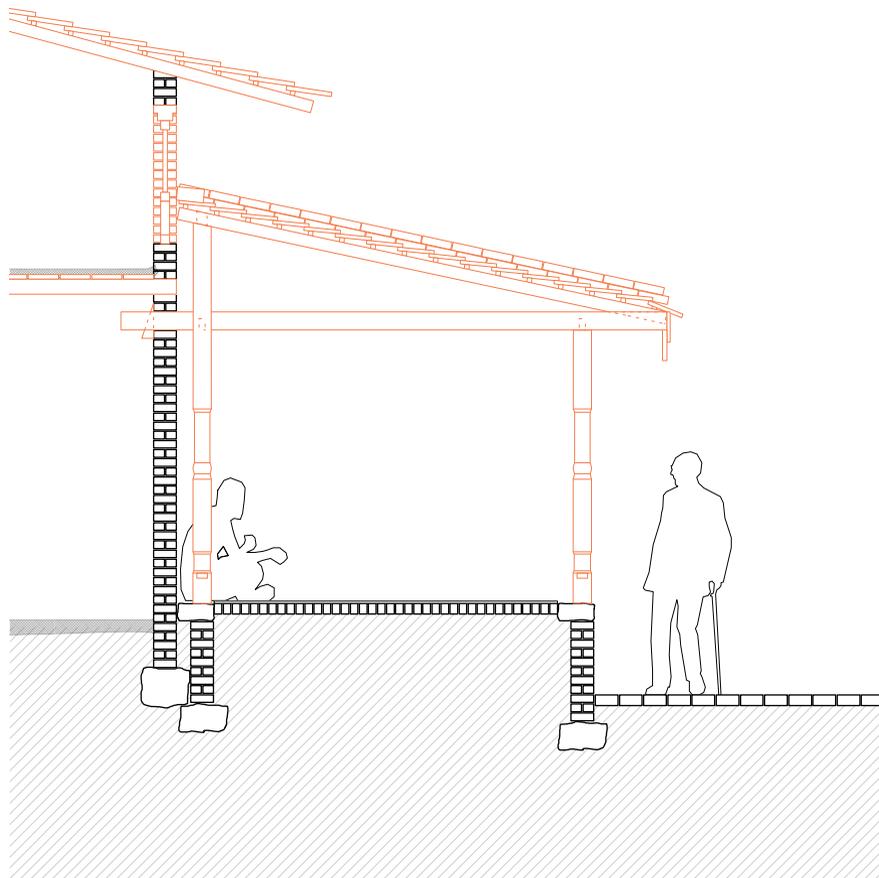


28: Section 1:50



29: Pati, Nepal

Small details like the little curtain to cover the finishing of the roof structure make those elements highly intelligent and alive. This piece of cloth is probably the cheapest and easiest solution instead of building a wooden construction and in the same time, it gives the construction immediately a softer appearance. In all those sections we can observe the mixture of different materials. The people chose very precisely where to use bricks and where to use natural stones. Most of the time top layer to sit or walk on is made out of bog stones while the lower layers are out of bricks.

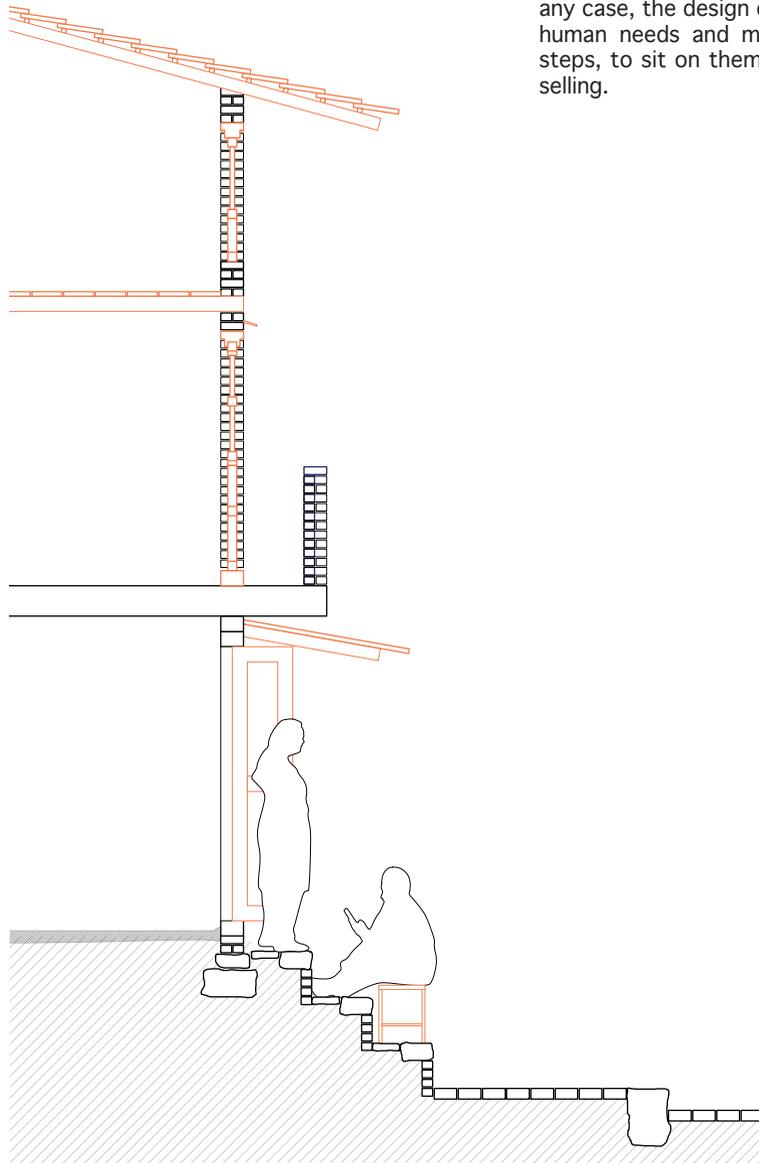


30: Section 1:50



31: Entrance, Nepal

Stairs in Nepali architecture are a highly important element and not to imagine without. Temples, as well as shops or houses, mostly have several steps between the pavements and the entrance of the building. The steps are mostly executed in a very specific way, which makes every single step to an individual step. They vary in height, depth, quantity, and material. In any case, the design decisions are based on the human needs and measurements to walk the steps, to sit on them or the present goods for selling.



32: Section 1:50



33: Old and new

## TRADITION AND HERITAGE: KEEP IT OR CUT IT?

---

To talk in a region like Dolakha about heritage seems to be a very difficult topic because the surrounding has been heavily destroyed by the earthquake but maybe even more important than in any other place.

Is heritage something we can keep and preserve or will it die in the same time we are trying to preserve it? Change and development are a very basic ambition of human beings and brought us to the point we are standing now. What we see as traditions probably is already a very advanced version of how it has been made before years. As soon as we try to keep something it might just become a piece of art for the museum, but it is not authentic anymore. To understand heritage and tradition a bit better I want to distinguish between tangible and intangible heritage or tradition. Tangible heritage is products, which can be protected and preserved physically. On the contrary intangible traditions are knowledge, practices, and skills. Those skills cannot be protected one to one. Traditional knowledge has been handed down from one generation to the next and is something very personal. We all do several things like pronouncing our words or cooking in the exact same way as our parents or grandparents are doing just by intimating them from the very first day on. The most important difference here is that the exposed heritage in the museum is not really authentic anymore.

Talking about heritage in Nepal mainly is talking about traditional ways of living and dealing with daily problems, like housing, food, education etc. In a rural region like Dolakha, where most of the buildings - the tangible heritage - has been destroyed by the earthquake and all the trust in their traditions is gone, it is very complicated to persuade the local population that it is very necessary to keep their tradition and furthermore their identity.

If we travel to a country like Nepal we are completely impressed by all those old „traditional“ products and ways of living. But would we like to switch with our life? Or do we prefer to visit these places enjoy some time there and then we are very happy to come back to our civilized

world? It seems obvious that most of the people are seeking to reach a more modern, western life. But does it make humans happier?

There are many pros and cons if we want to understand if we should try to preserve the traditions or not. The advantages of using locally available materials are diverse. Besides the higher sustainability compared to the use of imported goods, it also gives the population a stronger connection and identity to their product and involves many inhabitants during the entire process of growing, preparing, manufacturing and maintenance. One of the most important issues is for me the public acceptance of the final product - to make people satisfied and proud about it. The final product needs to be accepted by the population in the end. If the people are not proud of their building it is not worth to build it.

For me, the key lays in finding an interesting balance between the traditional use and manufactures, and a new interpretation to develop the products further and to add new and high aesthetic values.



34: Women in Lamidada

MOMENTS



35: Splitting the bamboo

## THE IMMEASURABLE PRIDE

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After some days in our village, I discovered that our old neighbor in Lamidada is one of the few people that still knows how to weave traditional bamboo mats and baskets. It was almost not possible to communicate with him, but we somehow managed and with Micheal's help it was doable. The old man was so kind to show us how he is waving a small basket in a very short time. The only tool he used, besides his own body, was a traditional Nepali knife.

It is very hard to guess the age of the local people, living in the mountains with very harsh conditions, but he definitively was already quite old. It was impressive how comfortable he was sitting on the floor for more than half an hour. First of all, he split the fresh and soft bamboo into thinner slices. With his very fast and skillful fingers, he finished a small basket with an amazing speed, by using his feet to hold the slowly growing piece.

He was highly concentrated in his work and without any words, he was teaching us how to weave a basket. Also his techniques and the precision working with different types of bamboo, just the way how he was cutting them, more thin and flexible ones and a bit bigger and stronger pieces.

While he was working we were all very interested in watching him. I had the feeling, he realized that he was doing something very interesting for us and his beaming face seemed to be very satisfied and proud of his skills.

These techniques used to be conveyed from generation to generation. But somehow people stopped doing it and rather buy a cheap plastic basket, made in China. Unfortunately, already his children and his grandchildren are not able anymore to continue with these traditional skills to weave a basket out of bamboo.



36: Weaving a bamboo basket



37: Open fire, inside

## “BASNUS! BASNUS!”

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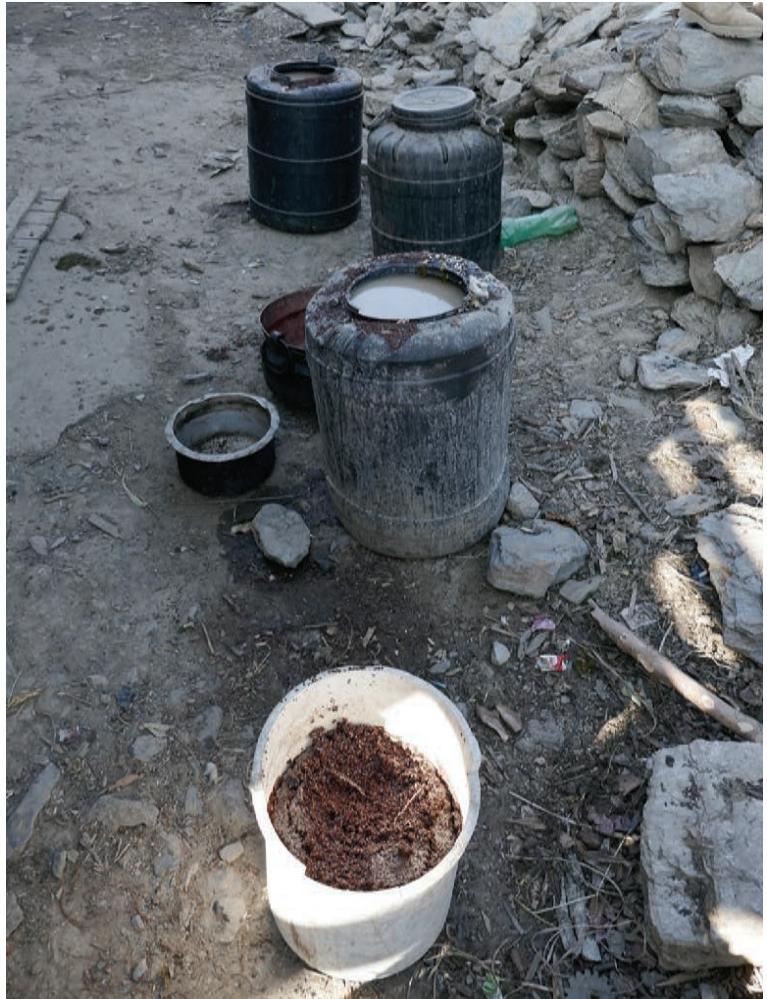
Always when I entered a private house or room somebody was saying „Basnus! Basnus!“, which means „Sit down“. Most of the time it was the mother of the house who was busy with preparing the fire to cook the daily „Daal Bhat“. So I always sat down on one of the very low selfmate stools or on a woven mat on the floor. I found it very kind and a beautiful gesture to immediately provide a seat for a guest. But I wanted to understand better why everybody does it.

After several times doing this process I understood that it has a very practical and simple reason: To sit down and bring your head closer to the floor as fast as possible feels actually like a huge relief. It is the only way to stand the strong smoke inside the houses. Since in Nepal most of the kitchen just include an open fireplace to cook without any chimney the air inside of the houses is enormously smoky. Naturally, the smoke goes up, so there is less smoke and more air to breath if you sit down.

This is maybe a very small detail but it shows how the architecture influences the behavior and rituals of the people. And even in more civilized regions where the houses are free of smoke, like Kathmandu, people still stick to this behavior and keep saying „Basnus! Basnus!“ as soon as somebody enters their place.



38: Smoke inside



39: Making Roksi

## THE RELIEF OF THE HEATING ROKSI

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One of the most beautiful encounters I had during my trip in Nepal and which still fills me with joy when I think about it from time to time was that old woman living next to us Lamidada, with her homemade Roksi. After some freezing nights in Dolakha, the tiny bottle of Whisky we were sharing amongst ten people to warm us up was gone. I then found out that our neighbors were producing their own Roksi, a traditional spirit made out of millet. While showing my impression to the procedure and the very beautiful pot made out of clay, where the Roksi is made in, I already hold a decent cup of this rather strong drink in my hands, in the middle of the day. After I tried the fresh brewed Roksi, I bought some for the coming freezing evenings on the campfire. She filled the distillate in an old, used plastic bottle and gave it to me.

I am not telling this story because of the great liquor, but because of the old women's reaction when I went back to her place the last day to buy another bottle to bring it back with me. It is hard to describe in words how happy she was that I liked her Roksi that much and that I even wanted to bring it to Europe. By showing interest in what the local people are doing with their own products and knowledge and seeing their reaction are probably the most lasting and deepest memories I have from my trip to Nepal. Normally I had the intention that Nepalis are a bit distances and not very intimate, but that wasn't the case in this situation. The rather small and a bit corpulent grandmother took me and gave me a long and warm hug to say good buy, I will never forget!



40: Lunch at school

## LUNCH: MORE CHILDREN TO SCHOOL

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How to motivate children in Dolakha to come to school every day? According to the high poverty children often need to help their parents to grow enough food to literally survive. To realize the need of going to school while people are dealing with very essential daily problems seems to be difficult.

I remember this little very poor boy with two different shoes how was constantly asking for food while we were having our lunch at school. The lunch we received was not really a culinary delight. Basically, we were having popcorn and boiled eggs. By sharing our very minimalistic snack the little boy was already happy and he kept on asking for more.

Also, the picture shows the social differences of the children and it becomes obviously in terms of food. Moreover, we learned from the teachers that some students are even not showing up because they are starving and don't have enough energy to come to school and learn. For him and many other children, it would be an effective trigger to serve food in the school. The food can be grown in a school garden which becomes part of the teaching program. The little girls and boys can learn how to grow their own vegetables, how to process them by cooking or drying and eat them later on.

Regarding the social issues in the school, the fact to serve the same food for everybody will be a very important subject. As we see on the picture the boy in the front is looking quite jealous to all the snacks of his school fellows while he has nothing to eat. The different social backgrounds of the children is a big problem in school and it becomes very obvious when it comes to food. To serve everybody the same food and the same amount of food will reduce the social gap between several children and creates more equality.



41: Disposal of waste

## TRASH INTO THE BUSHES!

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Once a week there is a cleaning they in school. All the students need to collect the trash from the school site. But where to put the waste afterward?

In Nepal, there is no infrastructure to dispose of the trash in a sustainable way or even to recycle it. In the villages but also in Kathmandu people just burn all the not decomposable waste or just through it into the next bushes or rivers as they do in the school. Ignoring the unhealthy impact people even stay next to the trash fire to heat them selfs or even cook on it. For us, it seemed to be very stupid to collect the trash but throw it, two meters further into nature, where it will come back again with the next wind. It seemed like a Sisyphus work.

Since it is a very long and hard way to build up an infrastructure to deal with the trash, the only logical strategy is to reduce the trash as much as possible in the school. By cooking their own food in school with their own products children would not need to bring their snacks to school, which is mainly chips or other packaged food, for those who can afford it.



42: Water stream at school

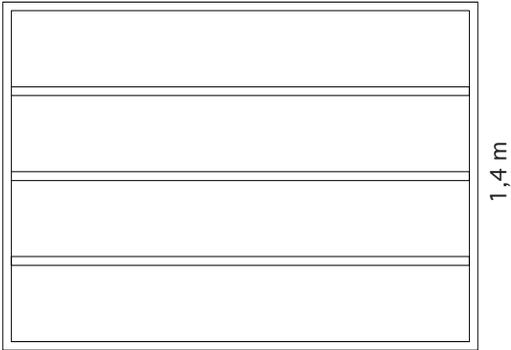
## THE BEAUTY OF THE CLEAN AND FRESH MOUNTAIN WATER

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The natural water stream going through the site of the school in Lamidada is probably one of the most beautiful elements of the site. The water coming from the mountains is very refreshing and even portable. I want to integrate this element in my design and make use out of it in several aspects. To enlarge the use of the water it will be collected in a small basin outside the building, to create an outdoor bathroom for the school to be used for the weekly washing ceremony of the children. Furthermore, the water can also be a lovely element for children to play with. Moreover, the water will be used to water the plants in the garden and for the kitchen to cook and to do the dishes. Since the water is flowing afterward to other villages it is important not to lose too much water on the way through percolation.

The impact of the water on the climate also helps to regulate it and can be used to generate electricity. There is a very simple water mill system provided by the Nepali government. It will generate even more energy than the school will need, the community can use the overproduction.

The water system on site also has to deal with the high amount of rainwater during summer in the monsoon season. The drainage from the roofs will go to the water stream, that is why it needs to be oversized to be able to deal with fluctuating amount of water. The water needs to be carried away fast and efficient to keep the inside of the buildings dry.



2,2 m

1,4 m



43: Drawing lesson, Shanti Sewa, Kathmandu

## CARPETS IN SANTI SEWA

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44: Drawing lesson, Shanti Sewa, Kathmandu



45: Knitting lesson, Shanti Sewa, Kathmandu

Shanti Sewa in Kathmandu is a Waldorf school and hostel place for orphan children but also a spot where people with many different diseases like Leprosy, Polio and all different kind of physical or mental disabilities. They can find a place to work and to live under fair conditions including a minimal health care. When I visited that place, I was lucky to see the small ceremony in the main hall with a lot of children playing music and the traditional Tikka- the red point on the forehead- was given to everybody.

At a certain point, all the children of the primary school from different ages separated themselves on several carpets on the floor of the hall. The teachers joined the groups and the classes started with various activities. One group was painting with chalk on small blackboards, the second group was knitting, and another group was reading in a book loudly or doing some writing exercises. It was impressive to see how concentrated the little children were sitting on their group carpet and focusing on one specific topic. Even though they were sitting in one huge room with around 200 children the volume level was quite low and the children were concentrated working.

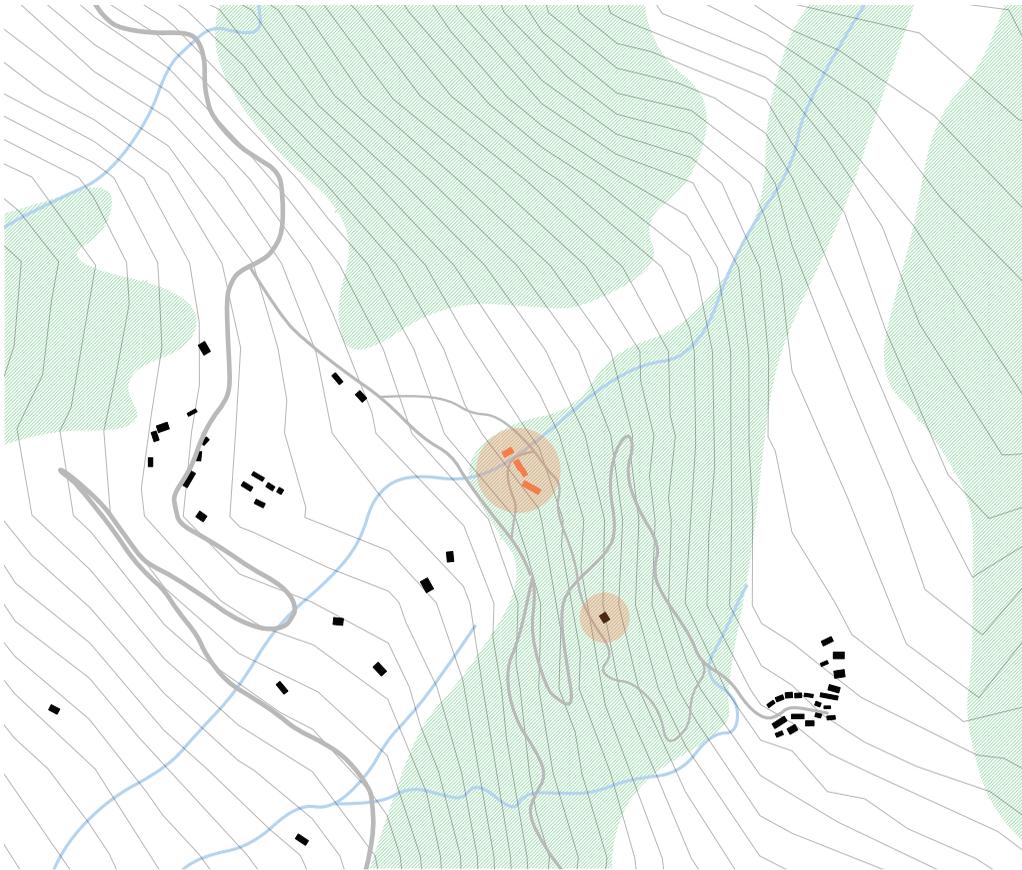
Furthermore, it became obvious that children in Nepal are very used to sit on the floor and do not really need furniture to sit on. Just their colorful carpets were enough to make sure where the borders between the classes are and to keep each class as a group together.

To design a generous space for school for me combines many of the topics above. A rather big room without fixed furniture but with flexible carpets to sit on will give a lot of freedom to the children to move and to learn. Those carpets can be produced locally and will be used either inside or outside to sit on it. By coloring them the users will create consciously or unconsciously different patterns and combinations of carpets. The massive Mauer serves as a backbone for the entire space to allow the flexibility and creativity.



46: Morning exercise at school

KALIDHEVI PRIMARY SCHOOL



47: Surrounding school

## EXISTING SCHOOL SITUATION

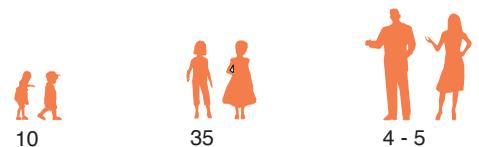
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The Kalidhevi Primary School in Lamidada is my concrete field of intervention. Since we are looking for 'the ideal school' and as I explained already 'the ideal school' for me goes together with a joyful school environment, first of all, I want to understand the existing situation in terms of joy.

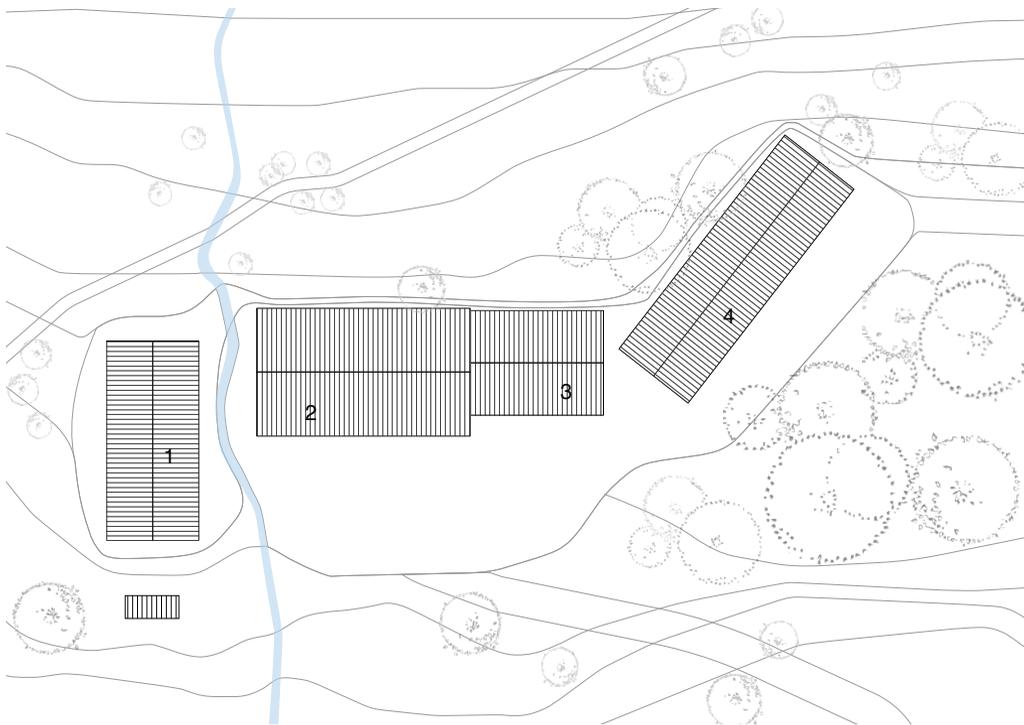
When I reached the school the first time, I was glad to be there because the way up to the school is already a small hike through some fields and little housing clusters. Compared to the children our way from the camp to school was rather short, some of them need to walk for around 30 - 40 minutes - and they walk way faster than we do. The students were all standing outside in straight rows to do the morning gymnastics. They have all over the country the same procedure to do these rather strict and not very joyful exercises. After they were done they welcomed us with a lot of rhododendron flowers, the Nepali national flower, and white scarfs.

A small footpath goes through the site of the school. People who want to go from the lower village to the above located little Buddhistic Stupa or coming downwards to the main street, are passing the school.

The primary school gives space for 35 children from grade one to five and ten little children who are visiting the nursery. Some classes are very low attended. Furthermore, there are not enough teachers available for each grade, only



48: User school



49: Existing situation, Kalidehvi primary school



50: Top view on site



51: TLC



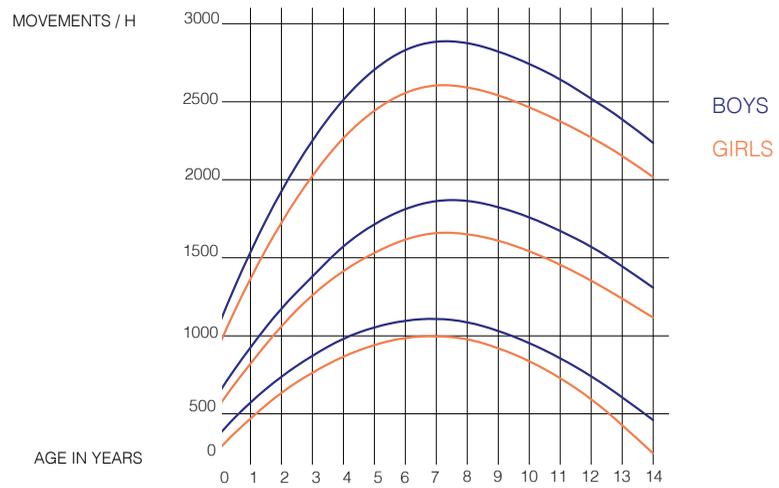
52: New buildings

four teachers one intern. Therefore the teachers need to switch during the lessons between the classes.

The site itself includes four small school buildings and a flat and empty schoolyard in front of the buildings. Like most of the buildings, also the school completely collapsed during the earthquake. The government was trying to rebuild the school buildings as fast as possible with temporary learning centers made out of a simple wooden structure, covered with corrugated sheets - building 1 and 4. Building 2 and 3 are new constructions made out of concrete and steel. The buildings itself are not very inviting or joyful, especially the new concrete/brick building is very cold and dark and not in use yet. But construction wise it is a very solid building and in my opinion worth to keep it and to improve it. While observing the courses inside the buildings it was freezing cold. That is the reason why often the teachers decide to hold the lessons outside in the sun.



53: New brick building



54: Movements of children



55: Lesson, Kalidhevi primary school

## WHERE IS THE JOY IN THE KALIDHEVI PRIMARY SCHOOL?

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How can we create a joyful environment for a school to make children and teacher happy going to school and to learn? To answer that question we first need to understand what it means to „to learn“.

*“Education is not learning of facts, but the training of the mind to think.”* <sup>6</sup>

Albert Einstein

In Nepal, the children in school are obliged to mainly learn facts by heart but not to practice them. For example, most of the children in our school in Dolakha knew some English sentences, but they were only able to answer if we used the exact same wording their teachers are using in class. They only learned the answers by heart but not how to practice the language in reality. The diagram (fig. 54) shows the results of studies that have been done by measuring the movements of arms and legs of children between 0 and 15 ages. The results are very different from hyperactive children to more quiet children. In any case, we can see that children between six and ten feel the most urge to move, boys always slightly more than girls. At the age of eight children want to move their limbs between 1000 and 3000 times per hour. This is the same period of life when little girls and boys start to go to school and need to sit all day long in the classroom to study. But can that be a sustainable and successful way of learning?

When I remember my school years in Steiner school, I enjoyed school, in general, a lot. This is for me personally mainly because I was able to spend a decent part of my time in school with practical or artistic topics like sculpturing, gardening, working with wood, stone or wool etc. Besides the important fact that I enjoyed it, I have to say that I learned most of the knowledge that I remember from school during these courses.

Already in the beginning of the 20th century Maria Montessori and Rudolf Steiner almost parallel introduced an alternative school system in Italy and in Germany. The essence of Stein-

er's Anthroposophy is to educate children holistically. Which means for him to strengthen body, brain and soul in an equalized way. For him, the child is a very fragile and sensitive creature which not only has to train the brain by learning facts. The personality and body of the human being still have to develop with an equal importance. That results in an educational system without pressure but with positive reinforcement. Pressure usually creates fear and fear does not help to development your own personality. Furthermore, for him, the moving of the children's body is highly important. This is needed to bring the children's 'aura' into the body to be more grounded.

In the 1950th there was a big change in Nepal from homeschooling to public schools. In the following 20 years, many schools have been built after the western system. But to be prepared for a life in the Himalaya of Nepal children need to learn completely different topics in school than we do in Europe.

To design a school that strengthens the brain but also the body and the soul with the same importance gives a high quality of spatial freedom for the children and the teachers.

The book "Learn Move Play Ground" by Victory Caprese and Barbara Pampe discusses the synergy of learning, moving and playing Learn = Move + Play

For them, intelligence is not only about data and the processing of data, but mainly about the interplay of brain, body, and environment. According to this equation, the learning process will be improved either by more moving or more playing or both in school.

Now the question arises how to design a suitable environment for children to be able to play and move and by doing so to learn. Every single child is very different and individual and looks for very specific play opportunities. That is why it is important to design opportunities to play.

*“Creativity is intelligence having fun”* <sup>7</sup>

Albert Einstein



56: Parents discuss reference models

## THE IDEAL SCHOOL FOR CHILDREN, PARENTS, AND TEACHERS

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In order to build an ideal school, it is highly important to involve every participant: the children, the parents, and the teachers. Only together we can understand the wishes and needs for a successful school. Additionally by inviting everybody in the process of designing a school a connection between the community and the school can grow.

Our methodology to get in contact with the village was the model presenting event in the school. Back in Belgium we all prepared a model of a reference school, brought it with us to Nepal and presented it to the people during the event. This was a very successful and important tool to really understand what people expect from a new school. In the same time, it helped a lot to communicate and to talk about architectural topics since we had something physically in our hands to show and to talk about. Janak –our translator from CEPP– helped us to

communicate.

With a delay of one or two hours, surprisingly many people arrived and it was impressive to see how interested the parents, as well as the children, were. Probably it was the first time for most of the local people to really think about the question what a school can be and how it could look like. Because for them only the very basic and simple solution provided by the government exists. By discussing the presented school we were able to open a long and intense discussion about pros and cons regarding the reference projects. It was a highly important moment for us to really understand what the parents want for their children and what they like or dislike in the existing school:



57: Children playing with the models

**Safety:** The first and most important concern is the safety during earthquakes. They are open for many different topics as long as the buildings are stable enough to survive the next quake.

**Cold:** Another important wish is that children do not need to freeze anymore in school, as they do now.

**Border:** To have a clear border around the school to protect the children

**Space for community:** People were very open to the idea to have a space for the community since there is nothing similar yet available in the village.

**Participation:** So far the parents are very open to participate in the building process. Also, they had built the existing new building.



58: Model event

## WELCOME TO SCHOOL

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During the model event and by talking to the teacher and holding a lesson in school we were trying to incorporate all stakeholders as much as possible, although our time on site was very limited. To understand what the ambitions and wishes of children, parents, and teacher are.

*„Architecture has become too important to be left to architects. (...) All barriers between builders and users must be abolished, so that building and using become two different parts of the same planning process.“*

De Carlo, 2005

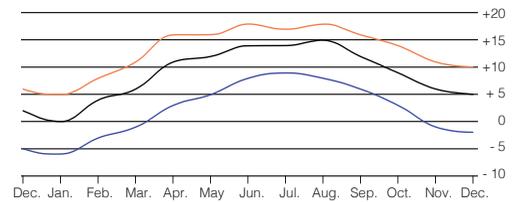
The architect's role changes completely in participative architecture. He or she is not anymore planning for the user, but with the user. For me, a school in the 21st century needs to be a place open for everybody and to be used for many different activities. By integrating the community in the designing and building process the boundaries of the school are immediately loosened. The building process itself can already become a learning process for everybody. That is one of the reasons why it is important use local skills, which are available in the village. By being part of the process the community will be able to identify more and faster with the new building. Taking into account the fact that there is no communal space available in the village and the government will not pay any money to build one it becomes obvious to me that a school should give the possibility and flexibility to also offer space for the community. Open and flexible classrooms they can also be used as a community center for people to gather, to celebrate festivals and to educate the parents or even grandparents by having access to a library or even a computer with internet. Moreover, the teachers told us that they are trying to meet the parents once a month to talk about school and the children, but there is no suitable place to do so.



59: Hot tea at school

## FREEZING CHILDREN CANNOT LEARN

During our stay in Lamidada, we all felt the cold of the high mountain area. To create a comfortable microclimate inside the classroom is a very important goal to build a good environment where children can learn. The average climate in Lamidada is between 0 and +15 degree.



60: Climate Dolakha

Luckily the school in Nepal only starts at ten o'clock in the morning. Most of the children need to work on the fields in during the morning to help their parents before they come to school. In terms of the climate, this is good fact, because the building with a right location and orientation has enough time to heat up to reach an appropriate microclimate to learn and to teach.

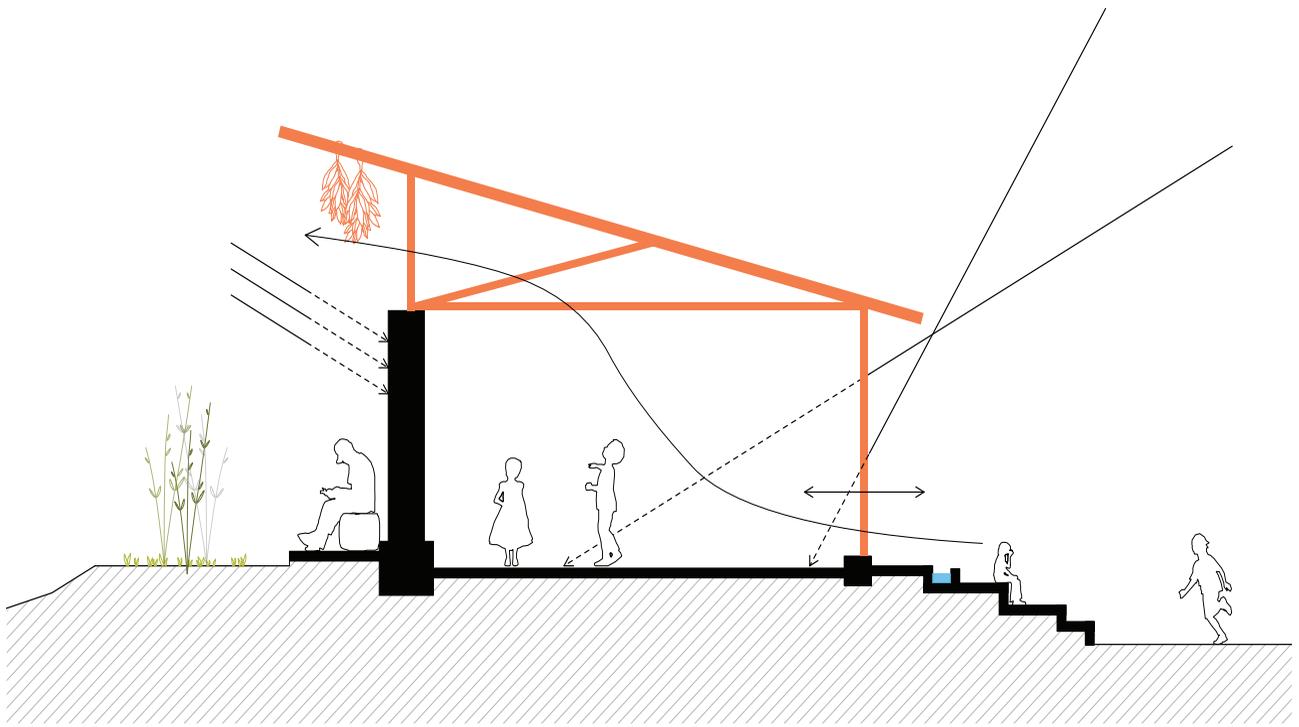
The existing school buildings have very small openings and due to the orientation, they cannot catch the morning sun to heat up enough before school starts. Since the sun in the high mountains is most of the time very strong although the air temperature is rather low, the teachers sometimes decide to hold the lessons outside.

Also by talking to the parents one of the first remarks was that their children are freezing in school.



61: Construction Site, SOS building, Dolakha

NEEDS



62: Use of the wall

## PARAMETERS

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The above-depicted observations and experiences during the trip in Nepal lead me to the following most important needs for my design proposal which I bring together in the construction of the wall.

### SAFETY:

The very massive and stable wall will be a very safe construction element of the design. The shape and the execution of the wall are designed to be more stable during an earthquake.

### CLIMATE:

The position of the new building in the north-western part of the site with a mainly open facade to the southeast makes sure that the building catches the earliest sun in the morning to heat up as fast as possible.

### JOY:

By creating a very flexible and open space with a continuous transition of the inside and the outside of the building will create a free and joyful environment. By using only carpets and no fixed furniture the children will have the possibility to move and a lot.

### FOOD - TRASH:

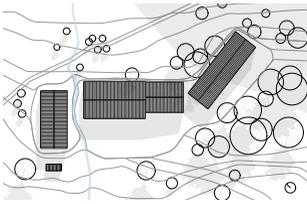
The school garden will provide one meal a day for every child. Serving food in the school will be an effective trigger for the children to come to school. They will learn about the environment and how to process the harvest. Furthermore, the trash will be reduced drastically because the children do not need to bring their own packed food anymore to school.

### WATER:

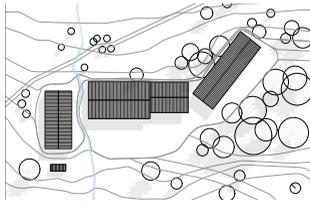
Collecting the natural water stream in the small basin next to the building will increase the quality of atmosphere a lot. It will be used as an outdoor bathroom for the children to wash themselves but also for the kitchen and to water the plants in the garden.

### COMMUNITY:

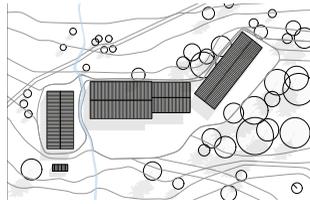
The community will also use the free and open space of the new design. The school is one of the only public buildings in the village which can be used for several events or as a meeting point for the parents to talk about the school and their children. Furthermore, a small library will give access to books, for those who can read or who want to learn reading.



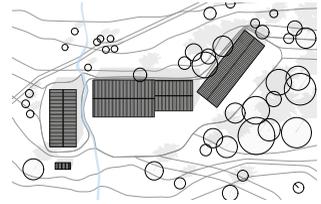
June 8 am



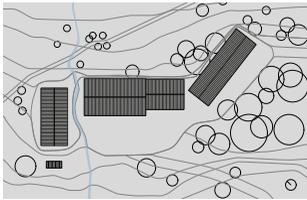
June 10 am



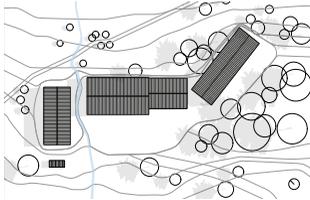
June 10 am



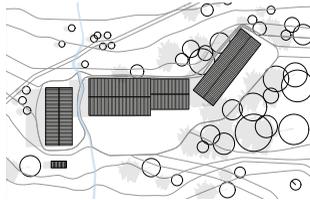
June 4 pm



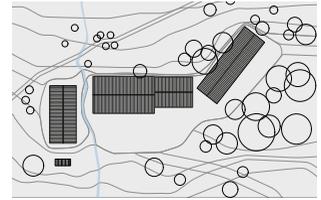
December 8 am



December 10 am



December 10 am



December 4 pm

63: Shading tests

## CLIMATE AS A DESIGN TOOL

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To be able to use the climate on site as a context to design we need to understand the local conditions to elaborate the best orientation and position of the building. The main goal is to create a comfortable microclimate within a yearly and a daily life circle by mainly using passive heating and cooling systems, natural ventilation and daylight.

Due to the very cold climate, it is important to catch as much energy from the sun as possible to heat up the building. Using the principle of different walls will allow creating specific climate zones in the school. The massive *Mauer* on the northwest facade will be used as storage for the heat to shift the climate, while on the other side, to the southeast, the light and transparent *Wand* construct allow the sun to enter the building and to heat up the rooms with the energy of the sun. Furthermore, the chimney in the center of the building can be heated up if needed during very cold days.

Since the sun can be very strong and might stoke up the building too much from time to time, natural ventilation inside the building is also important. By having enough openings on two opposite sides of the building a sufficient cross ventilation is guaranteed.

The natural water stream will be included in the design to regulate the temperature. Since water always keeps more or less the same temperature and can have a cooling effect when it is too hot, but also a heating effect when it is very cold.



64: Materials

## LOW - TECH DOESN'T MEAN NO - TECH

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To build a school in Nepal with mainly local materials and basic technology seems to be the most obvious and sustainable way to do. Since transportation in Nepal is very difficult and slow it is logical to use as many local materials as possible. But we should not forget about the fact that the Nepalis are very keen on having a modern and stable concrete building. The question for me is:

How much concrete do we need to make them feel safe and proud of their school?

If the parents are not going to send their children to school because they are afraid that it will collapse that means that we completely failed, even though we might be able to prove the stability via calculations and numbers. Furthermore, it is highly important that the users can be proud of their new school so it might become a prototype for following constructions. By using locally available materials the costs of the building can be lowered drastically, especially in a long-term thinking about the maintenance.

Available materials in Lamidada:

Limestone  
Earth / clay  
Pinewood  
Water  
Thin bamboo / grass

There is still a lot of stone rubble available in the village from the collapsed buildings with can easily be reused in combination with concrete to build the foundations. By putting rubble inside the foundation the amount of concrete can be reduced significantly.

The idea to use rammed earth as main building material for the massive walls came out of the fact that the earth is locally available for free, with a sufficient amount of clay in it and it has been used traditionally. Instead of having a straight wall in wall one line it will be shaped with several corners to get high geometrical stabil-

ty. Furthermore, the four continuous concrete beams (Foundation, Ring beam and two more in-between) connected with a vertical reinforcement can stand the vertical forces of a quake.

To enter the question above it could be possible to only use the rammed earth as a structural building material. But to increase the public acceptance of the building there will be obviously visible concrete elements. Using local earth instead of bricks, which need to be transported from the Kathmandu valley, still will reduce costs and transportation.

The Pinewood is available from the forests close by and can be used for the roof structure of the school. It is necessary to choose the right trees to cut down and not to clear entire areas because the trees and their roots are very important to stabilize the earth to avoid landslides during an earthquake. To keep a healthy forest it is also good to cut down several chosen trees for a sustainable forestry.

The weaving products out of thin bamboo and grass will be used for finishing's, like the inner cladding of the roofs, shading systems, inner flexible walls and to create softer surfaces, like the floors or seats. Besides creating a more cozy and warm atmosphere it will be needed to regulate the acoustics, which is a very important topic in schools. Instead of many types of furniture, the interior will mainly be designed with locally woven carpets.

Besides these materials, of course, some materials like cement, steel, glass or polycarbonate and metal sheets need to be imported and used.



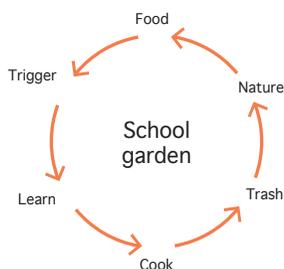
65: Garden in Kathmandu

## SCHOOL GARDEN

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Having a school garden in the Kalidhevi Primary School in Dolakha can solve several problems.

The garden can be seen as the heart of the new school. The children can learn in school how to grow their own vegetable and how to cook them. The found will be an effective trigger to motivate children to come to school. By doing so the children will not need to bring their own packaged food to school which will reduce the amount of trash and is a positive impact on the environment.



Besides those practical facts, it is a very relevant and fundamental factor of life to learn about your own environment and the cultivation of food. Anthropology and biology can be taught in a practical and vivid way in the garden. In addition to use the harvest of fruits and vegetables to feed the children a garden also gives a lot of beauty to the environment, flowers can be used for all different kind of traditional rituals as they do a lot in Hinduism and Buddhism. To learn about herbs and natural medicine is a very needed knowledge in Dolakha, because there is no hospital or doctor in the village or close by and transportation takes a lot of time. To teach the children about the whole circle of growing and processing food until it is ready to eat is fundamental knowledge and in an agricultural based country like Nepal highly important. The garden can also become an interesting tool to involve the community in everyday school life.

To cover the need of the school a garden of ca. 300 m<sup>2</sup> is needed.

Calculation:

Partly self-supporter: 25 m<sup>2</sup> / person 8  
45 children, 5 teachers

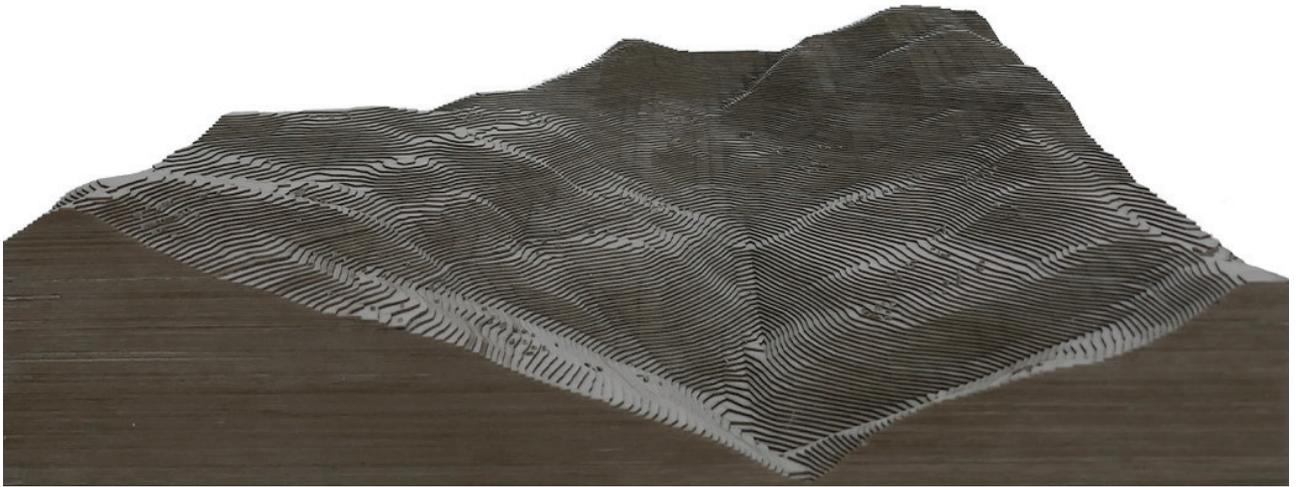
25m<sup>2</sup> / p : 2 (only 1 meal / day) : 1,5 (only school days) : 1,5 (mainly children) x 50 p  
= 278 m<sup>2</sup>

The school kitchen to cook the vegetables will be inside the new building, part of the classroom including a smoke-free fireplace and releases the heat loss while cooking to the rooms. The stove works with the biogas coming from the biogas toilet.

Calculation:

1,3m<sup>3</sup> / person

1,3m<sup>3</sup> : 2 (only half day) x 50 p = 32,5 m<sup>3</sup>



Topography Dolkha

DESIGN



Kitchen

## MY IDEAL SCHOOL

---

The main goal for the new school in Dolakha is to create a joyful environment for children, villagers, and teachers to come to school with a positive attitude.

These spaces are created within the playful dealing of the Wand and the Mauer. The wall, including the plinth, is the continuous element in the whole design. It can be part of an interior classroom, but also creating exterior spaces or even part of the garden. In combination of a more flexible secondary element, the Wand, several spatial qualities are created. The fluent connection and unidentified transition between inside and outside creates a very open and flexible space and allows a lot of freedom for the user.

The three classrooms in the existing building are used as conventional classrooms, which allow creating a more free room in the new building, also to be used as a communal space. The classes need to rotate between the garden, the kitchen, the new open building, and the existing rooms.

The shape of the wall is based on the topography of the site and the different uses of the wall on both sides. The four visible and continuous horizontal concrete bands are a bit wider than the rammed earth and create spaces to be used as kitchen or shelves in some areas of the building. The water system becomes part of the plinth and works as a gutter during the heavy monsoon season. In the basin, the water is collected to always have fresh water to drink, to water the plants, to wash the children and to be used for the kitchen and toilets. The wooden structure carries the insulated steel roof with a decent roof overhang to protect the wall and create covered outdoor spaces. To give the school building a more modern view the facade is made out of steel frames, which are placed in front of the wooden pillars. Three different elements create specific needs for the interior: fixed steel elements to be used for bracing, window stripes for light and huge sliding doors with a bamboo filling create the connection of inside and outside.

The biogas toilets on the north side of the building produce the gas for cooking the food.

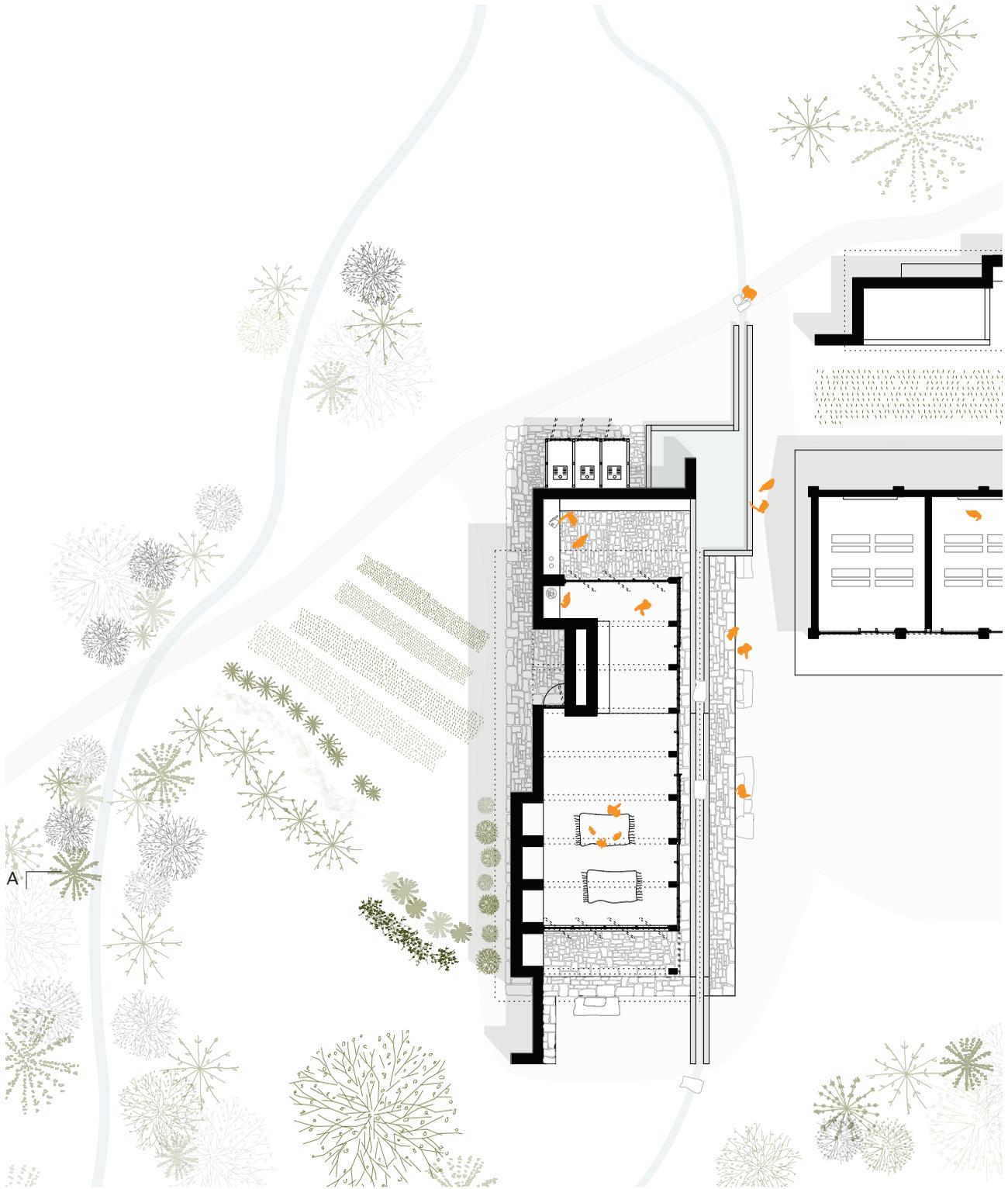
The existing brick building will be partly changed to improve its properties like thermal problems, daylight, and acoustical issues. The building has been built recently and is in a good condition and the embodied energy will be kept. The east and south facade will be open up to catch more sunlight during the day. A similar facade with the three different elements creates a visual connection between the existing and the new building.

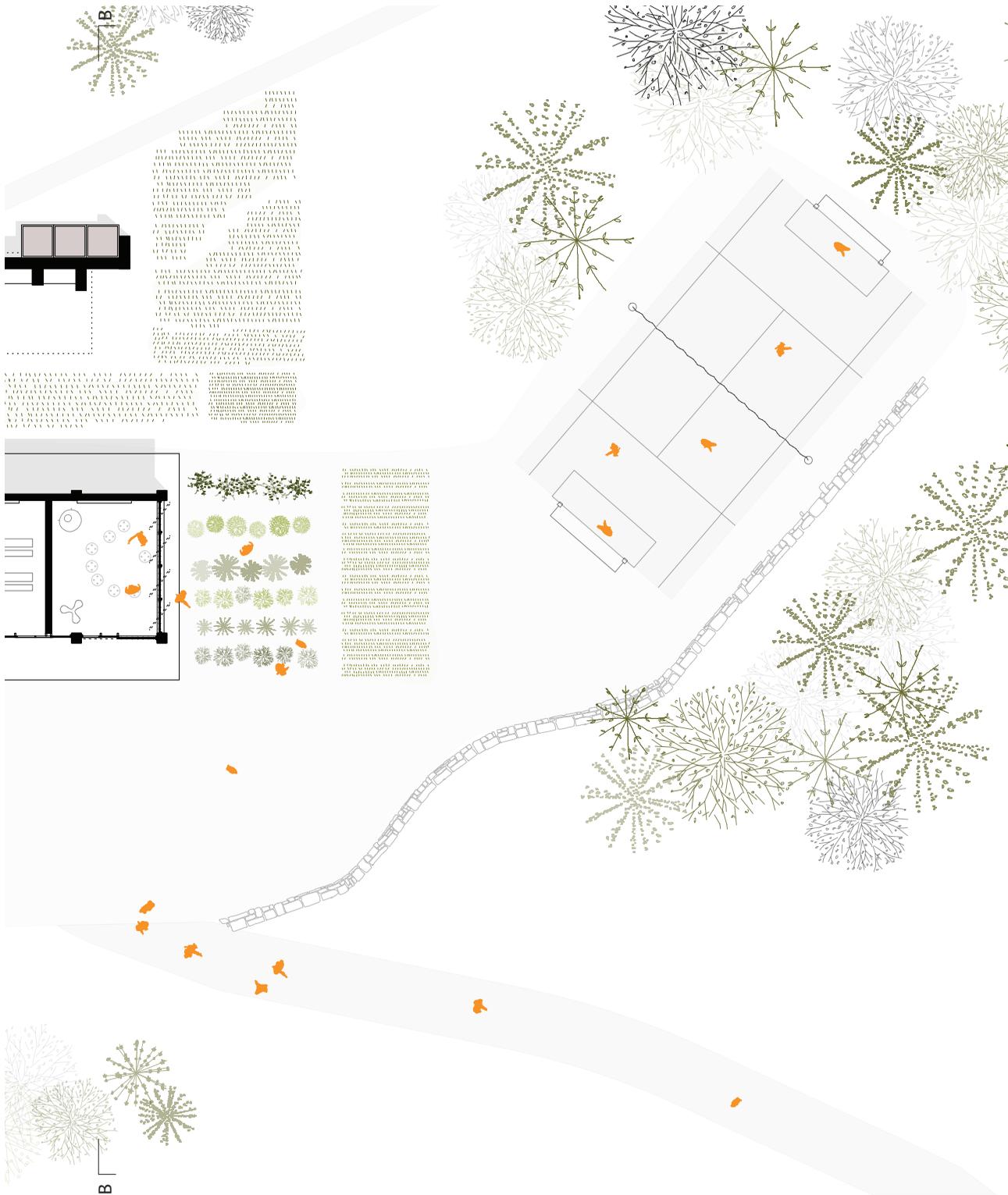
The wall in the garden is used to create a better climate for the plants by blocking the cold wind coming from the mountains.





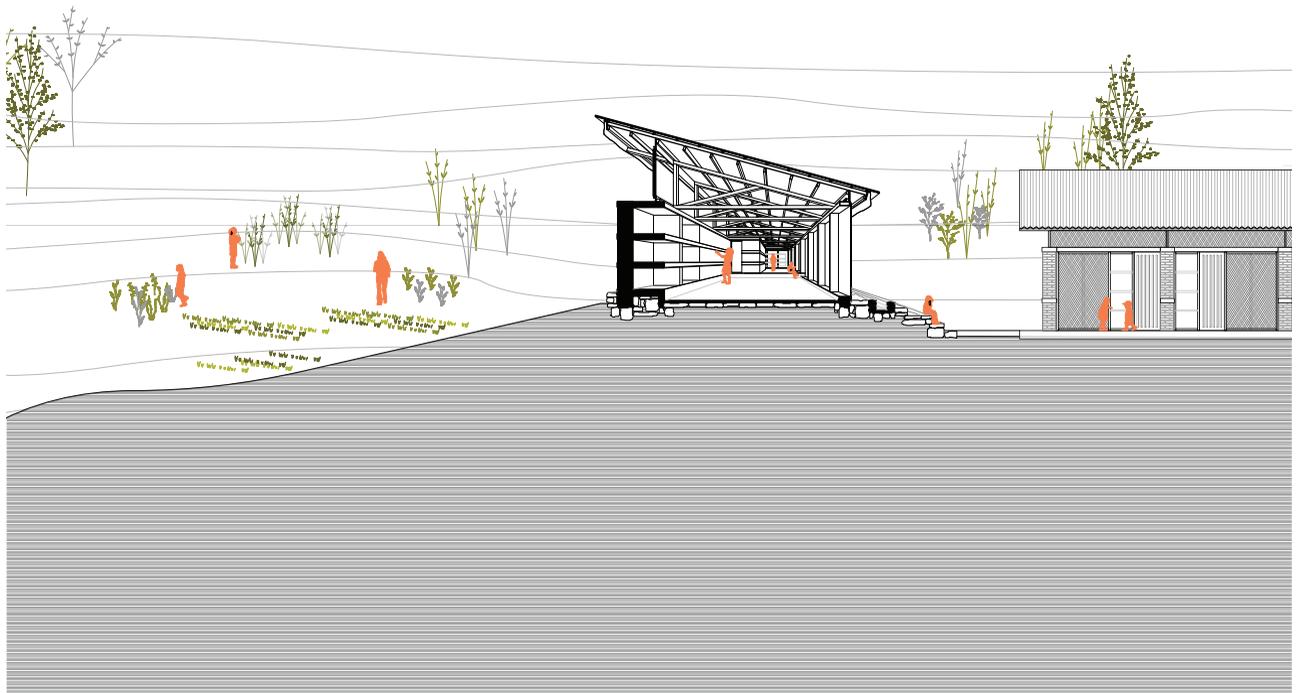
External view

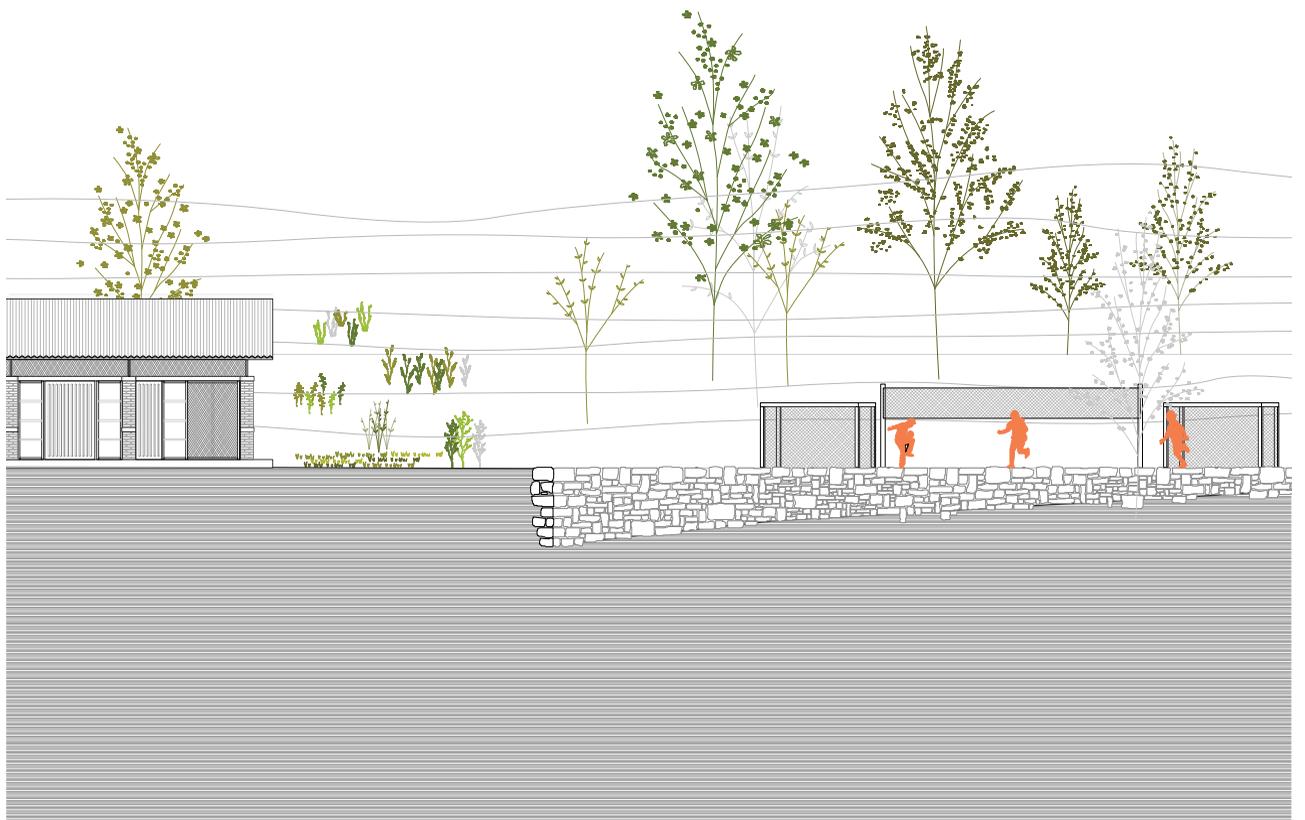




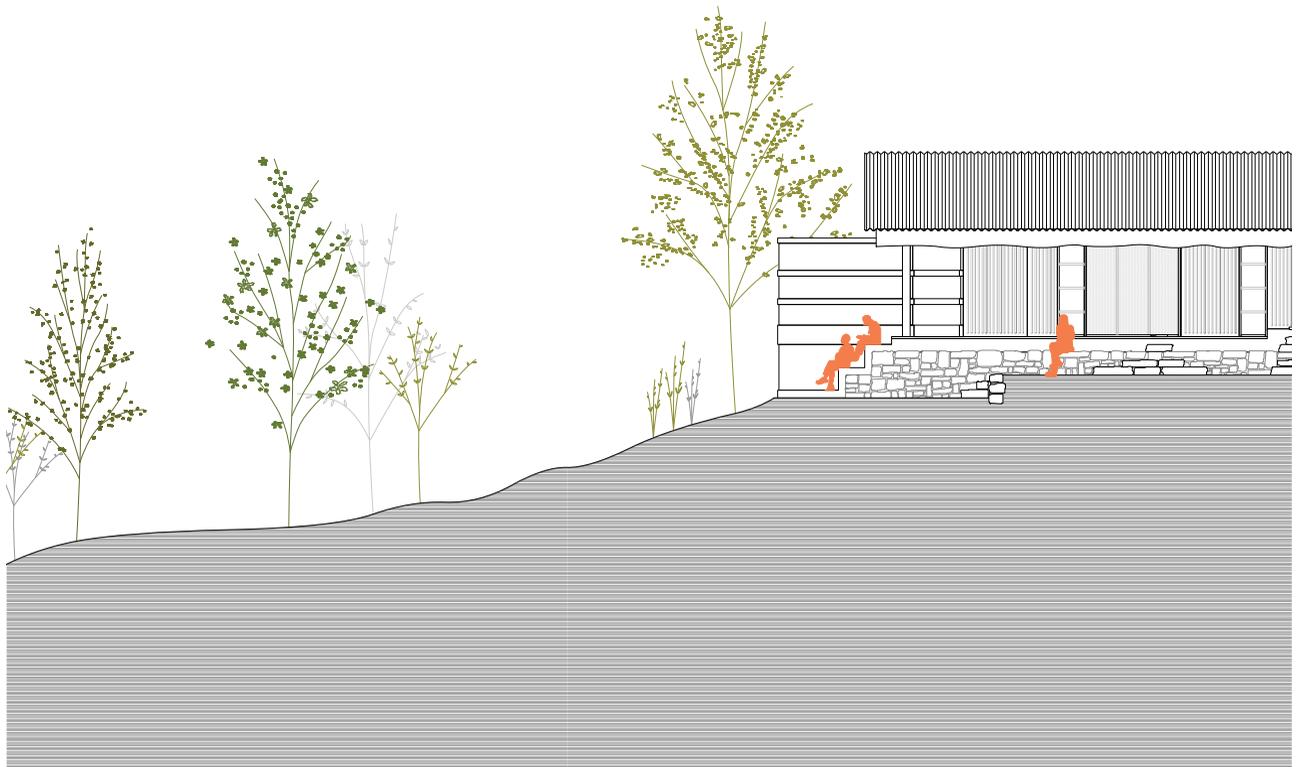
A

Site plan 1:200





Section A - A 1:200



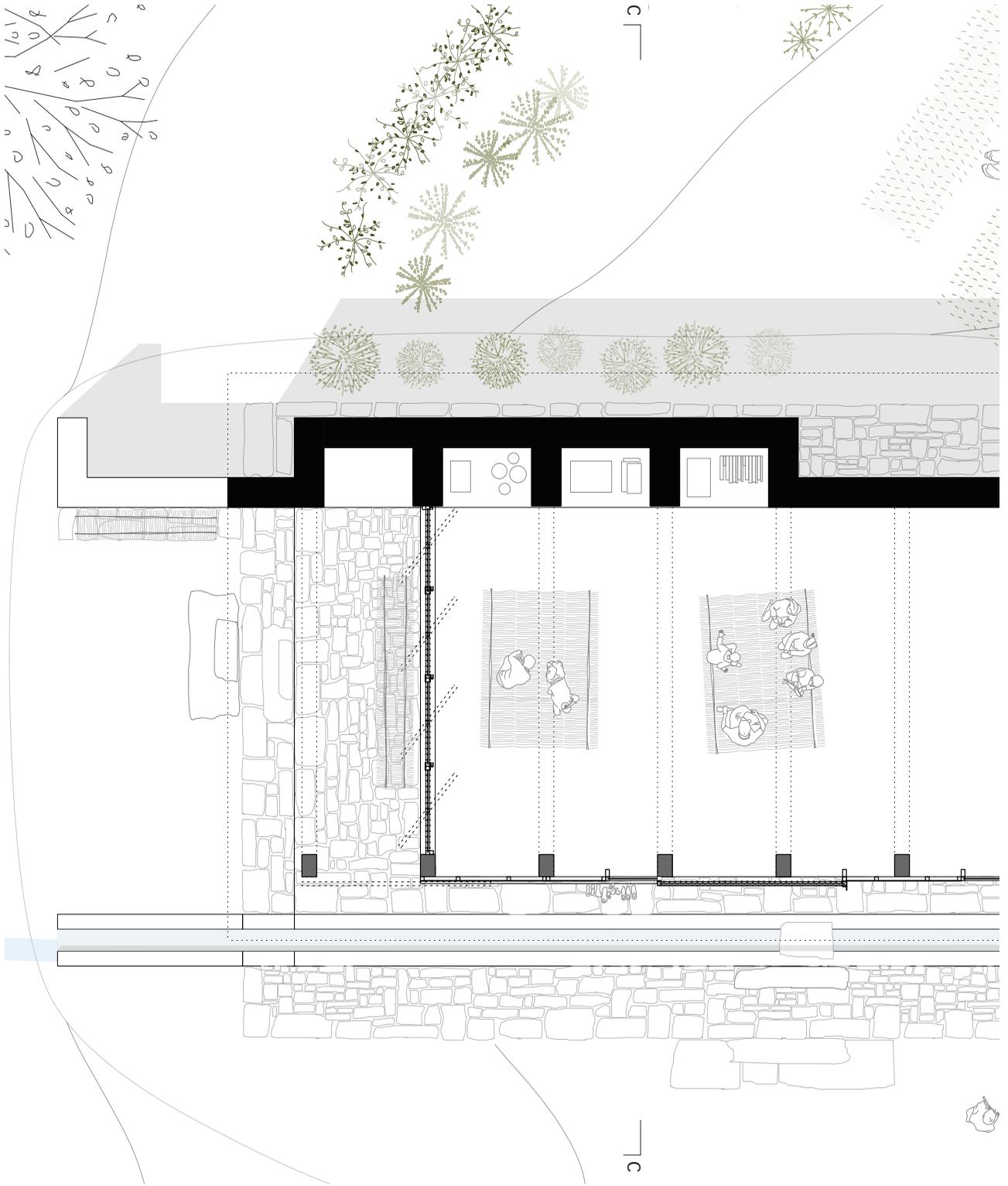


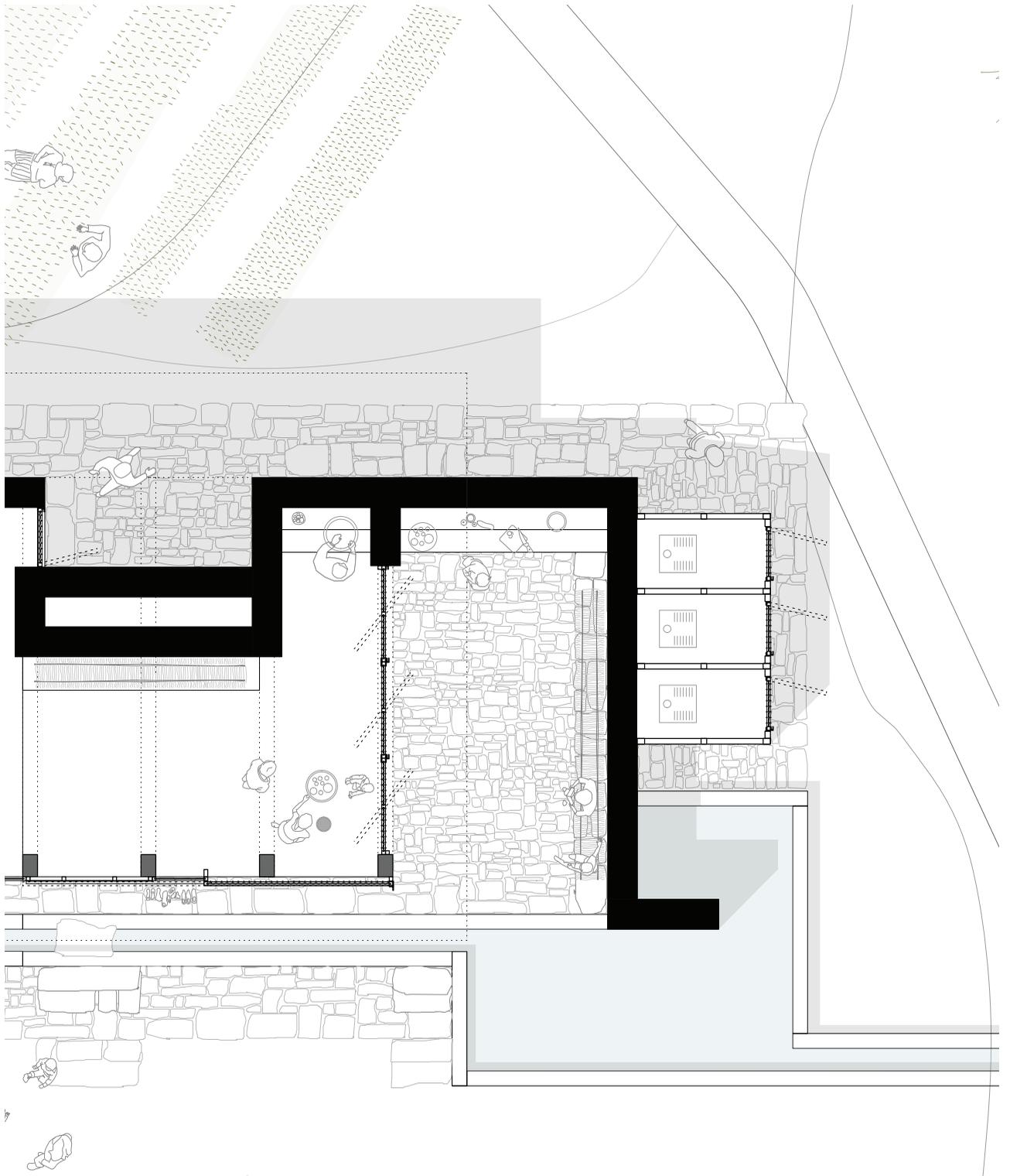
Section B - B 1:200





School garden





Floor plan 1:75 ↻





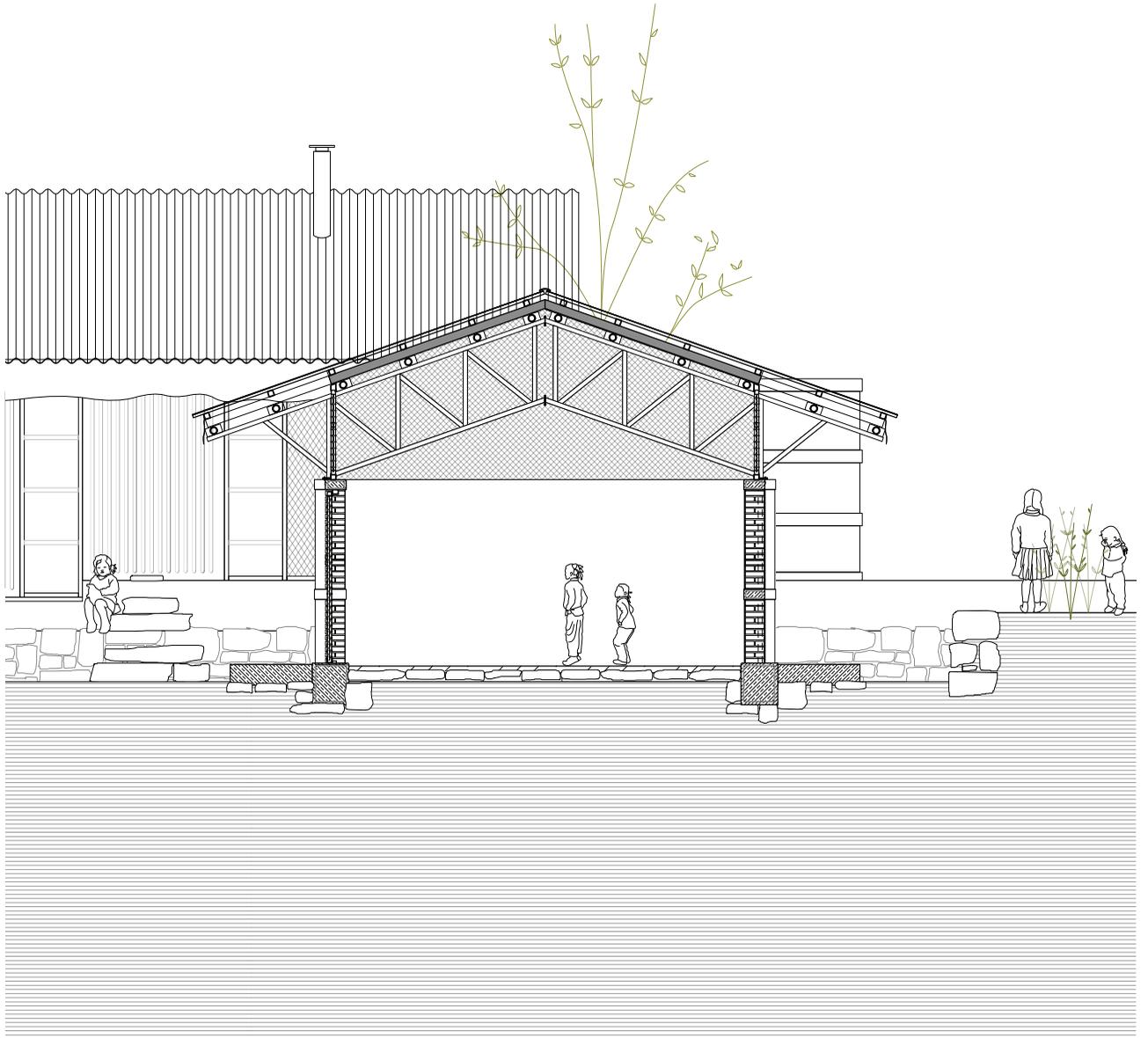
Section 1:75





Facade





Elevation 1:75



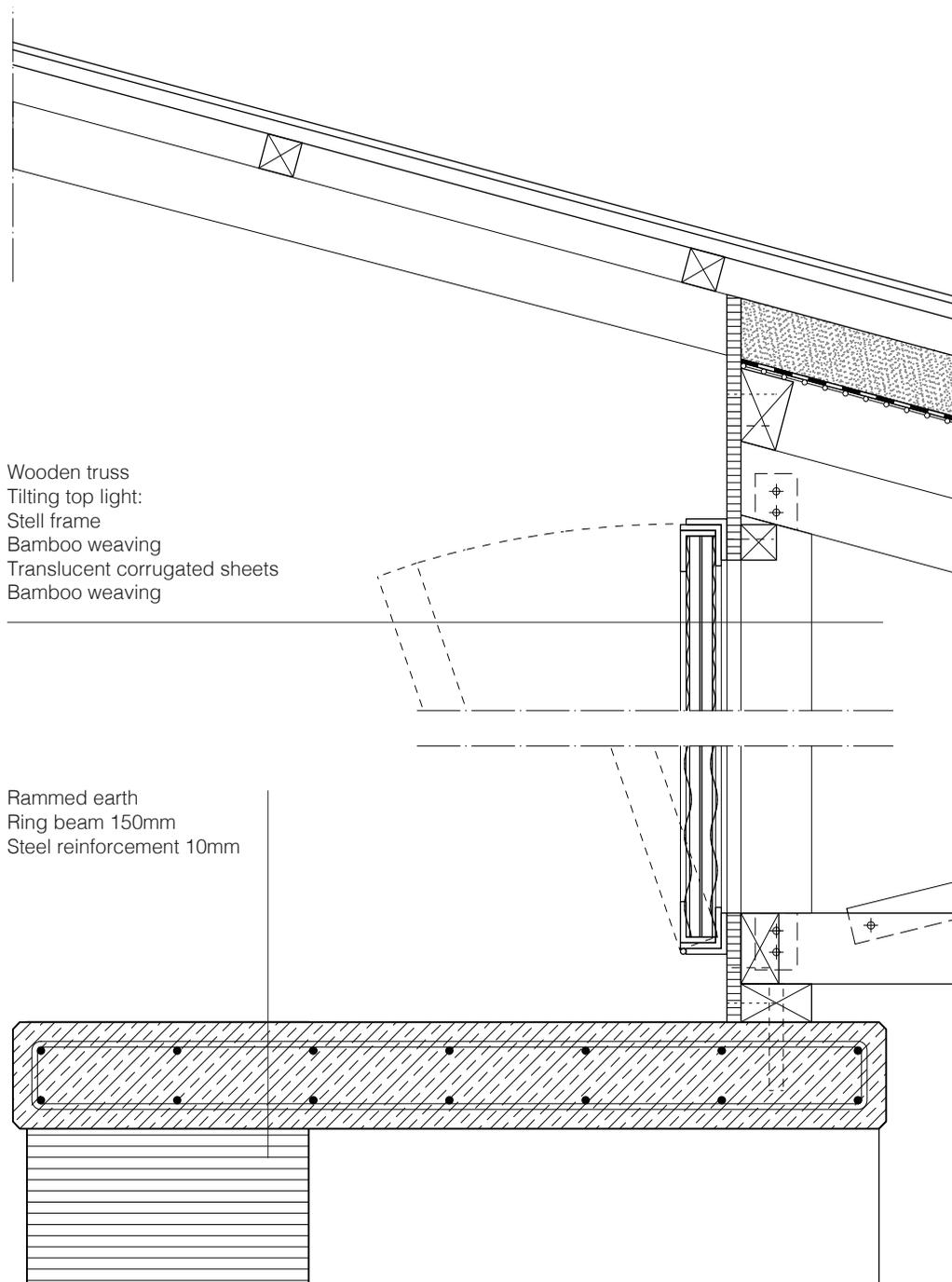


Section perspective

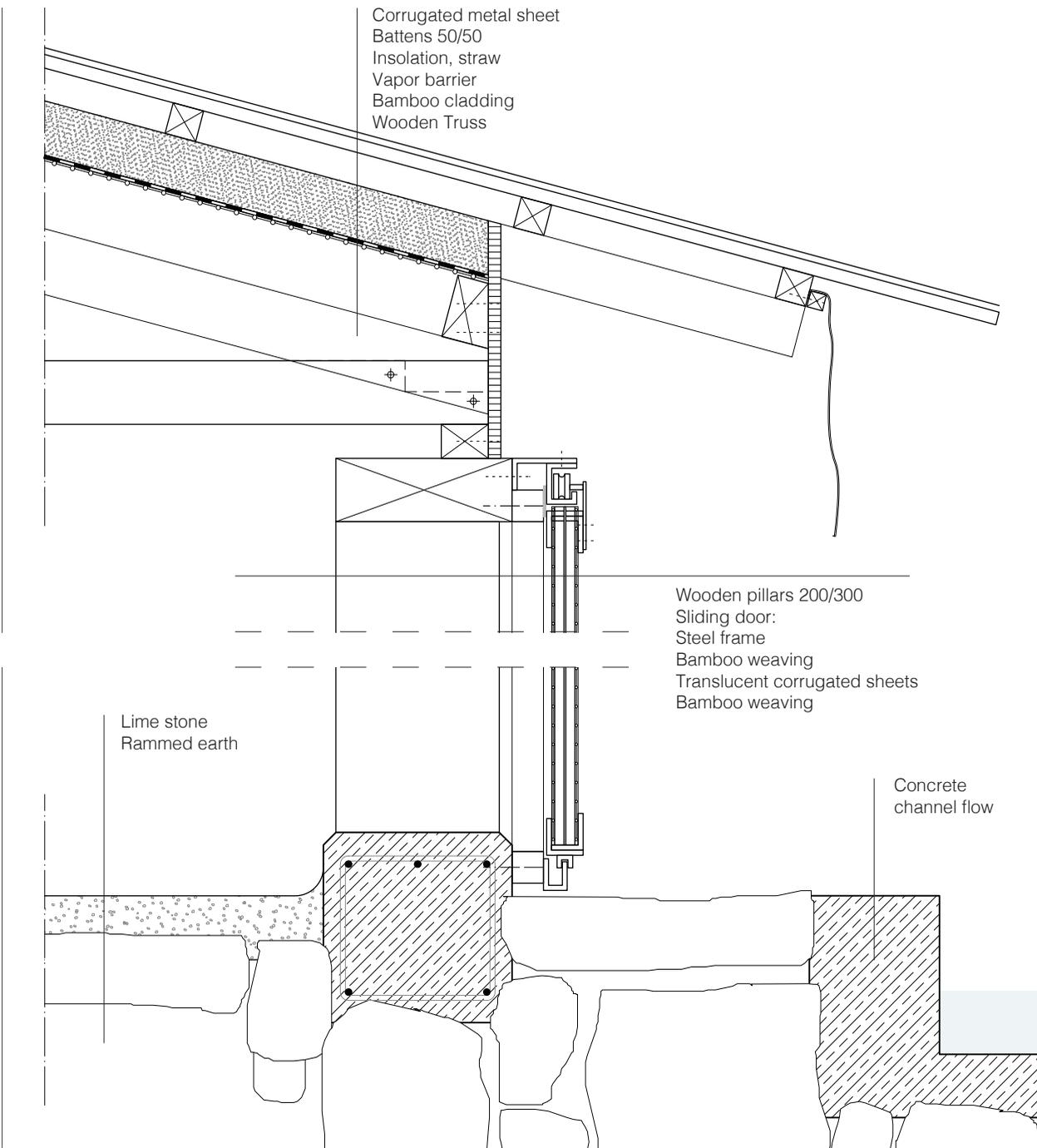




Interior view *Mauer*

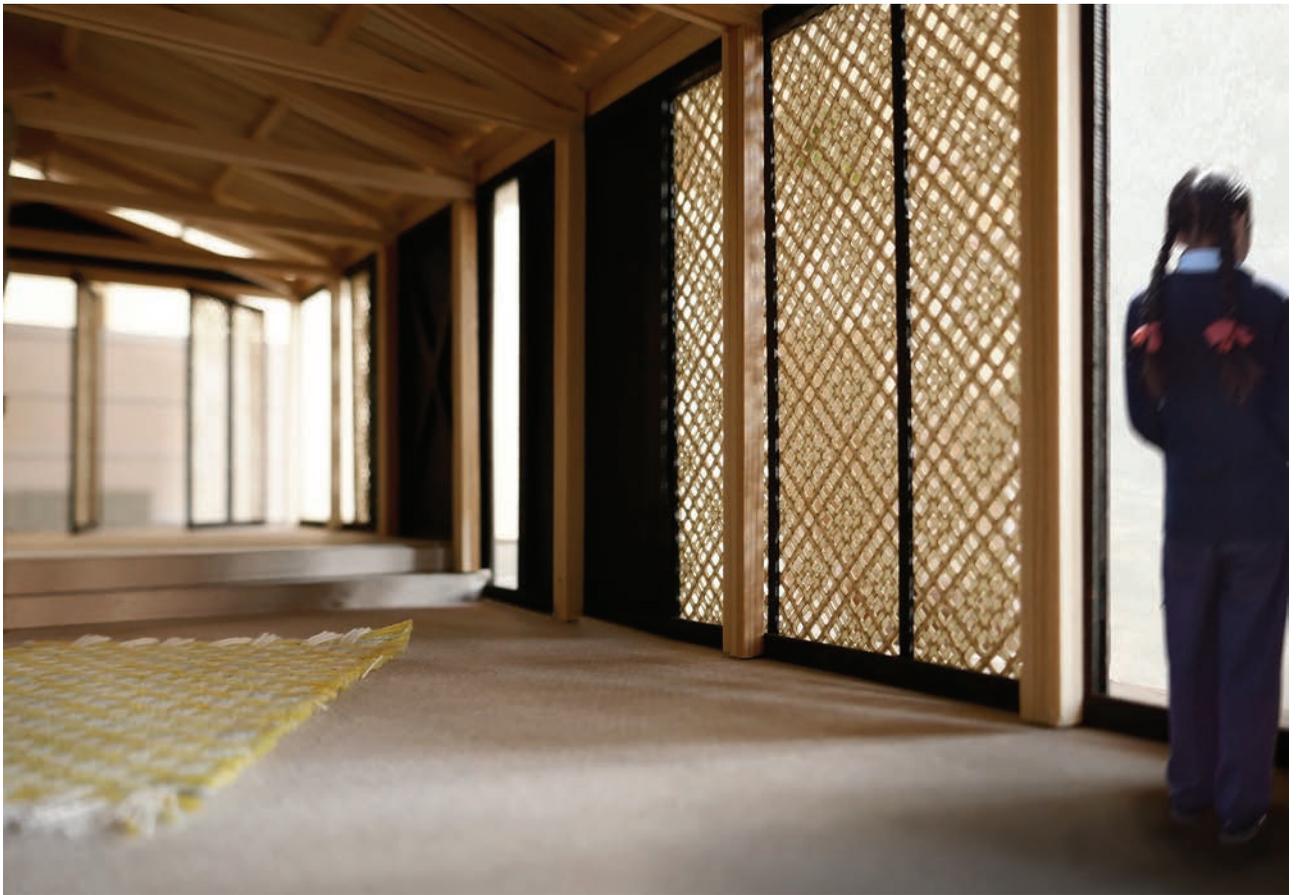


Facade detail 1 1:10



Facade detail 2 1:10



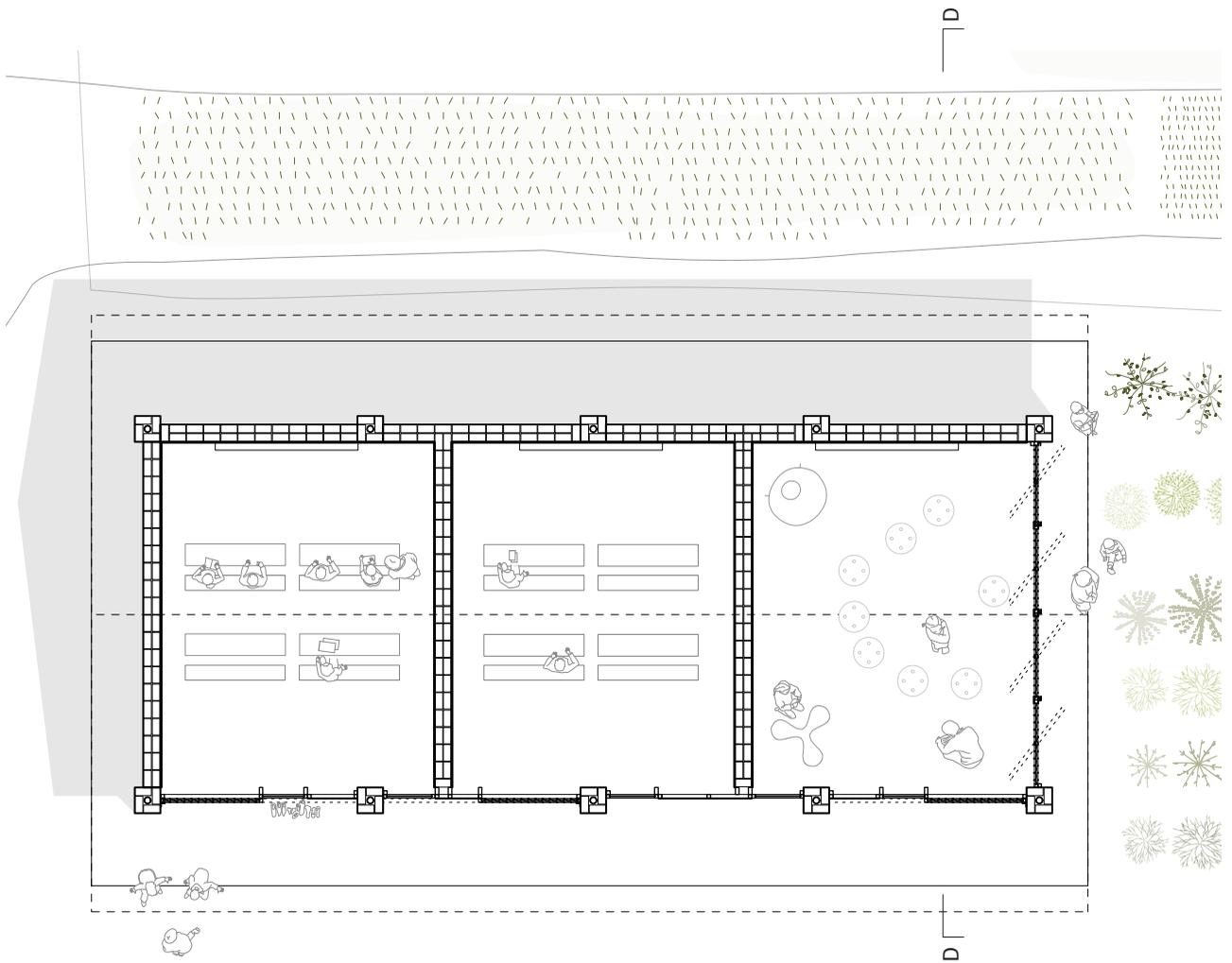


Internal view *Wand*





Renovation existing building



Floor plan existing building 1:100 ↻



Section existing building 1:100



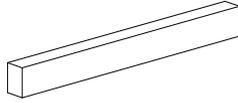


School yard

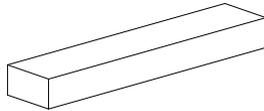
## 2. Structure

Wood

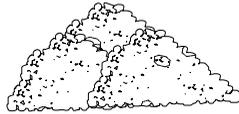
Trusses 100/80 160 mm



Pillars / Beams 200/300 26 mm

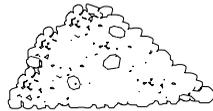


32 m<sup>3</sup> Rammed earth

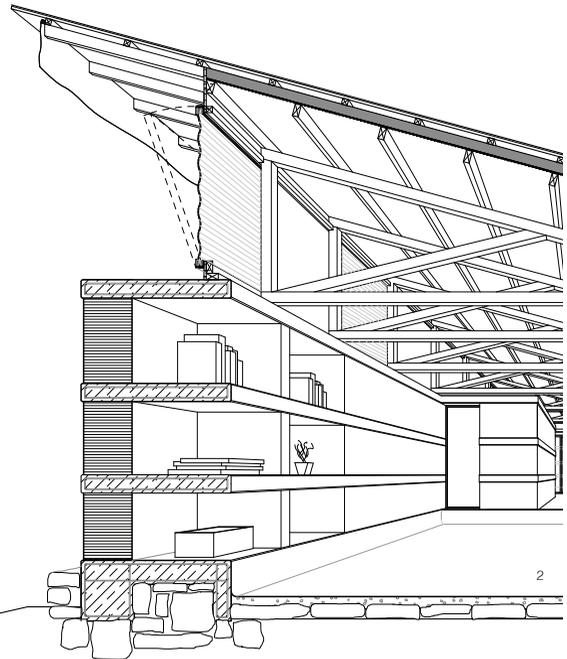


7 m<sup>3</sup> Concrete

6 m<sup>3</sup> Gravel



1,5 m<sup>3</sup> Cement



## 0. Preparation

Demolish 2x TLC  
Toilets  
Steel building

## 1. Underground

40 m<sup>3</sup> earth remove  
5 m<sup>3</sup> raised earth

9 m<sup>3</sup> Concrete

7 m<sup>3</sup> Gravel

Foundation:  
Reinforcement  
d 12 490 mm

∅



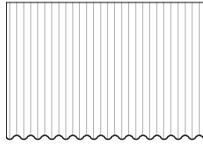
d 8 1000 mm

∅

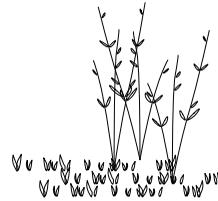


### 3. Roof

- 1. Battens 100/50 170 rm
- 2. Battens 80/30 133 rm
- Ventilation 50/50 200 rm



- Bamboo mat 110 m<sup>2</sup>
- vapor barrier 110 m<sup>2</sup>
- Insulation (Mud / straw) 120 m<sup>2</sup>
- Meatl sheet 120 m<sup>2</sup>

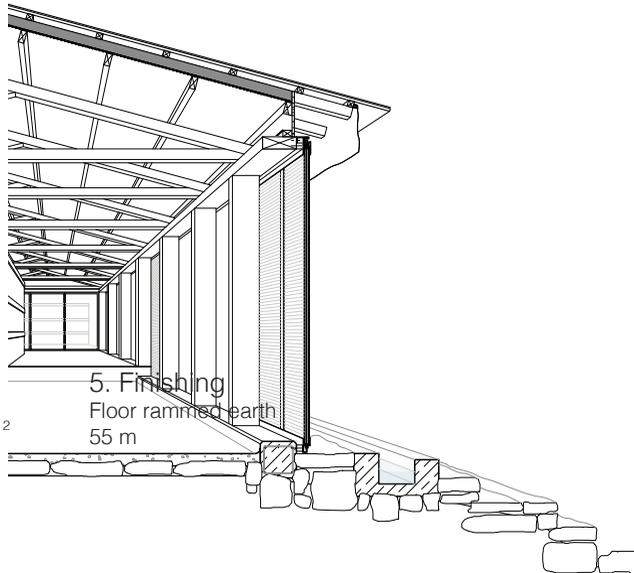


### 6. Techniques

- Toilets 3
- Biogas tank

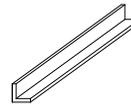
### 7. School garden

300 m<sup>2</sup>



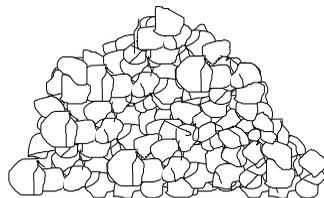
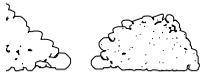
### 4. Windows

- Steel profile 30/25 460 rm
- Glas / Polycarbonat 45 m
- Bamboo mat 12 m



2 m<sup>3</sup> Cement

70 m<sup>3</sup> Lime stone



Calculations material



## CONCLUSION

---

The impressive site research in February 2017 was the starting point of my master dissertation. The stay in Dolakha, in the Himalaya mountains, turned out to be harsher than expected. As we learned shortly before leaving Kathmandu that we are staying in tents I still didn't know what kind of tents Micheal was talking about and how cold it will actually be. Every single night had to be well prepared with a 'Nepali fire' to survive the evening and organizing enough hot water to fill our all hot-water bottles.

There is this one picture of the old woman sitting in front of her house (page 34), unfortunately, I do not know her name and probably she would never imagine that the picture of her was the starting point of my whole thesis. I would love to go back and give thanks to her.

During the last months, working on the thesis I felt sometimes confused between the impressions and feelings from Nepal, which I was trying to keep awake and being back in Belgium, sitting in front of the screen. I was not always easy to not forget about it.

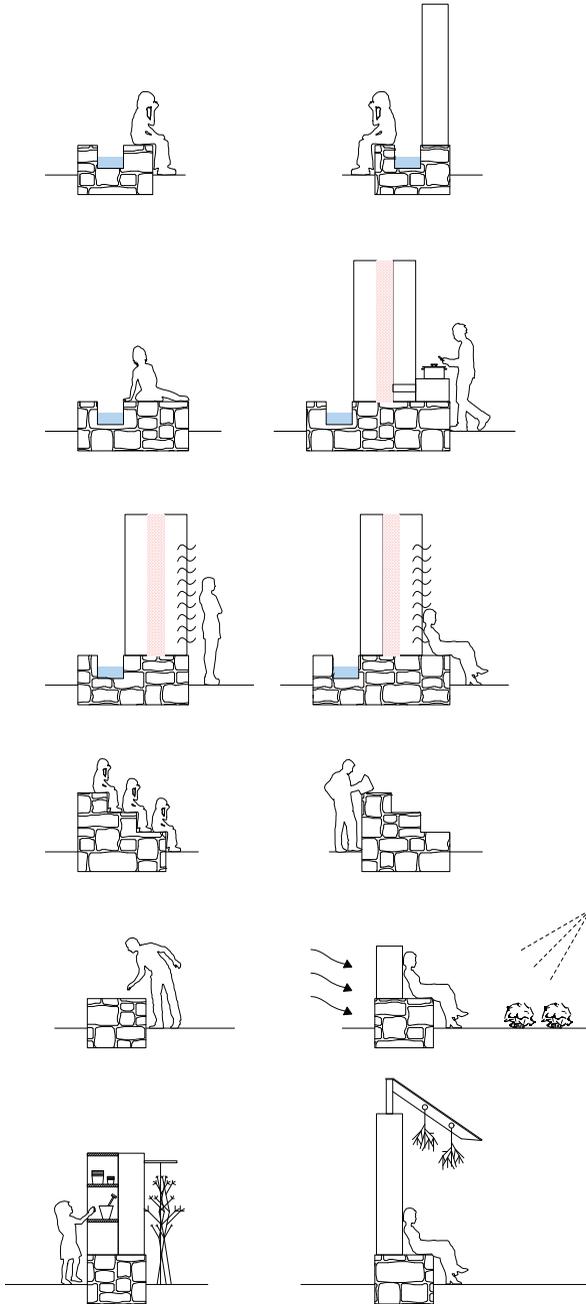
I hope with my proposal I can give a useful contribution to a new and innovative school with a lot of joy.

Let's bundle all the energetic power of those workers and start to rebuild the 8.000 *joyful school* for the children!



First Image

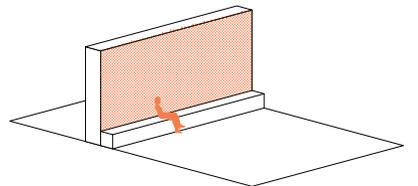
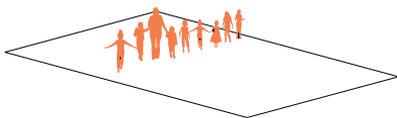
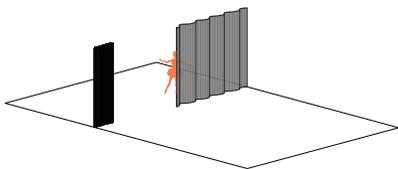
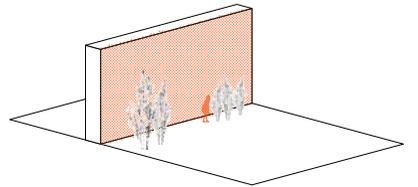
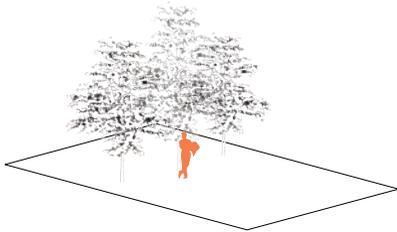
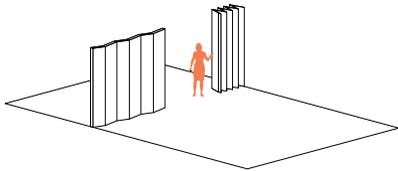
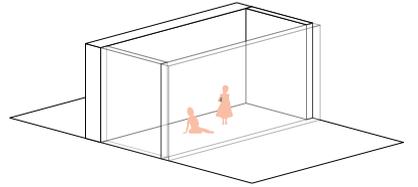
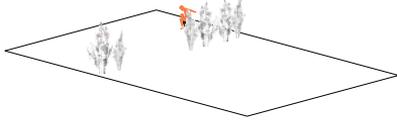
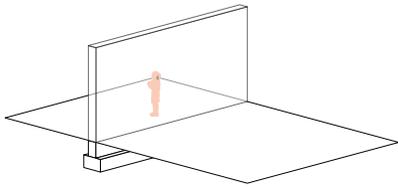
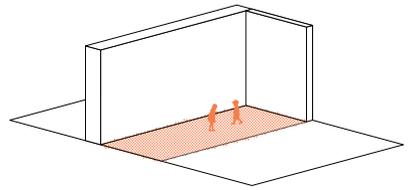
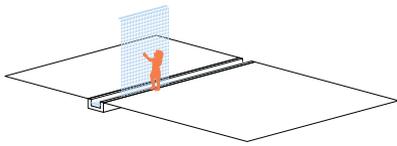
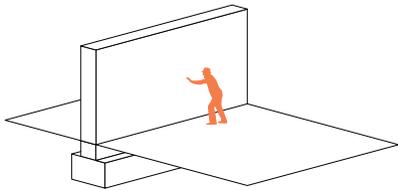
## PROJECT DEVELOPMENT



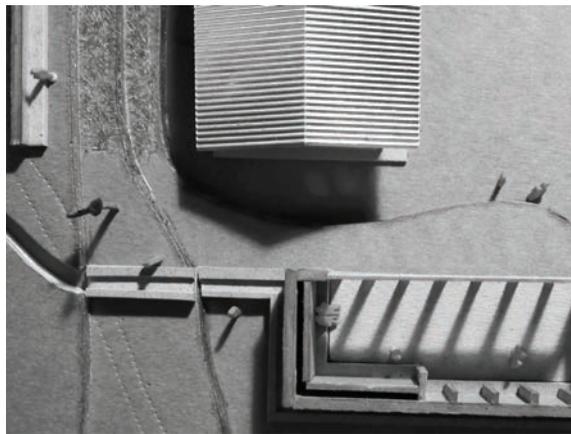
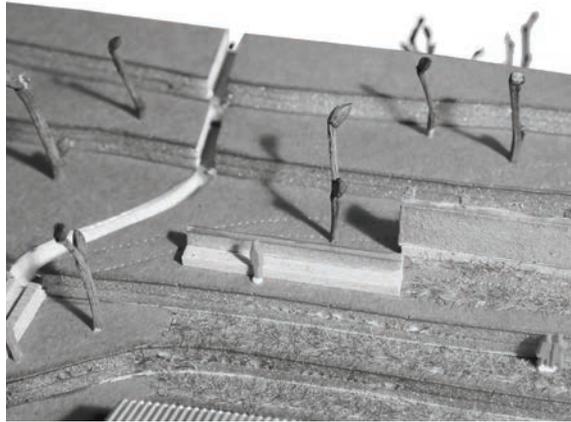
Conceptual wall

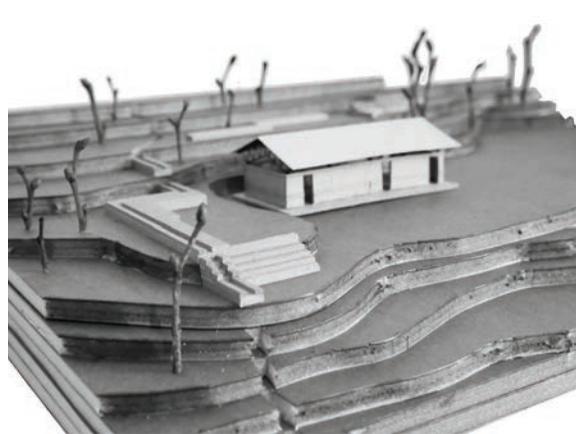
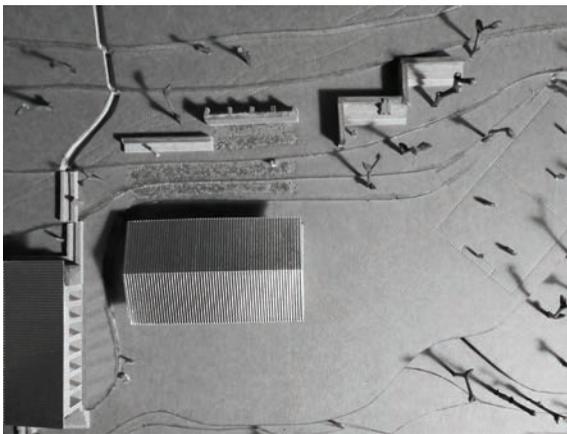
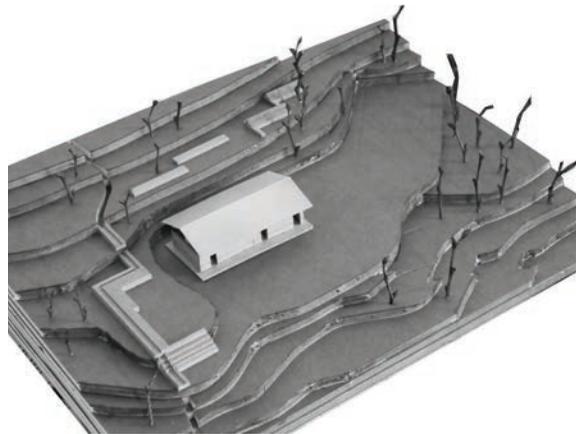
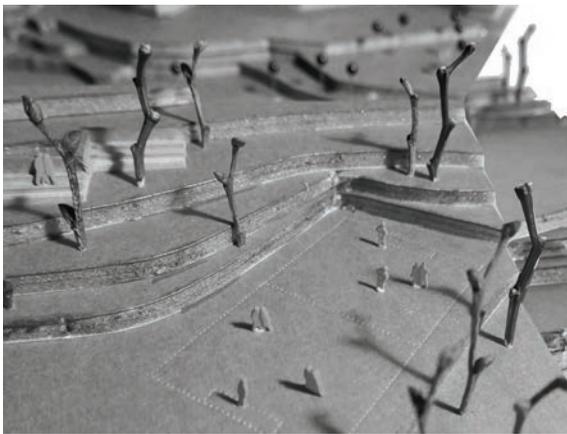
One of the first pictures I created in very beginner of the project, which led me all the time though, the design process. Even though the building itself changed a lot, I was always trying to keep the atmosphere and the feeling of this shot.

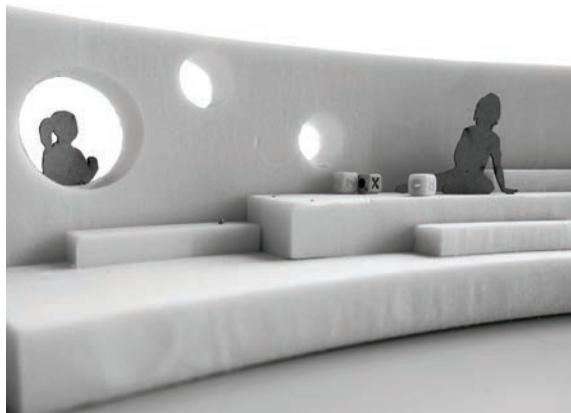
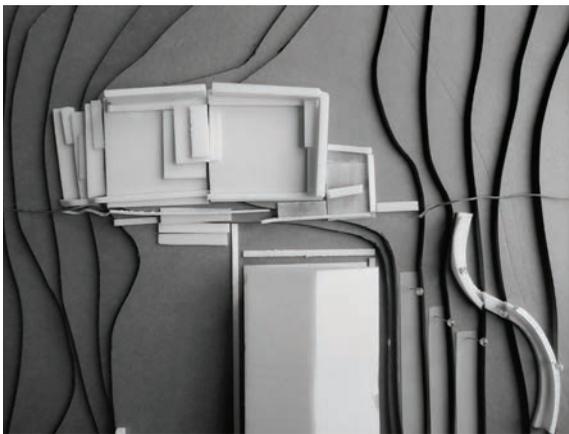
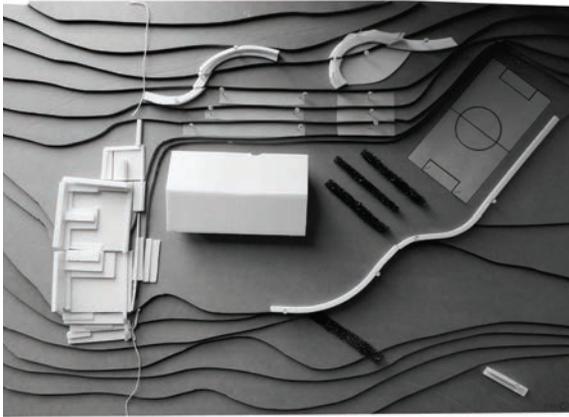
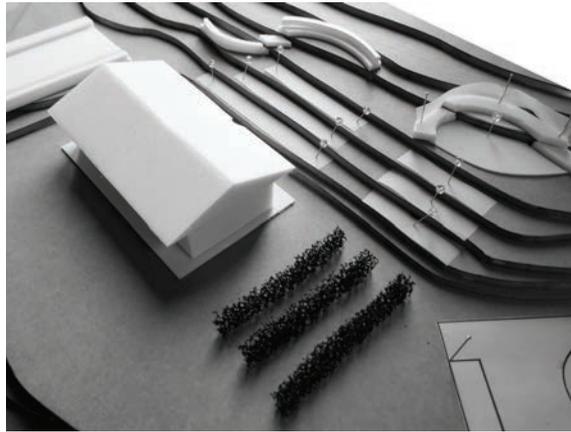
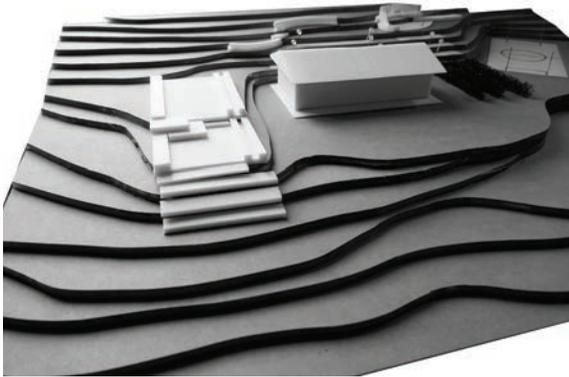


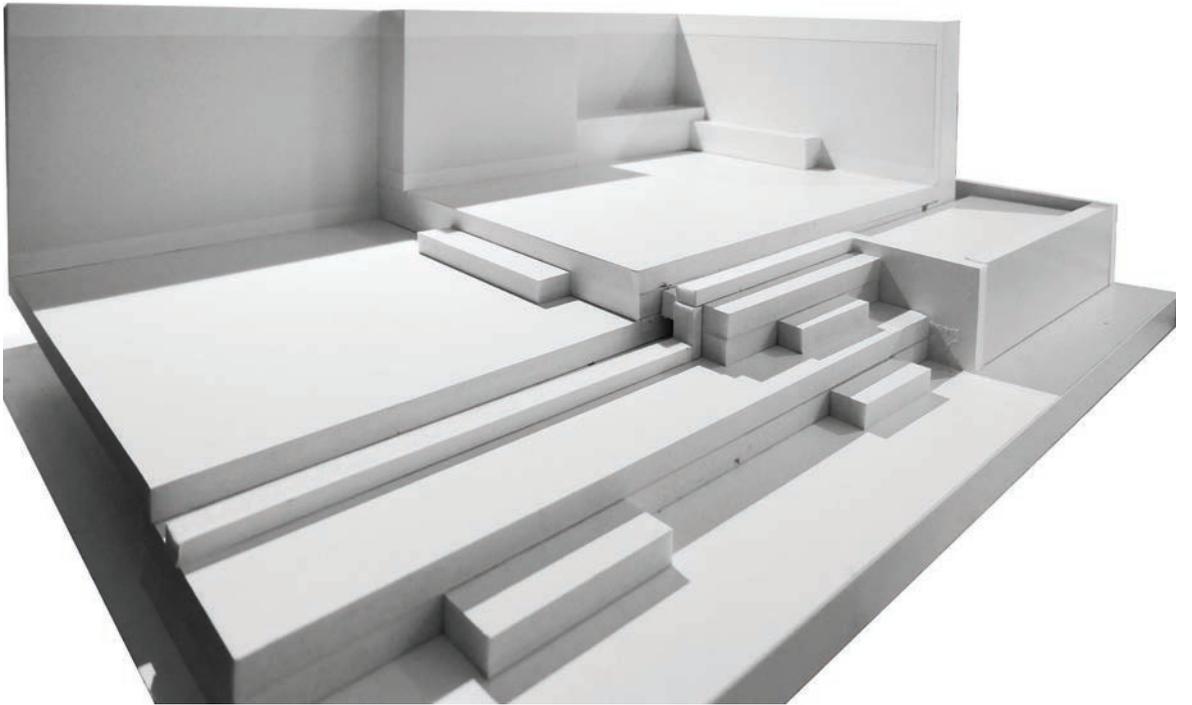
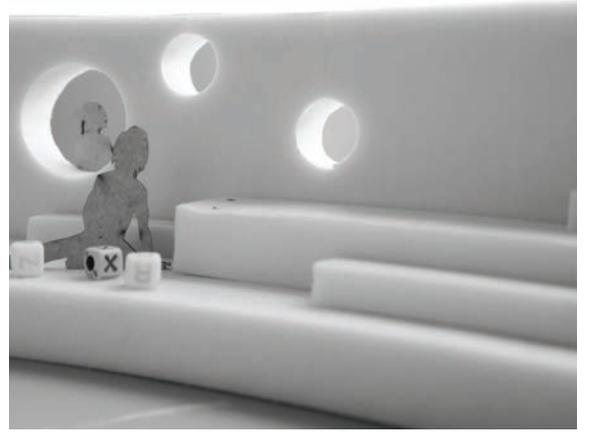
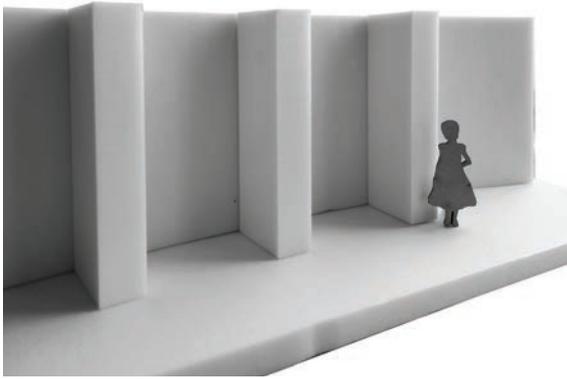


Typologies Wall















## DANJABAT

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First of all, I want to thank the team of our four academic promoters for their great support and always interesting advice, especially Ignaas Back, which brought me to today's stage of the project.

I also want to thank all my friends and my family who always believed in me and made me able to realize this project.



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### Final Design

NOTE: All images and drawing in the Final Design Proposal chapter are created by Ege Baki



## FOOTNOTE

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1: TC Plus, Tom Callebaut  
„TC PLUS“. Facebook.com. Abgerufen am 15. 05. 2017 von  
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