# REVIVE

## Transformation of an industrial landscape

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Rurban Transformation I 2021
Examiner: Nils Björling I Supervisor: Ida Röstlund


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## Abstract

Industrial landscapes are embedded in the structure of our cities. These landscapes can be seen as a result of today's consumption patterns. In a globalizing and transitioning world towards a fossil free future, production flows change and the use of endless resources is likely to decrease. These shifts might affect industrial landscapes such as the limestone quarry and factory of Cementa, situated right at the edge of the city center of Skövde. If the industry stops, the quarry industry will leave an inaccessible, large-scale modified landscape.

This thesis aims to explore how architectural design can transform an industrial landscape into a place for recreational and educational purposes. It will also explore how design can strengthen the mental connection to place and relate to time. This is carried out through a speculative design proposal. It will include a system of architectural installations along a recreational path through the industrial landscape. The installations aim to be a start to open up the area for new use and to work as a pedagogic tool to make the visitor more conscious about the place and time with focus on geology and human activity.

The thesis work has been carried out by an interaction between design and research throughout the process. Our design approach has been to build on the existing qualities of the site. This has together with studies of theories and reference case studies formed the outcome. Different design strategies have been developed in order to form an architecture that enhances the place's qualities and the historical layers. With a speculative transformation of the future use of the industrial landscape, we hope to raise interest about the place. The proposal could add to the discussion of the future use of the area.

Key words: *Cultural heritage, limestone, quarry, site specific, recreation, local materials*

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# Reading instruction

The thesis is divided in five parts.

**1. Introduction**
This chapter introduces the subject of the thesis, presenting background, research questions, aim and the outcome of the thesis. It also presents an overview of the process, method and the delimitations of the thesis.

**2. Theoretical approach**
The theoretical framework is developed through literature studies and reference case studies. In the end of the chapter we summarize and reflect how it can influence the design.

**3. Context**
The third part presents the chosen site and the local situation. The context is presented with a site analysis, including analysis of the landscape characteristic and historical background. In this chapter we also describe the local materials and the geology of the site.

**4. Concept & design proposal**
In this chapter the design proposal is presented. Design strategies and formulation of a program are outlined. Lastly, the main proposal is set in relation to other future potentials of the site.

**5. Discussion & Reflection**
The different parts of the thesis are discussed and reflected upon and conclusions are made.

## Student background

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**Education**
Master´s program Architecture and Urban Design — 2018-2021
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Material and Detail 22,5 hp
Architectural competitions 4,5 hp
Building climatology for sustainable design 3 hp

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Building climatology for sustainable design 3 hp

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## About the authors

We studied together during the bachelor and continued our master degree at Chalmers but in different directions. A mutual interest for transformation projects and site specific design shaped the direction for the master thesis. We also find it interesting to work with a project location that is between urban and rural conditions.

## Thank you!

We would like to thank our supervisor Ida Röstlund and examiner Nils Björling for support, valuable input and guidance during the work with our thesis project.

We are also happy for the interesting meetings and great input from people we met during our site visits in Skövde. A special thanks to the people at Platåbergens Geopark for their cooperation throughout the process.

# Background

In a globalizing and transitioning world towards a fossil free future, production flow change and the use of endless resources is likely to decrease. Some industries might have to shift or end their activity. This can open up for a new use. Industrial landscapes are embedded in the structure of cities, large as small. The locations of these areas are often pushed towards the fringes of the cities and at the edge of natural landscapes. They often exist separately and detached, not being part of either the urban sphere or the rural parts. The area can act as a barrier, with fences or modified topography, resulting in a detached and unapproachable space, disconnected from our everyday life. The post-industrial landscape could be seen as an undefined space in transition that is interesting to explore further.

In the master's direction of Rurban transformation at Chalmers (2021) a rurban area is defined as a space where potential from both rural and urban conditions are combined. This creates hybrid conditions. One example that is mentioned is the rural-urban fringes between the city and the countryside. The future use of unused industrial landscapes can fit within this definition. Because of their location and as they are places in transition. They have a potential to be a place where urban and rural assets can be mixed and create a stronger connection and understanding for each other.

## The modern need of fossil resources

In our modern society, we depend on the earth to provide resources. The way we use and consume resources today has an irreversible impact on our planet, it generates greenhouse gas emissions and destroys our ecosystem (WWF, 2020). The building and construction sector has a negative impact on our environment and stands for almost 40 % of the world's energy and process-related CO2 emissions. In which 11% is related to manufacturing of building material such as steel, cement and glass (IEA, 2019). With the threat of climate change it is important to find a balance where we respect and don't over consume the planet's resources. The UN Sustainable Development Goals and national initiatives such as "Fossil free Sweden" show a direction for future development. This puts pressure on industries to act to make a transition in order to meet the goals.

## Transformation

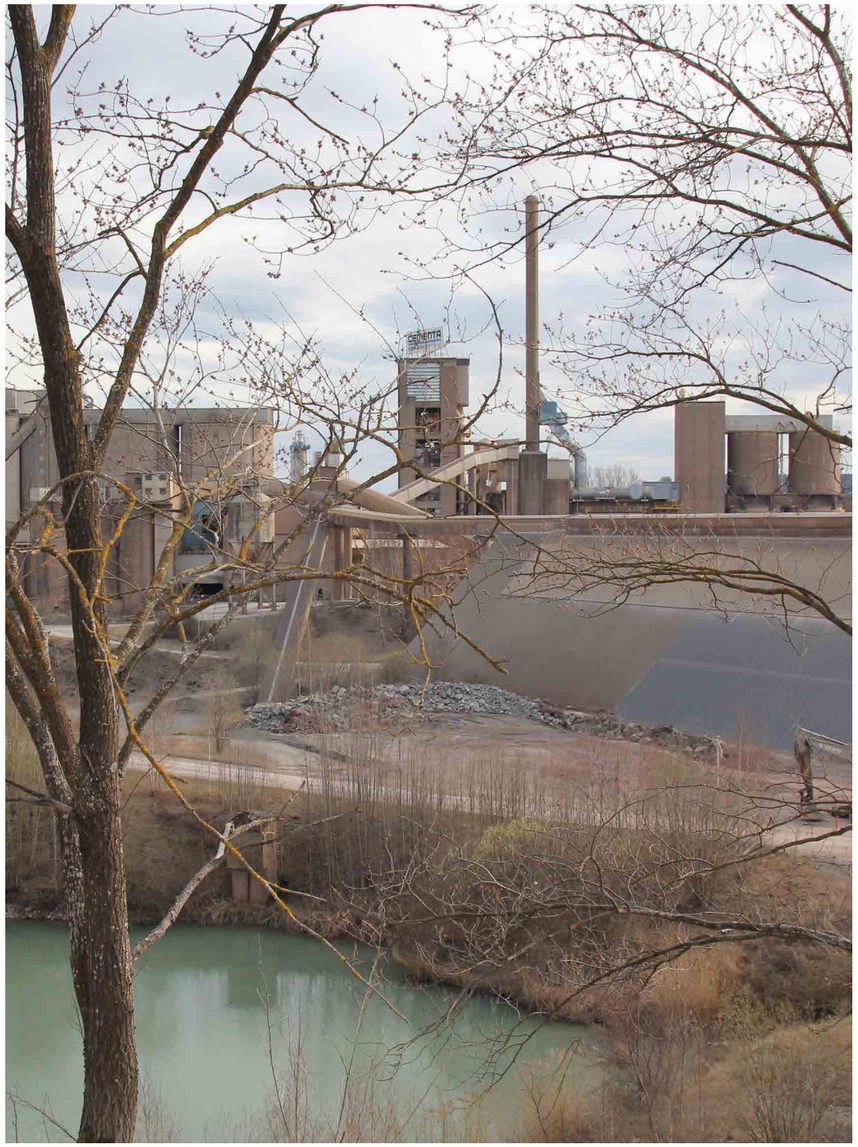
The industrial landscape is a typology that fits a specific function and there is a need for creativity to re-use and adapt it to a new purpose. In a broader context it is relevant to ask questions and speculate about their future. How the buildings and landscape can be taken care of but also if and how to connect to the identity and history of the place.

Within the architectural field, the idea of how to adapt a place to another purpose and at the same time strengthen the existing layer fits within a transformation approach. In the book Beauty Redeemed, Braaee (2015) means that one interpretation of transformation is to convert form or function but with connection of what was before and what is after, this being played out in space and time. Transformation is site specific and builds upon local resources. It relates to traces of the past, both made by human activity and natural processes. The past is given a new meaning in the future.

To explore and show one example of a transformation project in one specific context can inspire other situations and show their potential.







## Project location

The site location used in this master thesis is the limestone quarry Norra Brottet. It is situated in an industrial landscape at the edge of the city center of Skövde. The landscape consists of a cement factory and a quarry from where the raw material limestone is extracted from. The quarrying and lime burning has a long history around the mountain of Billingen. From small field furnaces to today efficient methods of extraction (Gullhögens bruk, 1966). The factory in Skövde is the second largest manufacturer of cement in the country and produces ¼ of Sweden's total amount (Cementa, 2020). Technical development and higher demand of cement have increased the speed of extraction which results in a larger impact of the landscape. The extraction rate peaked in 2020 when 1,5 millions of tonnes were taken from the mountain (Engelbrektsson, 2020). The close location to a city centre could be problematic with barriers and noise. At the same time, the extraction is transparent in response to the way we consume the planet's resources. If we continue using these materials in our constructions there will be a demand for continuing the production and extraction.

The stone quarry is a place where different interests meet. There is a national interest in extraction minerals but also a national interest in nature and recreational values (Skövde kommun, 2012). To have access to attractive natural environments close to urban areas is an important part of sustainable development and is declared in the Swedish government's strategy plan for Agenda 2030. Time spent in nature on a daily basis is connected in relation to distance; the further away, the less time spent (Naturvårdsverket, 2020). Several studies show that spending time outdoors increases our well being, in regards to both physical and mental health. It also plays a crucial role in the understanding of nature, which contributes to the notion that it is worth preserving, which could lead to a more sustainable lifestyle (Folkhälsomyndigheten, 2021).

The current quarry permission expires in year 2031. After this, the quarrying could continue if a new application is approved. If it is denied, the stone quarry can be transformed to be used for other purposes. With an unknown future, we think it is relevant to speculate on what the place can be if the activity ceases. Or if some parts of the industrial landscape can open up for new use in parallel with an ongoing but more sustainable production. With an increased interest and care for nature and recreational values in the local surrounding, our main focus has been to explore a speculative transformation of the industrial landscape into a place for recreation and education. A place where we can use architecture as a stepping stone and a first step to open up the area for new use and connect to the culture and history of the place that can form and inspire the future use.





*How can architectural design transform and revive an industrial landscape into a place for recreation and education?*

*How can architectural design strengthen the mental connection to a place and relate to time?*

## Aim & purpose

The aim with the thesis is to explore a transformation of the limestone quarry in Skövde through a design proposal, and more specifically find a new use and show one example of how to activate and start the transformation of the area. The aim is also to explore how design can relate to time in a transformation process. To continue to build on historical layers and strengthen the mental connection to place. This to make us more conscious about the place and our local context.

## Expected outcome

A design proposal for a speculative transformation of an industrial landscape will be the expected outcome of the thesis. The proposal will include a system of architectural installations along a recreational path placed in the stone quarry. They will work as a way to open up the area for new use, make it more accessible, promote shelter and guide the visitor through the area. The design will be based on local materials and aims to work as a pedagogic tool to make the visitor more conscious about the place including perspective of time with focus on geology and human activity.

## Method

There has been an interaction between design work and research throughout the process. We have studied theories and reference cases connected to site specific design and transformation.

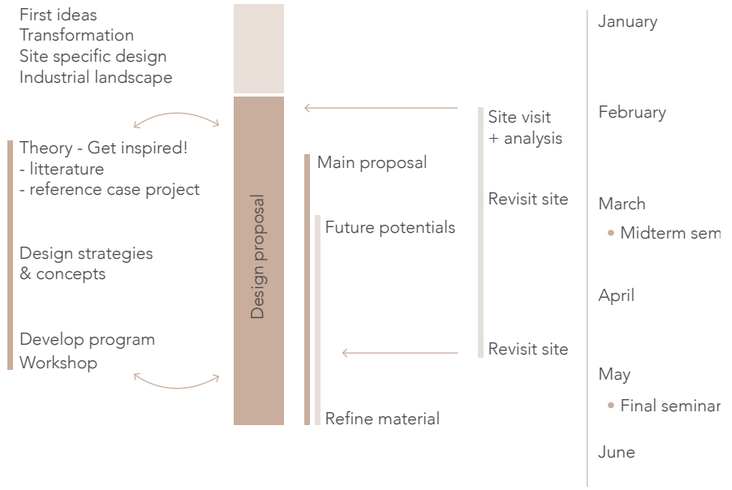
Our approach to design has been to continue to build on existing qualities and mapping and research on the site's context has been made. This analysis has been done by site visits and is based on our own interpretations. The site has been studied from different aspects, from the urban context to material studies. To understand the cultural context in a wider sense, we have explored literature about the site's conditions and history. Since the landscape is affected by the extraction of limestone this has been a main focus. This local material has been studied in aspects of using it as a building material in new construction.

We met the municipality of Skövde to get more knowledge about Skövde and how it will develop. We also met Platåbergens Geopark, which we imagine as a possible stakeholder for the program.





## Process & Timeplan




## Delimitations

The design part of the project has been geographically delimited to the industrial landscape connected to the cement industry in Skövde. The transformation focuses on the future use of the limestone quarry. It does not include a plan for the whole industrial landscape, including factory buildings. As this is an active industry, the proposal is set in relation to the likely expansion of the quarry in year 2031, which is the year when the current quarry permission expires. The current aftercare plan has been used as a guiding document to imagine how the quarry will be treated ecologically. From that we aim to enhance recreational and educational values. The thesis does not focus on how the project is financially feasible or how it can be implemented in regards to regulations.

# Theoretical approach

In this chapter different approaches to site specific design, cultural heritage and transformation will be presented. It will discuss and form the arguments to strengthen the idea and motivate working with the existing as the starting point for our design proposal. In the end of this part, reference case projects within this field are studied.

# Post-industrial landscape

### Scarred landscape
In the book, Post-Industrial Landscape Scars, Storm (2014) uses the scar as a metaphor to describe humans' large-scale transformations of natural landscapes. She means that the scar is a reminder of the past, both in a physical and mental manner, associated with memories and experiences. Intuitively, a scar is associated with something painful but she means it could also be connected with positive experiences. These post-industrial landscape scars could be seen as the inversion and response to our modern society. It reflects today's need and dependence on resources. Storm argues that these places are not valued according to their significance for us.

### Industrial landscape as a cultural heritage
The essence of a cultural heritage is something that is worth preserving because of its natural or cultural importance in which it is likely to invoke a strong sense of place for particular individuals (UNESCO, 2011). One strategy to achieve the Swedish culture policy objectives, set by the parliament, is to promote a dynamic cultural heritage that is preserved, used and developed (Swedish Arts Council, 2021). This highlights the importance of working with cultural heritage. In relation to post-industrial landscapes, Storm (2014) argues that heritage should provide a platform for critical engagement and that the narrative of places should be shared to shape new understandings. Although there could be contemporary challenges with dealing with the physical and mental scars. The environments related to an industrial past often consist of complicated, large-scale, polluted or devastated landscapes. Storm means that they could be too stigmatized to be included in an everyday landscape. Despite this, she argues that the place and its story should be highlighted to offer a focal point for reflection.

### Approach the landscape
Could architecture work as a stepping stone and strengthen the relation to the quarry landscape? In Sveriges Naturum, Caldenby (2013) argues how architecture can bridge the gap between the urban culture and nature. He describes this as a slash architecture, where architecture functions as the slash sign in between nature and culture. This can also be referred to as the nature/culture divide. Caldenby gives two examples on how architecture and culture can relate to nature. Either in terms of matter, materials extracted from nature, that can be formed into architecture that protects humans from natural elements. The other is an architecture that acts and is placed in nature and transforms the place into culture. This can be seen in the Naturum visitor centers. Some use building materials inspired from the surrounding nature or a placement of the building that relate to its surrounding landscape. Caldenby points out that not only nature but also the city and urban culture can be seen as pedagogical resources.





# Site specific design

### Design in response to site
We live in a time that is characterized by globalization and urbanization with large-scale urban development in many parts of the world. This means increased flows of goods, services, finance, people and ideas. The built environment is influenced by modernizations and standardizations. This could generate a global architecture that is homogenic in it's expression and doesn't adapt to local circumstances (Eldemery, 2009). This has been discussed since the introduction of the international style. Based on new materials and building techniques, the local practices that developed from a particular place over time were overlooked. The lack of response to the site's context evoked criticism. A reaction to this was to revive and value local identities through contextual architecture, where the design responds to the characteristics of the environment in which it is built (Jormakka, 2013).

### Critical regionalism
One example of contextual architecture is through the approach of critical regionalism. The term first appeared in an article by Liane Lefaivre and Alexander Tzonis in 1981, where they defined the approach as a way for architects to find a contemporary and innovative architecture that incorporates the significance and character of the place. According to this, architecture should derive from local parameters such as topography, culture, history, climate, light, materials and shape. The building culture with local resources and techniques of construction evolved to fit the specific site over time. By learning from this, design could become more connected to place. Kenneth Frampton made the concept wider known through the essay "Towards a Critical Regionalism: six points for An Architecture of Resistance" from 1983. Frampton criticizes both the emergence of a global architecture that lost the connection to place and the 1980's nostalgic postmodernism. He did not resist the modernist architecture approach fundamentally, but argued that the modern should be balanced against the local. He also discusses the contradiction in this. As we understand, it is about a design deriving from the local context but with the ability to progress and evolve in order to fit today's purpose. Through a critical perspective, we can learn from that knowledge and translate it into a way that fits today's purposes and ways of construction.

As Guallart (2009) states in the book Geologics: geography information architecture, a design that departs from the local context and supports the existing nature and culture can give additional values to the design.

*" Architecture is thus a process that adds new layers of history to places. If it knows how to interpret the values of the site, it will be capable of producing a richer and more complex place and leave it more open to life and to its transformation and evolution."*

(Guallart, 2009, p.4)

# Transformation as design

### The existing as main driver

Transformation is the theory of change and a design approach that uses the existing as a starting point and main driver. It can be interpreted in various ways. Design interventions can vary in scale and their presence can be everything from smaller additions or subtractions, to a total renovation. The strategy focuses on the creation of a new perspective on the existing rather than creating something totally new (Braae & Diedrich, 2012).

According to Braae (2015) the design is performed through intervention. An evaluation of the local situation can inspire and form the design. The design is assessed to allow it together with the pre-existing form the basis for the future transformation. After limiting the physical area for transformation, Braae describes two ways of approaching which elements to be part of the transformation. Either the edification approach, where one starts from scratch and forms a selection of what should be preserved and worked further with. The other approach is the adaptation method, or the détourage, where one starts with the whole, where the thought of everything present is seen equal until their potential for transformation is tested. This approach is more connected to the transformational way of working. A project that uses a transformational approach must be open to the actual context and the design result is not only the architect's own work, but something that is created together with existing context. One main challenge in the transformation of industrial areas is to adapt them to fit a new purpose meanwhile keeping the connection to the past (Braae, 2015 ).

From an economical perspective it can often be preferred to clear the site and start from scratch with new structures. But with a linear thinking and a consumption of endless resources, a scarcity of resources will probably be faced in the future. This presents a challenge to change perception of what is valuable now and in the future and industrial land can be valuable in many ways. Braae (2015) argues that everything we have may be of interest in what we want to take with us in the future and therefore the industrial landscape can be seen as a potential cultural heritage.

### Four transformation paradigms

According to Braae (2015) a relation to the past and the future is made through the present transformation. By this she identifies four concepts called the transformation paradigms. Through them, design in various ways conceptualise and relate to time; to the past, the present and the future. The paradigms can all be active in the same project and appear side by side. They can be used to analyse and understand a transformation project and how it communicates with time. To understand the project's expectations for the future and to see their potential (Braae, 2015).

*"Transformation means to change "something" into "something" else in such a way that the two positions - neither of them static - relate to each other. It is therefore a matter of preservation, restoration and creative reuse, where none of these approaches automatically excludes the others"*

(Braae, 2015, p. 312)



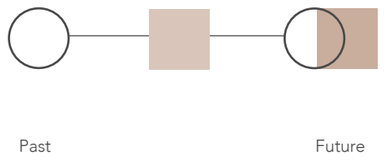


*Difference transformation*

According to Braae (2015), this concept is about contrasts between the old and the new. It is active in the present and creates a distance to the past. The past and the new additions differ and contrast each other but should at the same time strengthen each other's presence. This could be implemented by adding new materials or shapes.

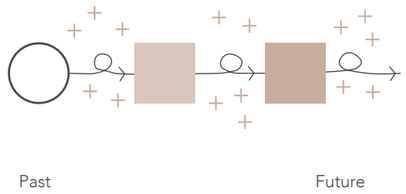

*Continuity transformation*

By this approach, Braee (2015) means that design could extend the past into the present. The design will make new connections through time. The transformation relates to what existed previously and gives the past a stronger place in future. New functions and changes are fully acceptable if they continue to articulate and communicate the past. The former function of something could change into something else.



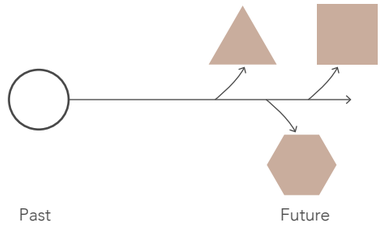

*Cultivation transformation*

In this concept, Braae (2015) points out that time as the most important factor in the transformation. The transformation is an ongoing dialogue and has no end. The future is uncertain therefore this concept relies on the materials properties and how the matter develops over time. Braee takes the example of how vegetation changes over time, and depending on external and internal factors how it can regenerate other processes. The development depends on the observation of an intervention that leads to a new action.




*Optimisation transformation*

This approach to transformation works in absence of time and works with what exists independently. Braee (2015) argues that it is the designer's task to evaluate what the essence of a place or object is, in order to figure out and optimize what it should be. To make the existing stand out and function. She exemplifies this approach by restoration of buildings. She means that the transformation is optimized if the building is restored to what it should be rather than to what it once was.




Interpretation of Braees transformation paradigms

## A reflection

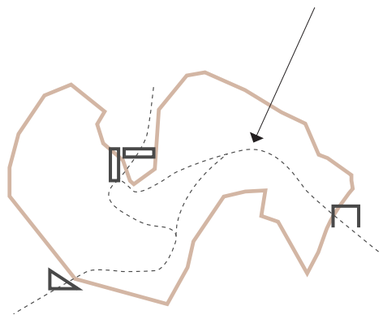
Our theoretical framework consists of site specific design approaches, such as the idea of critical regionalism and by the approaches to transformation formed by Braae. By studying these approaches we gained knowledge about the process of transformation and how the design can strengthen the connection to place and time.

The existing gives constraints and can be both challenging and work as a guiding element to motivate and strengthen the design. A transformation approach to design can be sustainable from several perspectives. It can raise awareness of time, history and place which could help to understand human impact on earth. It is also sustainable in terms of resources by taking advantage of what's already in the system. Future interest and shifts can put new demands and change the use of one structure or an area. The land and whole structures will have to adapt to work in the new context. With a growing population, it is important to consider already exploited land and to see it as a new area for transformation. With a transformation approach we can try out what the place can become and how to use the existing in the best way to adapt to our future needs and at the same time relate to the past.

The stone quarry has been identified as an area for transformation. How to approach the site specific qualities and potential for transformation could either be done through the edification or through the adaptation approach. To use the latter would probably give a more nuanced and more elaborated result but the process would be more time consuming. With our restricted time frame of the master thesis we will strive for the adaptation method. To be open and look creative on the site's qualities, but at the same time take decisions to be able to keep up the work, and in the end reflect back and see what choices could have been done differently. The transformation paradigms can be guiding and a way to analyse the outcome.

When developing the design, different strategies to transform the quarry and at the same time relate to the past and the local context are formed. The design will either differentiate, continue, cultivate or optimize to relate to time and place, or be combined. Local material such as limestone and wood will be used as building material. Local resources could also be to re-use whole structures. The shape of the design installations will take inspirations from the surrounding elements, the topography of the quarry and the industrial buildings. The installations will be placed at specific places in the landscape to connect with existing infrastructure, frame views toward points of interest and be a way to highlight the past. To add a new function in the quarry will invite and attract people. The result of the quarry being more public will open up the quarry for future transformations.

Design strategies of how to transform the quarry, *(pp. 58-59)*



## Transformation of the Ruhr district

The Ruhr district is an important industrial region in Europe and was during many years the driving force for German economy. Natural resources like coal and iron ore were the main part of the industry. The abandoned industries were the result of the industry moving to other countries and a technology that was outdated. Today it's an urban area with a dense population.

In 1989-1999 the IBA Emscher Park, an international building exhibition, was hosted in the region. The aim was to respond to the industrial decline and to establish a regional identity. The project's intention was to link the inactive industrial areas with active areas in the Ruhr region. The transformation and revival of the inactive areas were made by local intervention applied in specific areas in the landscape. Inactive industrial areas and leftovers were seen as assets and landmarks (Braae, 2015). Two of the main interventions are the Landschaftspark Duisburg-Nord and Halden Zollverein.

**What to take with us?**

- Small interventions as a transformation in a large scale landscape can create an interest and a discussion for the future use of the area.

- The importance of the Ruhr region is of great importance and the project has strengthened its identity. To preserve and use industrial leavings like buildings and infrastructure makes sense in parallel with a densely populated area.

- The curiosity and to think creatively about places and existing elements on a site

- Include natural processes in design.





*Figure 1. The Landschaftspark Duisburg- Nord*

**Landschaftspark Duisburg-Nord**
Location: Duisburg, Germany
Design: Latz + Partner
Project: 1990-2002
Size: 230 ha

The Landschaftspark Duisburg- Nord is a known reference for transformation of ruinous industrial Landscape It started as an international competition to design the future Landschaftspark Duisburg-Nord. The site was a former steel industry. The design team had the strategy to re-use as much as possible. They had an interest and curiosity in each specific place and what a structure could be developed into. Some of the examples are the re-use of railway tracks for circulation, re-used iron plates as the ground material for a large plaza and treatment of the water in Emscher river to enable its use for recreation (Braae, 2015).


*Figure 2. Kokerei Zollverein*

**Halden Zollverein**
Location: Essen, Germany
Design: Planergruppe Oberhausen
Artist: Ulrich Rückriem
Since 1994
Size: +40 ha

Halden Zollverein is part of the IBA projects and is today a UNESCO World Heritage site. After the coal production ceased, the area became inactive and started to grow wild. The large building complex was seen worthy of preservation. The other part of the area, the service for internal logistics, was at the time planned to be used as a rubbish dump. In response to this, The Artist Ulrich Rüchriem made a proposal including sculptures placed in the landscape that opened up for a discussion for the future use of the area (Braae, 2015).

## Naturum

The Naturum visitor centres can be seen as portals to nature and are often located next to attractive nature and recreation areas. The Environmental Protection Agency (EPA) uses the visitor centers to inform the public about nature and cultural history in the specific region. The aim with the centers is to inspire and experience nature and make it more accessible for everyone. This in order to enhance awareness and understanding of nature and the environment. The "Naturum" trademark is owned by the EPA and visitor centers can be operated by a municipality, foundation or a county administrative board. Architecture plays a part of the experience together with the exhibition and the surrounding nature. Target groups are the public with focus on children, youths and people with little experience of nature. Some guidelines for Naturum are that it should be located next to an attractive nature and recreation area. The visitor centre should be an attraction in itself with the aim to strengthen the place and the area's values and identity (Naturvårdsverket, 2015).

**What to take with us?**

- A possible stakeholder for our proposal can be an activity similar to Naturum.

- Naturum guidelines can inspire the program of the design proposal.

- Study of flows and floor plans.

- Importance of local material, how to use it in the design.





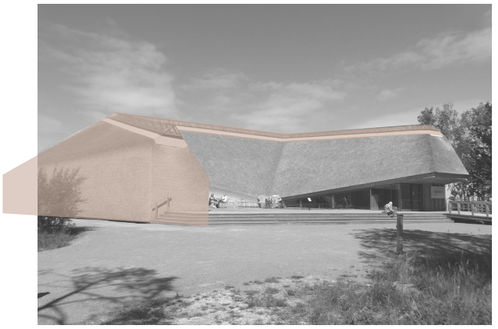


*Figure 3. Tåkern*

**Naturum Tåkern**
Location: Lake Tåkern, Ödeshög
Wingårdh Arkitekter
Project: 2012

To approach the visitor centre you walk through the sequence of a field, forest strip, a beach meadow and the lake. The main building includes an exhibition hall and cafe. In the surroundings, there are hiking trails and a bird watching tower. The use of local materials is present and there is a focus on reed in exteriors and wood in interiors. Building with reed is an old technique and not as common today. The reed properties require a steep angle which gives the building an interesting and contrasting shape. The ridge is designed with a lanternine that lets in sunlight. This detail is also a way to work with the exposed meeting that needs more care when working with reed roofs. Today there is not widespread knowledge about building with reed or a technique to harvest reed locally in Sweden. The project can inspire future use of old techniques of using local material.

*Figure 4. Hornborgasjön*

**Naturum Hornborgasjön**
Location: Hornborgasjön, Falköping/Skara
White Arkitekter
Project: 1986

The visitor centre is located next to one of Europe's most important bird lakes, located in the same region as the project site of the thesis. Naturum Hornborgasjön is known to be the first visitor center where exhibition, nature and architecture work together (Caldenby, 2013). The building is reached by bridges in the wetland. Local material such as reed is present in the building. New additions are built in limestone and wood. The visitor centre shares facilities with the county administrative board.

## Allmannajuvet Zinc Mine Museum

*Figure 5.* Café building

Location: Sauda, Rogaland county, Norway
Design: Peter Zumthor & Partner
Project: 2001-2016
Size: 150 sqm

Allmannajuvet is a ravine from where a zinc mine was operating in the late 19th century. It is situated in the rural parts of Rogaland county in Norway. In 2001, Peter Zumthor got a commission to design a museum that would exhibit the history of zinc mining. Fifteen years later, the buildings were finished and is a part of the National Tourist Routes, which was commissioned by the state of Norway as a part in increasing the tourism in the region. The routes are known for displaying innovative architecture that enhance the qualities of nature and that respond to the specific landscape characters.

The complex consists of a museum building, a café building and a service building. The three buildings are positioned in the ravine landscape and connected through a path with stairs. Each one of the buildings presents different views of the ravine landscape. Zumthor's aim was that the buildings should refer to the hard labour of the mining operations. The interiors are dark and narrow to capture the feeling of being beneath the ground. To enhance this, light is let in from small windows placed above the visitor. The tectonic details of the structures are of rough exposed joints on wooden frames, as a hint to the place's history (Archdaily, 2016).

### What to take with us?

- The buildings strengthen the connection to the place's industrial history. In terms of business as a museum and in the sense of spatial experiences.

- The buildings respond to the landscape. The three different volumes break down the scale, which enhances the dramatic topography. This also minimizes the visual impact on the landscape.

- The museum is one attraction along the National Tourist Route, this helps to connect areas and to attract more people to the region.

# Context

This part presents the chosen site and the local situation. The context is explained with site analysis, including analysis of the quarry and its surrounding, historical background and existing qualities to continue working with. In this chapter we also describe local material and the geology of the site.

# Geological preconditions

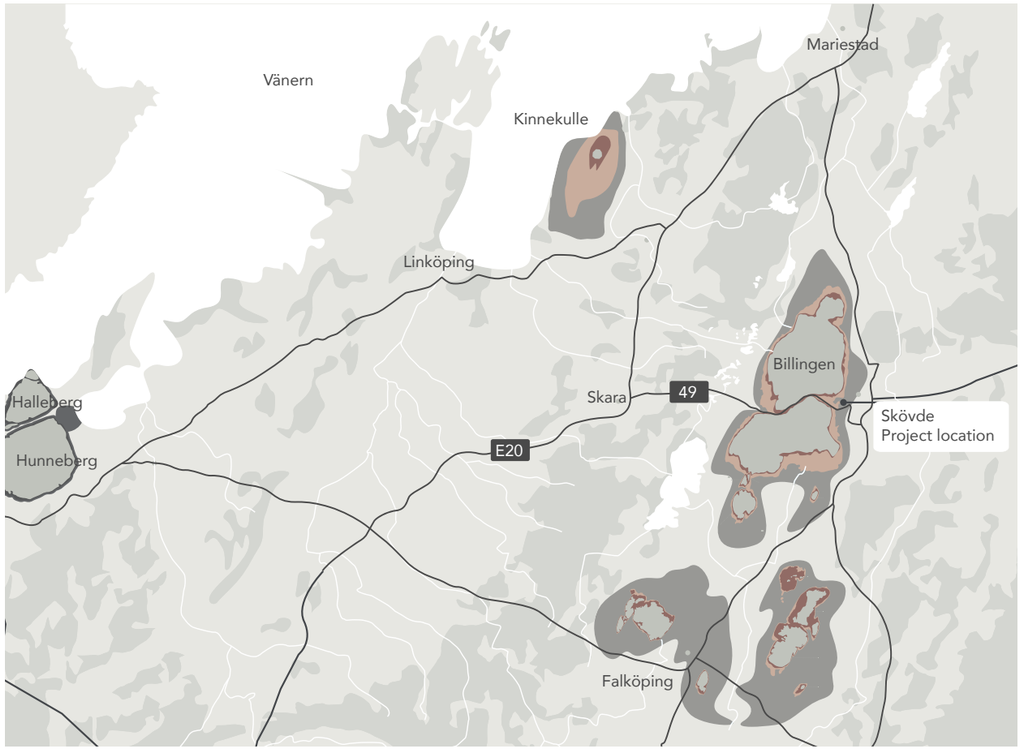



Table mountains in the region 1:600 000

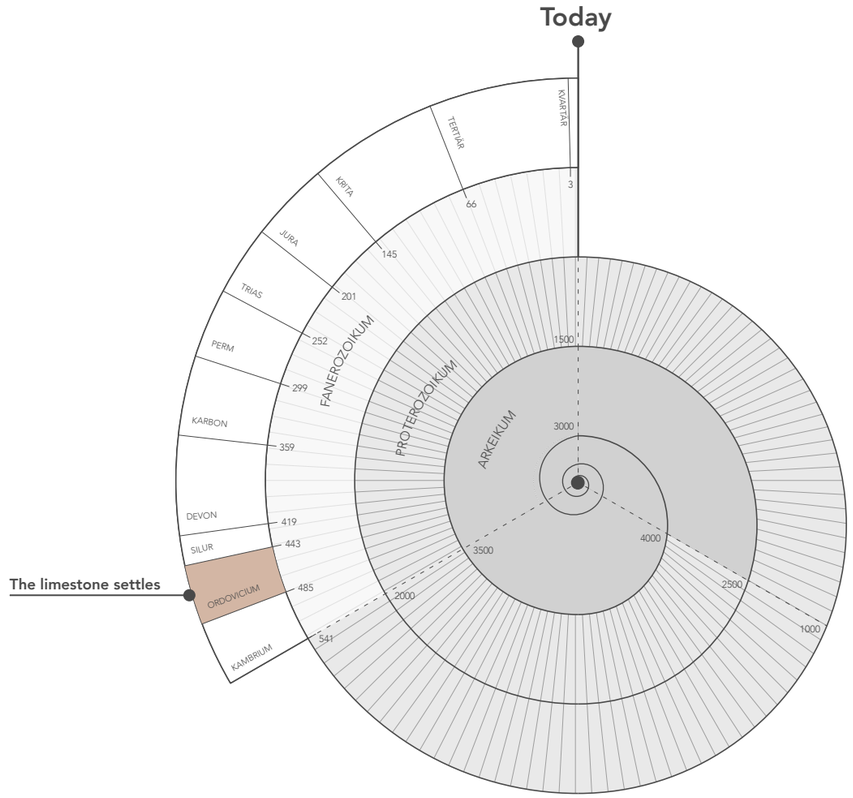

Section show layers of the table mountains

In the region of Västergötland, we find geological phenomenons that are unique. One of them is the table mountains that rise above the plains and are characterized by their flat tops and steep sides. The mountains consist of different stone layers and during millions of years, their top layer of hard dolerite has protected the layers underneath from erosion (Platåbergens geopark, 2021). The limestone quarry of Norra Brottet is located in between two of these mountains.

The people living here always had a connection to the mountain. The ground with its high lime content gave fertile and highly productive soils which contributed to why people chose to settle here. The mountain also provided good access to building material. The area has a long history of quarries, lime burning and stone masonries. Today limestone has a prominent role in the region's industry, due to the manufacturing of cement. The quarry made the layers of earth history exposed. By visiting and discovering, it is possible to travel in time (Calner & Ahlberg, 2011).








**The geological time**
The numbers are million years. The center is when the solar system was formed, about 4.5 billion years ago (Platåbergens geopark, 2021)

## Events in the geological history of the table mountain landscape

**1,700 million years:** formation of the primary bedrock

**600 million years:** the primary bedrock erodes and eventually becomes a peneplain; seen in the area of Vänersborg

**540 million years:** the sea covers the peneplain. Sediment is deposited on top of the peneplain, eventually becoming sedimentary rock, one of them being limestone, seen in Norra Brottet

**280 million years**: magma from inside the earth rises and penetrates the sedimentary rocks in some places, creating the rock known as dolerite/diabase

**250 million years** and onwards: the sedimentary rocks erode, leaving only those areas covered by the dolerite/diabase, seen as the table mountains

**115,000 years**: the latest ice age begins which reshapes the landscape, seen in the hills of Valle outside Skövde

**20,000–11,700 years:** the ice begins to withdraw

## Site location



The region of Västra Götaland, Skövde in red.
Skaraborg region in dark grey

### Skövde

Inhabitants: Municipality 56 366 (2019), Tätort (urban area) 39 210 (2019) (SCB)
Highest point: 304 m, Billingen

Skövde is located in the region of Västra Götaland, in between lake Vänern and lake Vättern. It has a growing population and is the largest municipality in the subregion of Skaraborg, which is a network of 15 municipalities. The west main line (Västra stambanan) between Gothenburg and Stockholm provides good conditions for commuting to Skövde.

With a location at the foot of the mountain Billingen, the inhabitants of Skövde have close access to nature and the large recreation area that is used during all seasons. The region is an old cultural area, with a rich and interesting history. In the landscape traces from human activities can be seen, from the remains of the first inhabitants, church buildings and village formations.





*Figure 6.* The project area is located about 1 km from the central parts of Skövde

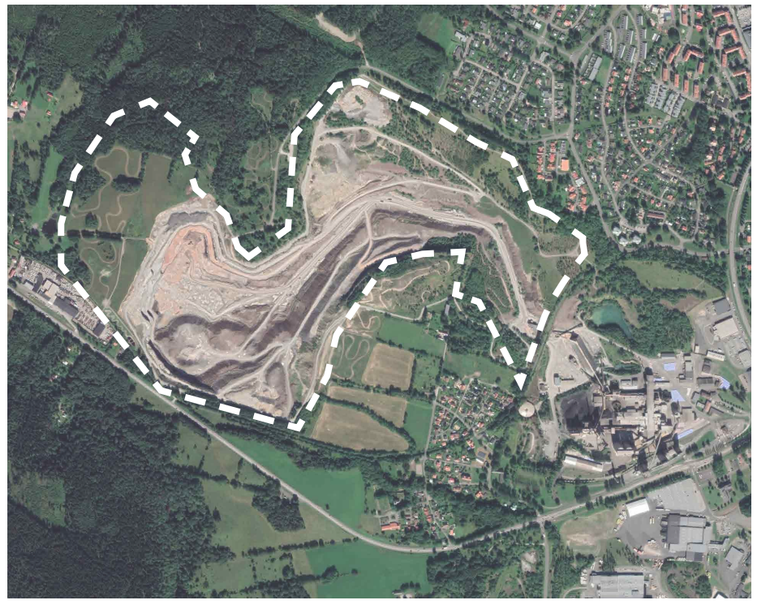


*Figure 7.* Project location where the lines show the estimated expansion of the quarry of year 2031

# Recreation at Billingen

### Nature tourism

There is an increased interest in nature tourism and outdoor activities at local and national destinations in Sweden. This has intensified the recent year and could be seen as a reaction to the restrictions of the Covid-19 pandemic situation. According to the tourism research center ETOUR (Pettersson, 2020) the new patterns are likely to influence future tourism patterns. Another type of nature tourism that is increasing is ecotourism, which in a higher sense values and respects nature at the destination. This means to not disturb, damage its habitats while educating the traveller. This with the aim to benefit the economic development of local communities.

### Billingeleden

The trail Billingeleden is a hiking route around Billingen, which is the largest table mountain among the fifteen in the region. When hiking the trail you walk on top of the table mountain that provides vast views over the landscape. It continues down through fields and forest in a varied terrain and passes historical monuments. The trail starts at Billingen´s recreational area and the total distance of the trail is about 66 kilometers and it takes 3-4 days to walk the whole route. There are several other hiking trails that connect to Billingeleden which make it possible to do shorter day hikes.

### A new path through quarry

If the stone quarry is no longer used for extraction of stone, a new adjoining trail through the quarry could connect to the city centre and add new recreational values to the area. This would add new hiking alternatives and points of interest along the route. The path would lead the visitor down to the quarry and through the industrial landscape. It could raise interest about the stories of human activities that have taken place during many years.

Recreation in Norra brottet in the winter

Hiking along Billingeleden in spring time





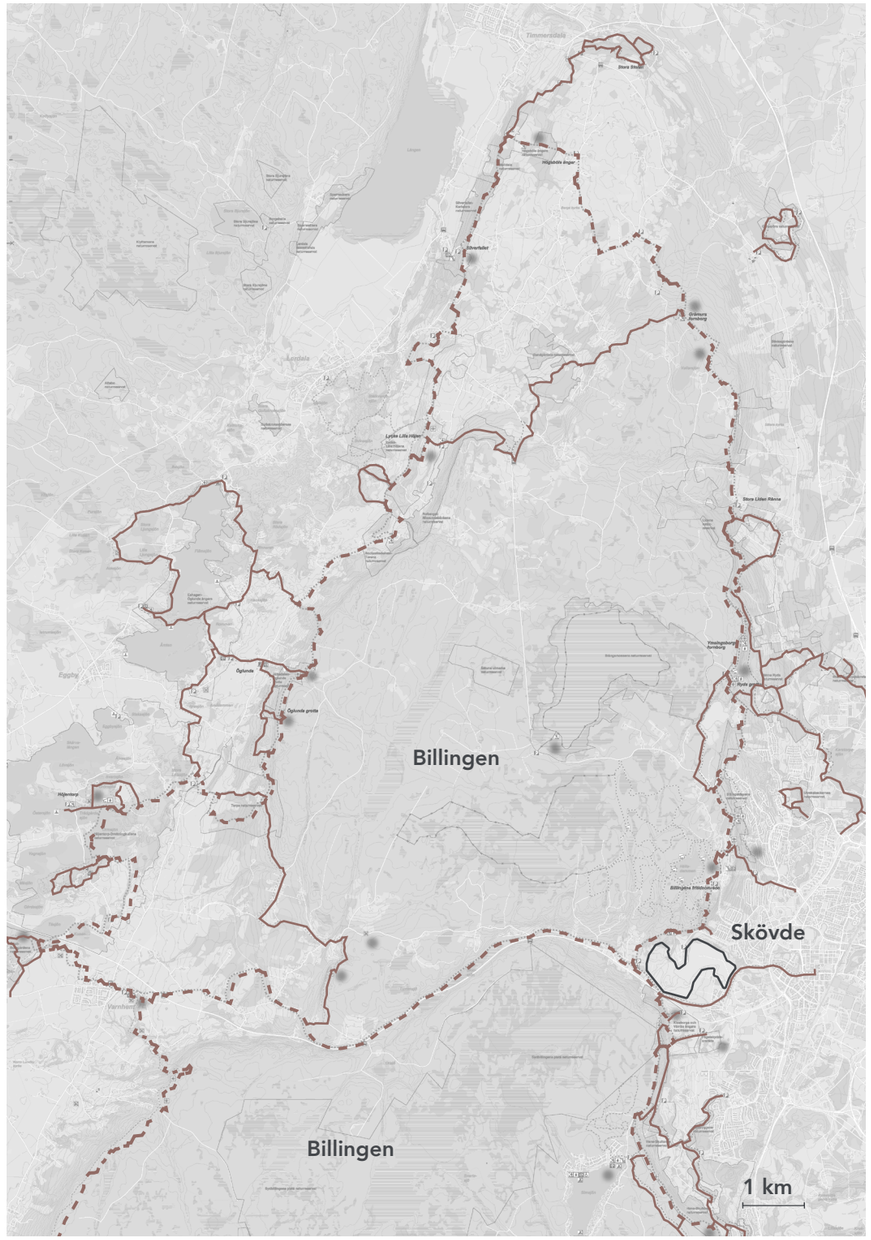



*Figure 8.* Hikingtrail "Billingeleden" and adjoining trails 1:100 000

## Site history - Time line

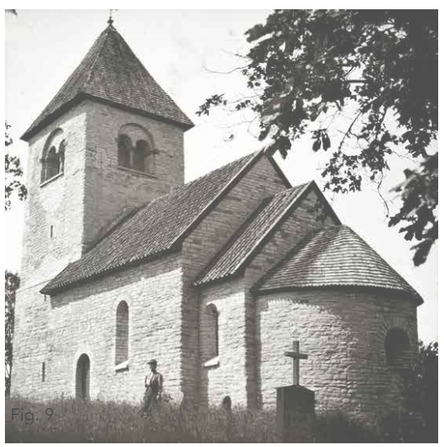


Fig. 9

**12th century** Church of Vårmb
New stone building technique introduced.


Fig. 10

**1904** On-site ovens
The start of burning the stone to extract lime on site.
This was made in three furnaces in the quarry.


Fig. 11

**1916** Gullhögens bruk
The company is established.
The on site-furnaces increased to be a number of 18.


Fig. 12

Agriculture
The valley of Vårmb was areal land for many centuries before the quarry took place.

**1908** The village of Vårmb.
Farm houses with cattle.

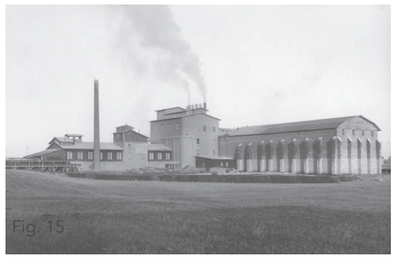


Fig. 15

**1924** Factory built
The factory enables the production of cement.
The workforce consists of 98 people.


Fig. 17

**1973** Cementa AB
Cementa buys the factory from Gullhögens bruk.

**2031** What will happen?
The current permit for quarring expires.

Our proposal
(pp. 52-83)

*12th century* *18th century* *19th century* *20th century*

**12th century** St. Elin
St. Elin "Helena" is the patrion Saint of Skövde. The myth says she initiated the church of Vårmb.

Pilgrimage
Pilgrimage to Skövde to visit St. Elins grave.
Importance for trade and the development of the county.

**1759** The city fire
Most buildings were destroyed in the city centre. Aspiration to rebuild with stone.

**1862** The Railway
The railway "Västra Stambanan" between Stockholm and Gothenburg.
Enable establishment of industries.

**1900** Military
Garnisonsstaden established.
Today one of the largest in Sweden.

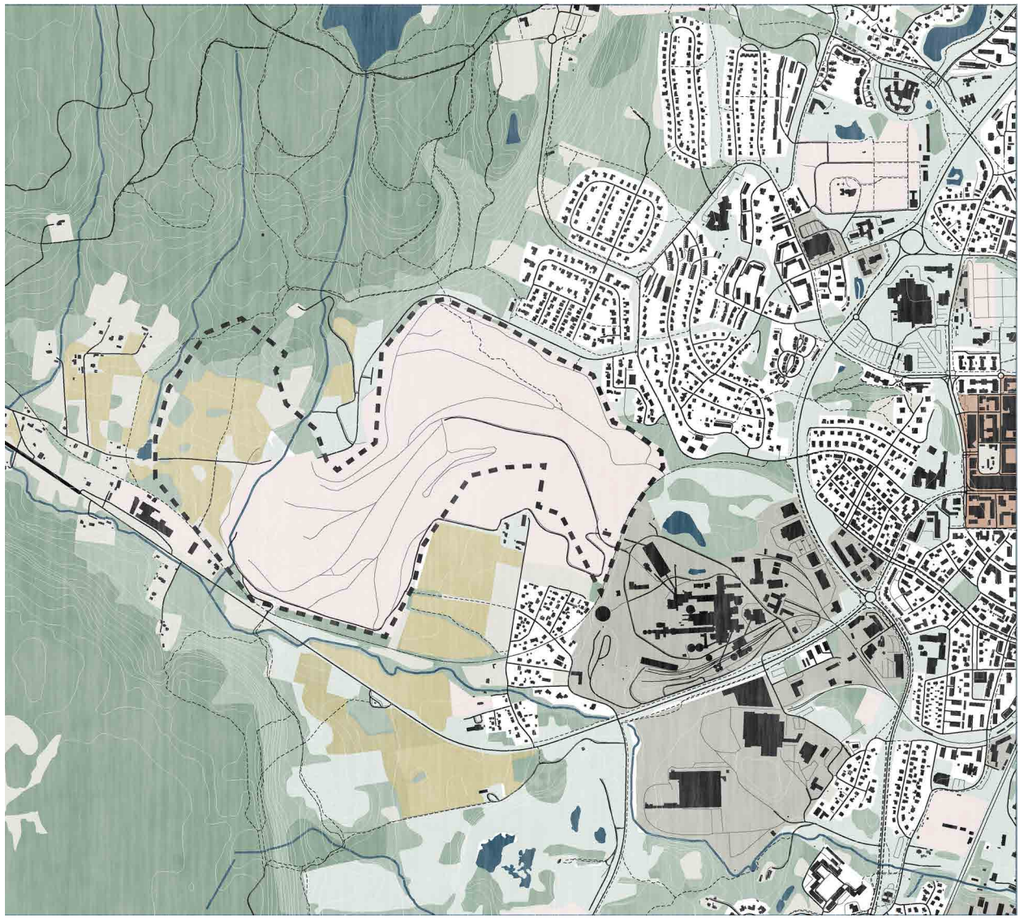
**1927** Volvo
Volvo begin to produce in Skövde.
Today 5000 workers.

**1937** Rockwool
Production of mineral wool.

**2021** Cementa
Cementas factory in Skövde is the second largest cement factory in Sweden.
95 people work here.

(Glise, 1966), (Skövde kommun)

# Land use



1:20 000

### Stone quarry

The active limestone quarry and the cement industry are located on the west side of Skövde at the southern slope of Billingen. The current extraction area is expanding and the dotted line shows the estimated area in year 2031. The area is both of national interest for minerals and for nature and recreation purposes. The old southern quarry is open for recreation and bird life.

### Industry

The cement industry is a landmark and is visible from far distance. It marks the entry to Skövde when arriving from road 49. Other smaller industries are located in the adjacent area south of the cement industry.

### Central

The stone quarry and its industrial buildings are located close to the urban core of Skövde. It is 1 km between the factory and central parts. At the square, Hertig Johans torg, there are shopping galleries and restaurants. The culture center and the railway station are located next to it. A few shops are also located next to the cement industry.

### Residential areas

Some residential buildings are situated 400 m from the edge of the quarry. Lower buildings with villas in the north towards Billingen and in the village of Våmb, located south of the quarry. East of the quarry toward the city centre, there are apartment buildings and villas in the neighbourhood Västermalm.

### Forest

The surrounding landscape has a rich and varied flora. Deciduous forest at the edge and coniferous forest towards the centre of Billingen.

### Cultivation land

Cultural landscape with pasture and arable land with fertile soil. Other features are farm environments, trees, old roads, stone walls and cairns.

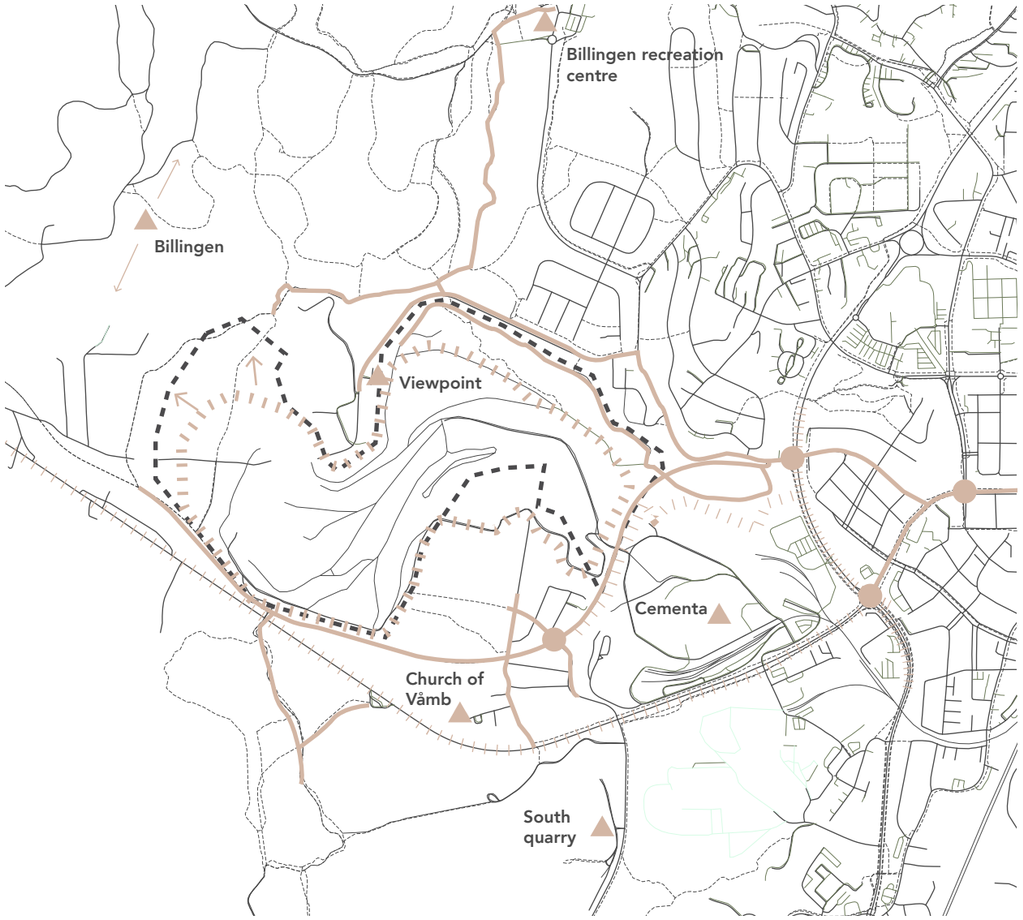
### Billingen

The mountain ridge of Billingen has a north-south direction. The table mountain has a unique geology which provides a fertile soil which results in great variation in nature. A place for outdoor life and recreation. A ravine enables flows in an east-west direction, this is where road 49 goes.

### Water

Lake Hållsdammen attracts outdoor activities such as fishing and hiking. The small river of Hålldammsbäcken has been relocated due to the stone quarry's expansion.

# Site analysis




1:20 000





This is our interpretation of the area around the stone quarry from a pedestrian perspective.

## Barriers

The stone quarry has a dramatic terrain with large height difference and fences surrounding it. The mountain ridge of Billingen in a north-south direction is a natural barrier. Road 49 is south of the quarry and has a speed limit of 80/km which makes it difficult to cross by foot.

## Districts

The stone quarry is situated between nature and urban areas. A varied landscape with forest, industrial areas, residential areas, agriculture land and a market area.

## Flows

A walking and bike path runs through the area and connects Vårnb with Skövde. This used to be the former railway between Skövde - Axvall. The road continues beneath a viaduct toward the centre. Hiking paths along Billingen continue around the stone quarry. The northern slopes  of the stone quarry have already opened up for recreation.

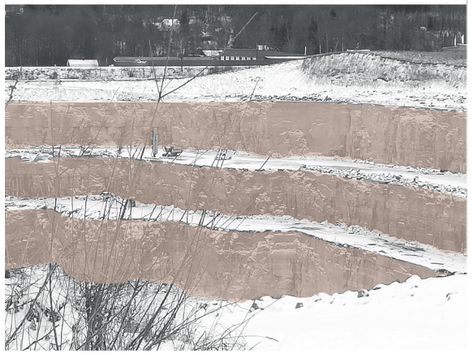
## Landmark

The mountain ridge Billingen and it's recreational areas is an important landmark. The industrial buildings of the cement industry is a part of Skövde Skyline. The existing viewpoint "north quarry" is a good place for panorama view, the exhibition is in bad shape and needs to be refurbished. The church of Vårnbs is visible from road 49. On the other side of the road, the former quarry "Södra brottet" is located, open for recreation and bird watching.

## Nodes

The roundabout "Hallenbergsrondellen" is an important mobility node. A crossing in Vårnb village connects the bike path with the roads for cars. Central nodes such as Hertig Johans torg and the railway station are located about 1 km from the site.

## Mapping of surrounding structures



### The Limestone quarry

The artificial landscape has different characteristics. The newly quarried parts are strictly leveled, showing the different kinds of limestone in each step. The older parts in the landscape are smoother as a result of the stone walls' erosion and the growing vegetation. The secondary limestone has been deposited in the edges of the quarry and which contributes to a smoother landscape. Transport roads meander through the landscape.

### The Cementa factory

The industrial landscape of the factory is a landmark in Skövde. The massive structures rise high above the city and create a skyline visible from far away. The individual elements are from different ages,  all have their specific function and are connected into a megastructure. The low noise and smoke from the factory is present all day.





### Rural land

The small medieval village Våmb is situated in the middle of the quarry and by the edge of the factory. In contrast to the industrial landscape, the buildings here are of a small scale, with farms, dwellings and a limestone church from the 12th century.

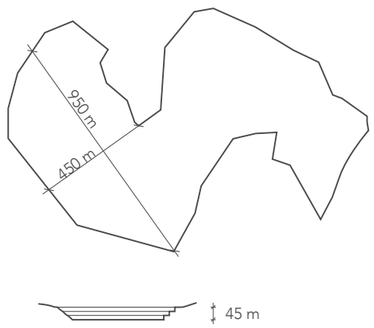
### Historical traces

Remains of structures and elements can be seen in the surrounding landscape from before the quarry expanded to the west. A road is cut off by the quarry, leaving it to end in a steep cliff. Traces also show low dry stone walls, fruit trees and fields from an old farm.

## The quarry

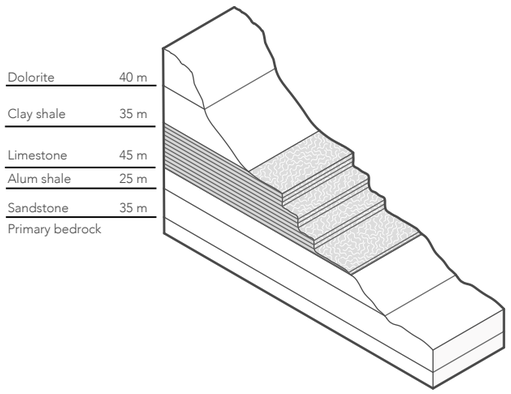
The limestone quarry Norra Brottet is located within the area of mountain Billingen. Here the limestone is situated directly underneath a layer of moraine, which provides good conditions for extraction. The first step of cement manufacturing is to quarry the stone. It is done by drilling holes to inject explosives that blast the mountain. The stone is then transported by dumpers to the factory. It is then grinded into a powder and heated to a temperature of 1450 degrees celcius in a rotating kiln. This creates small, round pellets called clinkers. In this step, the calcination of the limestone is made and the most part of the carbon dioxide is released. The clinkers are then crushed to be stored in silos and to be transported away (Cementa, 2021).

The limestone is of an ordovician age; almost 500 millions years old. That was when our continent was situated south of the equator. In a tropical environment, sediment, like sand, lime, clay and marine skeletons, was deposited at the bottom in a shallow sea. After time, they settled and became rock. The stone varies in color, density and lime percentage, shaped by the earth's conditions at the time it settled. It is also characterized by the traces of remains of ancient animals. The most common seen is the fossils of an extinct squid genus called Orthoceras, whose shell has a long, straight cone shape (Glise, 1966).




The stone extraction is arranged according to the stone's different properties, creating giant levels along the edges of the quarry. The limestone at the quarry has a depth of 45 meters and consists of three layers of stone with different properties. Each one has a thickness of roughly 15 meters. The stone layers have different percentages of lime content, which makes them useful for different components in the production of cement. Two-thirds of the limestone, the top and bottom layer, is used by Cementa in their manufacturing of cement. A lower percentage limestone on top and a high percentage stone at the bottom. The combination of these stones creates an ideal blend for cement (Cementa, 2021).

The middle layer consists of a limestone that has a lower lime content and can't be used for cement manufacturing. These masses, so-called secondary limestone or "skrotsten", are extracted and dumped at the quarries edges, to refill parts of the hole, as a part of the aftercare of the quarry (Enetjärn natur, 2012).




Section of earth layers, where limestone is highlighted.
1 mm of limestone has taken 1000 years to settle.
A top layer of moraine covers the rock.
(Platåbergens geopark)






The middle layer of stone has a low lime content
and can't be used in the manufacturing of cement.
It is today mostly used for refilling of the quarry.

# The afterlife of quarries

Extraction and mining changes the landscape drastically and gives irreversible changes. To restore the landscape to its existing shape can be seen as an unreasonable alternative. The material would need to be extracted from another site which results in pushing the problem away. To restore the quarry will also act as a way to hide the history of the place. The illustrations below show some examples of different ways of handling the afterlife of quarries.

### Plan for aftercare

When working with extraction of minerals, such as stone, there is an ongoing process of applying for a permit of the specific area. A part is to provide a plan for aftercare which is a requirement according to the Environmental Code. Before 1952, when the Nature conservation act was stated, extraction was allowed anywhere which resulted in destroyed landscapes, loss of geological values and damages on natural and cultural environments (Sveriges bergmaterialindustri, 2007).

### Kinnekulle

The limestone quarry is in the same region as Norra Brottet and closed 1978. Today it functions as a recreational area. The hiking path around the mountain of Kinnekulle goes through the quarry. The aftercare focus to enhance the existing biodiversity but also to add value, for example, parts have been water filled and fish has been imported. Regarding safety aspects, limestone blocks and hills have been placed along the edges, to guide the visitor.

*Fig. 18. Kinnekulle*

### Dalhalla

The limestone quarry outside Rättvik was transformed into a concert arena. The quarry shape resembles an amphi theatre and the texture of the walls makes the sound soft and even. This made it possible to have performances without electric reinforcement.

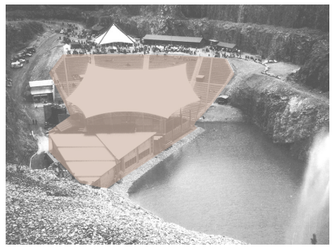


*Fig. 19. Dalhalla*

### Eden project

In this old clay pit close to Cornwall, geodomes house plants from around the world. The project focuses on environmental education and on the interdependence of plants and people. In this case, the quarry has transformed into something new with little connection to what it once was.

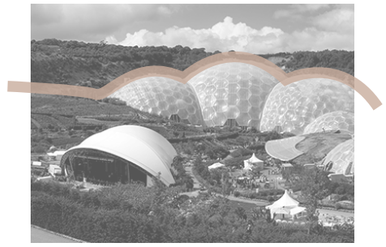


*Fig. 20. Eden project*

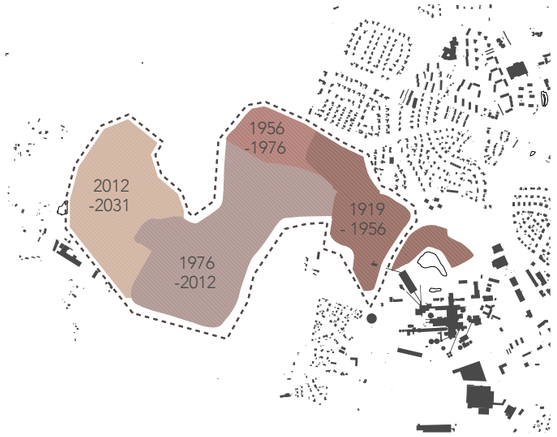




### Plan for aftercare for Norra brottet, Skövde kommun 2012

The application from 2012 includes an aftercare with a focus on biodiversity. The document describes the characteristics of the surrounding landscape, the limestone quarry, how the aftercare should be carried out and how residual material from the extraction will be handled and lastly how follow up will be made.

The plan aims to enable the creation of natural environments that benefit biodiversity. It also proposes an environment that adds new values for the inhabitants of Skövde. The aim has been to see the stone quarry as a cultural landscape and to accept the human activity. The new landscape properties, a result of the extraction over a long period of time, are meant to provide new landscape values and the dramatic topography can contribute to values both for biodiversity and for human experience. The goal has not been to restore the quarry into the landscape it once was. It has rather been to make use of the new landscape and take inspiration from the surroundings when introducing and adding new elements. The environment can be created by moving of land masses, planting, placement of limestone rocks, blasting and levelling of the terrain. At Norra brottet, one third of the excavated material cannot be used to produce cement, due to low lime content. These masses, called secondary limestone, are used to refill the quarry at chosen places to enable a richer biodiversity (Enetjärn natur, 2012).




Expansion of the quarry since 1919.

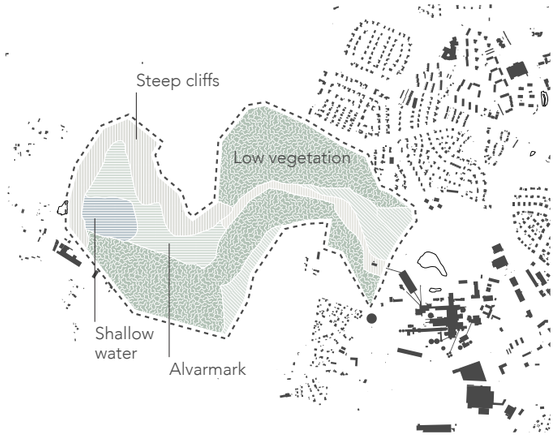



Illustration of the aftercare plan from 2012.

In our proposal we will take inspiration from the plan from 2012 and focus on recreational and educational values.

## Stone building tradition

To build houses of stone is considered labour intensive. The great effort is reflected in the houses robustness and ability to last over centuries. Historically, to build in wood has been preferred. The tradition of stone buildings has evolved in the regions that lack wood suitable for construction. The architecture historian Erik Lundberg pointed out that the art of building with stone also derives from humans' admiration for the eternal values that the stone represents. In relation to this, it is often the churches or buildings of other important characters that are made out of stone (Waern, 2011). This applies to the Skaraborg region with the prominent limestone buildings being churches. One of them is situated in Våmb right next to Norra Brottet. This church was built in the 12th century influenced by roman architecture. The knowledge of building with stone was brought to the region of cistercian order. The stone opened up for designs that no longer were limited by the wooden measurements. The massive stone construction, with 1,2 meter thick walls and vaults over small, narrow windows, creates a monolithic body (Waern, 2011).

### Forgotten craftmanship

The traditional way of building with stone requires craftsmanship that is not common today. For example, building traditional stone vaults could be considered irrational (Holmström & Anderson, 1967). Today, raw stone is commonly used as a skin to a house, compared to the former use as a load bearing body to the house (Arkitektens handbok, 2019).

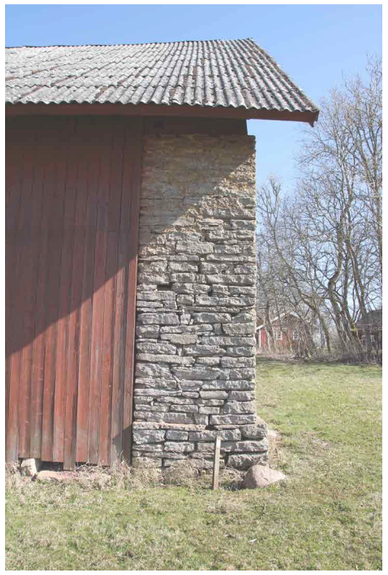
The stone's immediate connection to a place is interesting and puts stone architecture in a special position. Every stone has a negative space somewhere. In the modern world, when the source of the materials is less visible or known, the origin is given more significance (Waern, 2011).

### Limestone buildings in the region

The local material limestone is to be seen in buildings and constructions in and around the city of Skövde. Almost all of the city's wooden buildings were burnt down in the great fire of 1759. The town was rebuilt with stone for better fire safety. When walking around in Skövde, you notice the limestone, for example, in the foundation of buildings, in ornamentations and in low walls, which enclose properties. Especially, elements of limestone are visible in the houses built during the national romantic era around the 20th century, when the ambition was to display and use "authentic" materials, such as stone and bricks (Skövdes kulturhistoriska bebyggelse, 2011). Regarding the countryside building traditions, there was a shift towards more durable and well-planned buildings in the middle of the 1800s. The publication Lantmannabyggnader (1886) written by Löfvenskiöld from Mariestad, influenced the region's building traditions. He claimed that the houses should have proper stone foundations and the roofs should be extended to avoid moisture damages. A common way of using limestone in the countryside was by carefully stacking stones together without using adhesive mortar, a technique called dry stone wall (kallmur). This gives a construction that in some sense is flexible to movement. Historically these stone walls were acting as markers for the landowner and in some cases as barriers for animals (Lilja, 2015).







Various ways of using stone as a building material in the region.

## The properties of limestone

Limestone is considered a medium soft rock. For comparison, sandstone is softer and diabase, granite and shale is harder. Traditionally it's been used in buildings. The structure of the stone is layered which historically made it easier to quarry and process compared to other rocks. Harder layers of stone are dense and are interrupted by layers with more clay, which are softer. The harder layer of the stone is used in construction and is between 40-180 mm thick. It should be at least 100 mm to be useful (Waern, 2011).

Today the raw limestone is mainly used for flooring and for wall cladding, both for interior and exterior work. The surface of the stone often has traces of fossils and irregularities, which is more visible if the surface is planed or polished. In Sweden, limestone can be found in many parts of the country and in many colors, such as in gray, brown, red, black and in yellow (Arkitektens handbok, 2019). In the region, the majority of the limestone is red but interrupted by a layer of grey stone.

Fossils in limestone, polished surface

### Waste stone

The stone's durability makes it possible to reuse parts or find another usage for rejected stone. An example is how the remaining stones of ore extraction (slaggsten) have been used in Sweden since the 18th century. Some pieces were melted and reshaped into bricks to be used in walls (Blent, 1998). This was a way of extending the life of the material and giving it a purpose.

Another method was to use smaller, irregular waste stones pieces by molding them together with lime mortar in wooden casts to create load bearing walls. Houses built by this technique are called "stöphus". CG Rydin from Borås refined the technique and made it wider known by the publication Gjutna Kalkbrukshus in 1834. On a stone foundation, wooden pillars and horizontal planks created a framework for the mold. 45-60 cm were molded at a time, where mortar in a liquid form filled the gaps between the stones. Gradually the planks were moved higher up to continue the process. The wooden pillars could hold a roof to protect the cast during the process of settling. The technique has been used in Sweden up until the beginning of the 20th century (Blent, 1998).

### Possible use of secondary limestone

To use secondary limestone in the design proposal on site can make use of a leftover material from the cement production. It will give it a new life in future and tell a story about the industrial activity. Today the limestone is mostly used for refilling of the site. Other possibilities could be to use it in dry walls, to fill metal cages (gabions), mold with mortar or rammed chalk wall.

Dry wall Gabion Molded



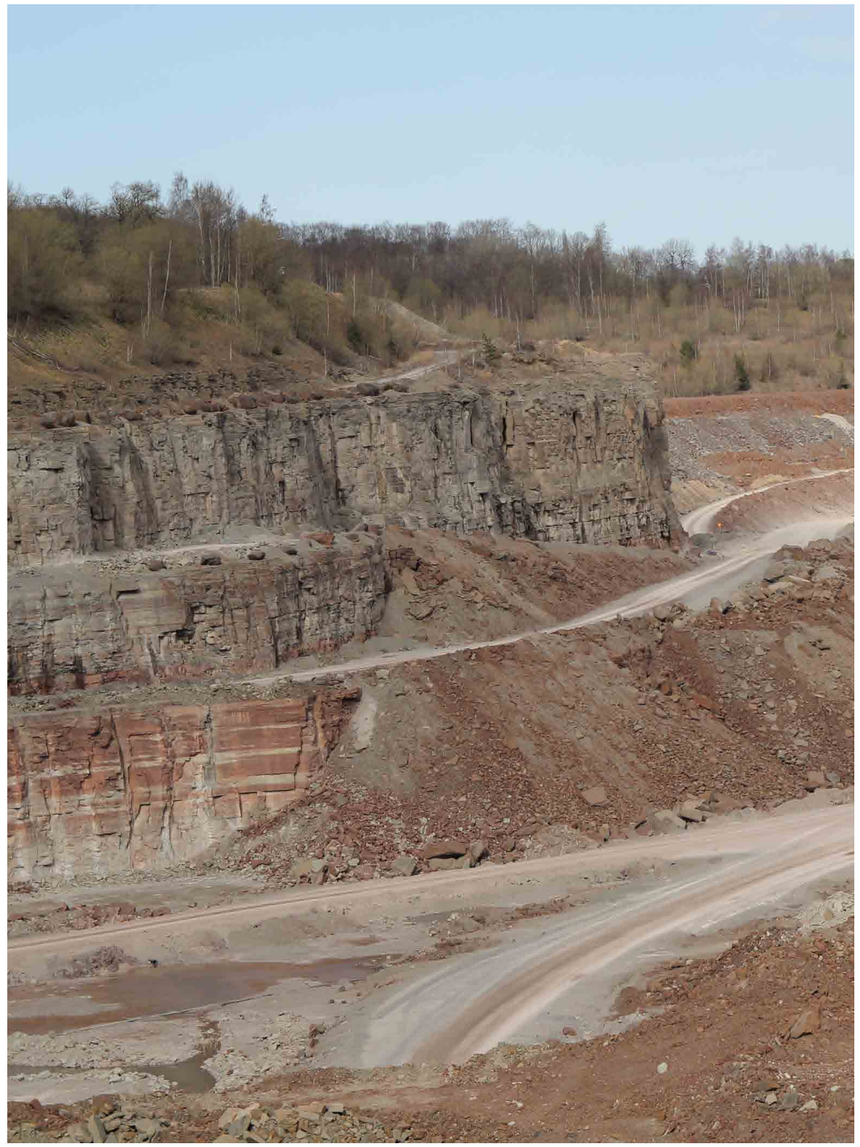


Secondary limestone

Fossils in limestone, raw surface

# Concept & Proposal

In this chapter possible futures are presented to show our direction of the main design proposal. Design strategies and formulation of a program are outlined. Lastly, the main proposal is set in relation to other future potentials.



## Possible futures

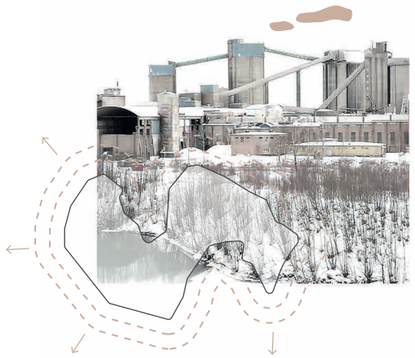
With an unknown future in mind, we speculate on how the industrial landscape can be used, if the activity ceases or changes. These are our own speculations based on the site analysis and theoretical framework. There is a high demand for cement today but with a building industry in transition, toward a fossil free future and a carbon neutral production, it could be difficult to use the area in the same way as today. The industrial landscape with its stone quarry and buildings may have to adapt to a new use.

In this transformation process, the aim is to build on the past and use the existing qualities. The transformation can take various directions which these examples illustrate.

The first possibility would be that the industry continues the extraction of stone. The second possibility "2031 - The Quarry opens up" is a scenario where the factory continues the production but the quarrying at Norra brottet ends. In our design proposal, this example is developed more in depth and is presented in the following pages. This can be seen as a first step to activate the stone quarry. The third example discusses a transformation of the whole area in a broader perspective, with different themes that can generate both synergies and conflicts. This is explored and presented after the main proposal.

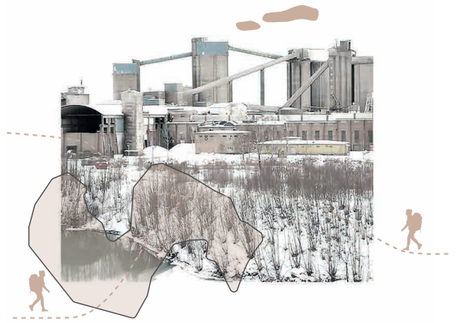






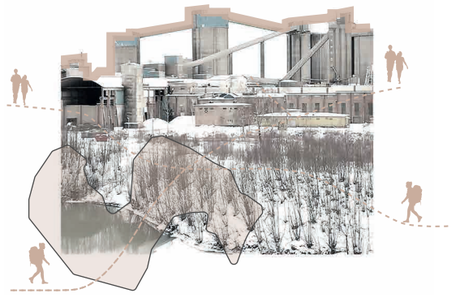
### 2021 - The Quarry expands

There is a continued demand for cement and the industry remains active for limestone extraction and production of cement. A new application for further extraction in the valley is approved and the industry requires more land, either an expansion further into the valley towards Billingen or to the central parts of Skövde. With this development, the area is not accessible for other purposes.



### 2031 - The Quarry opens up

A new application for further extraction in the valley is denied. There is still a demand for cement and the industrial buildings remain active but use raw material from another quarry. This opens up for a new use of the stone quarry. The proposal takes support in the upgoing trend and interest in recreation life and transforms the stone quarry into a recreational space that educates about the local context. (pp. 56-75)



### Future - Change of whole industrial landscape

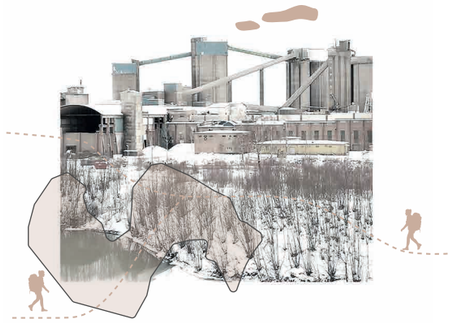
In the third step, the industry and quarrying stops and a new application for further extraction into the valley is denied. Both the quarry and industrial buildings can open up for new use. The industry could make a transition into a more sustainable production. The industrial landscape with buildings and quarry has many existing values to build further on. They can be seen as a resource in terms of reusing a structure and have a cultural value that tells a story about the past and let it continue and transform into a new use in the future. (pp. 76-83)

# 2031 - The Quarry opens up

## Motivation of program

Today's existing plan for after care of the quarry has a focus on biodiversity. In the development of our main proposal there is a focus to enhance recreational and educational values. An increased interest in nature and recreation motivate our program. To combine recreation with learning more about the place and its history is an interesting concept at this site. The unique geology in the region, the presence of the limestone quarry and production of cement makes a focus on geology and human activity central in the design. Both in program, shape and material.

The design proposal includes design installations along a path that connects the city with the mountain through the industrial landscape. It gives new entrances and activates the area. Design installations along the path at the quarry edges work as portals and invite and guide the visitor through the landscape. One of the larger design installations is a visitor centre.



2031 - The Quarry opens up

## Location of visitor centre at Billingen

The location of a visitor centre, with focus on geology, makes Billingen a suitable location. It is the largest table mountain in the region and reaches over three municipalities, Skövde, Skara and Falköping. This can enhance a collaboration between municipalities in Skaraborg and strengthen the identity of the region. It is an interesting place since it borders nature, a large industrial landscape and the city.  A visitor centre can raise interest for the place and give access to a large industrial landscape next to Skövde. Many visitor centers, such as Naturum, are located close to nature but far from a city. The location next to a city can make it more accessible with good communications to other regions. It is also possible to use the existing infrastructure, roads and parking lots.





## Target group

The visitor centre aims to attract a broad target group and will house both indoor and outdoor activities. There should be something for all age groups and no prior knowledge is required. The visitor centre agenda is to educate and inspire the visitor to want to learn more about the place and experience it on their own. There will also be guided activities and schools can do excursions to the area and use it as a second classroom. During weekends it can be an attractive destination for families and friends to gather around and experience the landscape together. The recreation area will be an asset for the inhabitants of Skövde but also attract a wider public in the region of Skaraborg and the Västra Götaland Region. It could also open up for tourism from other parts of Sweden or from abroad.

## Possible stakeholder

Exhibition space for visitors will share facilities with office space for a possible stakeholder. During the process we have been in contact with Platåbergens Geopark, that we imagine as a possible driver for the centre. Platåbergens Geopark is a project and collaboration between nine municipalities in the Västra Götaland region. In 2019, they applied for the area to become Sweden's first UNESCO Global Geopark. The application is being processed (Unesco, 2020). By this certification, the region can gain more attention and attract tourists from other parts of the country and outside Sweden.

Other possible stakeholders we imagine could initiate or collaborate in the project could be Cementa, Skövde municipality or the region of Skaraborg.

PLATÅBERGENS GEOPARK
Lager av historia

*"A geopark is an area with a geology of international importance – something unique which you will not find anywhere else in the world.  The landscape around Platåbergen contains several geological phenomena which are very special and deserve international attention."*

(https://www.platabergensgeopark.se/en/the-geology/)

## Design strategies

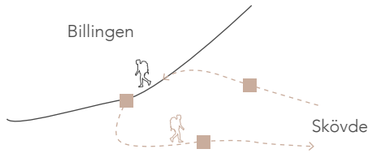
Based on the conclusions from the theoretical approach and the analysis of the local situation, design strategies have been outlined to start to form the basis for a proposal that aims to answer our research questions.

*How can architectural design transform and revive an industrial landscape into a place for recreation and education?*

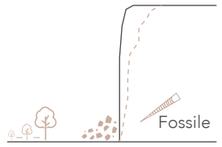
*How can architectural design strengthen the mental connection to a place and relate to time?*



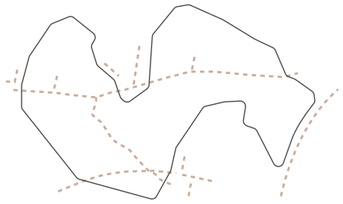




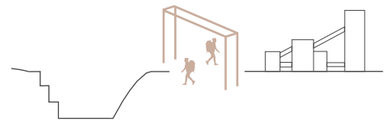

**Invite**
Invite and guide visitors into the landscape by a new hiking path and design installations at specific places that provide shelter, activities and information.



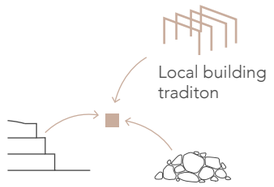

**Relate to time**
A design that enables the visitor to pay attention to time; geological age, present time and future.



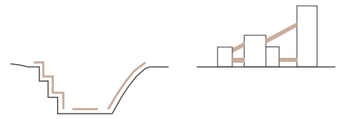
**Reconnect**
Historical traces and roads define the location of design installation to reconnect with the past.



**Frame views**
The design installations frame views towards the limestone quarry and the industrial buildings.



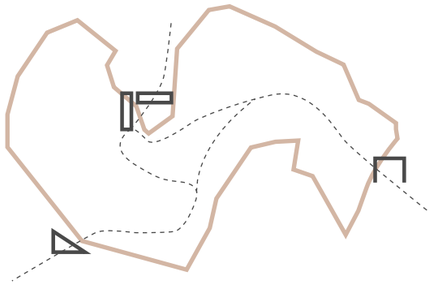

**Use local resources**
To use local materials and building techniques in the construction; limestone, “secondary” limestone as a heavy material and timber as a lighter structure on top.

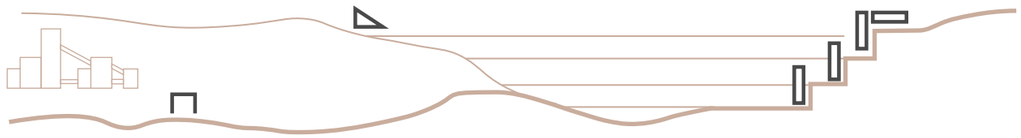


**Follow and contrast**
Let shapes in the surrounding influence the design; levels in the dramatic topography and how industrial units are connected. Design in contrast to the erosion of the rock and views to follow the ecological succession.

## Design installations

The design installations are developed from our design strategies. They are influenced by their immediate context in relation to view directions and terrain, in order to enhance the qualities of the place. The installations that are differentiated in activities, are linked through a path in the industrial landscape.



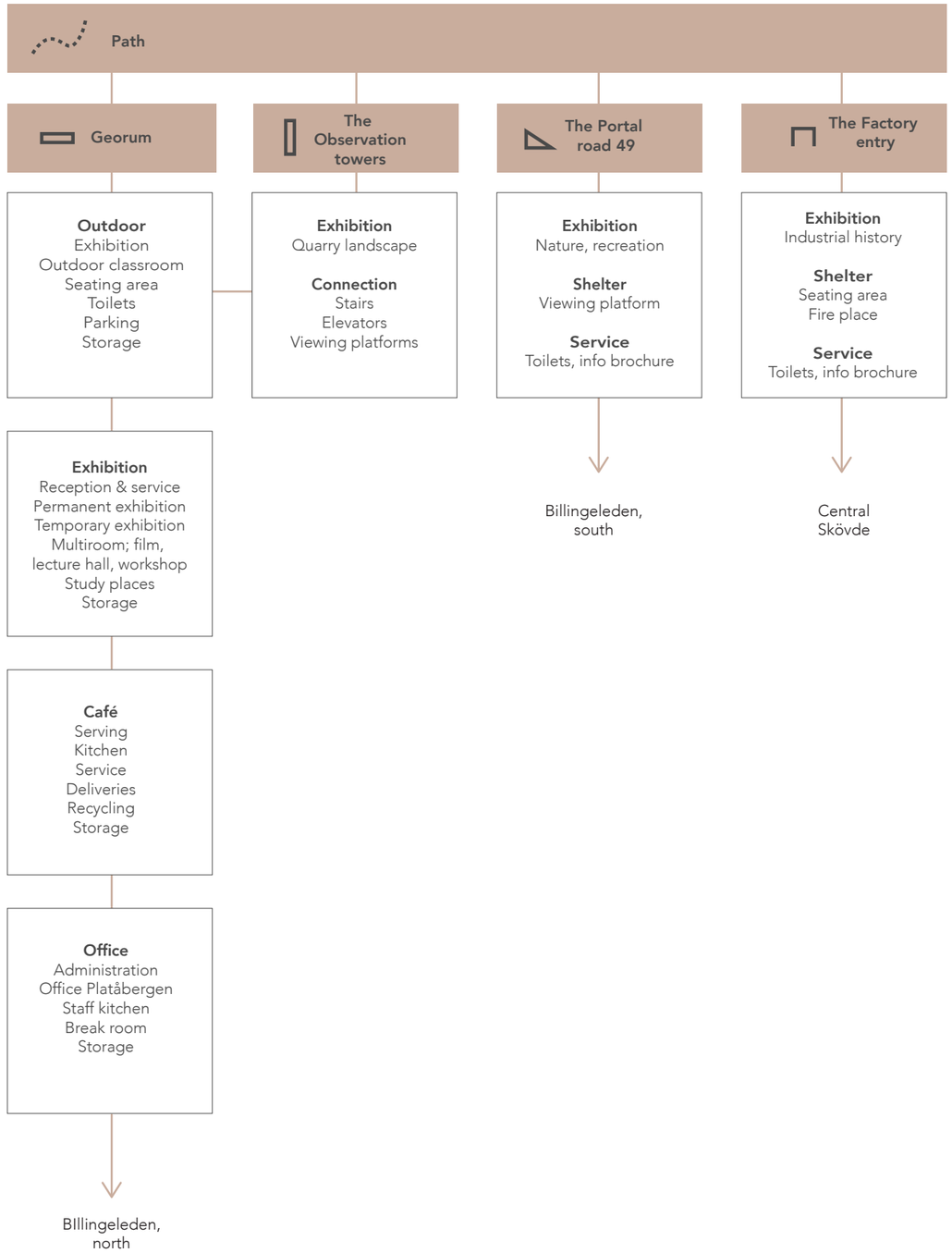


| Design installation | | Context | | | |
|---|---|---|---|---|---|
| Name | Symbol | Meters above quarry floor | Placement | Views | Relation to terrain |
| **Path** | | Varies | Between design installation and connects to existing infrastructure | Varies | Varies |
| **Georum** | | 45 m | Edge of the quarry<br>At the end of a cut of road | Stone quarry | Horizontal |
| **The Observation towers** | | 0-45 m | Parallel to the stone walls, next to the Georum | Stone quarry<br>Walls | Vertical |
| **The Portal road 49** | | 45 m | Edge of quarry<br>next to road 49 | Stone quarry<br>Billingeleden, hiking trail | Through |
| **The Factory entry** | | 0 m | Edge of quarry<br>next to the factory | Industrial buildings<br>Oldest part of quarry<br>Water | Horizontal |

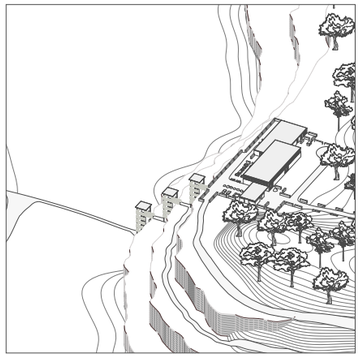




## Program



## Location of the installations

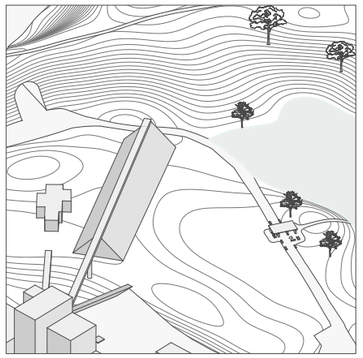


### Georum
### & the Observation towers

The visitor center “Georum” is situated on the top of the quarry where an old road ends in a steep cliff. The installation connects the stone quarry and Billingeleden.

### The Portal at road 49

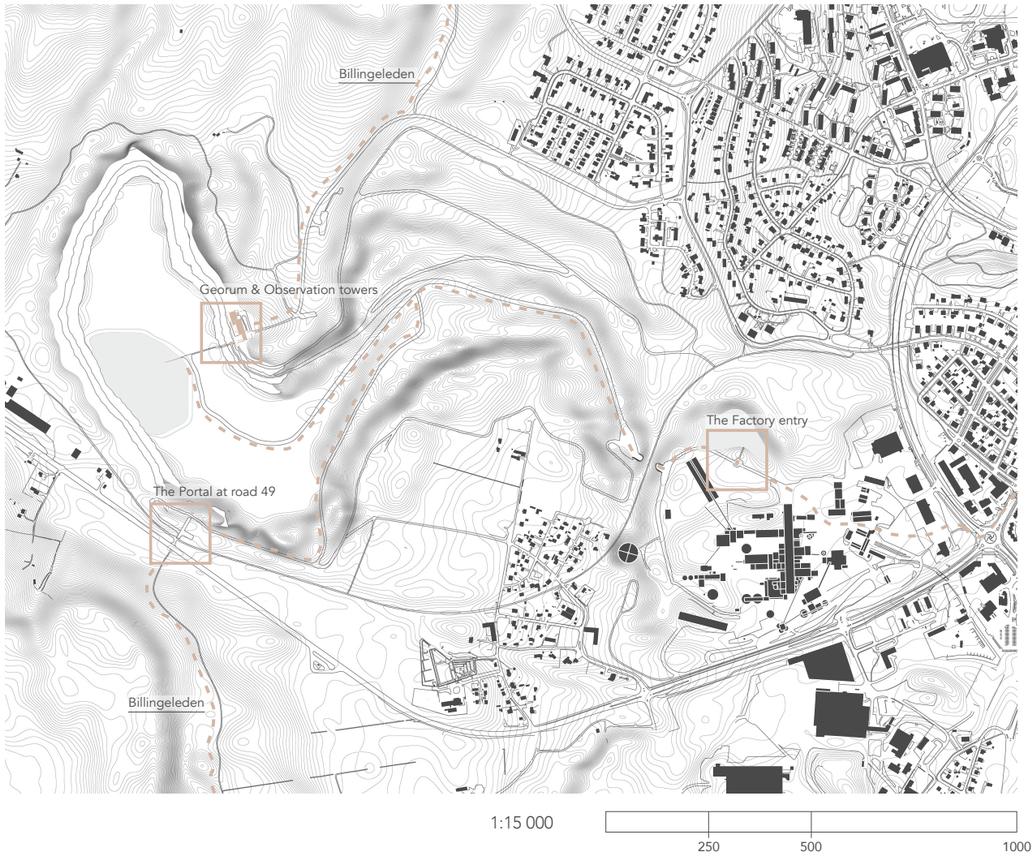
The portal connects to the quarry and the hiking path Billingeleden. The installation cuts through the hillside which enables travellers on road 49 to notice and experience the quarry.



### The Factory entry

The entry ties the stone quarry to the city center of Skövde. The installation frame views towards the factory landscape and towards the remains of the first areas that were quarried.

# New path

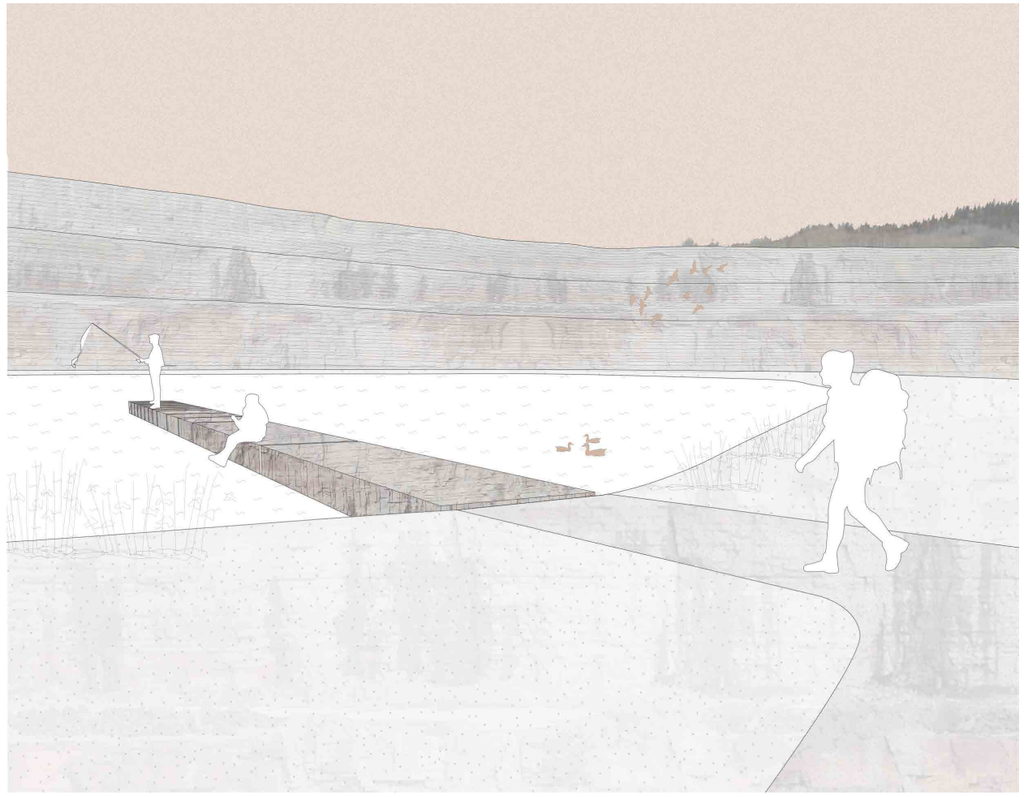



## Path through the quarry

The new path makes it possible to explore the landscape down in the quarry. The existing transport roads are transformed into hiking paths. The path that stretches from the Factory entry to the Georum is 1,5 km. To take a walk from the city center Hertig Johanstorg to the Georum through the quarry and back again is approximately one hour walk.







## Path elements

One of the elements along the paths is situated next to the lake. Today the water is continuously pumped out of the quarry. If the quarring ends, the water will be kept in order to create a richer biodiversity. According to the aftercare plan, the water level is going to be around 1 meter at the time of 2031 but will alternate throughout the seasons (Enetjärn natur, 2012).

The path connects to an installation of limestone blocks that extend into the water. The small-scale bridge could enhance the feeling of the large quarry. The blocks also act as a reference point as the water level will differ throughout time.

# Georum

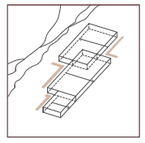
The visitor center, with the components Georum and the observation towers, is situated on the top of the quarry, where an old road ends in a steep cliff. This is the largest design installation and should be an attraction to explore the quarry. It is located strategically next to Billingeleden.

The building has an elongated shape in the direction of the quarry. The division of the volume creates a portal to the quarry from the road. From this point, the visitor could enter the indoor exhibition or continue through the outdoor exhibition, into the quarry landscape. The division of the volume also enables spaces that could offer better microclimates at an exposed site, suitable for seating areas. Semi high limestone walls also contribute to this.

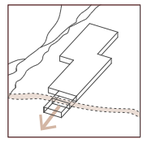
The whole building should work as an exhibition space to experience geology and history of human activity. The outdoor exhibition and observation towers are open around the clock and make the place active when the indoor exhibition is closed.

Inside, the permanent exhibition is situated around a central core which consists of a workshop and lecture hall. The cafe, with large windows, provides views over the quarry. To the north, there are office spaces that could house Platåbergens Geopark.

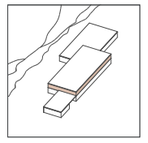
Division



Portal



Layers



## Exhibition 620 m²

1. Permanent exhibition
2. Multiroom for workshops, film display & lectures
3. Temporary exhibition
4. Storage
5. Conference room
6. Wardrobe & toilets (above: study places)
7. Reception
8. Shop

## Outdoor exhibition

9. Secondary limestone display
10. Table mountain layer exhibition
11. Outdoor classroom, workshops in fossil collection
12. Toilets
13. Storage
14. Bicycle storage
15. Accessible parking space
16. Elevator in the Observation tower

## Office & service 175 m²

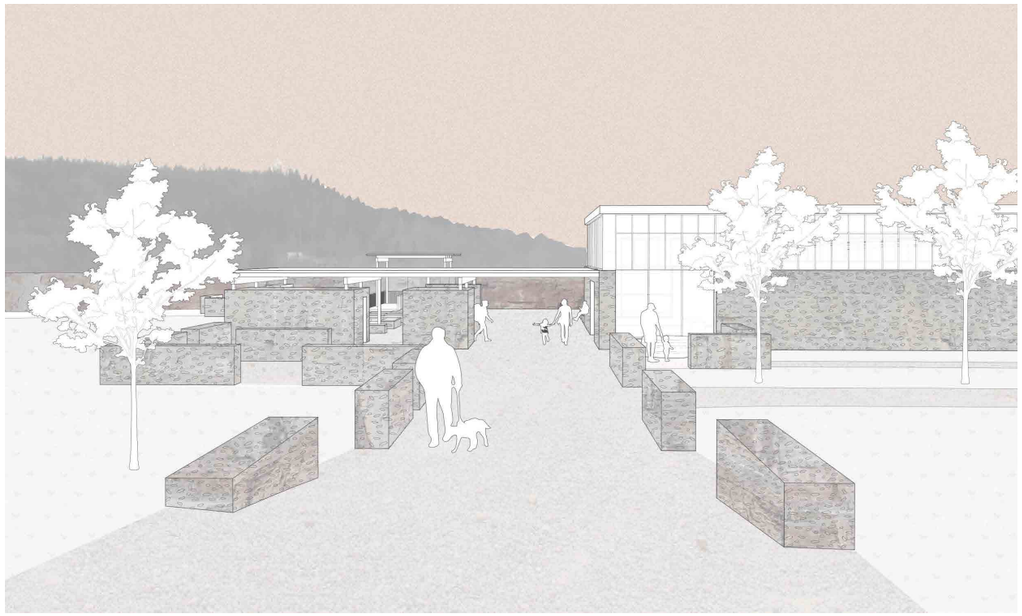
17. Office Platåbergens Geopark incl. meeting rooms, toilets, kitchen with outdoor seating area.

## Café 165 m²

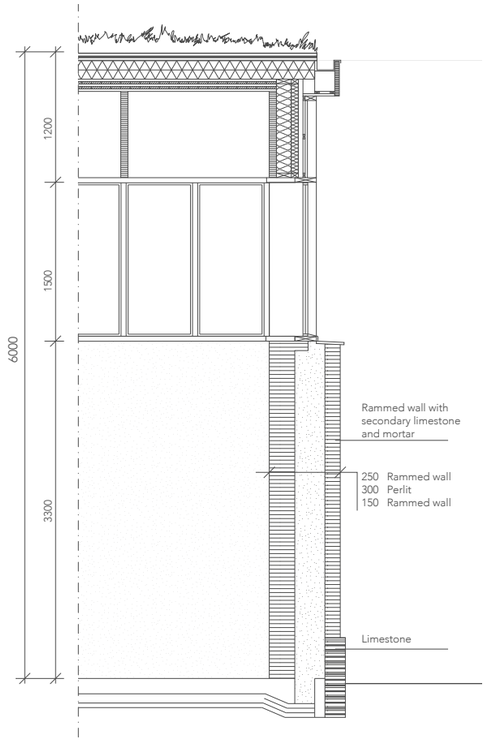
18. Kitchen with storage
19. Seating area
20. Outdoor seating areas

Total 960 m²

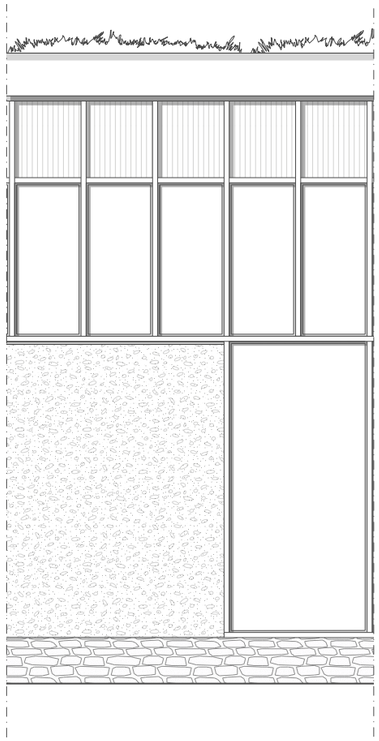
Plan 1:400



View towards the entrance of the Georum and the quarry landscape.



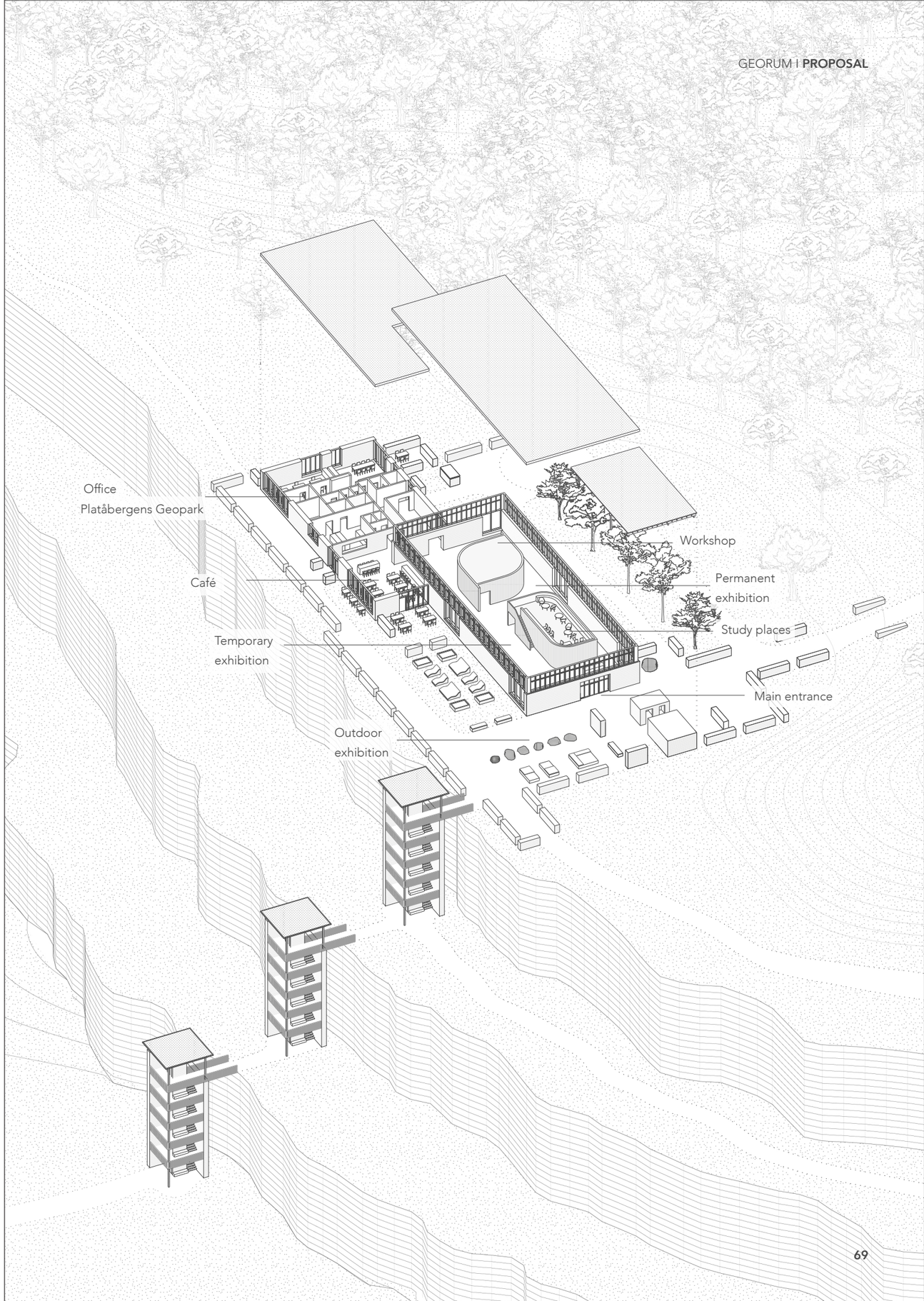

Section 1:60



Elevation 1:60



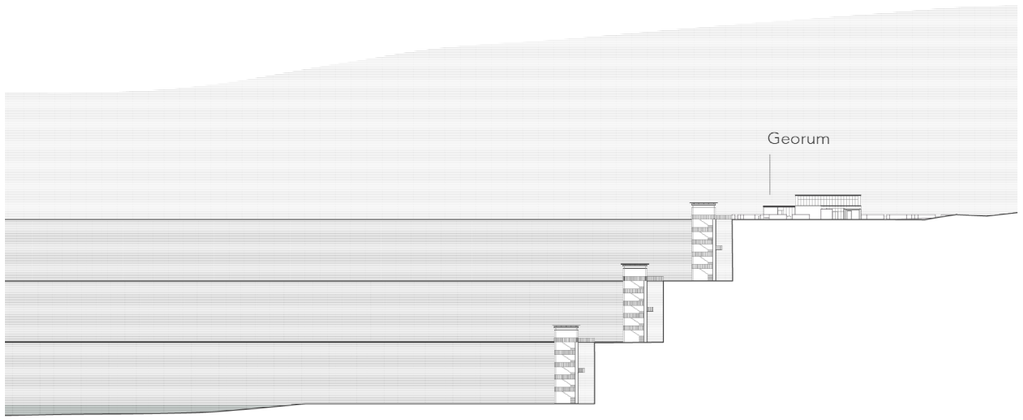




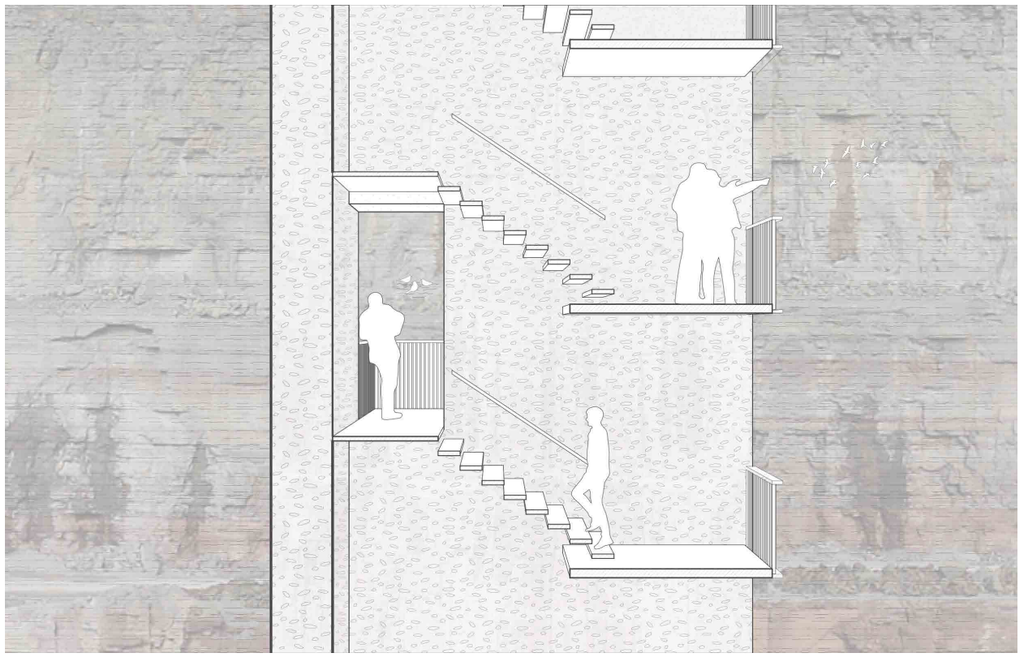
## The Observation towers

The observation towers are open for visitors at all times and with stairs and elevators the visitor can access the quarry. At the platforms, there are exhibition spaces from where the visitor can learn about the place's history connected to the quarry landscape.

The massive walls of secondary limestone have openings at some places to frame the quarry cliffs. Here, the visitor can experience the rock and the wildlife at a close distance.




The Georum is 45 meters above the quarry floor. With stairs and elevators, the visitor can access the quarry. 1:1500



The visitor can experience the stone walls at a close distance when walking in the observation towers.

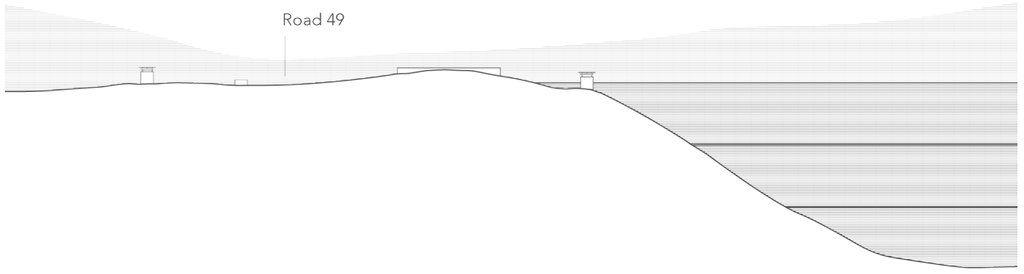




## The Portal at road 49

Today, a small hill acts as a barrier between the road 49 and the quarry landscape. In this installation, the connection between Billingeleden and the quarry is strengthened by stone walls extruding into the hill in order to access the quarry and the viewing deck.

The walls continue in a similar way on the other side of the road. Through time the vegetation will gradually take over and transform the today's rocky slope to a green hill and the design will contrast even more.

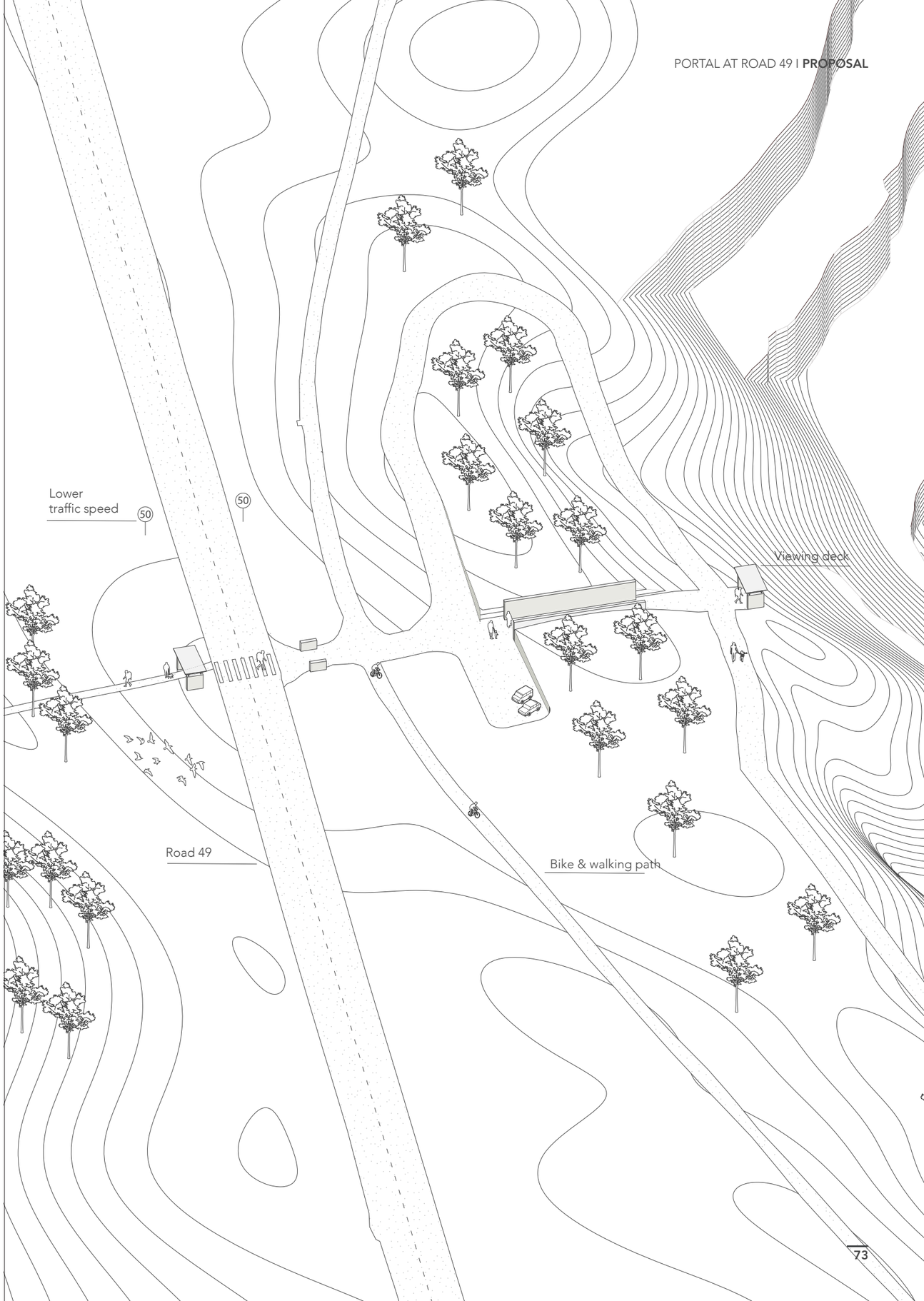



A space that connects Billingeleden and the quarry landscape. 1:1500

Work as a portal that invites visitors that access by foot from Billingeleden, or pass by on their way commuting to Skövde by bike.



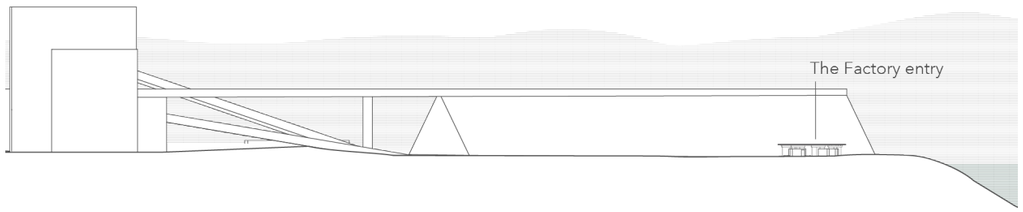




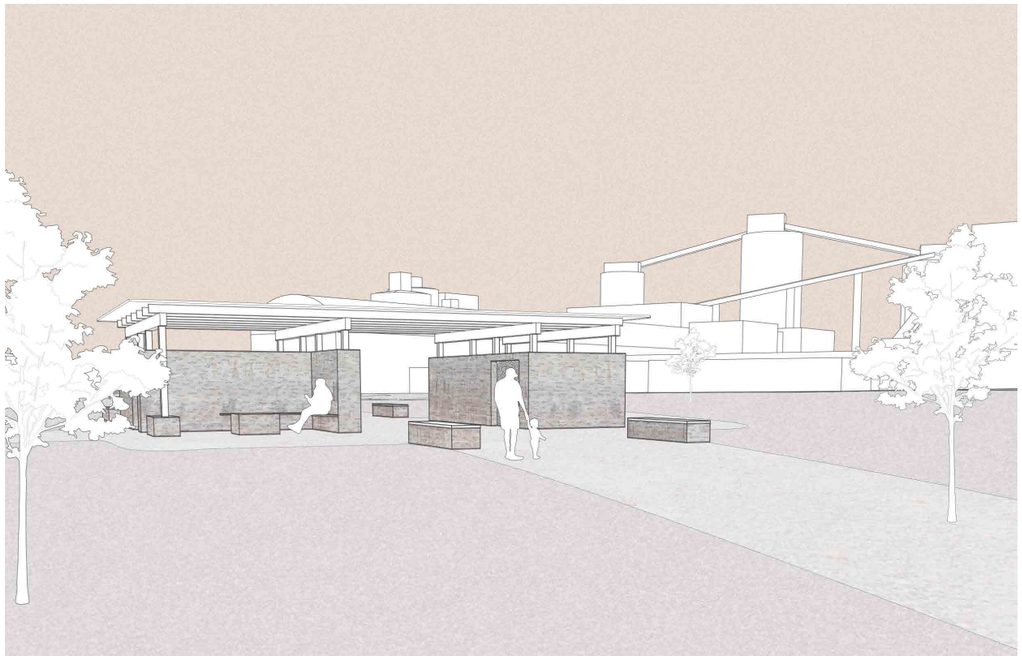
## The Factory Entry

This installation is situated on the transport road that connects the factory to the quarry. It works as an entrance to the industrial landscape. If the quarrying stops at Norra Brottet, the road could be adapted into a hiking path in order to connect the central parts of Skövde and the quarry landscape.

The factory could remain active with material extracted from other quarries. At the installation, the visitors can observe the factory landscape and visit the exhibition space. The two seating areas with fireplaces frame views towards the factory and a small lake, that is the remains of the first areas that were quarried, in the beginning of the 1900s.



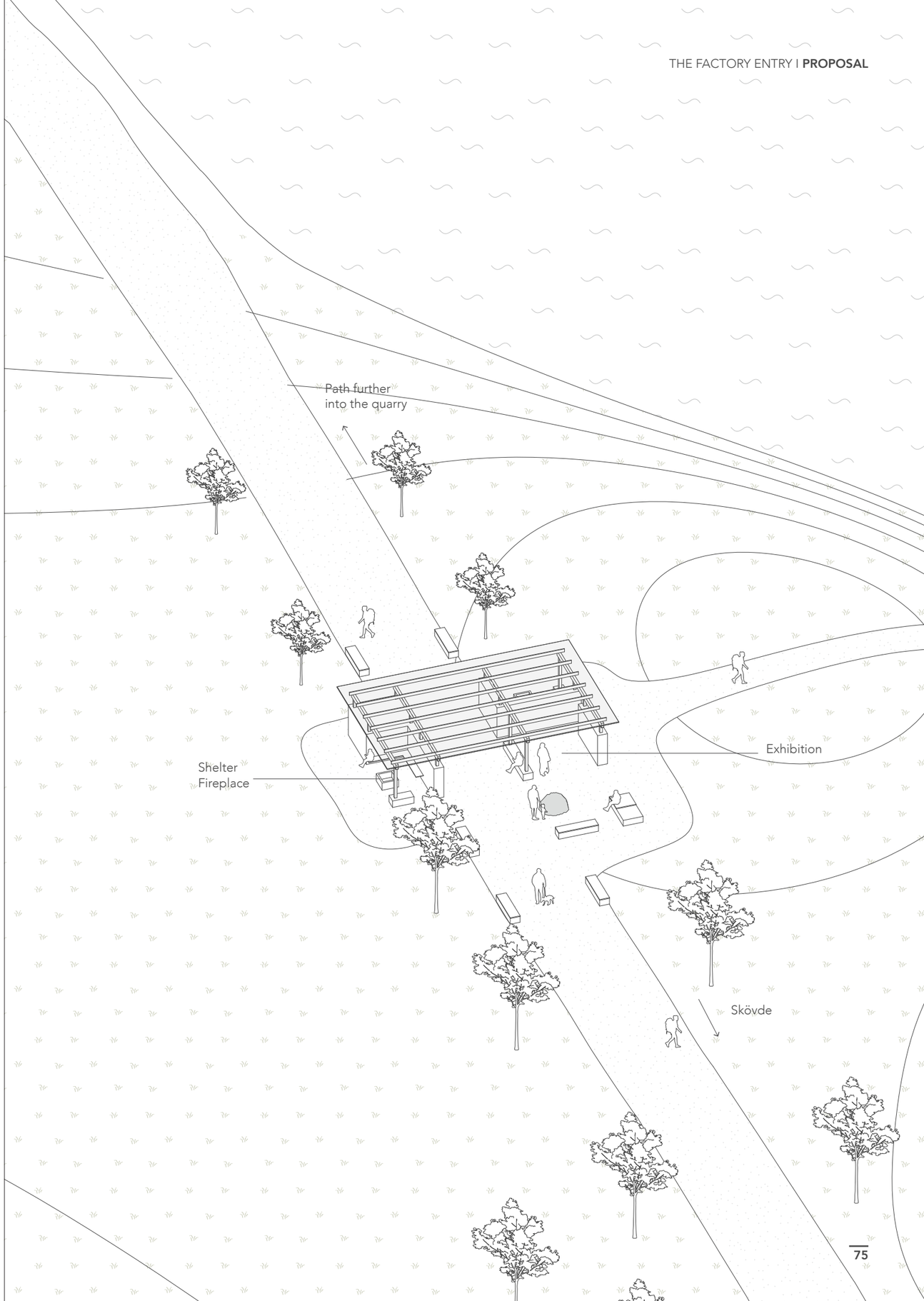

Located on the existing transport road between the factory buildings and the small lake. 1:1500



The industrial buildings form a fascinating landscape that can be viewed from the shelter.



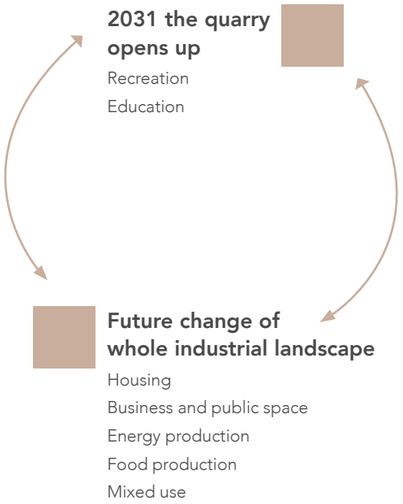




## Future - Change of whole industrial landscape

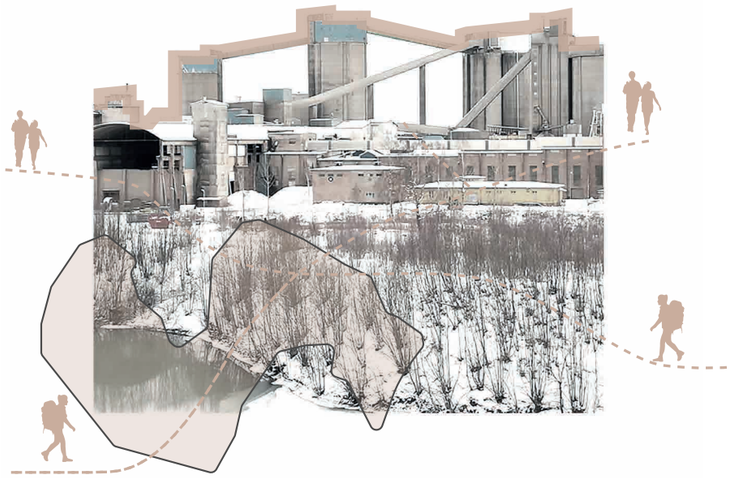
With a quarry being more open to the public, it broadens the view for other potentials. In this part future potentials of the whole industrial landscape in relation to the proposal are discussed. It is a way to explore other themes and develop the proposal for 2031 so that it is open for change and does not close doors for future transformations in the area. Another reason is to show that there is not only one solution but more potentials seen in this landscape. With the examples we can discuss how a combination of different functions would work together, if they create conflicts or if they create synergies and strengthen each other.

How our proposal can relate to the surrounding is tested with possible establishment of functions such as housing, businesses and production of food and energy. In this elaboration, we also involve the factory buildings and speculate about their future use. Four themes are discussed separately and then merged into one example.







Future - Change of whole industrial landscape


## Housing

### Why?
Skövde and the region is growing and there is demand for new housing.

### How & where?
The stone quarry and industrial landscape could be an attractive place for housing close to the city centre. A residential area would activate and give easy access to the recreation area.

**1.** The bottom floor of the quarry could provide a large area for housing. But by introducing a private typology in a recreational space and in this special and dramatic landscape would change the character of the place into a more private area.

**2.** Housing in the factory buildings of Cementa would provide dwellings close to the city center. The industry is a specific typology and it would require specific solutions for each dwelling. To adapt to the standards of housing could be an expensive transformation which might make the structures more suitable for other functions. The site could also be contaminated, if so, it needs to be remediated in order for people to live here.

**3.** The agricultural land around Vårnb village could be an attractive location for new dwellings. To replace the agricultural land with a residential area would change the character of the small village. To build more densely along the quarry edges and along existing roads would allow to keep larger areas for agricultural purposes. Apartment buildings would add a new typology.

**4.** Housing around the edge of the stone quarry would provide dwellings with an attractive location, with views over the quarry. To avoid the feeling of being surveilled when being in the quarry, the buildings could be of a lower character. In the village of Vårnb, this idea would conflict if higher exploitation is needed to keep parts of the agricultural land. If housing would be placed along the south edge of the quarry next to road 49, it would be suitable to lower the traffic speed.

**5.** The today highly trafficked road Vadsbovägen has the potential of becoming more of a boulevard with a more active life. Housing along this route and at the edge of the industrial buildings could connect the post-industrial area with surrounding neighborhoods.






## Businesses and public functions

### Why?
An increase in population would require more places for business, workplaces and public functions.

### How & where?
**1.** Down in the quarry, different activities such as climbing and guided tours could be provided by tourist companies. The large space also allows for bigger events to be held here, such as concerts or sports events. The noise could be problematic and disturb the wildlife.

**2.** The factory buildings could be easier to convert into spaces for businesses and public functions, in comparison to a conversion into dwellings, because of their scale and structure. These functions would strengthen the connection between the city and the industrial landscape. It could house a mix of activities. To use existing structures could lower rents and appeal to smaller businesses. For instance, it could be used for co-working spaces.

**3.** The visitor center could become a new point of interest in the city which attracts other businesses to establish close to it. As it is situated close to the recreation areas, the businesses could be connected to nature tourism and outdoor activities.

**4.** The road 49 is an important connection to the surrounding region and makes the area interesting for businesses. The portal to the stone quarry could activate the site and be more attractive.

**5.** As mentioned, Vadsbovägen har potential of becoming a boulevard. Business and public functions would strengthen this flow. The factory entry ties this area with the stone quarry.


## Energy production

### Why?
An increased demand for local production of energy due to the transition to renewable energy sources. Another aspect is the increased use of technology that requires more electricity.

### How & where?
Wind power and solar energy are renewable resources that could be introduced.

**1.** Introduction of large structures for energy production at the stone quarry could change the character of the quarry and disturb recreational activities. Wind power can generate noise and can be problematic in this context, close to a city and since silence is often desired in recreation areas.

**2.** Some of the structures of factory buildings might have a potential to shift their production. Also by reusing structures, less resources and energy could be used.

**3.** Solar panels could be integrated in new buildings such as dwellings and on businesses.

**4.** Solar energy could be implemented on the slopes towards the south in the quarry. They could be adapted to the topography and integrated with shelters or other functions for visitors.






## Food production

### Why?
Locally produced food in a more urban environment can raise interest and knowledge about how crops grow and from where it is produced. It has a recreational purpose. Another reason would be a higher food security. In order to not depend on import of food and have shorter transports. To produce food in the post-industrial area would also connect to the time from before the quarrying took place.

### How & where?
**1.** It is difficult to use the quarry for agricultural purposes in a conventional way. To reintroduce soil in the quarry would change the character of the place and hide the traces of quarrying.

**2.** Industrial buildings can be used for urban farming and storage of food in silos. Examples such as hydroponic, aquaponic, vertical farming could be implemented. Industrial activity could have contaminated the soil. This is a factor that needs to be further examined. If contaminated, vegetation could help to remediate the soil.

**3.** The soil around the quarry is fertile. The land next to Vâmb village could continue to be used for farming or pasture. In the valley of Vâmb, where the visitor center is placed, could also be a suitable location for such activity.

**4.** Masses from the excavation contain both stone and soil from the top layer and are moved to the edges of the quarry. This might be a more suitable place for growing crops. In particular, slopes facing south could provide a good microclimate.

**5.** The area closest to the city centre can be suitable for allotment gardens and community farming. It will add a pedagogical and recreational value.

## Mixed use

### Why?

To combine functions can be a way to use the land efficiently. They can sustain each other and create synergies. The area can support more needs and become attractive to a wider public. Different functions activate the area during many seasons and hours of the day. A zoned area with one function can be more vulnerable, but a mix could create a more resilient neighborhood. To have a circular thinking, to produce and use locally.

### How & where?

In this future potential there is a mix between housing, business, public function, production, culture and recreation. The aim has been to find a balance between future needs and to be able to see traces and understand the past of the place. Because of the location also to create hybrids where rural and urban interests can meet. The future will look differently depending on future external demands.

The proposal for 2031 is a first step and one layer in the continuous transformation of the area. These smaller interventions can lead to larger transformations with other potentials developed around them. And with the same transformation approach of using the existing and connecting to the past.

The design installations invite and make it possible to go down and explore the quarry instead of only experiencing it from a distance. The former barrier is broken. The area becomes more attractive for both residents in the surrounding neighborhoods but also for tourism. The visitor centre and the portal at road 49 connect to the existing hiking path along Billingen and gives an alternative to walk down in the quarry instead of walking around it. The factory entry marks a new entry to reach the mountain and the recreation area from the city.





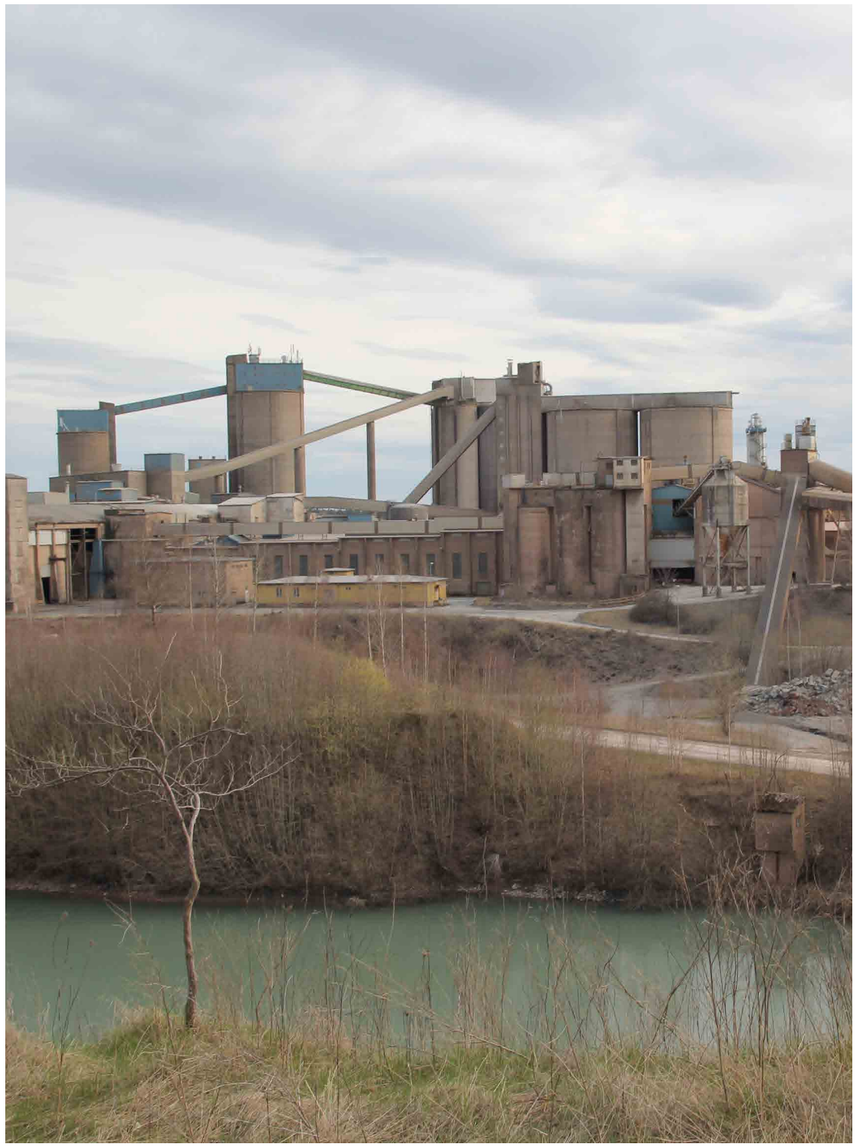

By placing the design installations at the edges of the quarry large parts can be kept and the dramatic landscape can cultivate. This will enable different types of biodiversity. It would also create an environment for recreation close to a city. Future use of land could develop around the industrial buildings and around the edges of the quarry.

To have a mix of functions would activate the area during different hours of the day. Businesses and recreation functions activate the area during daytime. In the evenings, the presence of inhabitants of the new dwellings could add a feeling of a safer space to be in. Also, businesses could provide culture and recreation values which could activate the area during days, evenings and weekends, in the quarry and at the factory.

In general, the mixed functions could attract more people and could integrate this area with the city center of Skövde. The functions would give synergy effects in different ways. For instance, local energy production can be used in the production of food, and for household electricity. Each household or residential building could also be more self-sufficient, examples are to have allotment gardens and solar panels in order to produce their own energy and food. To grow food in the industrial buildings could also be a way to raise knowledge and interest for an alternative way of farming. These crops could be served in restaurants in the visitor centre.

# Discussion & conclusion

In this chapter the different parts of the thesis are discussed, reflected upon and conclusions are made.



*How can architectural design transform and revive an industrial landscape into a place for recreation and education?*

*How can architectural design strengthen the mental connection to a place and relate to time?*





# Discussion

This thesis has explored these research questions through a design proposal that shows one example of how to transform a stone quarry in Skövde to a recreational and educational space. It also gives examples of how the design can relate to time and strengthen the connection to place.

### Design proposal in relation to landscape

The large-scale landscape at the site could be seen as both appealing and hostile. Attractive in the sense of an unprogrammed space that is rare in cities. Adaptions to make the landscape more accessible and attractive to more people could diminish this perception. At the same time, it could pick up qualities of the landscape and enhance them.

The design installations aim to make the space accessible and function as a stepping stone to the former industrial land. We worked with design strategies that highlight the place's qualities and the different historical layers, to activate the site and guide visitors to experience and understand the place and its history. Hopefully, this will make the users more conscious about the place and value it higher. By placing the design installation at the edges of the quarry, the dramatic landscape down in the quarry can cultivate. To keep large parts of the quarry intact would enable different types of biodiversity. It would also create a unique environment for recreation close to a city. If more exploitation is needed it would be better to use the industrial buildings and its surroundings.

### Speculative design

The future can have many different scenarios. To work with a speculative design is a method to vision things we do not know yet and compare different outcomes. To test ideas how the intervention affects the future and relates to the past. Even smaller interventions can activate a place and set a direction for the future. With this speculative transformation of the future use of the industrial landscape, we hope to raise interest about the place. The proposal could provide a base for further discussions of the future use of the area. The proposal focuses on a specific site but the method and approach to design could be applied to another site where other existing qualities will be the object in focus and form the design.

### Transformation method

The point of departure for the transformation has been the stone quarry and focus has been to build on the existing qualities. Our ambition was to work with the adaptation approach, to understand the area as a whole for the transformation. And to be open for the potential of structures and test what the place could become. For instance, this is how we incorporated the material secondary limestone as objects for transformation. The process of identifying objects for transformation can be very time consuming but the advantage is that more qualities and more potential for transformation can be found.

In this work, the design program developed in parallel with analysing the site to find a suitable program based on the qualities and needs of the place. But this way of working might not be the most common case. A more conventional way is that a program is delivered that should fit within a frame. A consequence could be that the site is instead adapted to the requested program. It would be more advantageous to turn the process around, to look at the whole site, find a program and let the resources and building elements be used in their best way.

## Design in relation to time

We see advantages of looking at the project through the time paradigms outlined by Braae. Both as an analysing tool of the proposal and to study other reference cases but also to use it while designing. By using this method, it is possible to highlight how time interacts with design in various ways and what consequences it generates.

By analysing the proposal using the paradigms we can be more aware of the transformation process. The design proposal for the transformation of the quarry operates in all transformation paradigms. One transformation paradigm does not exclude another and we can also see examples where one paradigm could lead to another through time. These are some examples of how the design proposal relate to time in various ways:

*Difference transformation*

The new design installations both follow and contrast to the quarry landscape. By introducing new buildings and functions in an unbuilt environment, previously used for extraction of stone, it contrasts to the past. The observation tower with its straight walls follow the vertical direction of the quarry but contrast to the uneven cliff wall. Through time, this could be enhanced due to the erosion of the cliff. The portal at road 49 contrasts the landscape by cutting through the hill that today hides the stone quarry. By time, some design installations will contrast even more when vegetation grows on the sloped hills in the quarry edges. This also connects to the cultivation paradigm.

*Continuity transformation*

The proposal aims to preserve the character of the place and to extend the past into the future. While the new design installations can be seen as contrasting elements in the landscape, structures in between, such as topography and roads, can be strengthened by the design which could continue their presence in the future. This merges into the continuity transformation paradigm. One example is how the project adapts to the dramatic topography shaped by the quarrying, where the Georum takes inspiration from the levels in the topography and follows the direction of the quarry levels. By the placement of the Georum at the end of a cut off road we aim to strengthen the traces of the past. Another example is how the design installations frame views in different directions such as the quarry landscape and the industrial buildings and highlights its history. The use of local material, the secondary limestone, gives the material a new life in future and it will continue to tell a story about the past, being a leftover material from the cement production. Working with a program that focuses on geology and industrial activity will continue the narrative of the place. Lastly in our proposal, other future potentials are discussed, and we continue to build on the past and existing structures such as the industrial buildings are given a place in future.

*Cultivation transformation*

In the cultivation paradigm, the transformation has no end outlined and is open for various changes. It can take different directions depending on both external and internal factors. With the design proposal we speculate and set new expectations for the future. The design installations work as portals into the quarry, and activate and encourage more movement in the quarry. Together with the pre-existing, the new activity could generate new actions.

One example where time is the driving force is along the quarry edges that have already been refilled with secondary limestone. Vegetation will gradually take over at these places and transform the today rocky slope to a green hill. This could make the design installations contrast even more.

Since the future is unknown, we don´t know if or when the industrial activity and the extraction of stone will stop and open up the industrial landscape for new use. This can create very different futures that are discussed in the future potential part. By introducing more functions the area can become more attractive to other activities and create synergies.

*Optimization transformation*

The optimization paradigm is not connected to a specific time and focus is on transforming something existing into what it should be instead of restoring it to what it was. We can apply this to our project by speculating in what a former stone quarry could be transformed into. By the design proposal, a visitor centre with focus on geology with the aim to enhance recreational and educational aspects shows our way of optimizing its use as a first step. We also aimed to create synergies with other functions that support other local interests.

Another aspect of the project is that we tried to optimize the use of resources on site. The leftover material, secondary limestone, is used as a building material. Another example are the former transport roads for industry adapts and are used for hiking. The industrial buildings are also seen as a resource that could be optimized to fit another function.

## Site specific design

To look through the lense of critical regionalism widened our field of what site specific design can be. In the project we work towards the approach of critical regionalism. In the sense to use and take advantage of the local conditions of the place. To use local material, the topography and to connect to the building tradition of the region. The shape of the design takes inspiration from the layering in the topography and the inherent layers of the limestone. This resulted in the use of waste stone molded in walls and the use of dry walls. Both constructions took inspiration in a local technique of “kallmur och stöphus”.

By using building materials that are molded on site resulted in a design that is rather permanent. To work with another construction but still use the secondary limestone could open up for more changes of the design and leave it more open for re-use and disassembly of the building elements.

## Sustainable perspective

The planet’s resources are limited and we need to be more aware of how to use them and to work with renewal of what we already have. Also to consider land that is already at our disposal, such as post-industrial landscapes. At first they can be seen as difficult structures to re-use but with curiosity and an open view they have potential to be transformed into something beyond its former use. If the past is continued into the future through design, it can provide an understanding for the place which could make people more aware of and understand their immediate context and take more care of it. To work with local material is one example where the pedagogic aspect can be seen. People can get a better understanding of where the material is taken from, its history and what consequences it has for its environment.

## Use of post-industrial landscapes

Even if the stone quarry in Skövde is very specific in its context, we can see similarities with other situations. Industrial areas have had an impact on the structure of the cities and the countryside. For example industrial and logistics areas are often located strategically next to train stations and harbors close to the central core of cities. With a transition that affects the use of industries it could deliberate large space for new use. There is a potential in transforming these areas instead of demolishing or leaving them to decay. To keep them but to optimize their use can be a reminder of how the production has raised our living standards but at a cost of nature.

## Cultural heritage

The post-industrial landscapes reflect today’s need and dependence on resources. Storm (2014) argues that these places are not valued according to their significance to us. Further, she argues that they could provide platforms for discussions and reflections. The transformation of the Ruhr area is one example of how industrial areas are transformed and highlighted because of its historical importance for the region. To find historical traces about the past can make us more curious about the place. Although, the view of industrial leavings can be diverse. For some they can be fascinating and for others they are most seen as disturbing. If a transition of industries would lead to a large close down, how can we decide what will become valuable in the future? Something that we think is ordinary today might be looked at differently in the future. It would be irrational to preserve everything for its cultural and pedagogical value. Rather to find a balance and see the post-industrial as resources and try to optimize their use.

# Reflection

### The process

An important part of our work has been to analyze the site and it's context. The research about the site has been an ongoing process and could continue to inform the design. From the beginning our intention was to work with both the factory and quarry landscape as a whole. We had to limit our area of interest to the stone quarry in order to fit within the time frame of a master thesis. To work with the whole industrial landscape and make a more detailed proposal would need an even more developed analysis of the site and its objects.

As the industry is active, this has restricted us in terms of site visits inside the factory and quarry, due to the restrictions of the covid-19 pandemic. We have tried to compensate for this by visiting outside the fenced area during different seasons. Also by taking part of photos and video material from inside the quarry. To experience a similar space, we visited Kinnekulle stone quarry which is of a similar size and depth as Norra Brottet. This quarry closed in 1978 and has since been a recreational area. This gave us an idea on how time affects the quarry in the sense of the stones erosion and the succession of vegetation and wildlife. If we had the possibility to experience the space down in the quarry, we imagine that we could have found other potentials which could inform the design. The placement of the design installations along the quarry edges was a way to add portals to the quarry that invite people further into the quarry but also to keep its character. Another reflection is that maybe it became a natural choice to focus on these areas since we were only able to visit outside the fenced area.

A great part of the analysis of the site has been from our point of view. To understand the site and its context in a wider sense we have taken part in articles, literature and by talking to people with a connection to geology and the industrial landscape in Skövde. This could have been carried out further to understand the site from more perspectives.

To widen the perspective and work with future potential connected to the design proposal took the project a step further. This could have been tried earlier to be able to take many turns and change the design along the process.

Another direction for the project could have been to develop a main proposal that included the industrial buildings with a scenario where the industry had ceased. Then the focus might have shifted more to the use of the whole building structures and the re-use of building material. To strengthen the connection to time, the industrial heritage would have been even more central in such a project.

### Reflection on transformation

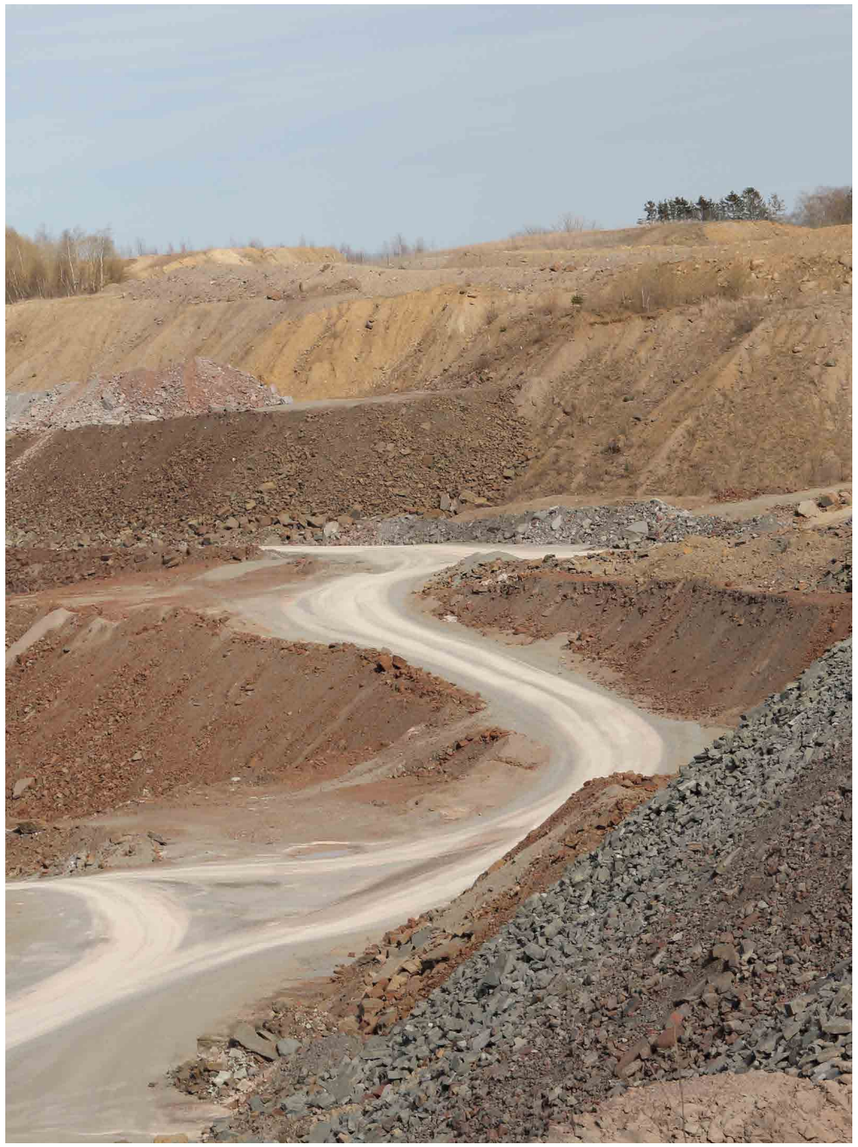
Transformation is a broad approach and during our process it has sometimes been difficult to grasp and be confident in our choice of method. At first we thought of transformation of existing buildings as an important part, which is something that we haven't explored within our project. The project rather focuses on a transformation of the use of the quarry into something else. Local material found at site, the topography and to continue to build on historical traces became important factors. We aimed to create a new perspective on the existing situation which also involves the future use of the factory buildings. These aspects correspond to the transformation approach, in which the design is created together with the existing context.

To work with a local context connected to design is present in many projects. During our architectural studies we have worked in such ways but not always put the definition "transformation" to it. But in this process we have been more aware of how design relates to time and how it creates a more dynamic condition.

During the process with the thesis we have discovered new fields of interests. By collaborating with local initiatives such as Platåbergens geopark, we got more knowledge about the mountain, its geology and its importance for the region. This motivated our program that focuses on recreation and education. By starting with existing qualities of the site was a way to optimize the use of the industrial landscape located between urban and rural conditions.







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## Images

Figure 1
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Figure 6 & 7
Lantmäteriet (2020)
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Figure 8
Billingeleden
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Figure 9
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Figure 10
AB Gullhögens Bruk, Personal
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Figure 11
Aktiebolaget Gullhögens Bruk. Sättning av kalkugn
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## Images

Figure 12
Fabriksbyggnad. Aktiebolaget Gullhögens Bruk
https://digitaltmuseum.se/021016323019/cementfabrik
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Figure 13
Skövde, Gullhögen (cementsäck)
https://digitaltmuseum.se/021017207148/skovde-gullhogen-cementsack-2-st-kopior
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Figure 14
Vårnbs kyrka, interiör
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Figure 15
Vårnbs kyrka och stenvalvsbron över Vårnbsbäcken (RAÄ-nr Vårnb 50-1) 1910.jpg
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stenvalvsbron_%C3%B6ver_V%C3%A5mbsb%C3%A4cken_(RA%C3%84-nr_V%C3%A5mb_50-1)_1910.jpg
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Figure 16
Ugnen fylles
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Figure 17
Cementa AB. Före detta Gullhögens cementfabrik
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Vandra på Kinnekulle (2011) Vandra på Kinnekulle from Sweden,
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Swecontpict (2009) Dalhalla
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