

POLHEM

VISITOR

CENTER



POLHEM VISITOR CENTER

Hanna Modin
Master thesis in Architecture
Matter Space and Structure
2014



*POLHEM VISITOR CENTER
MASTER THESIS IN ARCHITECTURE
HANNA MODIN*

*MATTER SPACE AND STRUCTURE
CHALMERS UNIVERSITY OF TECHNOLOGY
TUTOR: DANIEL NORELL AND EGIL BLOM
EXAMINOR: MORTEN LUND
2014*

A photograph of a person with long hair, wearing a grey sweater and dark pants, standing on a dirt road that leads into a dense forest of tall evergreen trees. The person is seen from behind, looking down the road. The lighting is soft, suggesting an overcast day. The road is unpaved and appears to be a path through the woods.

PREFACE

Growing up I would often travel through and to different parts of Bergslagen, from the window you could see the remains of the mining industry, the moon like landscapes surrounding the mine or the headframes like sleeping giants piercing through the green deep forests. As a child I was unaware of the glory days for the mining industry in Bergslagen to me it was just a area in which we went camping by beautiful lakes and pick berries and mushrooms in the forests.

My father told me stories about his grandfather and uncles how worked in the mines. I heard stories about the tough work in the mines and the hard life that people in the area led and the accidents when shafts collapsed capturing the workers in the mine. Even though working in the mining industry was tough the area flourished and the cities had all possible services, banks, post offices, dance palaces and large hotels. As a child the stories are nothing but stories, but as I traveled through the area now as a grown up they became more real a part of local history that have shaped the area forever. As the mining industry moved out of the area eventually so did a lot of the inhabitants leaving the cities and villages on the path of becoming ghost towns. Large beautiful villas, stores and schools just left in the often breathtaking Swedish landscape. And goes for the industrial buildings, some of them have been used by smaller industries but most of the are just left empty, as modern ruins over a great time.

In my thesis I wanted to investigate if you could use the industrial ruins for something and by once again adding function to them ignite something new in the area.

TABLE OF CONTENT

1. *BACKGROUND*
2. *POLHEM*
3. *PROGRAM*
4. *DRAWINGS*
5. *VIEWS AND MODEL PHOTO*
6. *DETAILS*



BACKGROUND

ABSTRACT

All around the world built structures are left empty, as their original function no longer is needed. A lot of the structures and building that are abandoned are so because their design was very function driven and therefore isn't easily transformed. This is especially common for industrial buildings as their shape and spaces are to a very large extent depending on its functional demands.

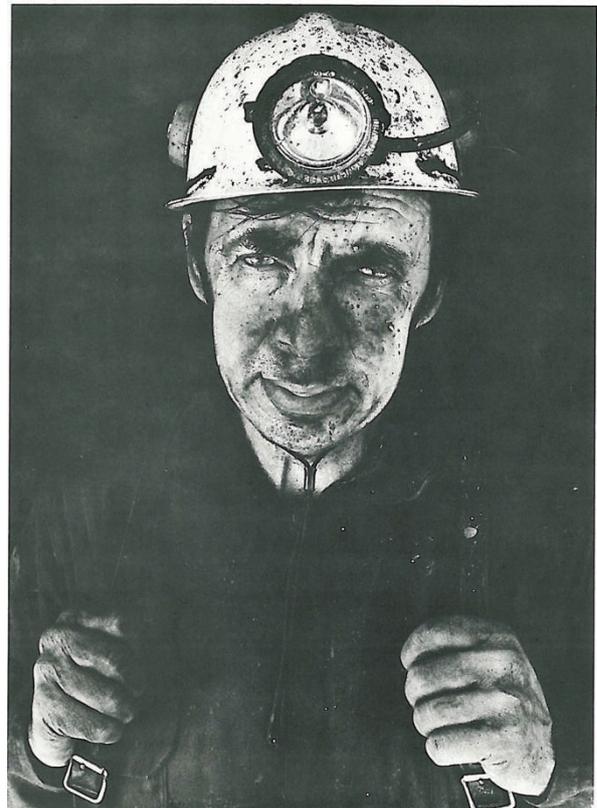
Polhem visitor center is a project about how architecture can restore the value and respect for these structures. By changing and adding to an existing building and introducing a new function it can help to vitalize not only the immediate vicinity but also a larger area. This is investigate by re-designing and adding to an abandoned structure of a mine in Bergslagen. The area that are usually referred to as Bergslagen, the northern parts of Svealand it got its name from the organized groups of men that where working in the mines. Bergslagen have had a great influence on the Swedish economy for a long time. But as the mining decreased during the last half of the 20th century the cities and villages in the area which came to be because of the industries have lost a lot of their population a long with their pride of being a model mining community. The former glory can be seen in the many large villas and of course the remaining industrial ruins. The ruins from the industrial area are plenty in Bergslagen some ave been restored to their former glory and a functioning as industry museums, but the most of them have remained untouched since the mining stopped.

These industrial ruins have the last 20 years many of the mines have become popular visiting sites for so called Urban explorers. In most cases they are driven by a great curiosity and the special thrill to discover a space that have not changed a single bit since the workers stood up from the benches and left for the last time. They are in a sense traveling back in time, walking in the rooms and spaces that not so long ago was inhabited by heavy working miners but now only whispers about their existence. The curiosity of urban explorers along with a mixed program that is not a museum over the former glory of the mining industry in the area but instead could be an exhibition for art, nature, history etc.. A long with tourist information, restaurant , café and the possibility to accommodation. Making the sites accessible for the public to increase awareness of the effect the raise and fall of the mining industry hade on the societies in the area and raise the interest for the area in general, without forcing the information upon people but rather let them experience it through the architectural spaces. At the chosen site only the head frame remains as an empty concrete shell. The new functions are added by stacking boxes in the vertical space, the concept is to distance the new addition from the existing to increase the kontras between the to and to enhance the sense of the verticality. You reach the different rooms from a exterior elevator or if you want to experience the spaces even closer ladders and nets in the void between new and old provide alternative routes. In the building you can stand with one hand on the rough concrete surface of the existing shell while the other one is touching the new smooth metal surface of one of the boxes. One hand on the past and one on the future while being in the moment.

BERGSLAGEN & THE MINES

Bergslagen is a area in the northern parts of Svealand, i.e west and slightly north of Stockholm. The landscape is dominated by forests and small lakes and rock, the map to the right you can easily se the distinct change in the typology between the plains to the east and the mountain area in the west. The area have since the middle ages been dominated by mining, the combination of ore rich rock and the accessibility of wood and water made it ideal, and it was up until the mid 20th century the most important mining district in Sweden. And the mining industries, its owners and patrons were all important factors in the industrial revolution in Sweden. The mining in the area enable the development of a rail way system and small villages grew around the minig site. The ore industry also lead to the developement of related industries, like forges, melting-works and ironworks. As time passed an the

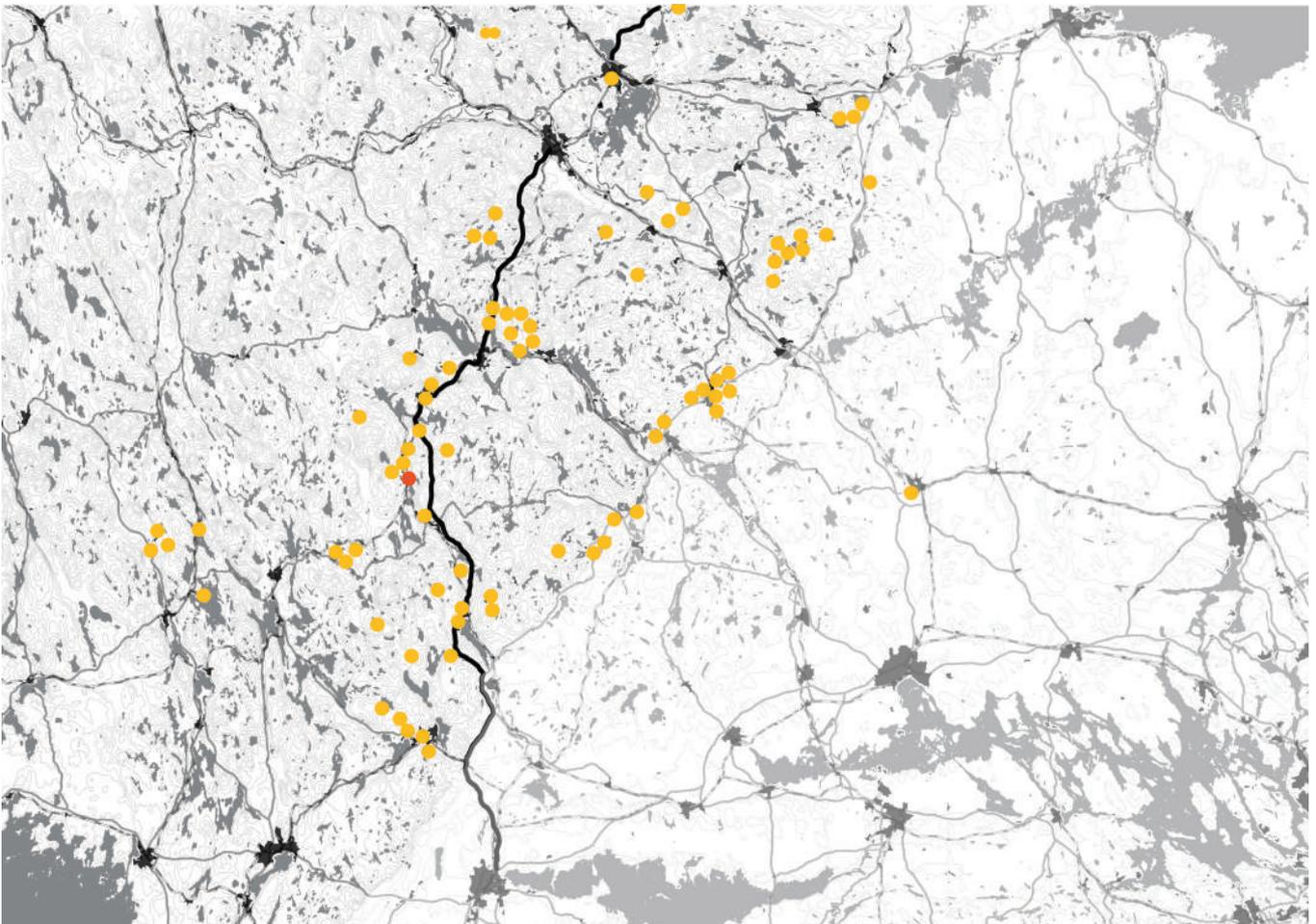
mines increased in number and became larger the villages eventually became cities as people were moving into the area to work. A large part of the wealth in Sweden today comes from the copper and iron ore mines in Bergslagen. In the early 20th century there was 500 mines in Sweden that together produced 8 million tonnes of iron ore. In the middle of the century the number of mines had decreased to about 100 but the production had increased to 20 million tonnes / year. The technical developement in the miningn industry was Sweden was during the 50s the largest export agency of iron. But as the iron price dropped the number of mines in Bergslagen decreased from 70 at the end of the 2nd world war to 25 in 1970 to eventually all be closed in (the last one in 1992).



Bertil Svensson, 59 years, 36 years working in the mine



From the top of the headframe at Polhem, you can see the undulating forest landscape and the lakes. The old sign of the mining company was left when the mine was closed in 1967.



Mines in Bergslagen. From the typography you can clearly see the shift in the landscape from low farmlands to the hilly and rocky characteristics of Bergslagen.

MINES & COMMUNITY & ORE

There have been mines in Bergslagen for a long time and they have always affected the life of people living there.

Remains from mining from the middle ages, ranging from open, water filled, craters and old black smiths houses and workshops, large quarries all the way to large transport systems and industrial buildingd from the 60's.

Historically first open surface mining was done and around the mining site small villages was created with black smiths and other professions connected to the refining of the ore , from iron ore to iron, steel and even ready made products such as weapons. As the techinques became more and more advanced, from working with fire and hatches to pneumatic drills and eventually large industrial drills connected to vehicles, the mines grew larger.

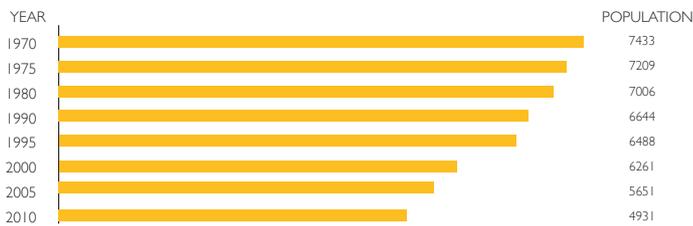
And as they did so did the small villages around them. People where moving into the area in search of jobs and there was plenty. The access to iron ore and the mining also fueled other industries to be establish in the, close to the natural

resources and the transportation system was developed with good roads and train tracks. The mining compaines also showed interest in the public and built schools and other public facilities such as theaters and cinemas.

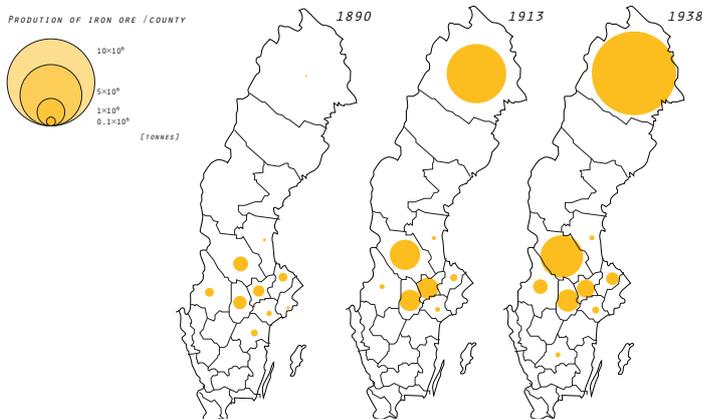
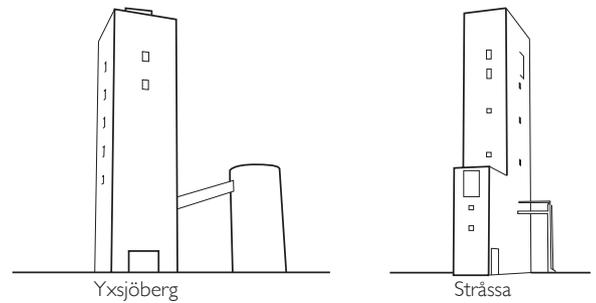
Most of the mines were mining iron ore but there was also copper and silver mines in the area. The iron ore production in the area played a large part in building the wealth of Sweden, supplying it with steel for weaponry and industry.

For the same reasons that people moved to the region in search of jobs a lot of people left as most of the mines were closed in the 70's, due to increased international competition and decreasing prices. Left behind was infrastructure and buildings suitable to serve a population and an industry that no longer existed. Since the closing of the mines the population have contiuned to decrease and driving through the Bergslagen today leave you with a feeling of abandonment and passed glory days.

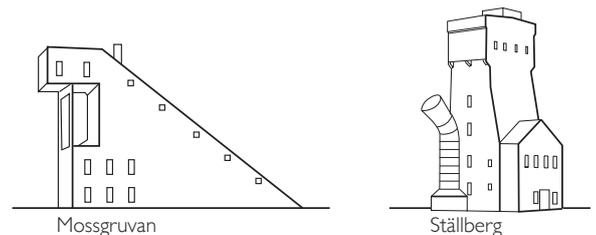
DEVELOPMENT OF POPULATION IN THE MUNCIPLITY OF LJUSNARSBERG 1970-2010



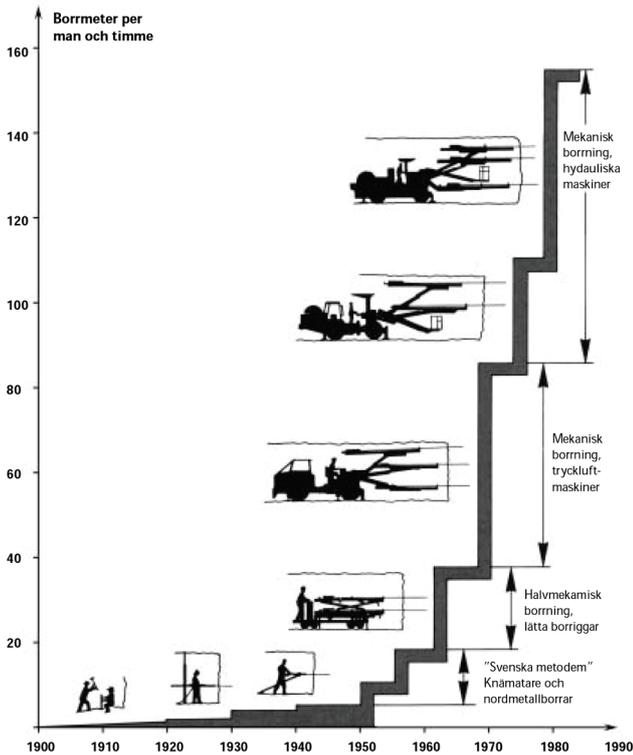
Development of population in the municipality of Ljusnarsberg



Production of iron in ore / county



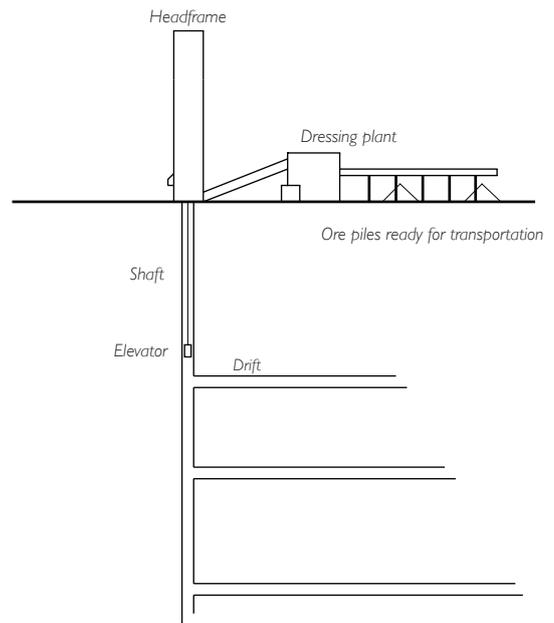
Examples of different head frames in the area



Development in mining techniques in Sweden.

During the 20th century the development in mining techniques improved the efficiency of the mining and following the transition from men working with hatches to large scale industrial drills.

From the graph above you can see how the development increased the number of meters drilled in a workday, but it did not only increase the efficiency it also decreased the number of employers needed in the mine.



Principle sketch of mine from the 1950

The typical mine setup from the fifties is made up by a deep vertical shaft where an elevator is operating. Above the shaft the headframe is located, the height of the headframe is needed for the angle of the elevator wires. The headframe also works as a storage silo for ore, and from there the ore can be transported away by train to another site or an on-site dressing plant, where the ore is seperated from the rocks.

From the shaft workers reach the drifts which are more or less horizontal tunnels in which the mining is executed. The ore is then transported back to the elevator or to trucks that can drive it up to the surface through secondary tunnels.



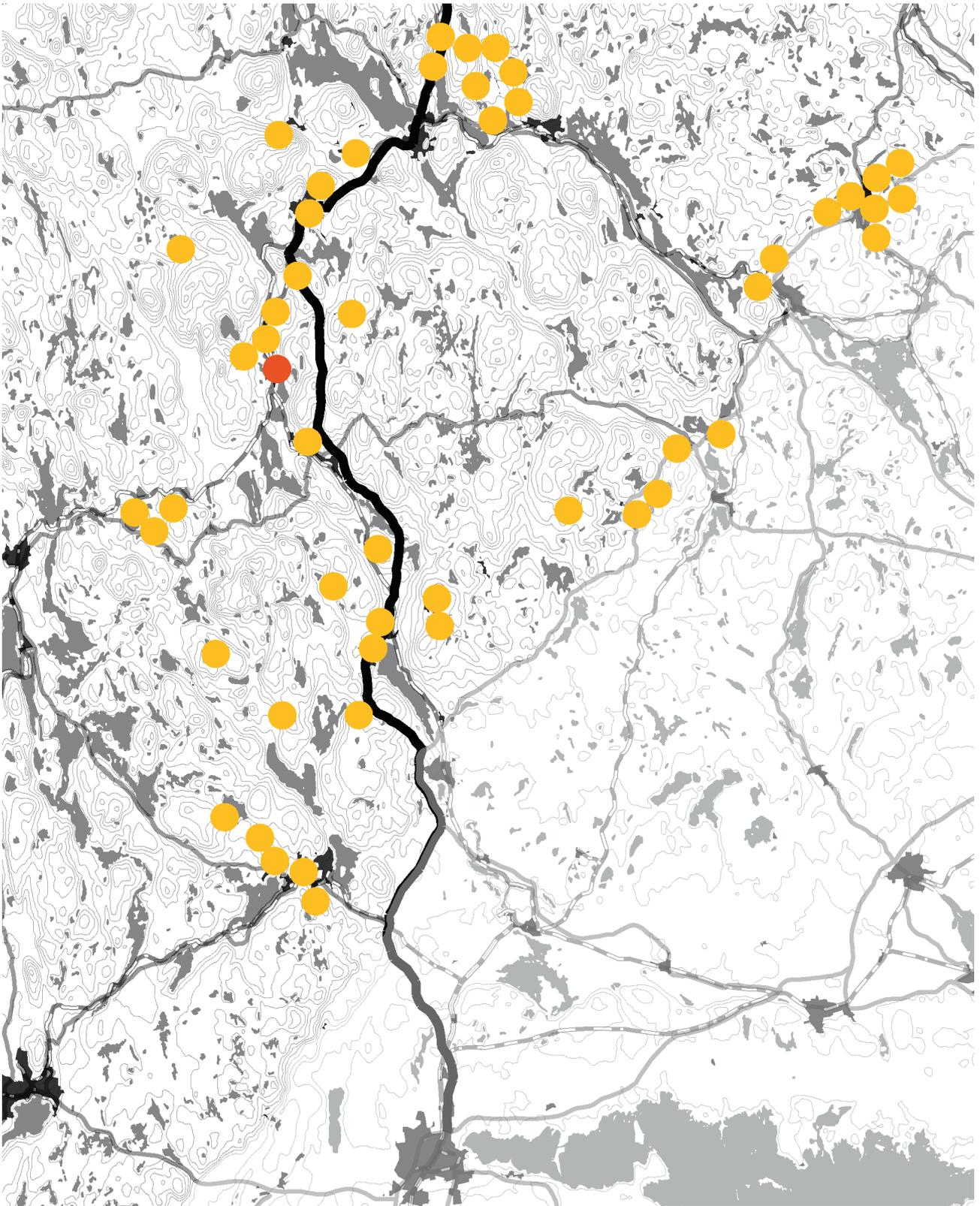
Mine workers performing hydraulic drilling in underground mine



Old surface mine. The old mining pit is now filled with water.

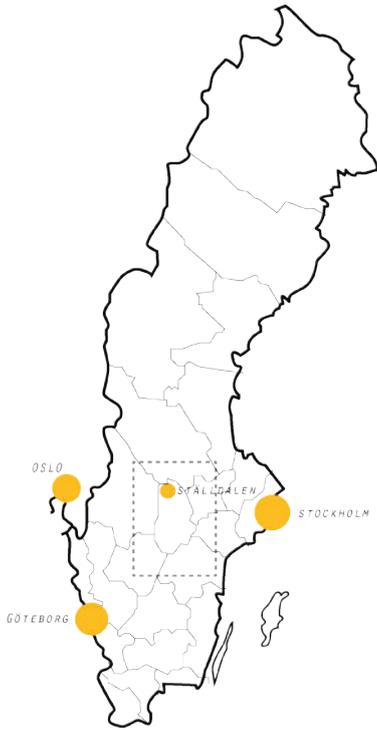


POLHEM

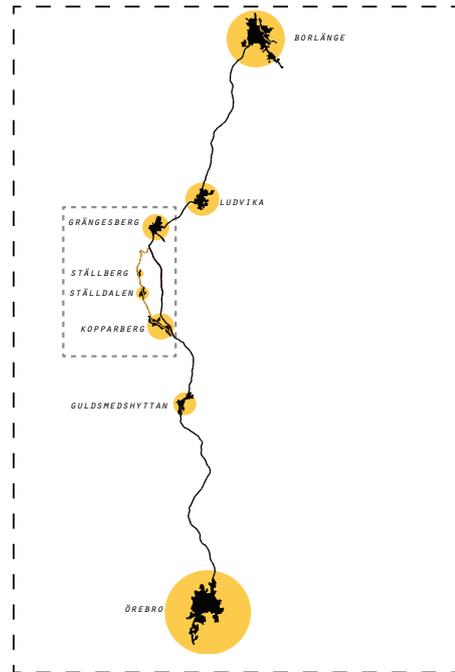


THE SITE

The site is located 10 kilometers north of Kopparberg, a 14 min drive from the large national road. It is just inbetween Örebro and Falun, the closest larger cities. It is located in between two train tracks and close to a small lake. The area is dominated by deep woods with some clearings left behind from the mining industry previously located at the site. The only thing revealing the previous activity is the abandoned head frame, standing as a skyscraper in the middle of the woods. A functional industry building transformed into an tomb stone.

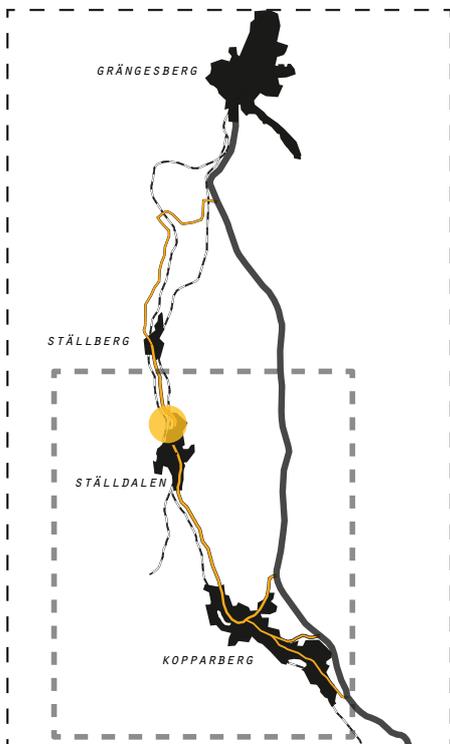


Distances from	
Oslo	360 km
Stockholm	240 km
Göteborg	375 km
Falun	100 km
Örebro	100 km



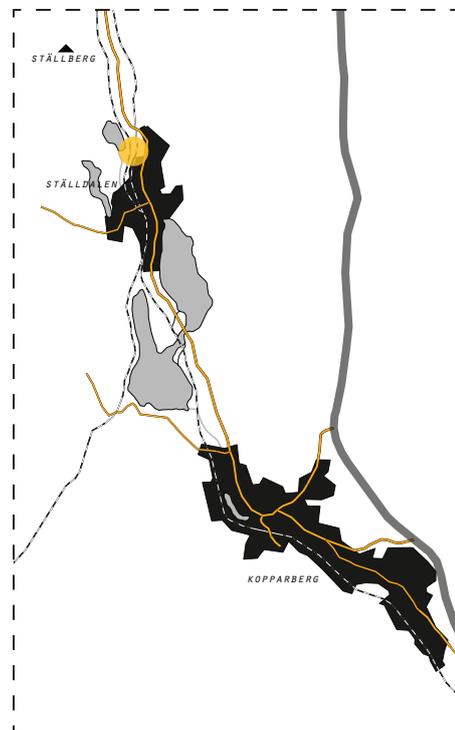
HIGHROAD 50

Highroad 50 is the most use road in the area as it is connecting larger cities such as Örebro, Ludvika and Falun. Traffic going north from both the western parts of Sweden as well as the areas south of Örebro converges here making it an important connection between north and south. It is sometimes referred to as 'Bergslagsdiagonalen'. From the highroad you experience the landscape with all it lakes, hills and deep forests. But you never come close enough to experience the real life in the area today and how the mining industry's rise and fall have affected it.



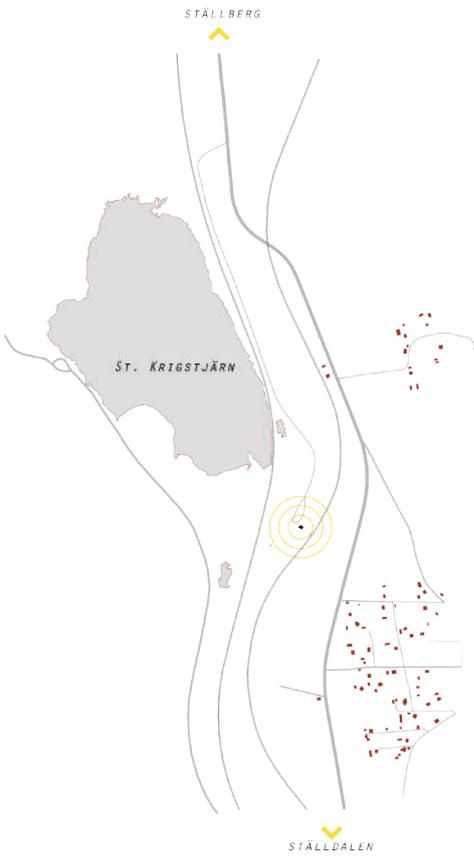
THE TOURIST ROUTE

The tourist route is an alternative way between two cities in the area, Kopparberg and Grängesberg, following the route you experience the effect that the depopulation have had on the cities in the area. You see the closed grocery stores, bank offices and the abandoned house but you also see the picturesque sites, the beautiful sandy beaches surrounding the clear watered lakes.

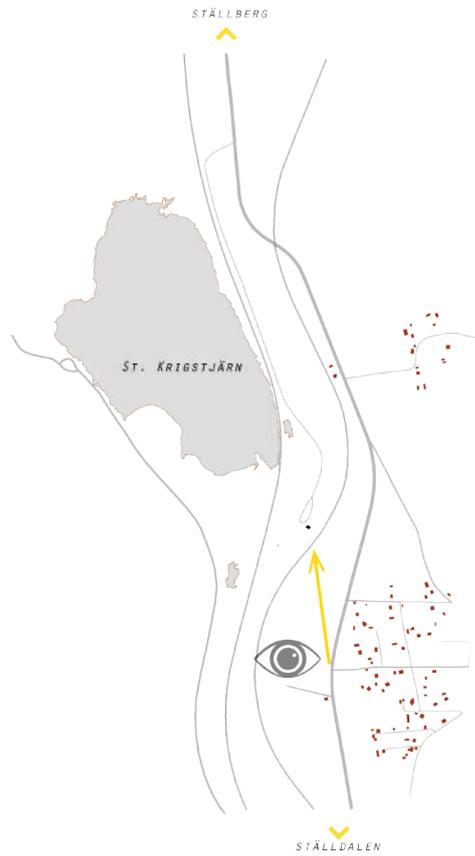


POLHEM

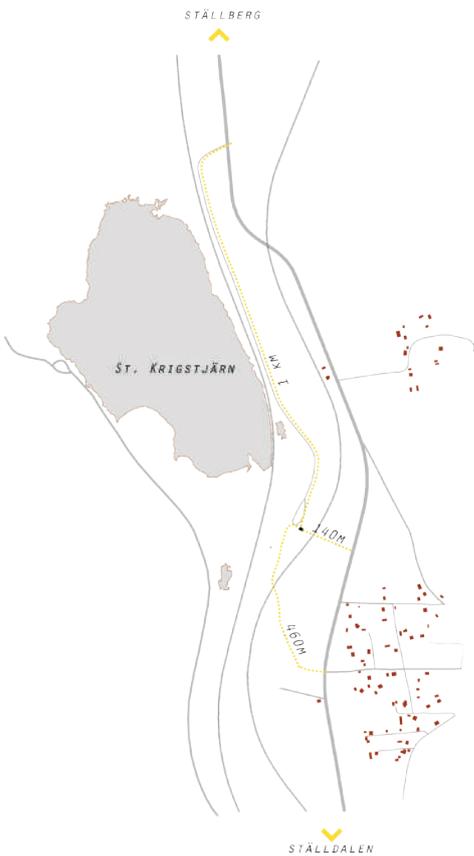
The Polhem mine is located only a few hundreds of meters from the tourist route and as you can see the top of the headframe when driving a long the road.



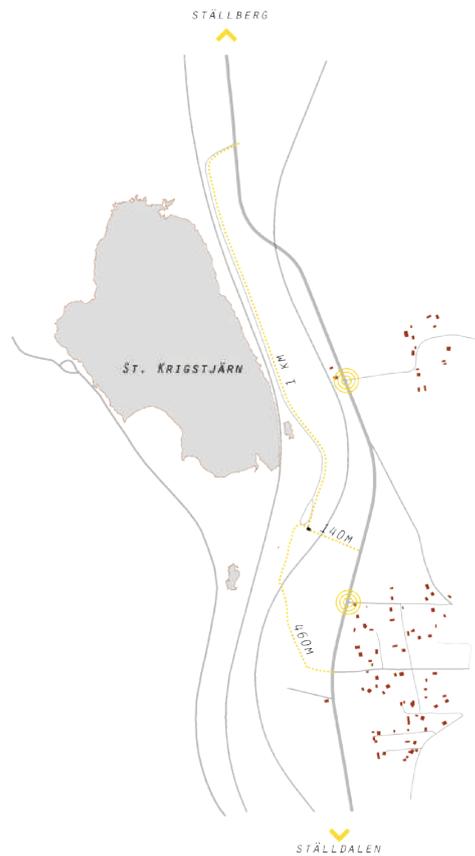
The site is close to the railway tracks and inbetween the villages of Ställdalen and Ställberg



Driving north from Ställdalen you see the remaining head-frame just as you leave the village.



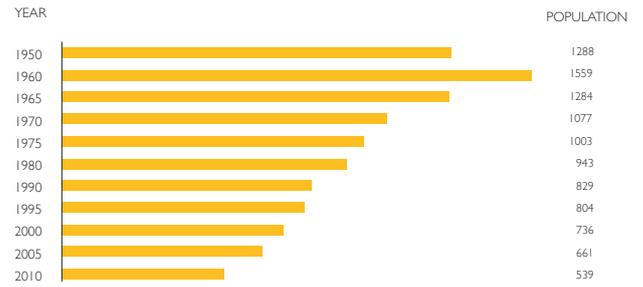
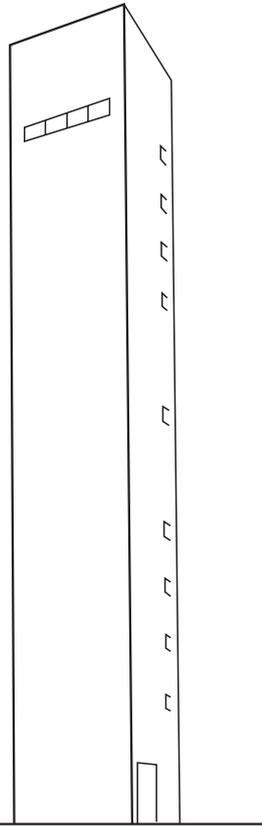
The site is reached via a small gravel road from the north or via a footpath through the forest from the south.



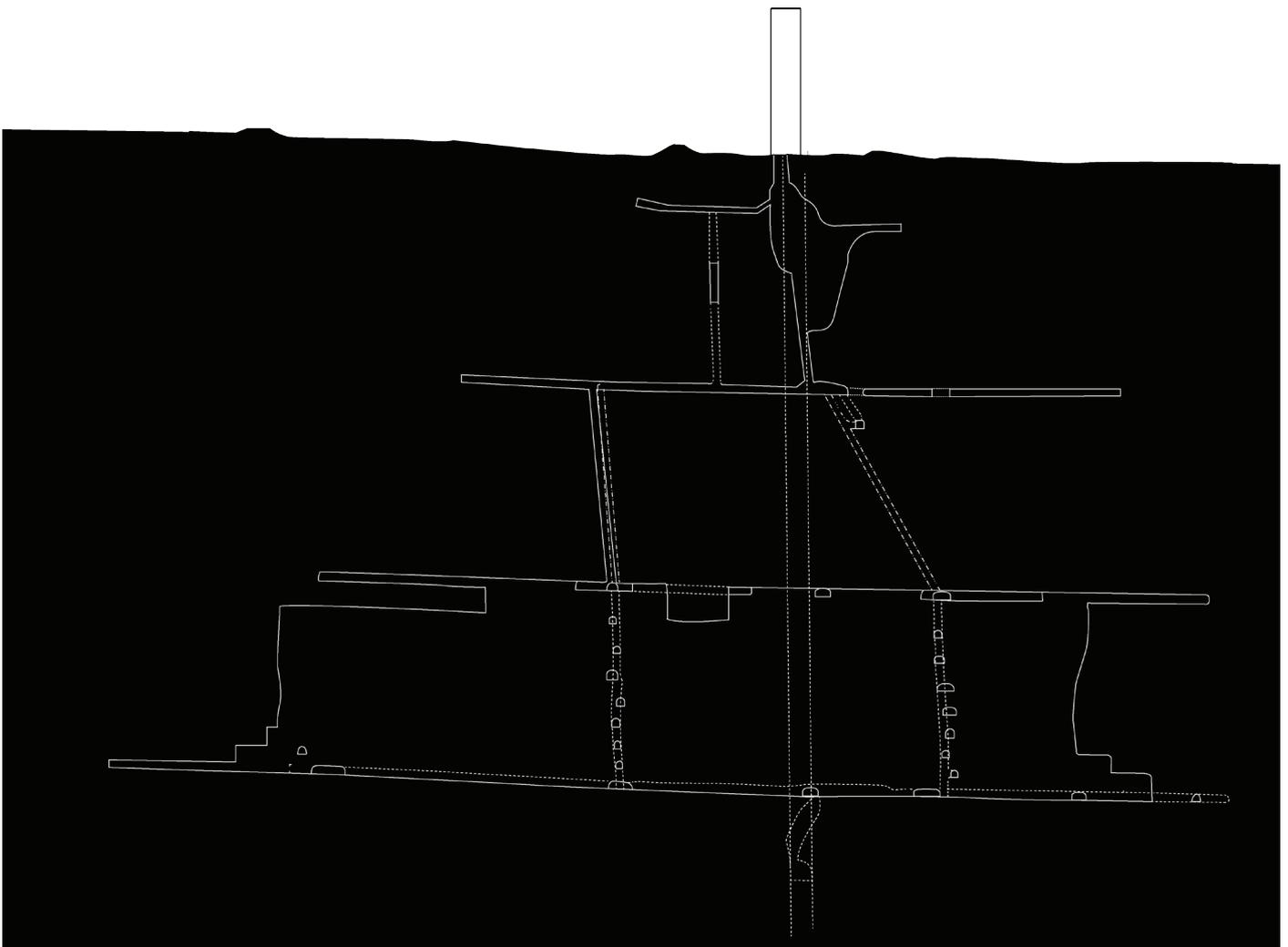
Existing bus stops a located at the indicated intersections.

POLHEM MINE

The head frame remaining at the site are 44 meters high and is a the only building left still standing. The current head frame was constructed in 1958 when the mining was reinforced at the site, it is design by architect Yngve Fredriksén who at the time was employed by Ralph Erskine. Is a reinforced concrete structure.



Development of population in Ställdalen, the closest village to the Polhem mine



A sectional drawing of the mine, the underground spaces are an intricate system of shafts and drifts reaching all the way down to 260 meters of depth.



Workers waiting to enter the elevator



Operating hydraulic drills



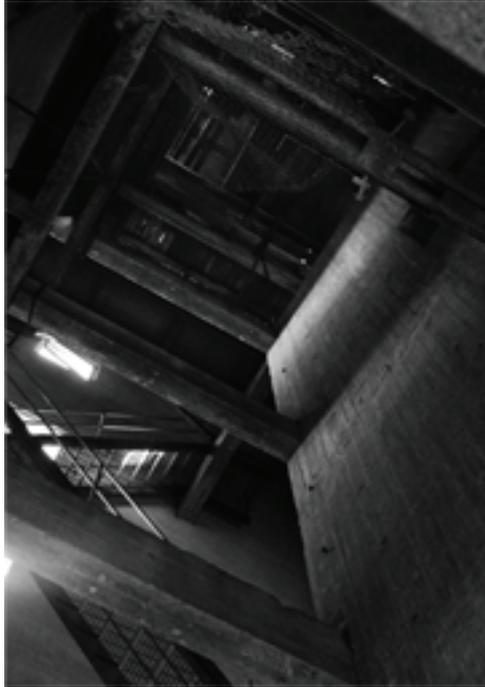
Climbing from one drift to another.



An older ladder between two drifts.

THE POLHEM MINE YESTERDAY

The mining at the site started already in year 1844, and was running sporadically during the following 100 years. The modern mine dates back to 1958, when then new headframe was completed. The Polhem mine was as several other mines in the vicinity owned by the StällbergsBolaget. The mine was around 200 meters deep at its deepest. The mine was closed for the last time in 1967 due to increased international competition and decreasing profitability. During these last years of mining 280 909 tonnes of iron ore was extracted.



Interior space



Condition of the tower



The head frame today



Nature and urban elements

THE POLHEM MINE TODAY

The only building remaining today is the headframe, it stands alone in a clearing in the woods, it can be seen from the car just as you exit the village Ställdalen. The gravel ground surrounding it is partly covered with trash and you can see the remains from a car that have been burnt down. The rough concrete walls are covered in graffiti a feeling of urban prescens even though it is in the middle of the forest. Parts of the ground floor walls are covered in coal and ashes, rumour has it that someone tried to blow the tower into pieces, but failed.



PROGAM

?

?

?

?

THE POLHEM MINE TOMORROW

Hopefully the re-furbishment of the Polhem mine suggested in the thesis can breath new life into both the local commuinty and in Bergslagen as a tourist attraction. The old mine will be a central node for visitors in the area and serve both bypassers and locals with a meeting point.

INVESTIGATION OF DIFFERENT PROGRAMS

I want to do a mixed program containing an accomondation part and a second function.

Possible second functions that was investigated:

- Spa
- Exhibition space
- Storage
- Food production
- Concert space
- Cloister

EXHIBITION SPACE - ART

+

- All year around
- Attracts tourist
- Spontaneous visits possible
- A cultural program that could attract the same visitors as the opera

-

- Demands on interior climate
- Can be hard to attract people
- Does make use of the unique situation

EXHIBITION SPACE - NATURE

+

- All year around
- Attracts tourist
- Spontaneous visits possible
- Could act as visitor center for the entire area

-

- Can be hard to attract people
- Too narrow narrative

CONCERT SPACE

+

- Cultural event could connect to the opera
- Unique space for concerts in the mines
- Attracts large amount of people

-

- Event based use, not over the entire year
- Logistics
- Acoustic demands

FOOD PRODUCTION FACILITY

+

- All year around
- Generates work possibilities in the area
- Can be coupled with restaurant and exhibition
- Connects to Grythyttan and Kopparbergs

-

- Can be hard to attract people
- At lot of closed spaces
- High demands on interior spaces in terms of temperature, humidity and daylight.
- Competition from Grythyttan

SPA

+

- All year around
- Can make use of the water in the mine
- Attracts tourist

-

- Exclusive
- Only planned visits
- Hard to connect to the local community

CLOISTER

+

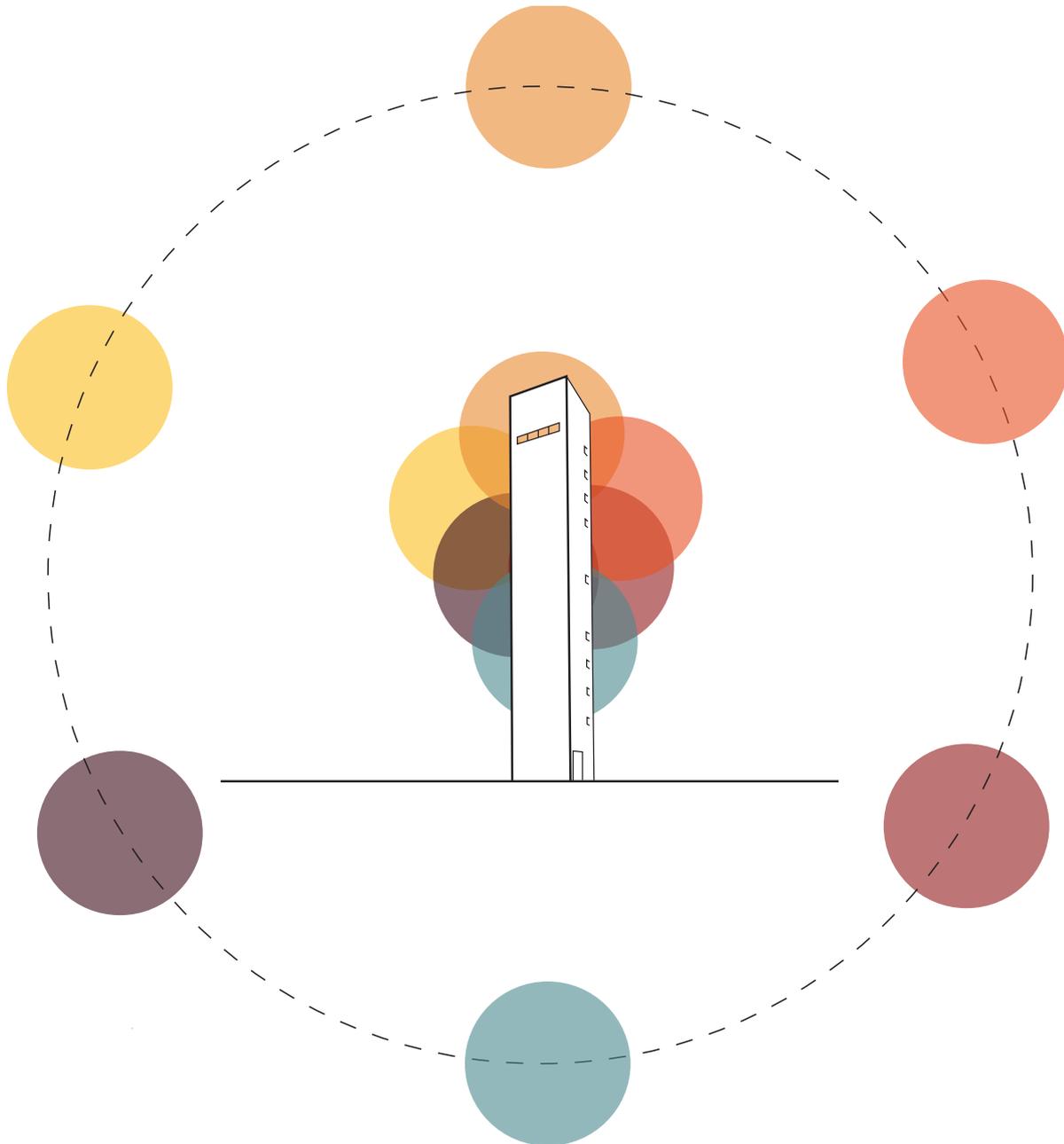
- Suitable for a remote place
- Program fits pre-conditions

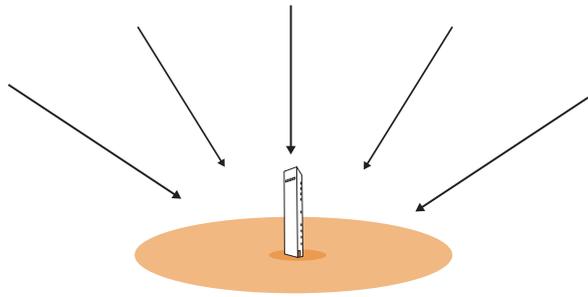
-

- Attracts few people
- Closed to the public

FUNCTIONS OF THE VISITOR CENTER

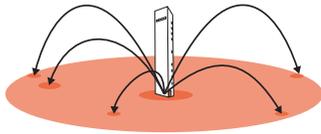
Eventually the choice fell on a visitor center that could work as a node for tourists in the entire area. But also serve as a public space for people living in the vicinity.





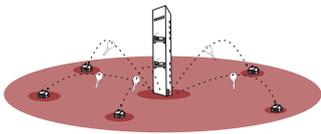
DRAW ATTENTION TO THE AREA

Refurbishing of an old mine and converting it to an architecturally interesting space together with the historic connection will attract people to Bergslagen and help increase tourism.



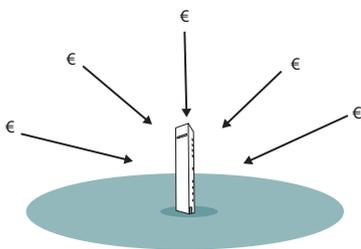
INFORM AND GUIDE TOURISTS

There are lot of different tourist attractions and things to do in Bergslagen. Informing about and guiding tourists to other interesting locations give a contribution to the entire area.



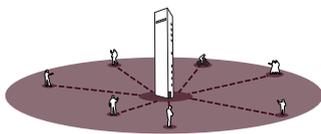
ACCOMONDATION AND HOUSE RENTAL

The visitor center provides a limited number of beds. As an alternative visitors can rent an entire house in one of the villages in the vicinity. Building large areas for living is unmotivated as some many house are available in the area.



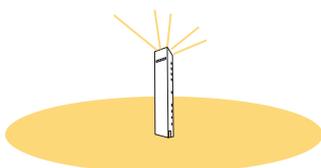
RESTORE VALUE TO THE HEADFRAME

By adding a new function to the abandoned head frame, the value of the structure increases not only monetary value but more importantly in the way that people see it.



A SOCIAL MEETING PLACE

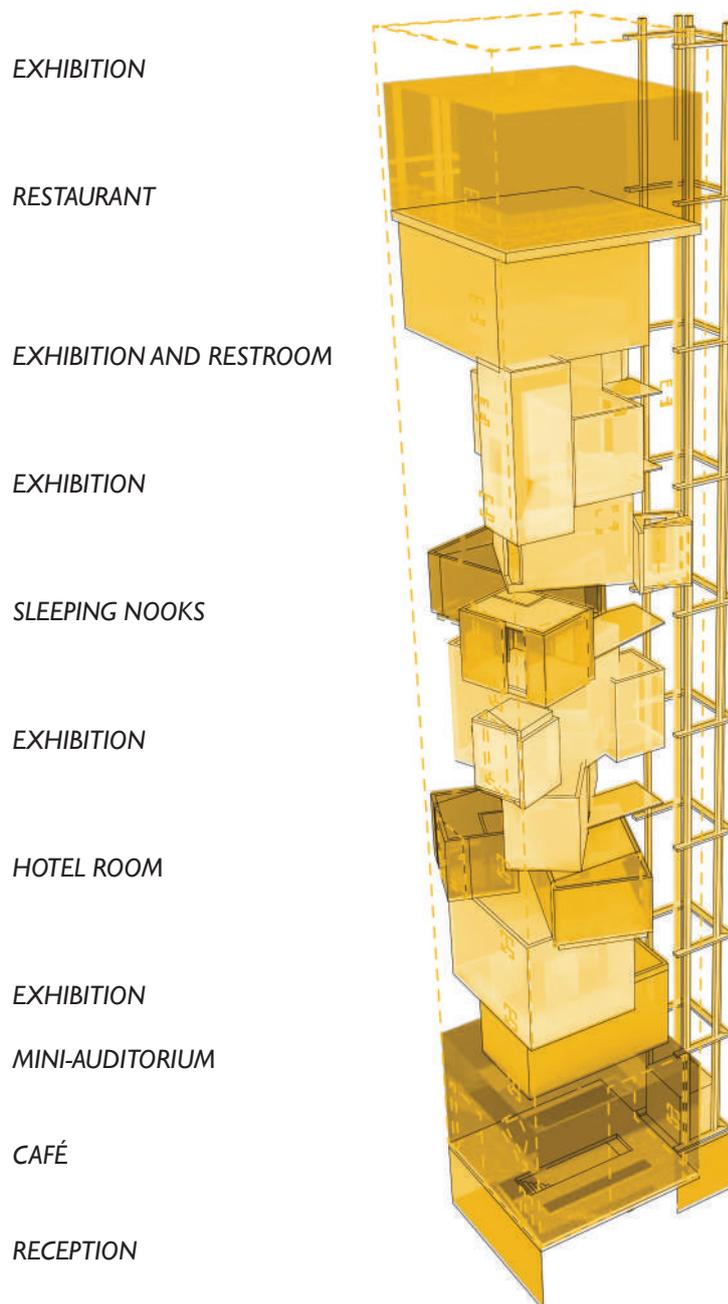
It is important that the visitor center benefits the inhabitants in the nearby villages. It can provide for occupation for some, or only act as a meeting places somewhere you can go to cook and eat a meal in the company of others.



AN EXHIBITION SPACE

The majority of the spaces within the visitor center are categorised as exhibition spaces. But they can also be used for other purposes if better needed at that time. All of the exhibition spaces have their own spacial experience.

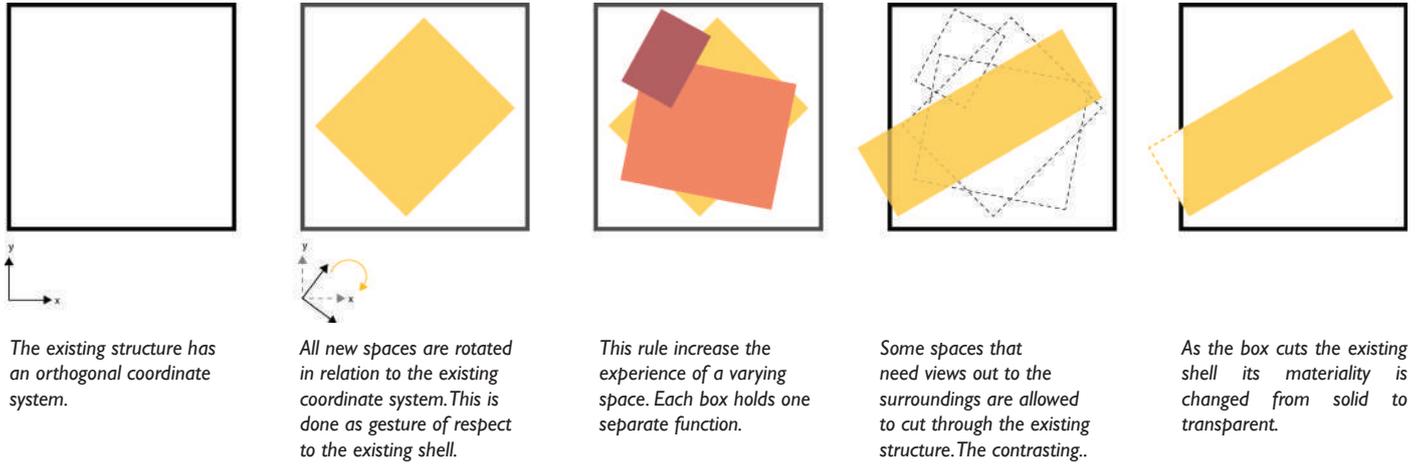
PROGRAM DISTRIBUTION



The program is arranged vertically. The movement through the building is done by the means of the elevator just as in a mine, but there are shortcuts with ladders and climbing nets that the visitors can use to move from one function to the other.

DESIGN RULES

Designing something in relation to an existing structure is always challenging as you need to taken a lot of aspects into consideration, like insulation, level of renovation, surface treatments amongst a few. There are different strategies to do a renovation project.



The existing structure has an orthogonal coordinate system.

All new spaces are rotated in relation to the existing coordinate system. This is done as gesture of respect to the existing shell.

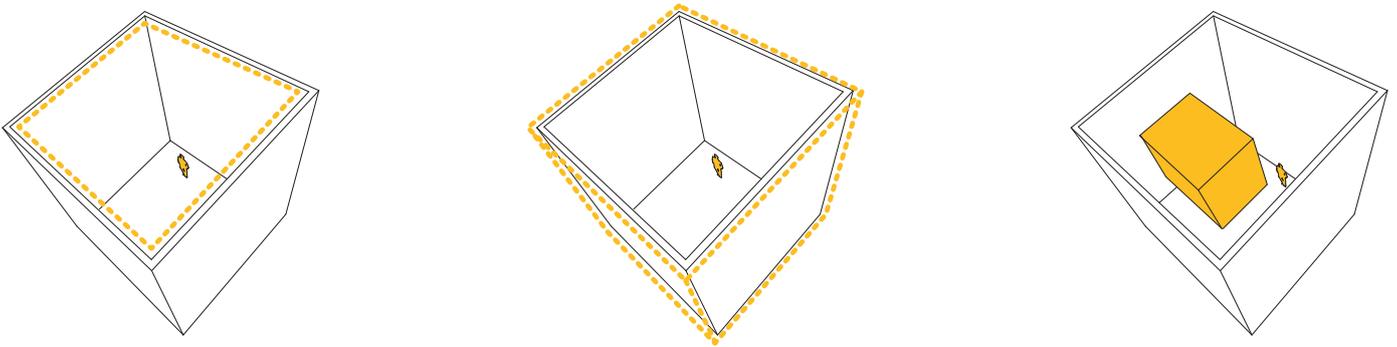
This rule increase the experience of a varying space. Each box holds one separate function.

Some spaces that need views out to the surroundings are allowed to cut through the existing structure. The contrasting..

As the box cuts the existing shell its materiality is changed from solid to transparent.

RESPECTING THE EXISTING

Designing something in relation to an existing structure is always challenging as you need to taken a lot of aspects into consideration, like insulation, level of renovation, surface treatments amongst a few. There are different strategies to do a renovation project.



The existing structure has an orthogonal coordinate system.

The existing structure has an orthogonal coordinate system.

The existing structure has an orthogonal coordinate system.

INSPIRATION PROJECTS

Some of the projects dealing with existing structures and underground spaces studied during the project.



Grindbakken, Rotor



The Palais de Tokyo, Lacaton & Vassal



Flat in Barcelona Eric Miralles



C Mine, NU Architecturatelier



Bunker 599, Raaf and Atelier de Lyon



Hedmark Museum, Sverre Fehn



Yellow house, Valerio Olgiati



Salina Turda Salt Mine Museum

CONCEPT



THE SKIN

The headframe left at the Polhem mining site is located in a clearing in the forest. The nature is trying to once again re-take the site. The tower is all empty apart from a smaller silo in one of the corners.



THE VOID

The headframe left at the Polhem mining site is located in a clearing in the forest. The nature is trying to once again re-take the site. The tower is all empty apart from a smaller silo in one of the corners.



THE BOXES

The headframe left at the Polhem mining site is located in a clearing in the forest. The nature is trying to once again re-take the site. The tower is all empty apart from a smaller silo in one of the corners.



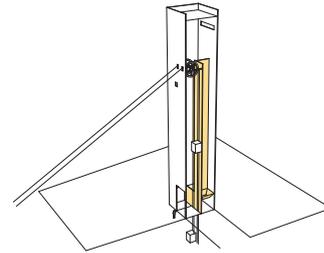
ASSEMBLED

The headframe left at the Polhem mining site is located in a clearing in the forest. The nature is trying to once again re-take the site. The tower is all empty apart from a smaller silo in one of the corners.

TRANSPORTATION CONCEPT

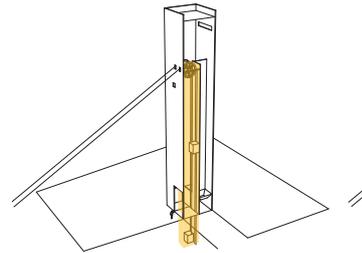
THE EXISTING TOWER

Is nothing more than an empty vertical space, everything of value have been removed and the only thing remaining are some interior separating walls. As they have no structural contribution to the tower they can be removed.



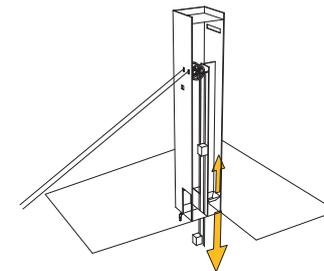
THE MINING ELEVATOR

The elevator was the main transportation in the mine and the introduction of it in the mining industry enabled deeper and more efficient mines.



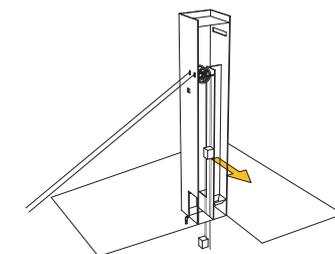
THE TIP OF AN ICEBERG

The depth of the mine in Polhem was about 260 meter at its deepest. Thus the head frame and the part of the mine visible above ground is only the tip of an iceberg.



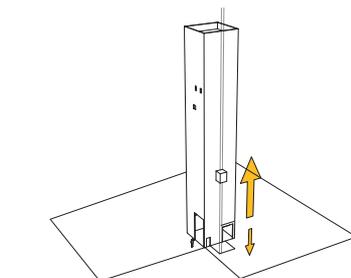
ELEVATOR AS BILLBOARD

As the elevator have been such an important element in the mining industry I want expose it more. The elevator is place on the outside of the building on the eastern facade. It is then visible from both the tourist route as well as the train.



ELEVATOR AS TRANSPORT

The elevator is the main transport in the tourist center. From the entrance level below ground you rise through the surface of the earth as you move on up. The elevator space also serve as a neutralizer between the different rooms at the different levels, a kind of pause separating the spacial experience.



FLEXIBILITY

The vertical distribution of the rooms together with the main transportation via the elevator give the possibility to use the spaces in different ways as well as configurations depending on the spacial demands at that time.

1. EXHIBITION

The opening season a large exhibition of local art is held at the tourist center. In the mini-auditorium an introduction movie is running, and all the exhibition spaces are used. The curator also used the concrete walls and the platforms in the void to exhibit both paintings and smaller sculptures. The vernissage at in the restaurant and on the top floor is crowded. Some adventurous visitors even uses the ladders and nets to move through the exhibiton as much for the fun of it as for avoiding the cue to the elevator.

2. DOUBLE EXHIBITION & WEDDING

A smaller exhibition about the relationship between people and nature in Bergslagen habitates the larger exhibition spaces, while at the same time a visiting exhibition from Liljevalchs art venue are located in the remaining exhibiton spaces and the mini-auditorium. During the night the restaurant is hired for a wedding celebration, the top floor is used as a dance floor and the roof top is perfect when you need to get some fresh air. The happy couple is eating drinking and dancing all night long with their friends and family, before checking into the hotel room. Most of the other guest have hired cottages and rooms in the surrounding villages

3. STAYING THE NIGHT AND CINEMA

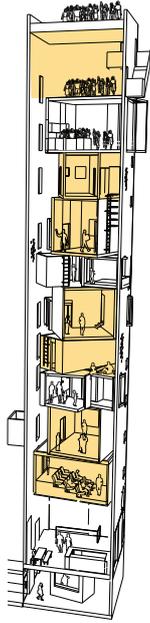
The mini-auditorium is used by the local community showing a new movie every thursday. The café is opened for late night discussions and snacks after the movie. The same day two families with kids stays at the visitor center. One of the families rent both of the sleeping nooks and thus get a private floor. While the other family stays in the hotel room where the writing corner is transformed into a sleeping area for the children. The families plan to use the restaurant to cook a simple evening meal but the plans changes as a women from Ställdalen offers to cook for them. As the grown-ups stay in the restaurant talking. The kids go out to climb on the nets in the void.

4. CONFERENCE AND CURATION

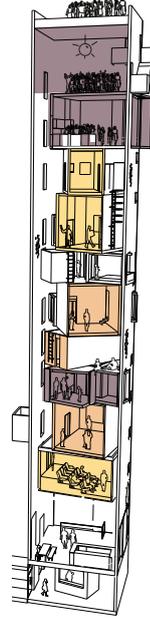
The visiting exhibition from Liljevalchs are over and the exhibition spaces on floor 7 and 8 are closed for curation. The nature and people exhibition is still running. During the day the mini-auditorium is subletted for a board meeting after a long day of discussions they end the day by together cooking a nice dinner in the top restaurant, guided through the kitchen chores by lady from the village.

5. NEW YEARS EVE

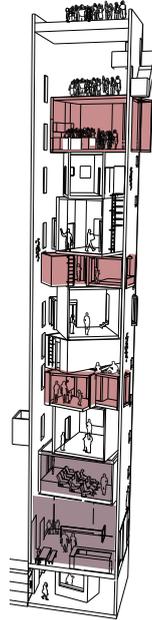
A local society arrange a new years eve party in the visitor center. The guest arrive through the tunnel where the cold weather have turn the water on the wall to ice sculptures softly lit from the wallwashers. In the café they get a welcome drink as they wait for everyone to arrive. A group from the society have been spending the day cooking in the preperation kitchen. The guest take the elevator to the resturant to enjoy the dinner. Just before the clock strikes 12 the guest go up to the rooftop to enjoy the fireworks over the forest.



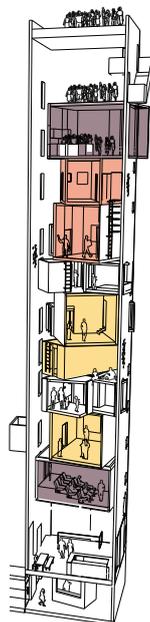
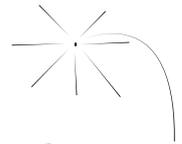
1.



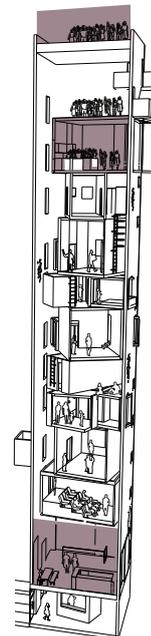
2.



3.



4.



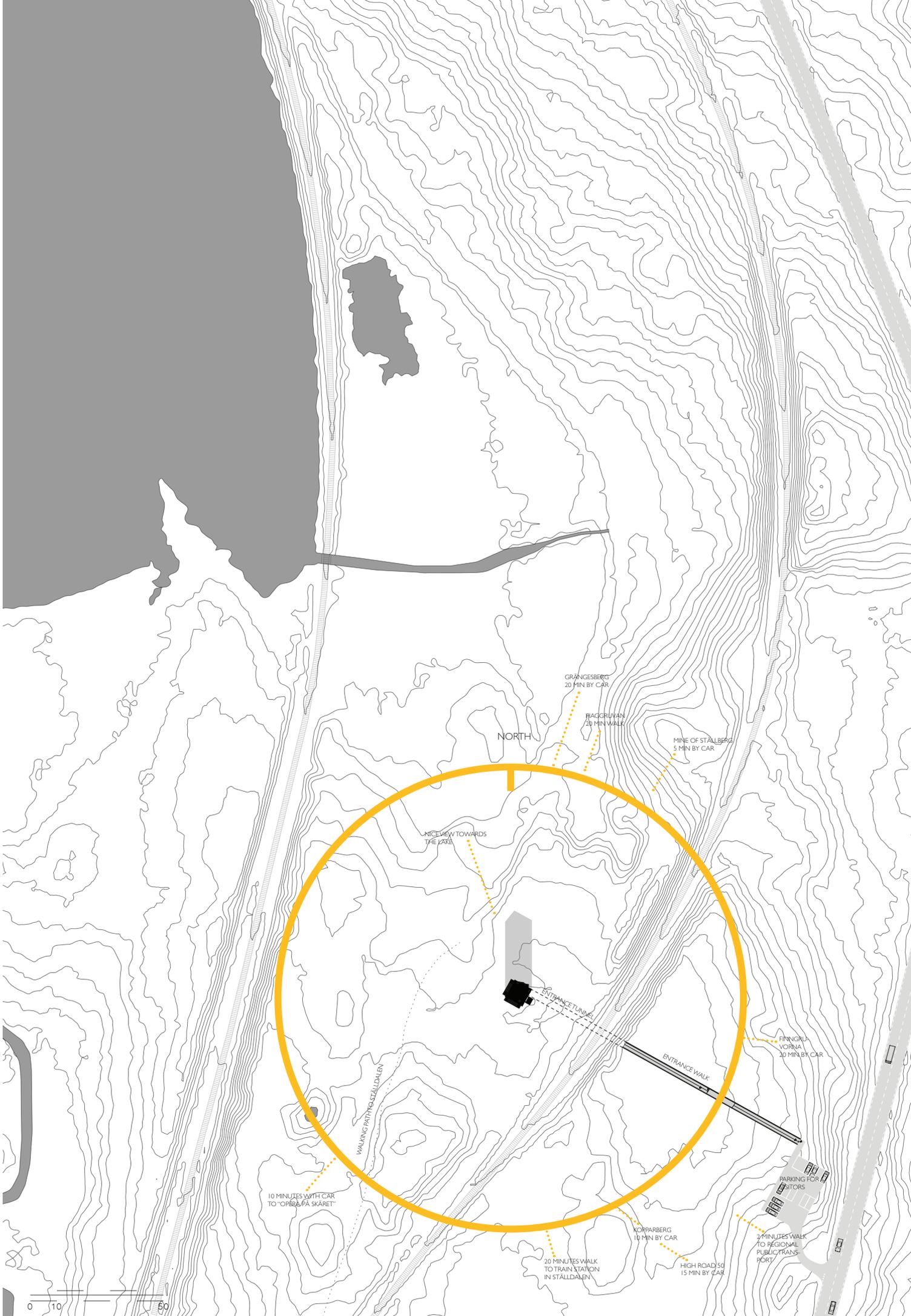
5.



DRAWINGS

SITUATION PLAN

A new parking is made close to the road in order to increase accessibility. From there a straight concrete path leads the visitor through the forest and to the tower in the woods.



Path through the forest to the tower, the concrete path cut through the nature on a straight line just as the mining never considered the natural patterns in the mountain but rather what would be most efficient for a industrial use.

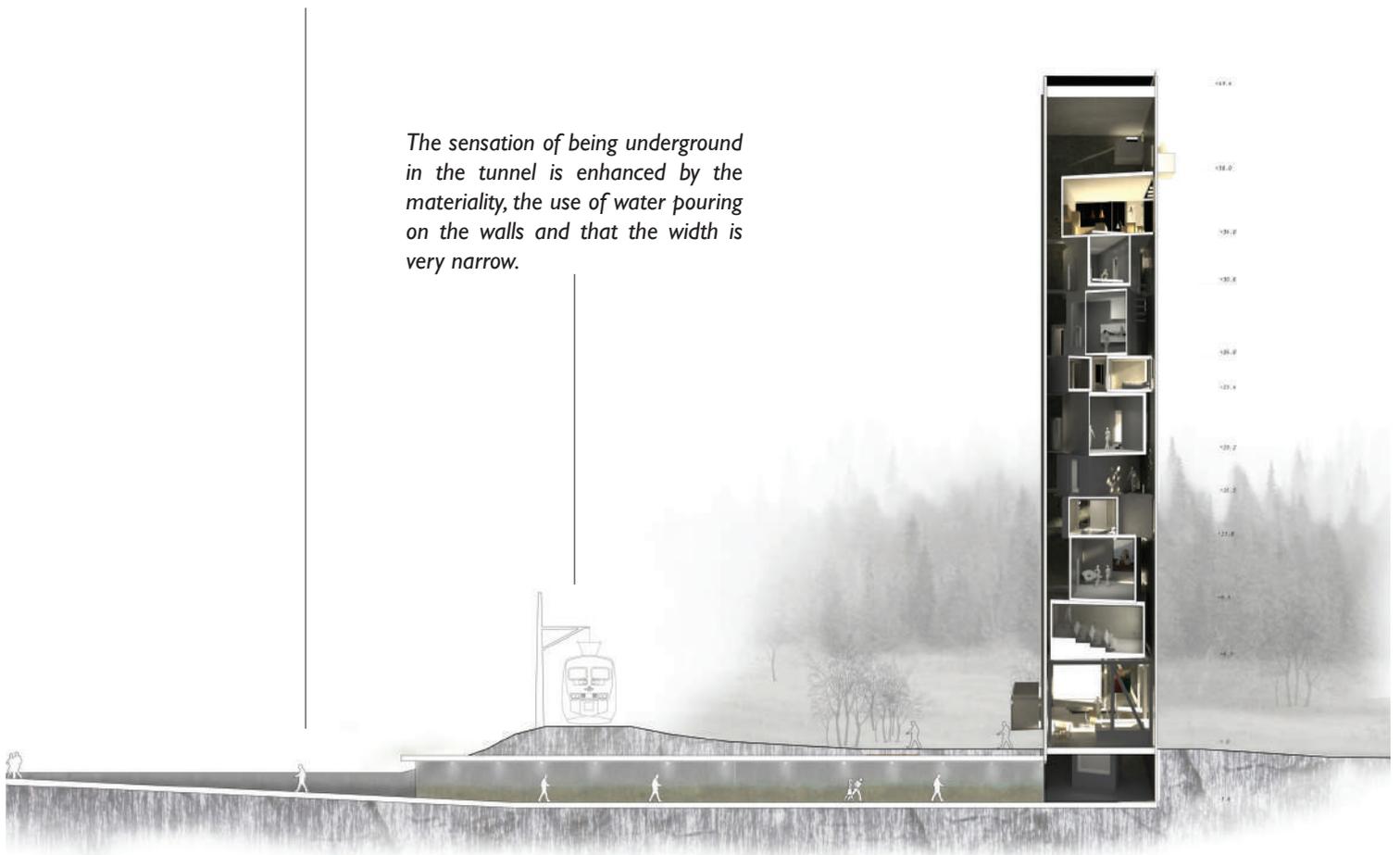
The road

Parking



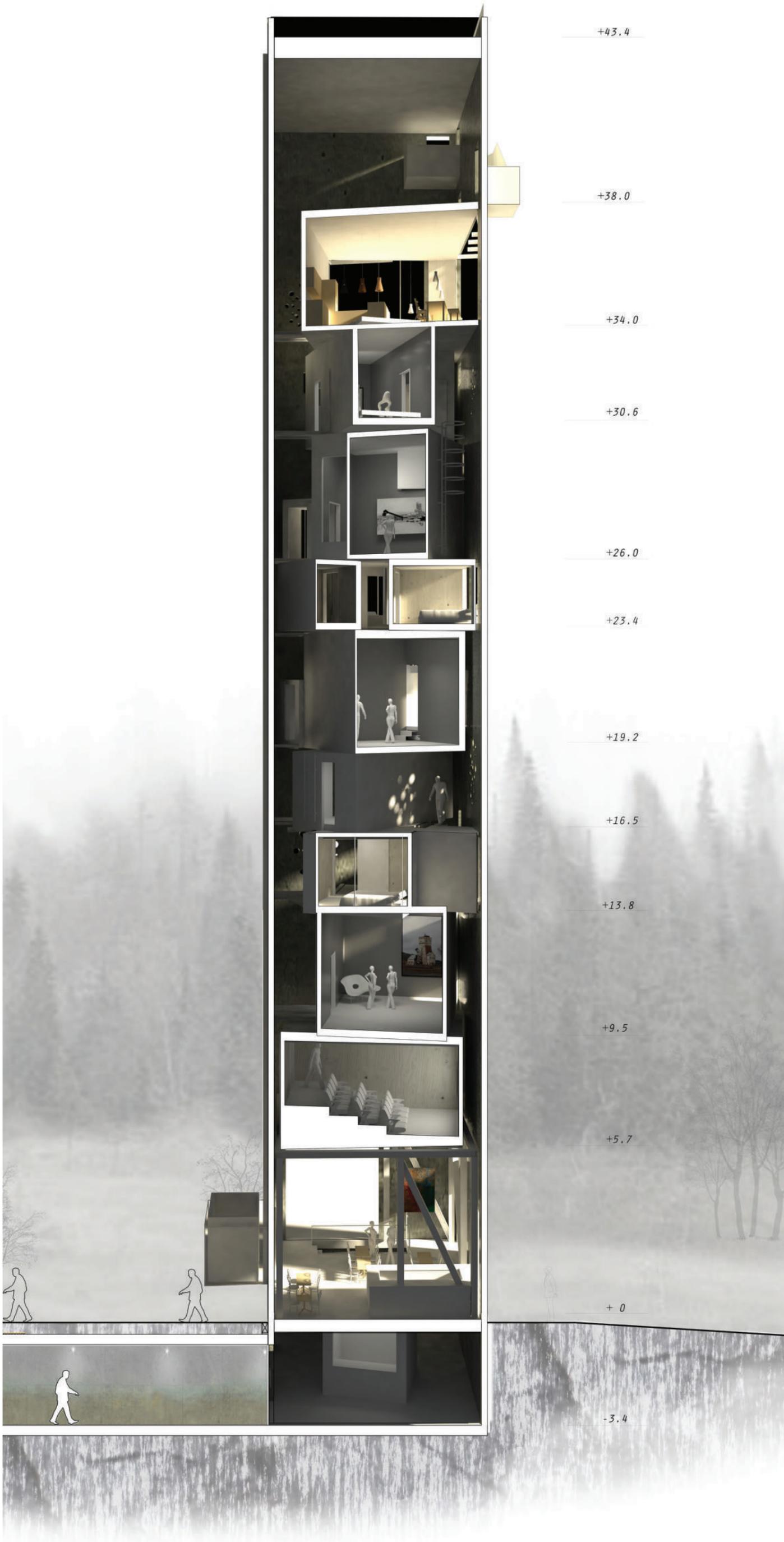
The path declines until eventually you enter into the ground. This gives the visitors a better understanding for the life in the mines before they reach the tower. But it also serves a practical reason as the visitors don't have to cross the railway to come close to the tower.

The sensation of being underground in the tunnel is enhanced by the materiality, the use of water pouring on the walls and that the width is very narrow.



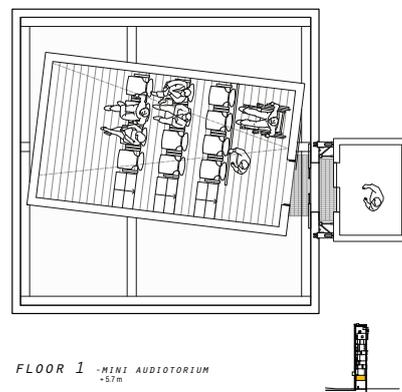
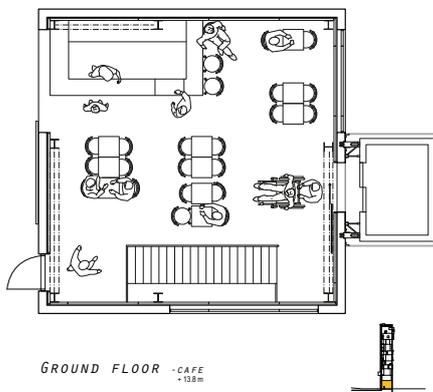
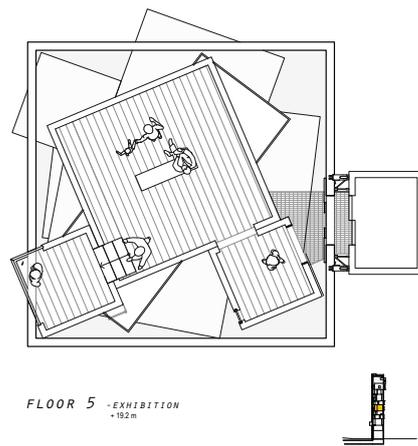
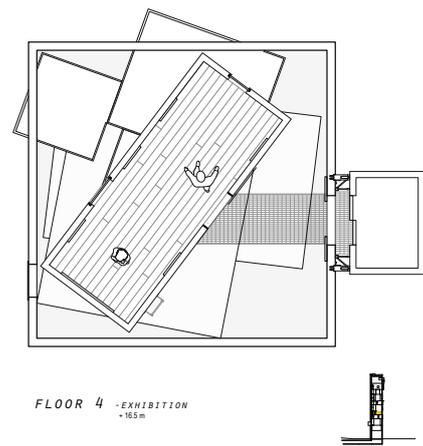
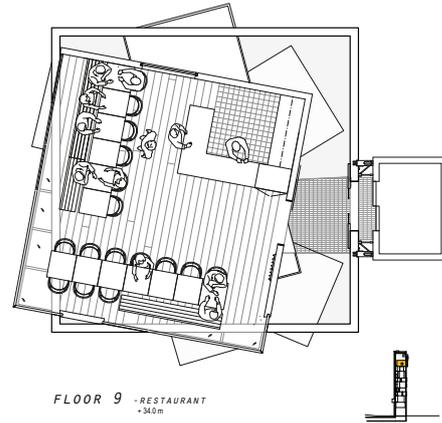
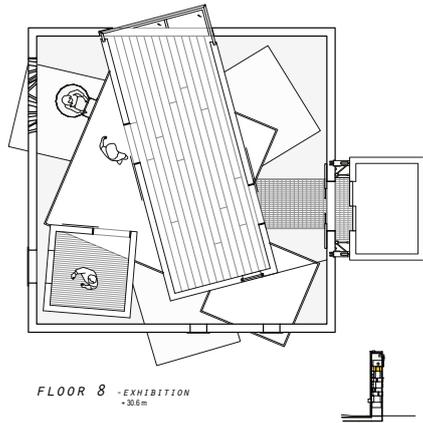
SECTION

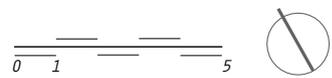
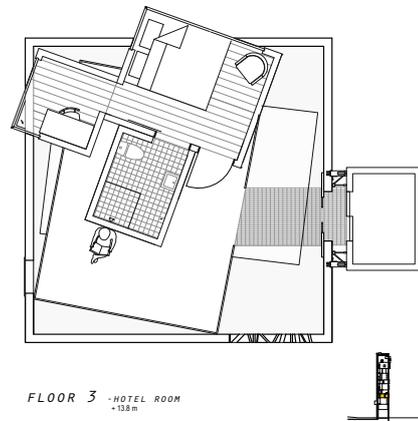
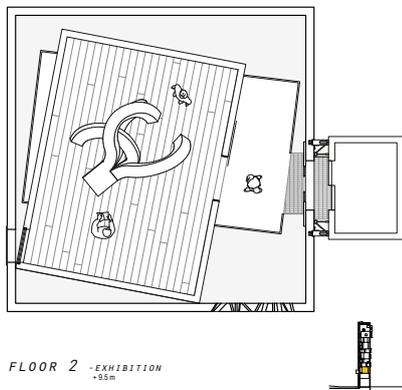
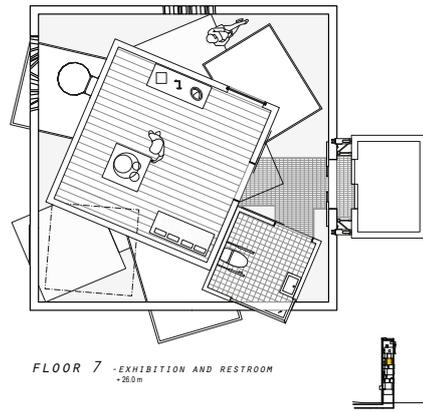
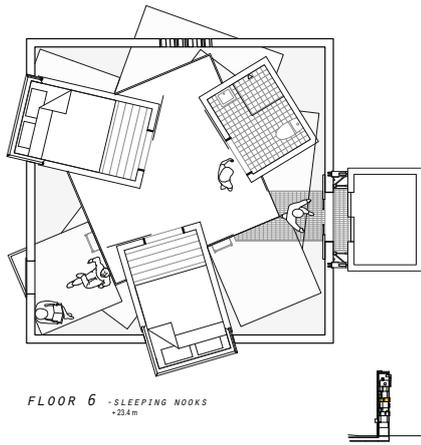
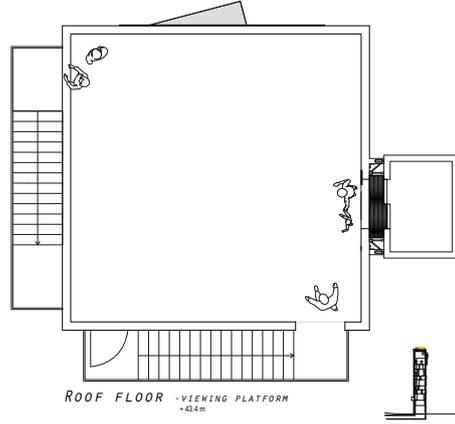
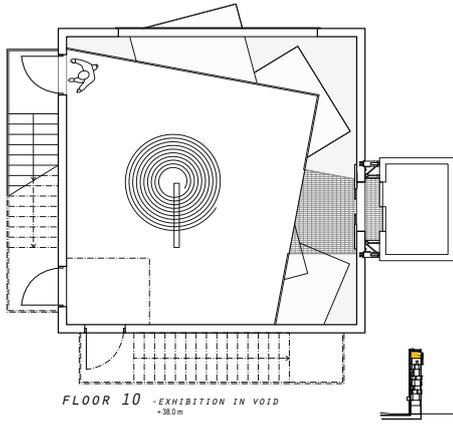
*The tower is 44 meters high in the section you can see the different characteristics of the spaces.
Unfold to see the entire tower.*



PLANS

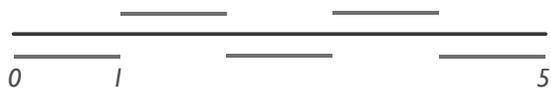
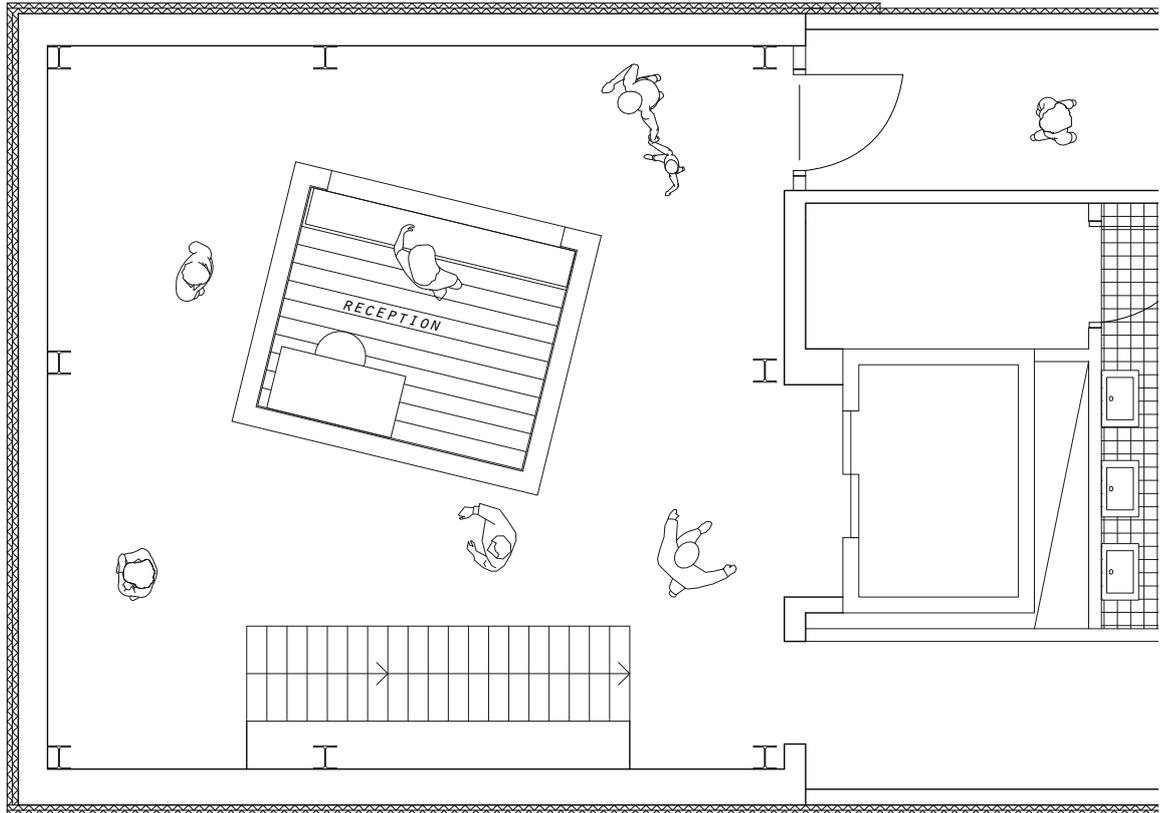
The layout of the plans follows the concept of variation, rotation. Each floor will be presented in more detail on the following pages.

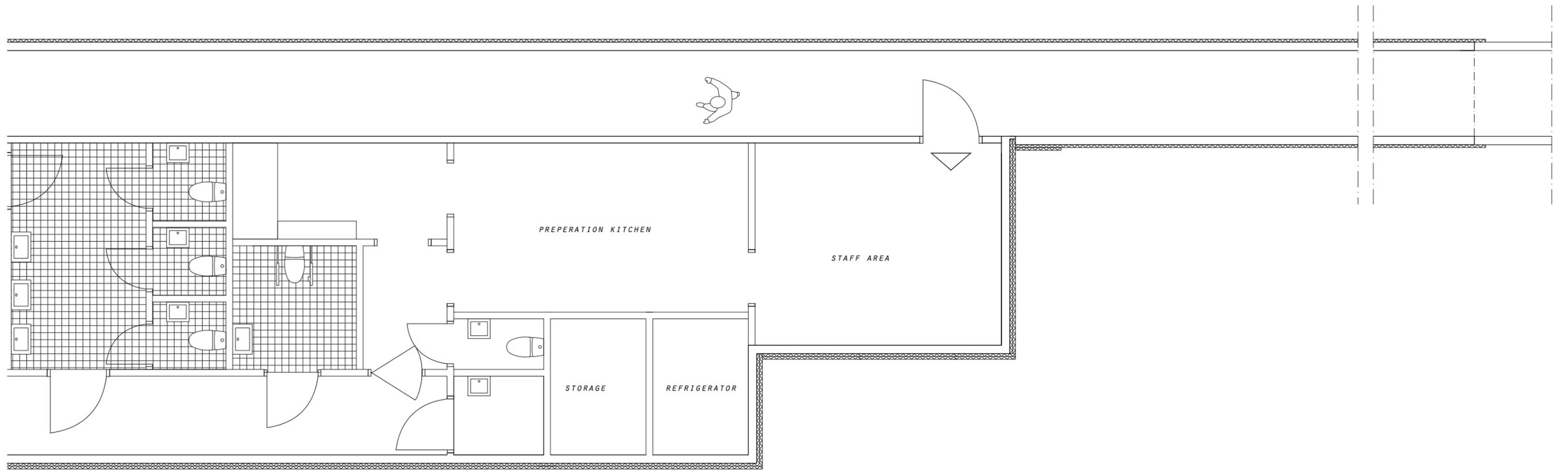




ENTRANCE FLOOR -3,4 m

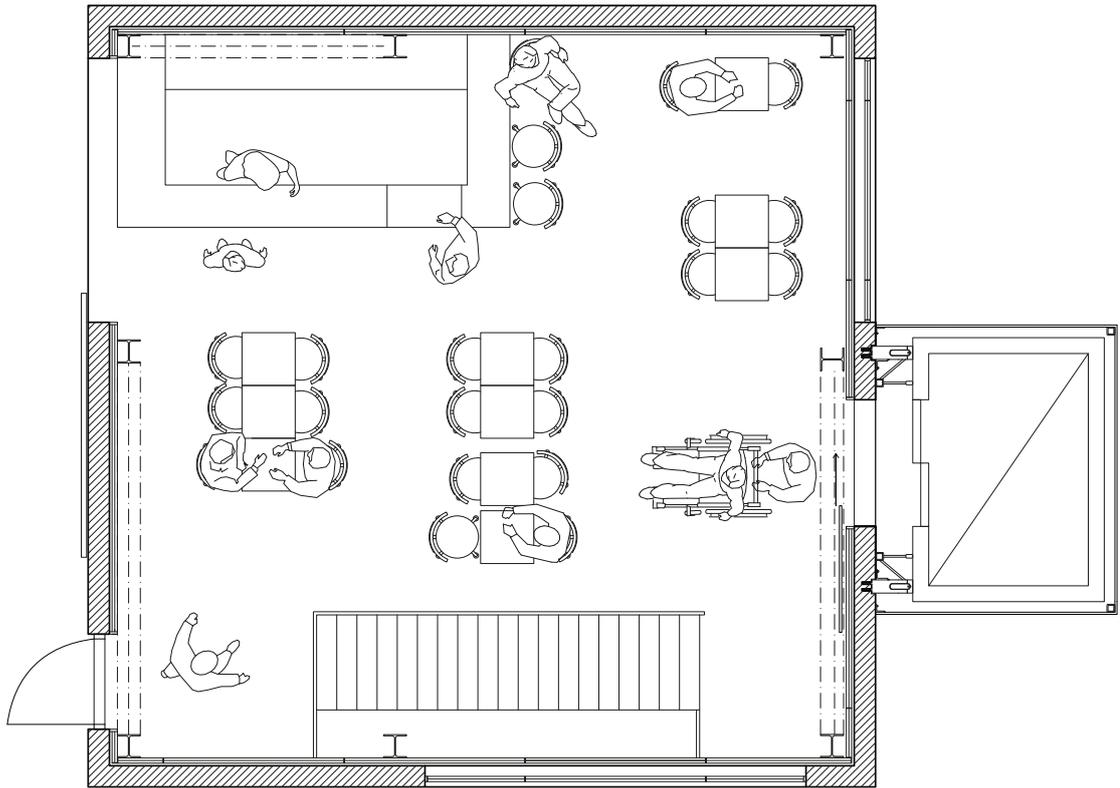
The entrance level is located underground, entering through the tunnel the visitors get a sense of being in a mine. The experience is enhanced by the choices of materials and textures. The entire tunnel is a non-heated space, the threshold between heated and non-heated is as you enter the space immediately underneath the existing head frame. On the entrance floor you find a reception with information about the visitor center and the surrounding area along with check-in service for the accommodation spaces and key service for the rental cottages. This floor also holds bathroom and wardrobe facilities along with restaurant kitchen and staff areas.





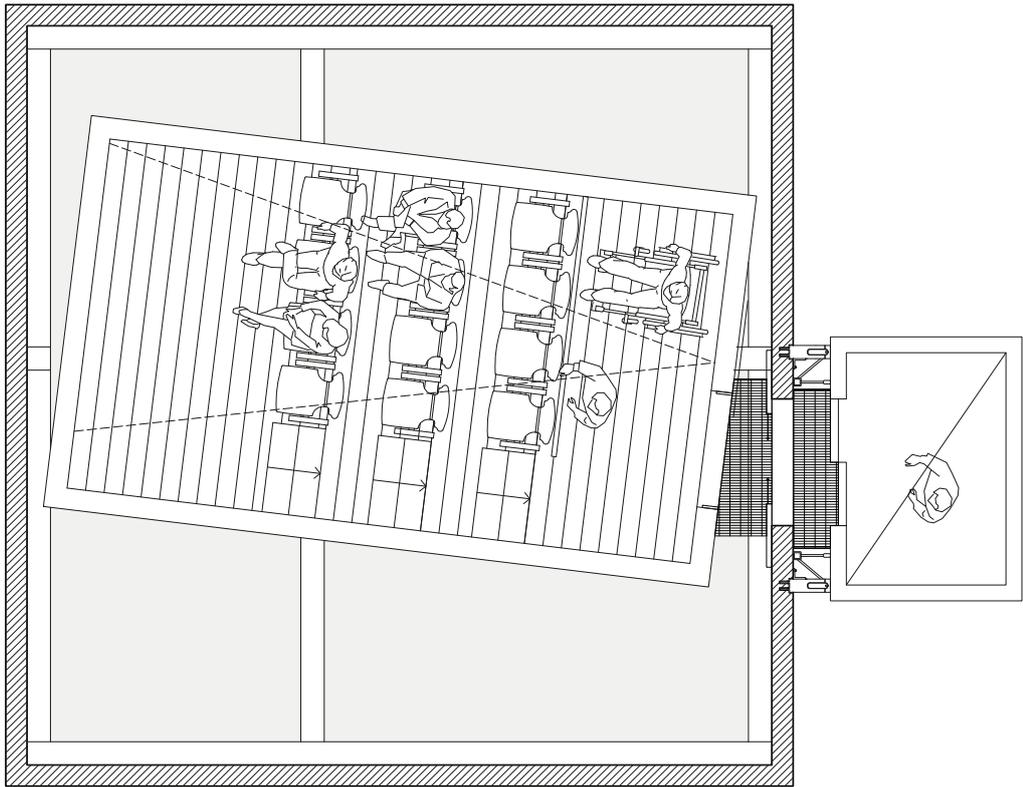
GROUND FLOOR + 0

From the entrance below you enter the ground floor from the staircase or the elevator, but it can also be reached from the ground level so that people walking in the area easily can access the café and so that the visitors can have a cup of coffee outside in the warmer seasons. The cafe is situated in a glass box that is situated inside the existing shell, through the glass the rough and worn surfaces of the concrete walls can be seen as a reminder of the previous state of the tower.



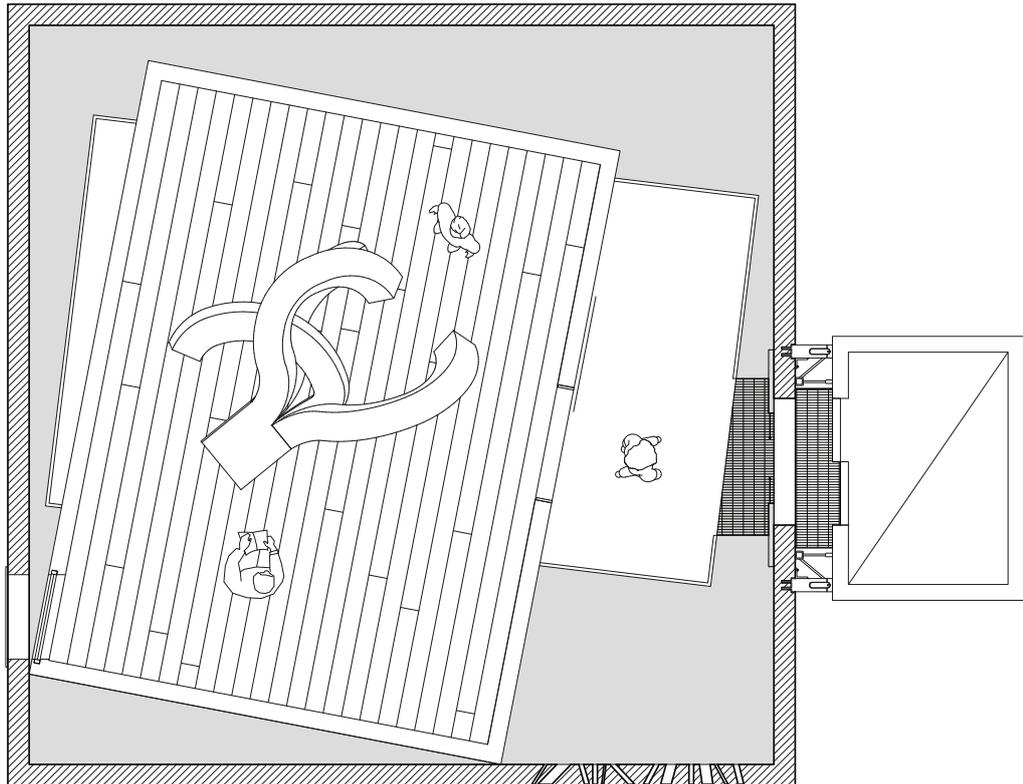
FLOOR I + 5,7 m

The first space that you reach as you move up through the tower is the mini-auditorium. It can be used to introduce exhibition by a short film, to host smaller conferences or as a small movie theater for the locals.



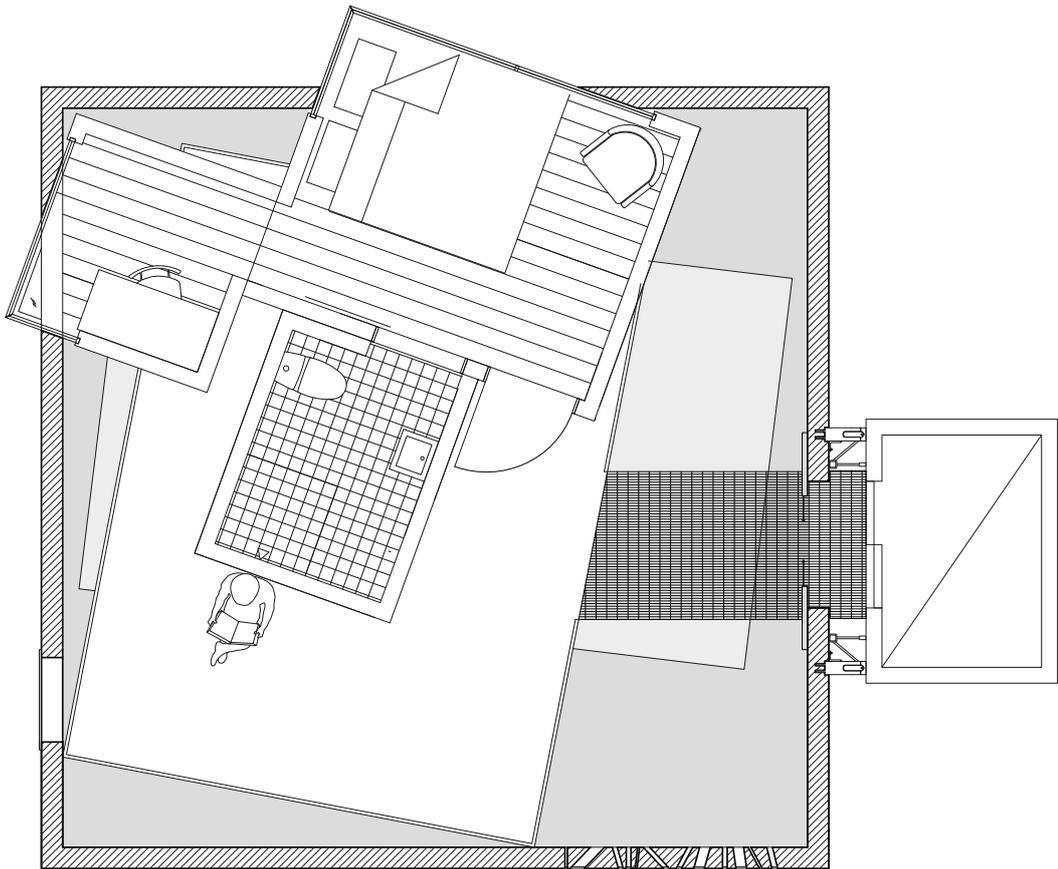
FLOOR 2 + 9,5 m

In the second box you find the first exhibition space, the large white spaces are completely separated from the void space, the only place you can sense the presence of the exterior space is by the small windows in the south west corner, one by the floor and one by the ceiling allow light from the openings in the existing tower to enter into the space but without offering any views to the outside.



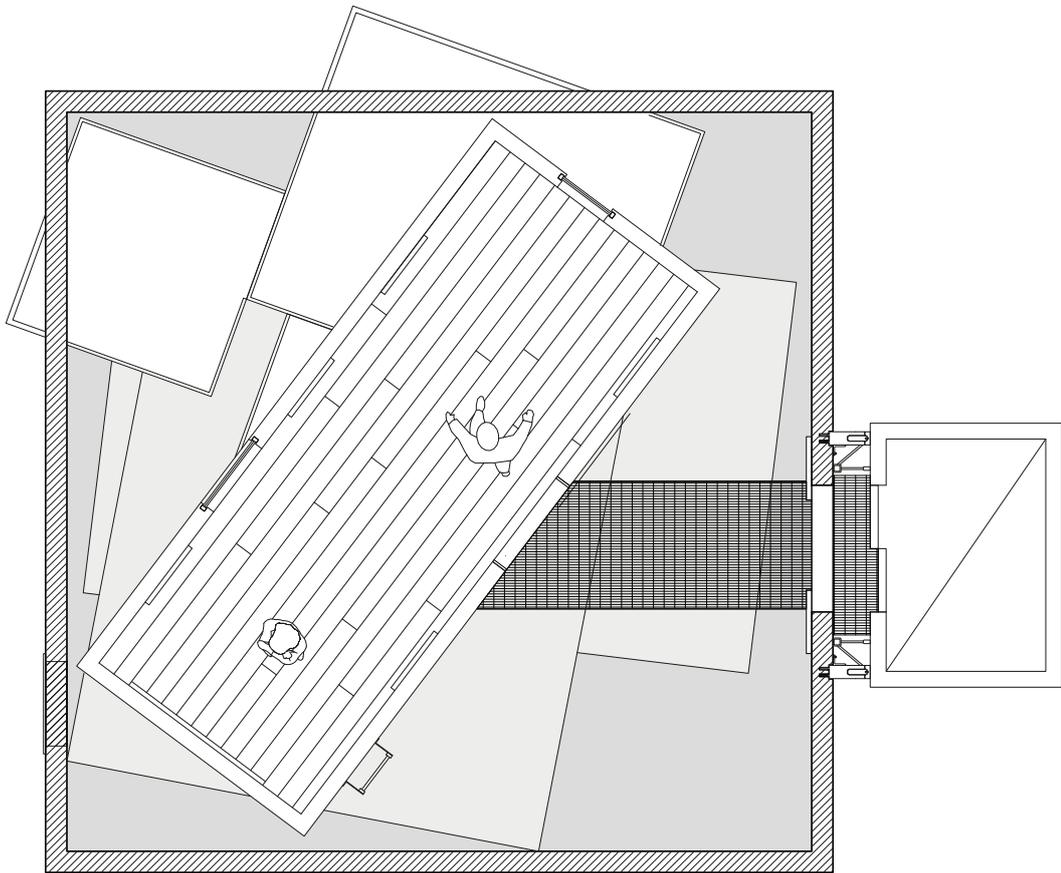
FLOOR 3 +13,8 m

On the third floor you find the first example of accommodation within the tower. A larger bedroom connected to a private bathroom and a smaller room that could be used as a second small bedroom or as an office for artists in residence. The roof of the box below gives an exterior space in the void that can be used as a workshop space or just as a place to hangout and relax.



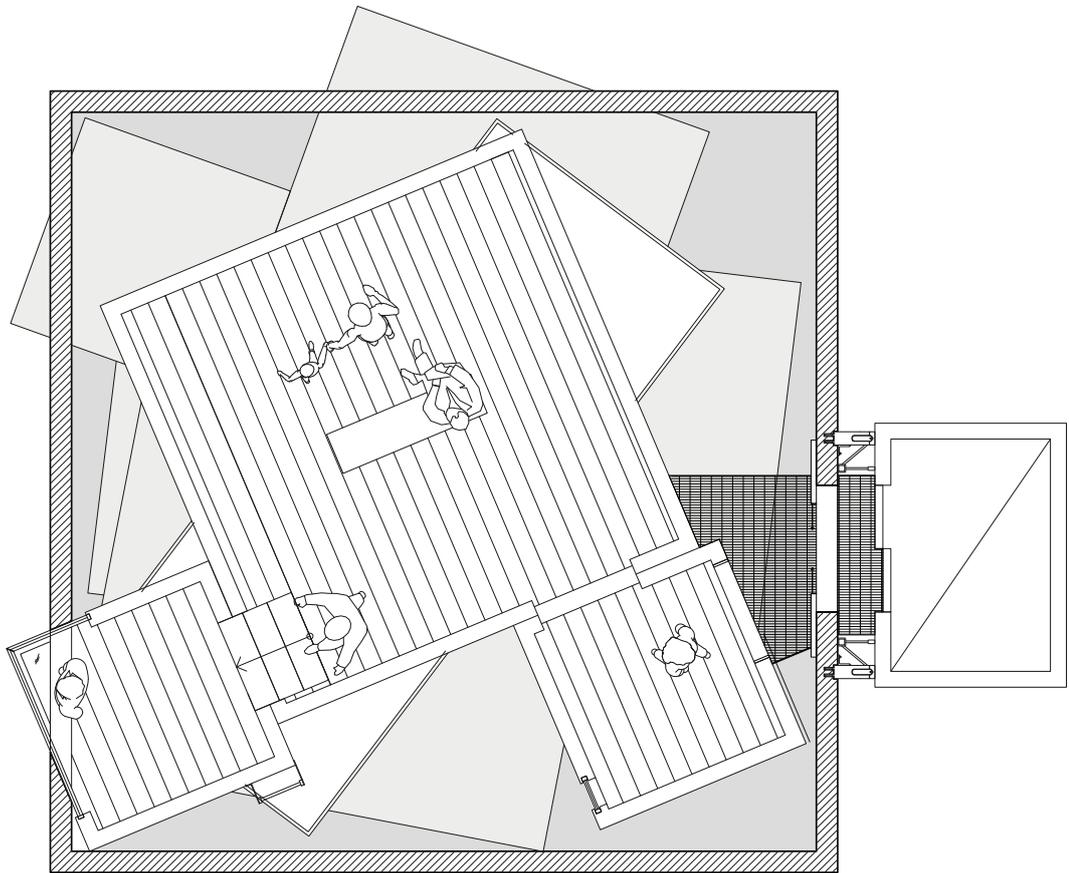
FLOOR 4 + 16,5 m

On the 4th floor you find a exhibition space with a rectangular plan the larger walls are perfect for exhibiting smaller paintings or photographs. Through the windows at the end of the space you can see the light play in the void and larger pieces that can be exhibited in the void itself.



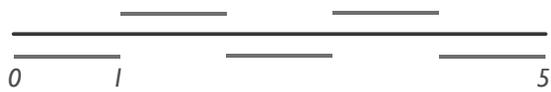
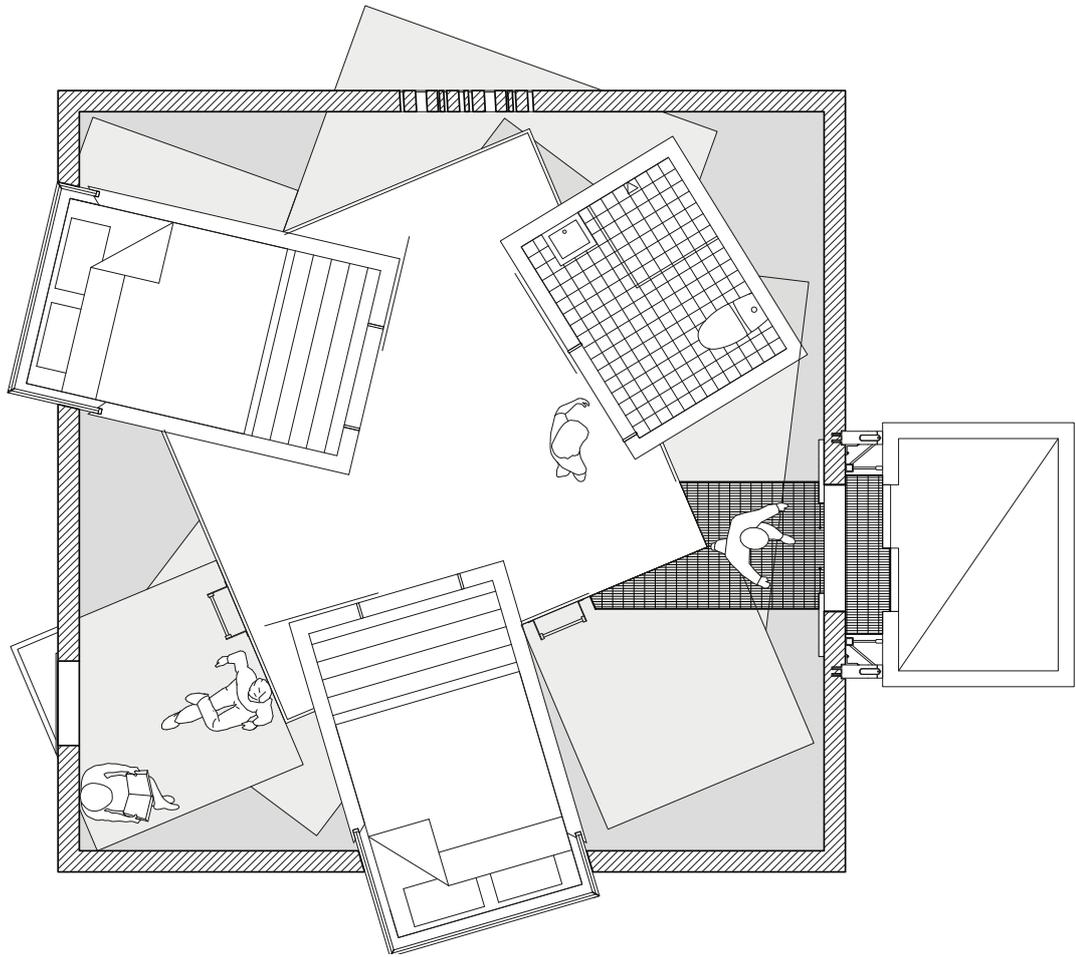
FLOOR 5 + 19,2 m

Exhibition spaces are also found on the 5th floor, here one large and two smaller boxes, spaces are arranged in a sequence. The difference in size and how you enter into the different spaces gives a unique experience. From a small box you reach the larger space and from that you can reach yet another small space by climbing a steps.



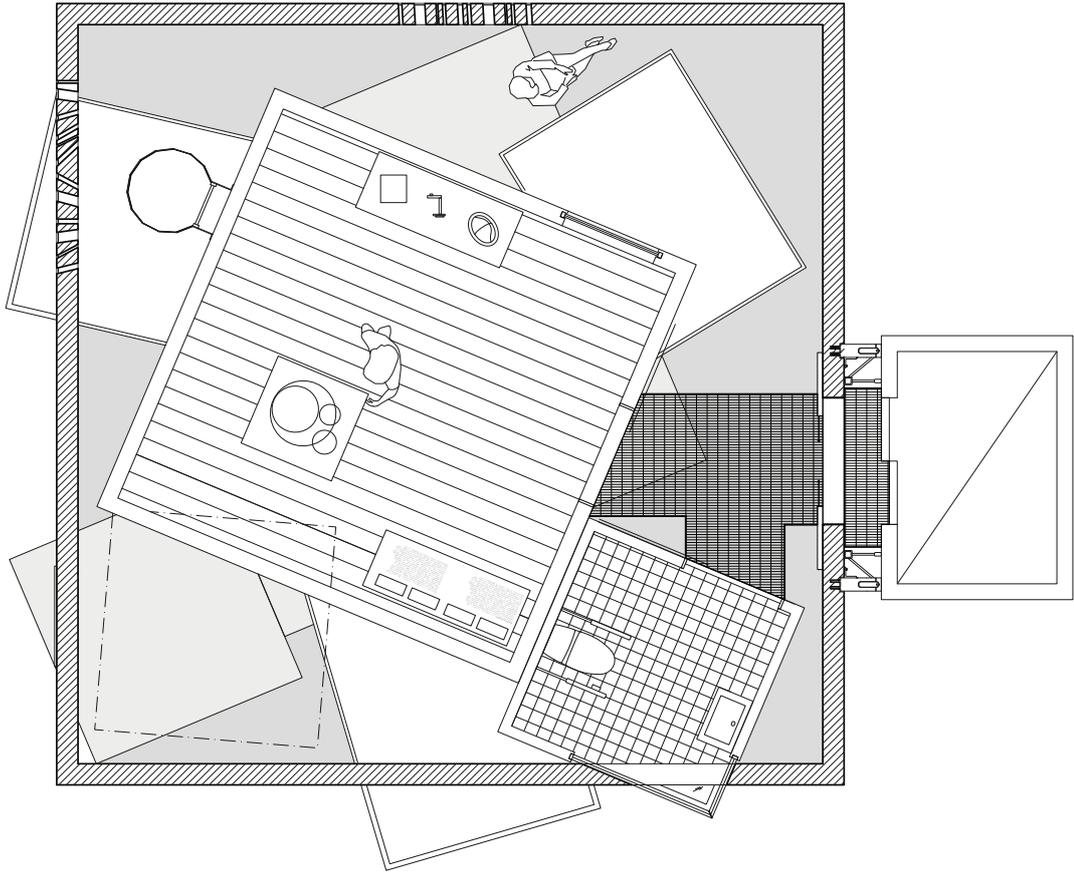
FLOOR 6 +23,4 m

On the 6th floor you find the second set of sleeping nooks, to small sleeping spaces each only slightly larger than a queen size bed and a bathroom are arranged in a cluster on top of the exhibition space below. The configuration of the boxes leaves a courtyard in between them that can work as a common spaces for the people living in the nooks. There are also a more private platform that only can be reached from this floor perfect for a picnic tête à tête.



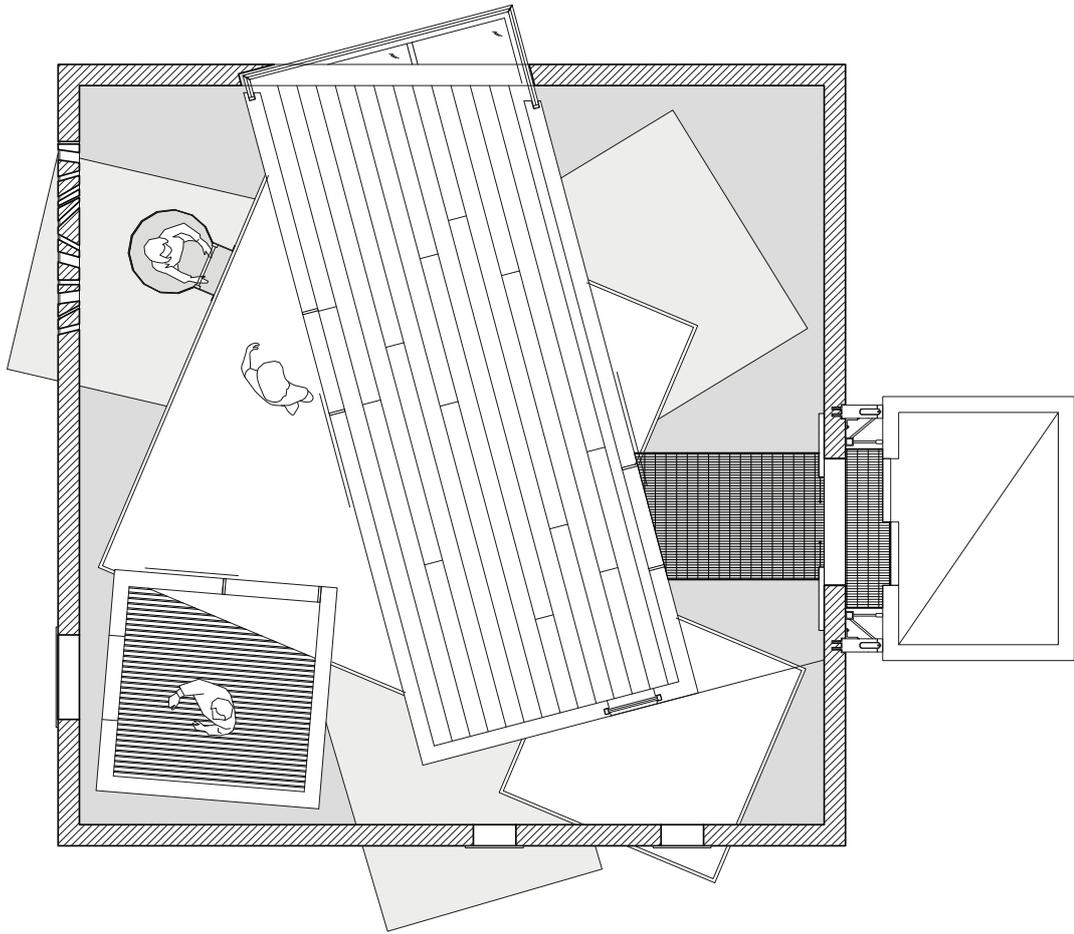
FLOOR 7 + 26,0 m

From the 7th floor you reach a larger exhibition space, several smaller roof platforms and a public bathroom. The exhibition space is a white cube, its' large volume make it suitable for different kinds of exhibitions. A large window reaching from floor to ceiling connects the large white space with the void, allowing the existing rough space to disturb the perception of the perfect white cube. IN the opposite corner one of the exhibition spaces from the 8th floor is intruding into the space.



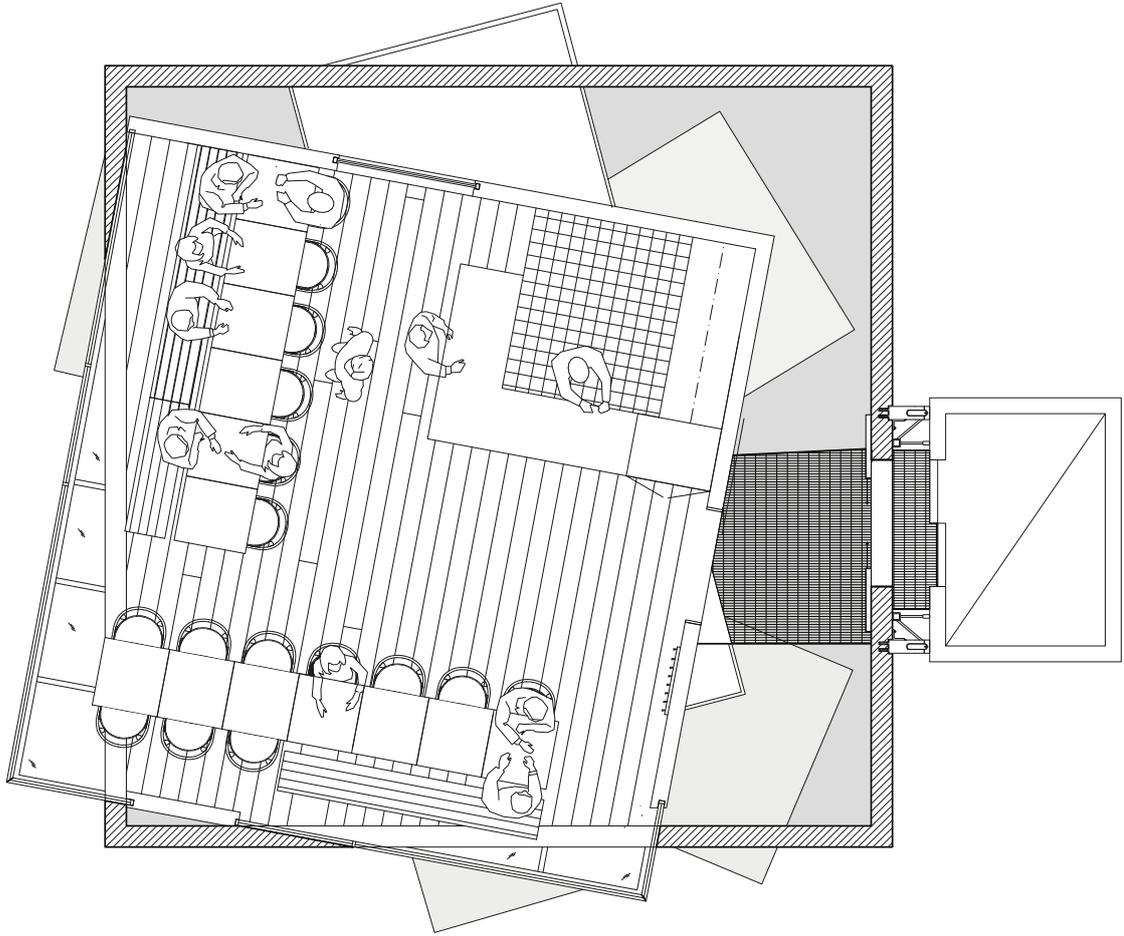
FLOOR 8 + 30,6 m

On the 8th floor there are two different interior exhibition spaces as well as a void platform that can be used both for exhibiting smaller pieces and as a view platform. The two interior spaces have completely different characteristics the larger one is rectangular and narrow, with corner piercing through the existing concrete wall to provide view in the direction of the nearby mine, Mossgruvan. The other room is very small and can only accommodate one or maximum two persons at a time. Here you enter on a grating suspended in the middle of the space so you have a void underneath you as well as above. A small window allows the visitor to look out but nothing but the sky will be visible, the spaces offers a very special and focused experience.



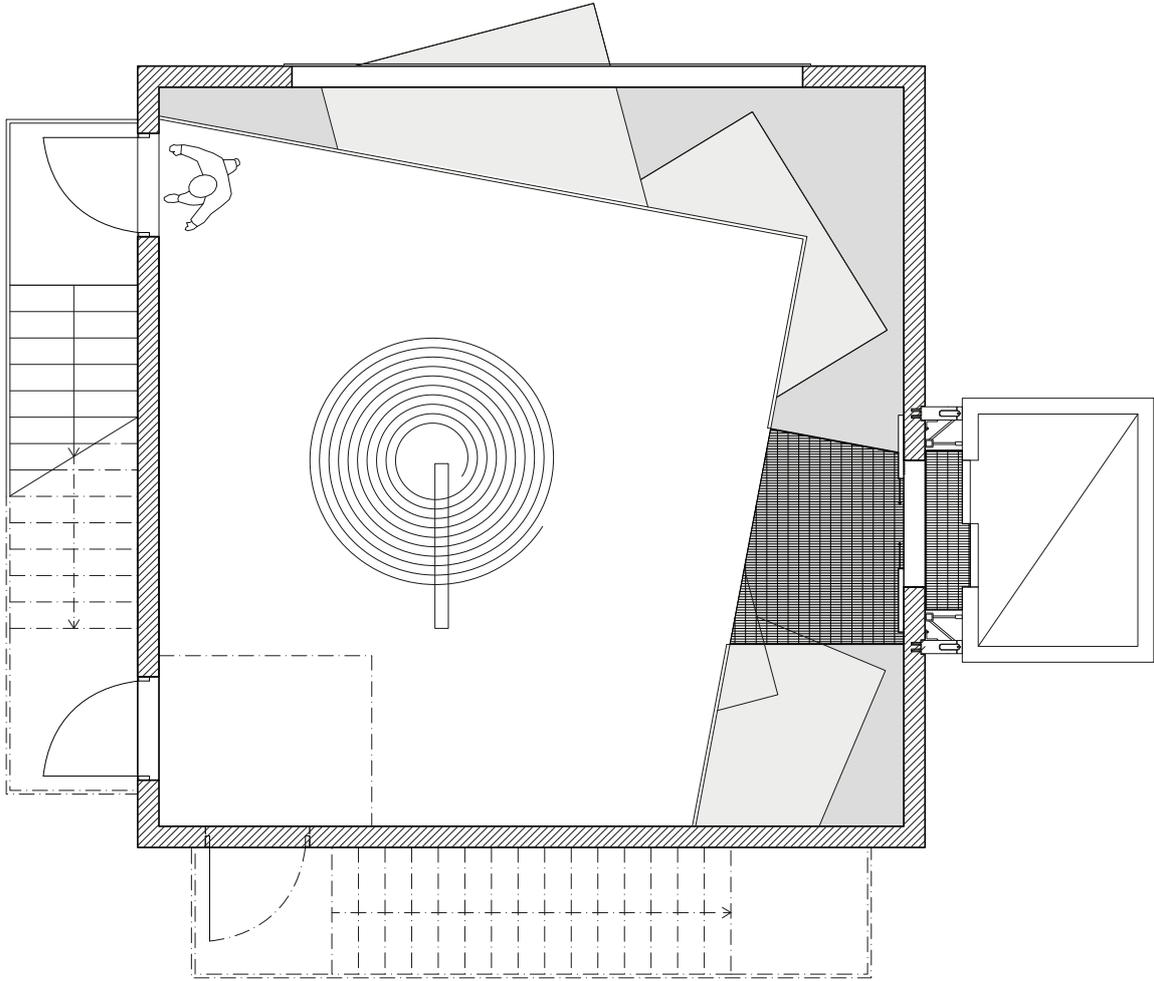
FLOOR 9 + 34,0m

On the 9th floor the visitors find the restaurant. Here they can enjoy the splendid view over the tree tops while having a dinner or a snack. The restaurant is also one of the social nodes of the building where tourist and visitors can meet, interact and be guided by the local inhabitant that not only work in the restaurant but also come here themselves to meet people and to share their knowledge of the surroundings, both in present and past days.



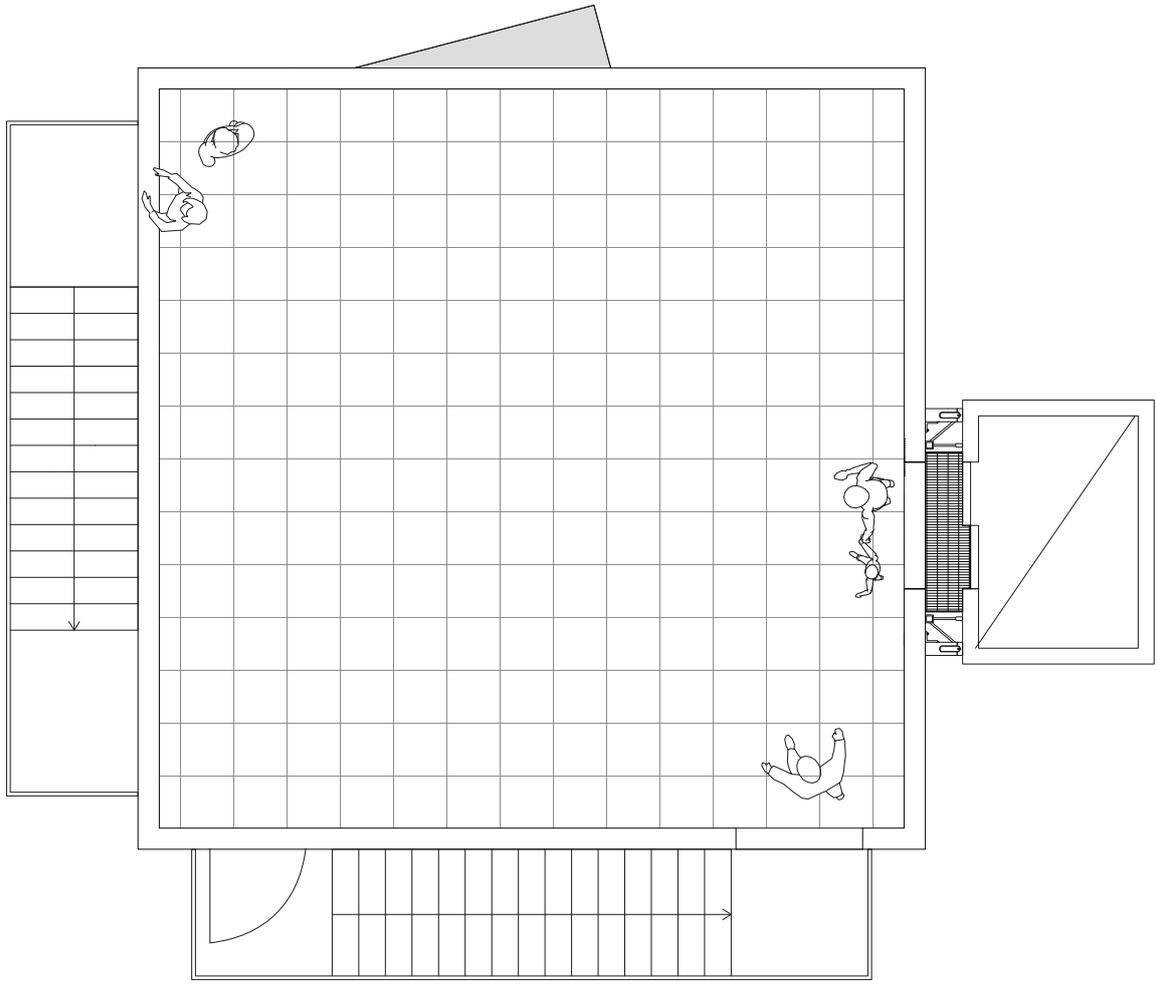
FLOOR 10 + 38,0 m

The entire 10th floor is a part of the void, from this floor you can see all the floors that you passed on your way to the top and your eyes is drawn to the narrowing gaps along the existing walls. The floor space can be used as part of an exhibition or an extension of the dining area for the restaurant or why not as a dance floor. In the ceiling you can see the remains from an industrial transportation system side by side with pristine white balcony acting as a landing for the staircases leading up to the roof terrass.



ROOF TOP TERRASS

The roof top terrass is used as a viewing platform on top of the head frame, from here the visitors can see the undulating forest landscape, the nearby village and the closest other mines. From here you can really sense the relation between the landscape and the mines in the area, and decide where to go next. The roof top can also be used as an extension of the restaurant in the summertime.

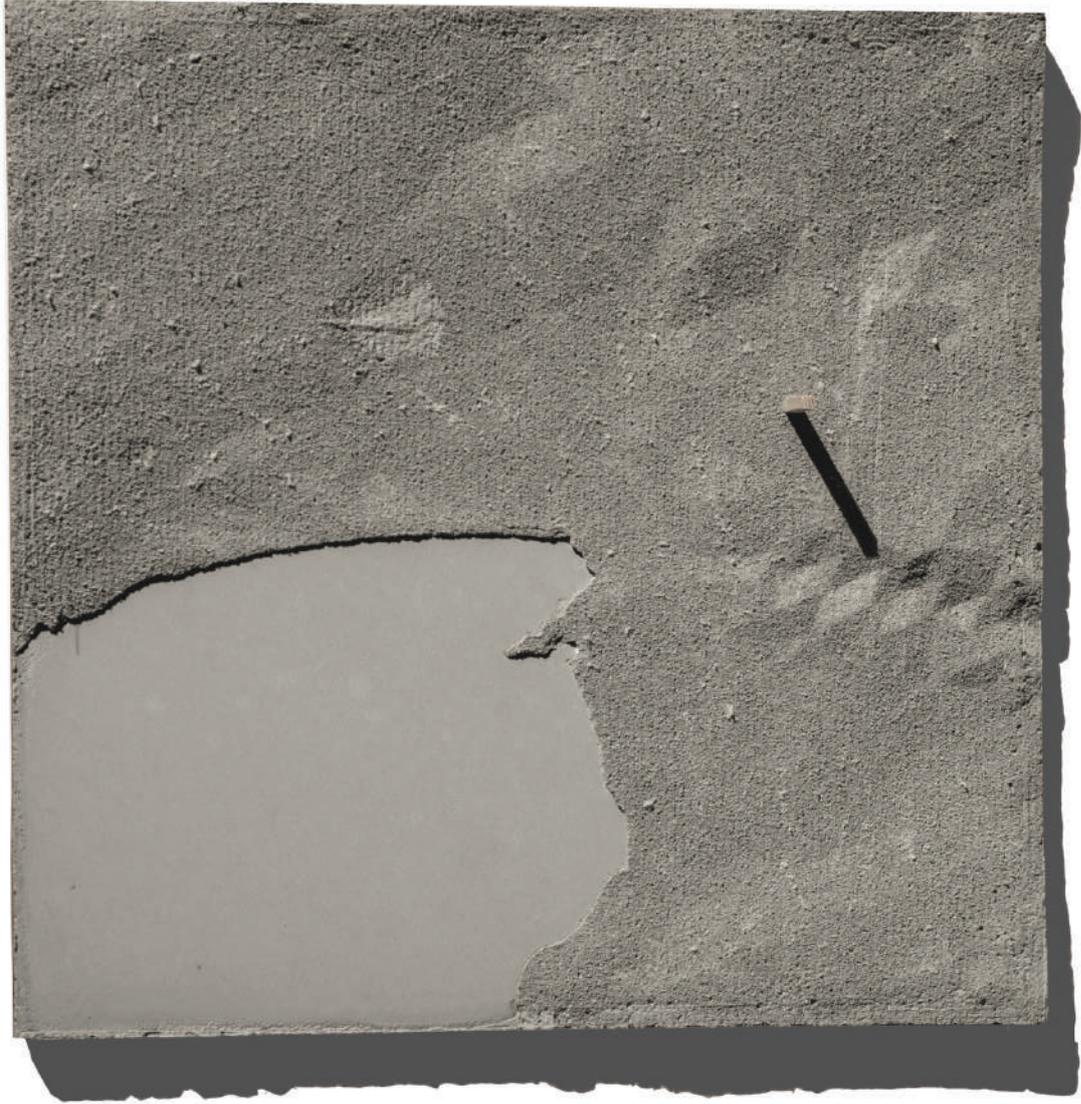




VIEWS AND MODEL PHOTOS

MODELS





Model photo of landscape model in concrete. North directed downwards.



Model photo of section model. Floor -1 and ground floor.



Model photo, underground entrance and ground level café space



Model photo, relationship between interior and in between spaces



Model photo, relationship between interior and in between spaces



Model photo, extruding glass box



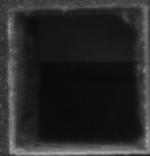
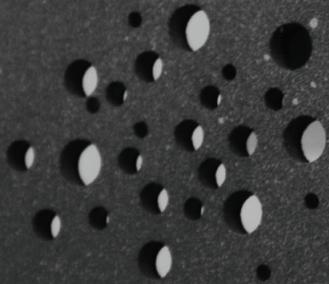
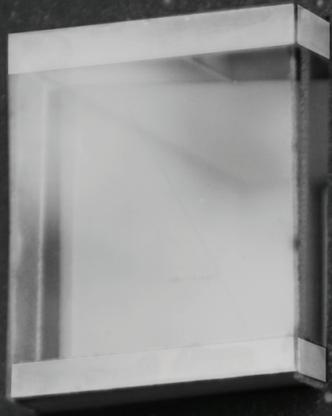
One of the large exhibition spaces, the windows in this room corresponds to the existing windows in the exterior skin. The placement towards the floor and the ceiling give a soft light and the absence from views to the void and the exterior gives full focus to the exhibited items.



The restaurant is the main social meeting point in the building, here people can meet, cook or just have a chat. The idea of the restaurant is that it should feel more like if you are entering someone's large kitchen rather than a public restaurant. The different chairs, stools and benches have been bought at local flea market.







DETAILS



Industrial ladders

(page 88)

White painted wooden planks

Window in existing concrete shell

(page 88)

Plywood sheets as interior surface

Extruding boxes

(page 87)

Structural steel profiles

(page 86)

New openings in existing skin to allow light to enter

(page 89-90)

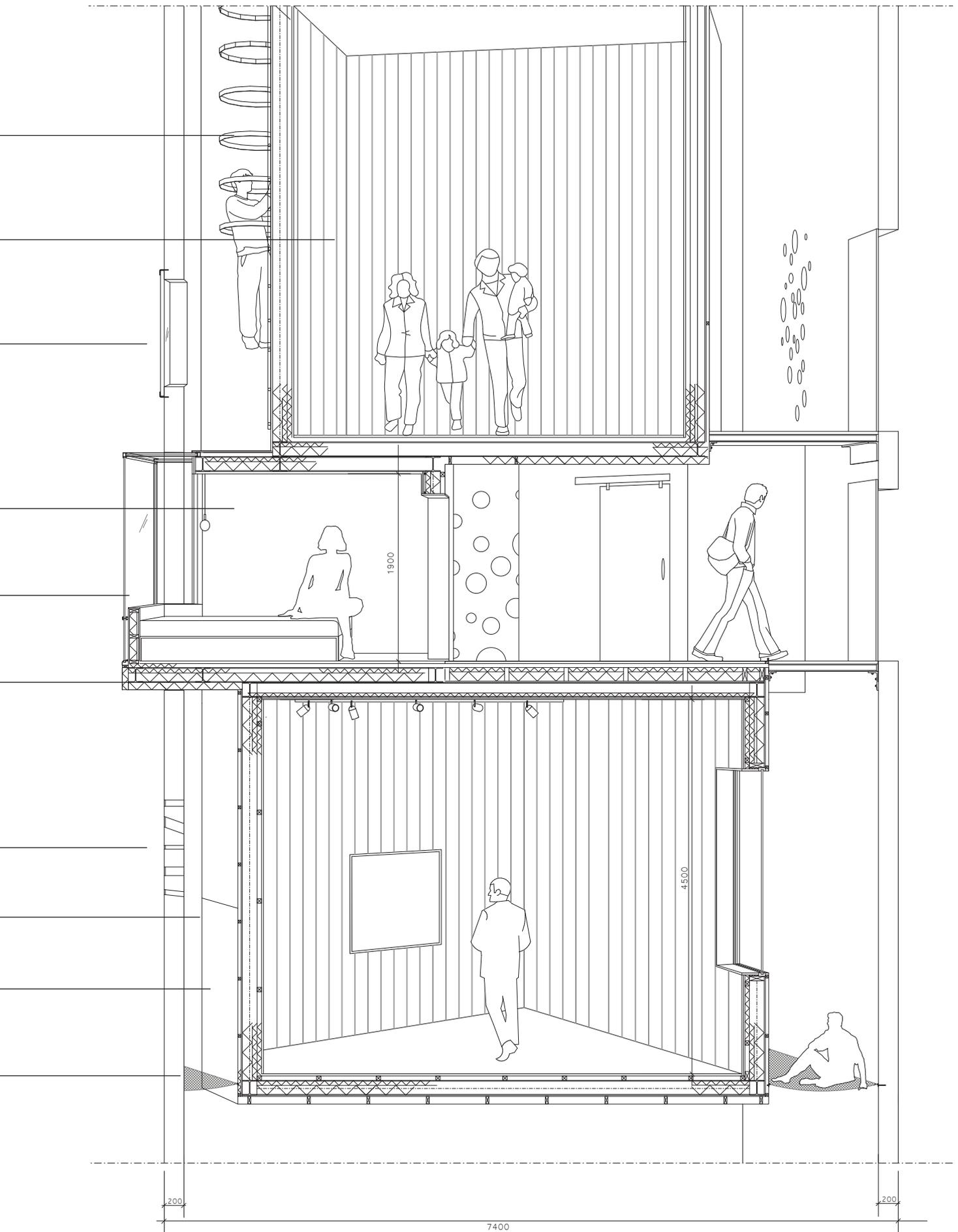
The void

(page 85)

White painted metal sheets

Metal mesh

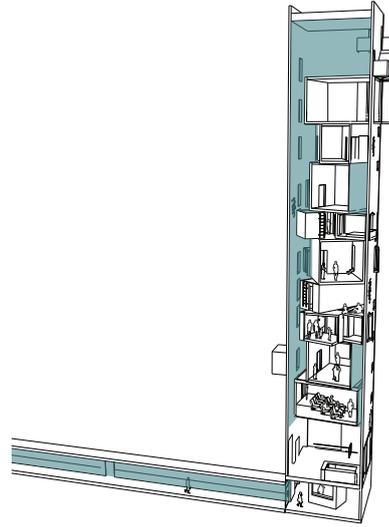
(page 88)



DETAIL SECTION 1:50

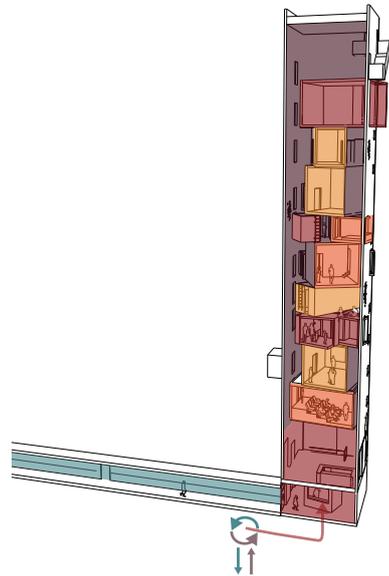
THE VOID

The void is the space between the boxes and the existing shell, it is mostly used for transportation but also work as a possible extension of the exhibition space as well as a respite and a place to reflect upon the differences between the new and the old.



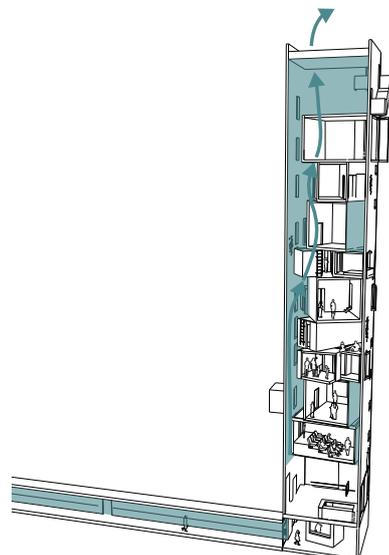
INDIVIDUAL THERMAL COMFORT

Depending on the function in each box the comfort demands as well as the thermal loads in the space are different. This enables the heat exchange in between the spaces and reduces need for heating in spaces that aren't used.



NATURAL VENTILATION

The void is also enables use of natural ventilation of the boxes, as the height of the tower and thus the void contributes to a stack effect and enhances the natural flow of air in the building.

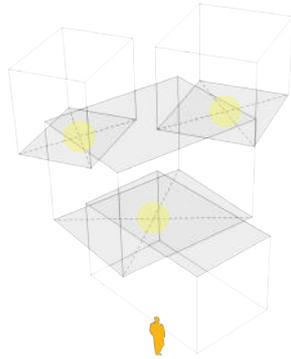


STRUCTURAL PRINCIPAL

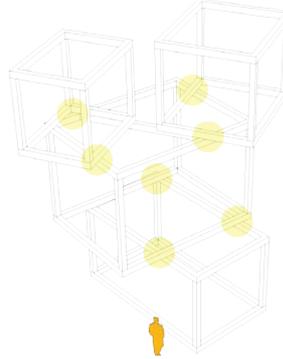
The structural system are made up by stiff frame boxes made from steal profiles. The boxes are then stacked on top of each other



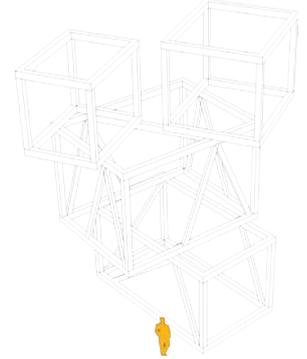
The structural system are made up by stiff frame boxes made from steal profiles. The boxes are then stacked on top of each other



The center of gravity for each box is located on the box beneath.



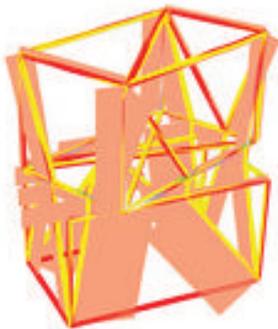
The points where one box meets another are the weakest points for the beams.



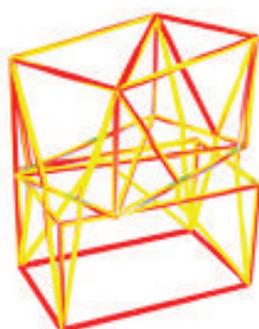
Bracing is introduced

STRUCTURAL SIMULATION

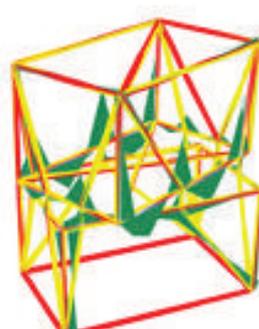
Simplified structural simulations was carried out in Karamba to find approximate cross sections of the beam and pillars in the steal box frame.



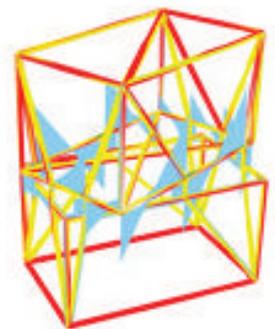
AXIAL LOADS



UTILIZATION



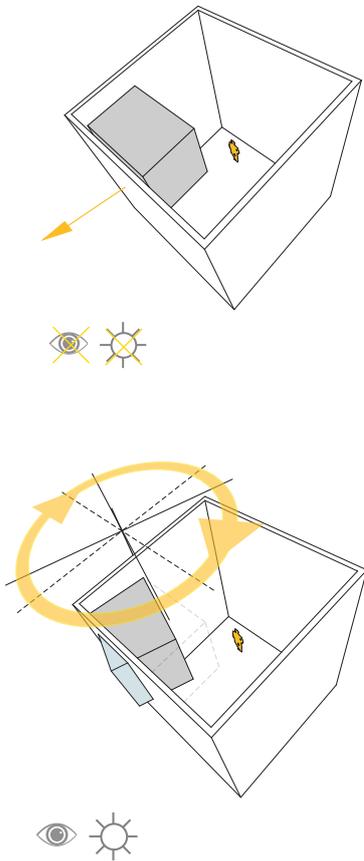
MOMENT



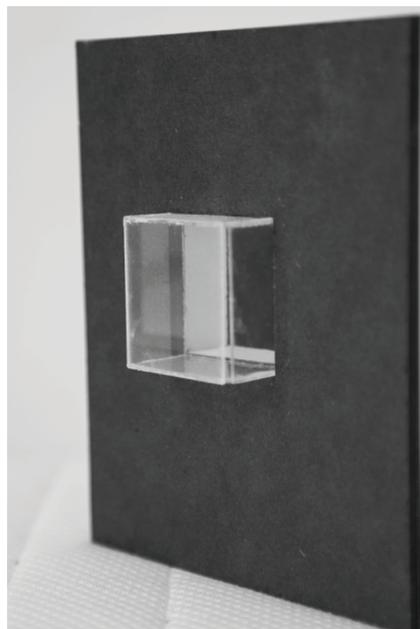
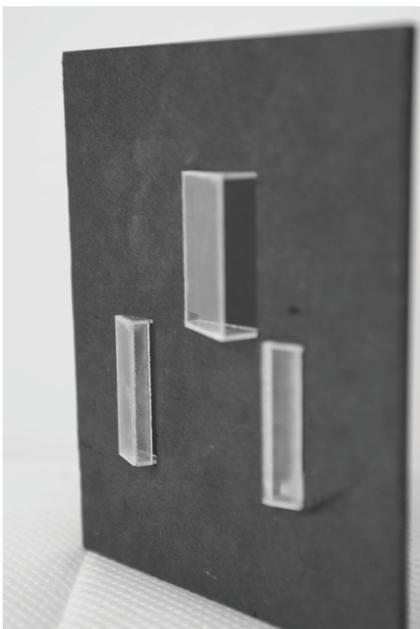
SHEAR FORCES

PIERCING THROUGH THE WALL

Where the function boxes are piercing through the facade the existing concrete is cut by a diamond wire in order to get a precise and smooth surface. As the box cut through the wall the floor, ceiling and the walls change material from metal and wood to glass.



Early concept model of solution for exterior views in the interior spaces.



Model studies of new openings in the existing facade.

THE EXISTING OPENINGS



In order to make the concrete shell wind and rain tight the existing openings need to be sealed whether they are old windows or holes due to the decay of the building. A simple plane of glass is attached to the existing wall by metal clamps and the sealed with a soft joint.



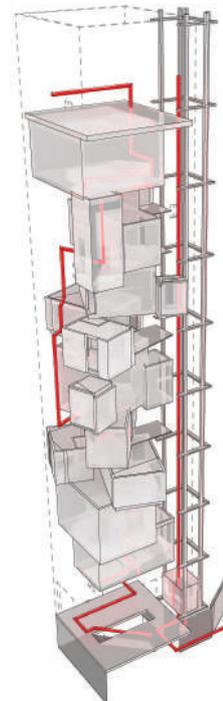
There are two different kinds of openings in the existing facade, the rectangular openings that used to contain windows and the organic holes caused by the passage of time and wear of the concrete. The chosen solution can be used for both types.

TRANSPORTATION



Inspiration: In orbit, installation by Tomás Saraceno

Between the boxes and the existing walls nets are suspended. They have two purposes, they enable the platforms to be free from railings so that the borderline between floor and void is blurred. They also work as a mean of transportation as you can climb on the nets to reach other platforms and thus being in the void space.

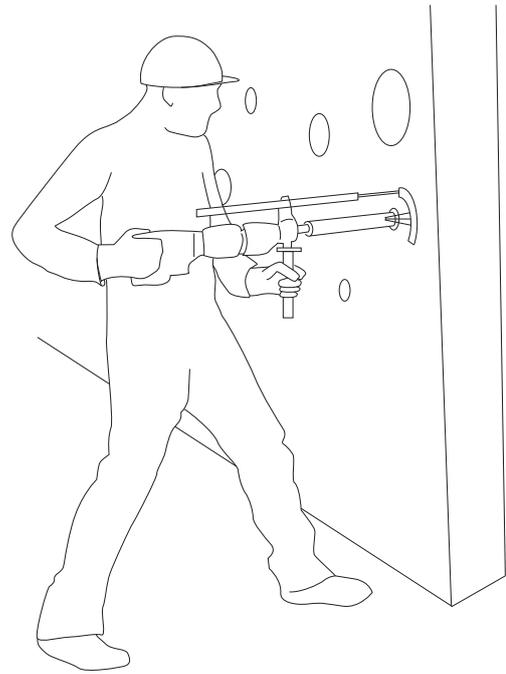


Ladders on the boxes in the void provide for an alternative way of transport through the tower.

DAYLIGHT THROUGH THE WALL

To allow daylight to enter through the existing concrete wall without reducing the feeling of the tower as a monolithic structure, smaller holes are drilled using a core drill. The holes are each drilled with a different inclination both in relation to the vertical axis as well as along the wall, by doing this the experience of the light from the inside is a pulsating light that is.

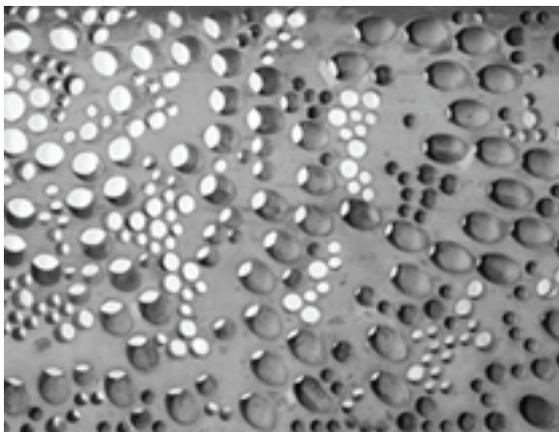
The holes can be made through drilling either from a temporary platform on the inside or the exterior of the tower.



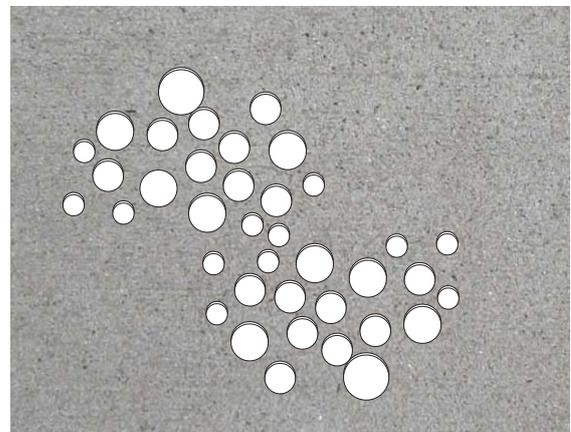
The use of different sizes of core drills give a variation in size and expression of the holes.



Core drilling is a common method to make holes in existing concrete structures.



The different inclinations of the holes also increase the variation. Through some holes you don't see anything but the concrete itself, while through others you see a glimpse of the sky or the forest.



The circular and elliptic holes arranged in an irregular pattern contrast to the existing openings in the tower that are very orthogonal and function driven.



Model test of openings in concrete shell, with different light angles



Model test of openings in concrete shell, the light and shadow play alters with the angle



Model test of openings in concrete shell, with different light angles



Model test of openings in concrete shell, the light and shadow play alters with the angle

