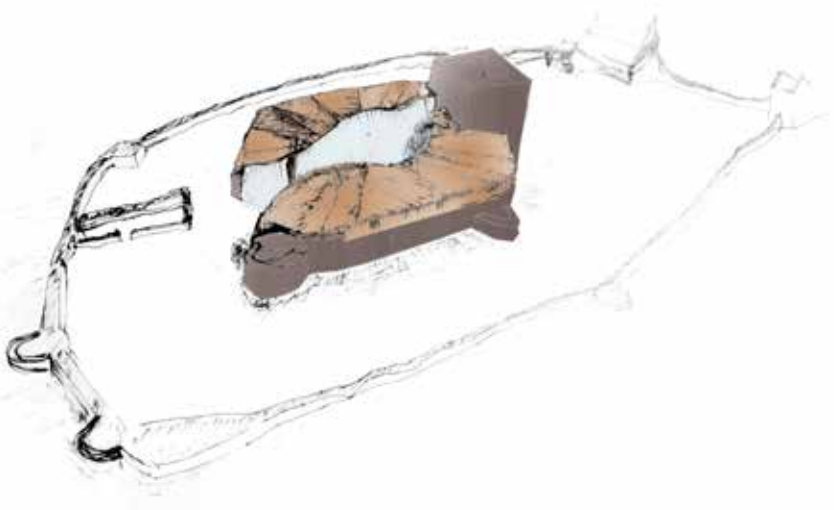

HAMMERSHUS
NEW VISITOR CENTRE

ABSTRACT

This paper is concerned with the transformation process of Hammershus from an old ruin into a modern visitor centre that fulfill the needs of today. The communication of the history of Hammershus has been the focal point throughout the whole project. This includes the history of the location, the original purpose of the castle and the communication of the history of the new building. In the work with the new visitor centre the transition from a busy tourist attraction into spatialities, where concentration and contemplation is possible has been in focus. In addition to the architectural principles, there has been assigned a high priority to a sustainable approach.

The making of the visitor centre is based on Naturstyrelsens program for a new visitor centre at Hammershus and take their requests and demands as its starting point.

Jonas Holmgaard Hundebøl

Hammershus New Visitor Centre
Thesis project, MSc4, ARK
Architecture and Design
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Supervisor: Claus Bonderup
Technical supervisor: Rasmus Lund Jensen
Copies: 4
pages: 78

INTRODUCTION

Naturstyrelsen did in 2012 get approval from A.P Møller og Hustru Chastine Mc-Kinney Møllers Fond til almene Formaal regarding financial support on 92,5 million kroner for a hole project that both preserve and extend the presentation of the ruin of Hammershus.

The project includes restoration of the ruin (28 million kroner), building of a new visitor centre (64,5 million kroner) and demolition of existing buildings in front of the ruin. In this way Naturstyrelsen wants to make modern surroundings for communicating the stories about Hammershus and the landscape near by, concurrent with preserving the ruin.

1st. of April a closed competition for building began. The competition is based on sketches Jørn Utzon made as a proposal in the sixties.

This 10th. Semester project will be based on the competition. The project will however not use these thoughts of Utzon in the later development of the visitor centre. Instead this project has moved the building site from where Utzon planned it to the top of the ruin. In this move the project has to deal with the transformation from ruin to a modern visitor centre.

Through out the whole project the main words are presentation and communication. These words are both representing the museum and its exhibitions and also the building itself.

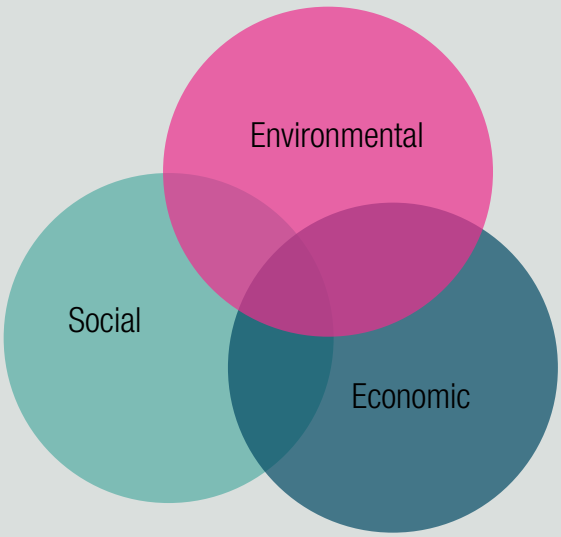
Program

CONTENTS

Design development

Presentation

SUSTAINABLE APPROACH



Ill. 2 Sustainability

In sustainable architecture different factors have an effect. This involves the environmental approach, the social approach and the economic approach. Each of these factors then has an effect on the design of the building in their own single way. In different buildings the relation can then vary, between which factors have the greatest impact. In the construction of the new visitor centre at Hammershus, the three different approaches will be incorporated in the following way:

The environmental approach:

- As low energy use as possible without negative consequences for the architecture.
- For limitation of the energy use in the visitor centres preface local materials is used if possible.
- If possible recycling of the existing buildings is used.

The social approach:

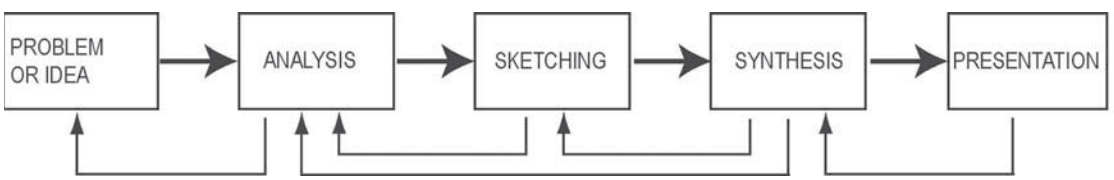
- Flexibility of the building, so that the use of the building can change in the future.
- Good comfort in relation to indoor climate.
- By use of local materials, a support for the local craftsmen are made.

The economic approach:

- Optimisation of the use of square metres.

DESIGN METHOD

The design phase is based on Mara-Ann Krudstrups method of "Integrated design process", which play a part of her problem based learning. In this method the project phase starts with an idea or a problem and then runs through different phases before ending up with a solution. (vbn.aau.dk) Especially this integrated design process is not a continuous process, where you move from A to B, but instead a process, where you make iterations of the project several times. These iterations have, thus also been made on this project but is not shown in the report. For better communication of the final product, the integrated design process has therefore been cut down to three overall subjects. These subjects are also the main paragraphs in this report, that is Program, Design phase and Presentation.



Ill. 3: Design Method

COMPETITION DEMANDS

This paragraph outlines some of the themes described in the program from Naturstyrelsen. In the following program phase these themes will be described. All text is translated from the program send out by Naturstyrelsen mentioned in the litterature list.

General requests

The visitor centre has to place itself into a hierarchy between Hammerhus and the surroundings. The landscape and its surroundings are the fundamental elements in the experience of the area around Hammershus. The experience of the dramatic landscape is compounded by the fact that Hammershus is placed in a higher level and therefore dominates its surroundings.
Furthermore it is requested that the visitor centre is designed to accommodate 300 visitors at a time. This means that the spatialities have to be proportioned and orchestrated in such a way that the visitors are guided through the exhibition in an eventful, pleasant and appropriate way.

Presentation and communication concept

The visitor centre should respect the castle as the dominating centre in the area and therefore it has to support and supplement the visit by providing an overview and create a link between the castle and the landscape.
In this way the visitor centre should function as a portal that gives a common introduction. The communication of the historical material should be represented in a way that activates the visitor through association and interpretation. At the same time, the visitor should gain insight into factual information and closed conclusions that give an anchor. The communication should be differentiated so that visitors with diverse qualifications will win by the visit.
The visitors should be challenged through their fantasy and creativity so that a dialogue between the visitors and the attraction will be established. It is important that the spatialities of the new visitor centre are as flexible as possible and they should appear attractive and workable. Furthermore, there should be vast possibilities for flexible use of digital techniques. The solutions for illumination should create an interaction between dark and bright panoramic parts, which creates a link between the castle and the communication of it. The visitors should have the experience of being invited into the castle from the exhibition and the other way around.
(Naturstyrelsen, 2013)

Ill. 4: A sign

THE APPROACH TO TRANSFORMATION

When a new building is created it is always of a significant importance to be aware of the developers primary requests. In relate to Hammershus the main request has been to create a visitor centre that is able to communicate the history of Hammershus. As already explained I have chosen to transform the ruin into that visitor centre and it is therefore highly important to be aware of the existence of different approaches to such a transformation process. By studying different transformation projects, I have constructed three overall approaches to the process from "ruin" to "workable building". In the following, the three approaches are explained and exemplified.

1. The building and the existing rooms are transformed into a new kind of spatiality. Existing spatialities are changed and walls are removed

- The result of this approach is that the new building work places a new layer to the existing building, which prompts new functions but at the same time also removes the focus from the original history of the building. On the other hand, the new layer allows changing the former purpose of the building into a new one.

- An example of this approach is seen in parts of Castelvecchio Museum in Verona. Here Carlo Scarpa has used his methods and architectural touch in the many visible details for instance in entrances, stairwells and show rooms so that rooms and the experience of the rooms have changed radically from the original.

Ill. 5 Carlo Scarpa - Castelvecchio Museum

2. The new building work is placed on the existing building with new spatialities but the existing spatialities is maintained as a part of the new building work.

- The result of this approach is that the visitor will be an observer of the original story without taking part in it. On the other hand the approach allows the place to create spatialities that serves the new purpose of the building much better - without changing the original layer of the building.

- Sverre Fehn has in his project Hamar Bispegård Museum used this approach. It is seen at the entrance, where a big ramp of concrete is placed. This ramp runs through several rooms.

Ill. 6 Sverre Fehn - Hamar Bispegård Museum

3. The existing ruin is rebuild with the same form and expression as before it was abandoned.

- This approach focus on the original appearances and spatialities of the castle and the visitor will, in this way be able to reconstruct and imagine the original life in the castle. The inconvenience of this approach is the limitations of the original spatialities.

- Koldinghus Slot is an excellent example of this approach. The castle is reconstructed by Johannes Exner and the new workings are true to the spalitalities in the original castle and visitors are not in doubt about the looks and spatialities of the original castle.

Naturstyrelsen wishes that the new visitor centre focus on the communication and presentation of Hammershus. In other words, Naturstyrelsen focus on the communication of the history of the location, the communication of the building throughout history and partly the communication of the current Hammershus. To create the best physical surroundings for the presentation of the former everyday life at Hammerhus the development of the new visitor center will take approach number three as its starting point. This approach will be able to communicate the original functions of the castle.
To create the necessary spatialities of a modern visitor center this approach will be combined with approach number two. This means that the existing walls will be maintained so that the construction of the new visitor center make use of the original spatialities. Furthermore, the transformation process takes its starting point in Johannes Exners concept "proceshistorisk bygningspleje", which contains four items in the work with historical buildings.

1.Originality; this refers to the materials of the original building.

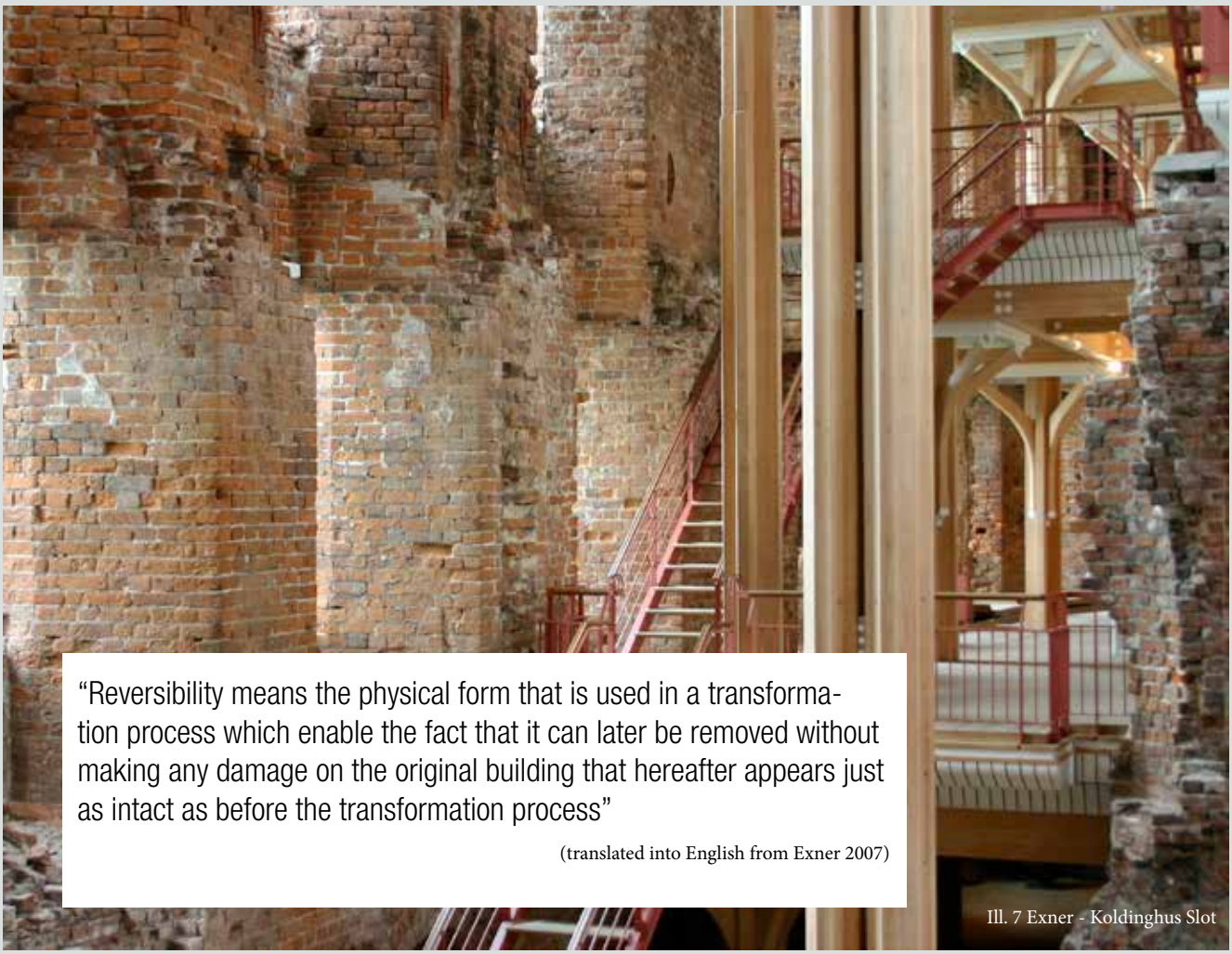
2.Authenticity; how the building in its physical appearance indicates the history that lies in the materials, surfaces etc.

3.Identity; this means the historical use of the building and the changes of this use throughout history.

4.Narrative; the narrative value and readability of the building.

Johannes Exner makes use of another concept - reversibility. This concept is described in the phote underneath.

(translated into English from Exner 2007)



"Reversibility means the physical form that is used in a transformation process which enable the fact that it can later be removed without making any damage on the original building that hereafter appears just as intact as before the transformation process"

(translated into English from Exner 2007)

Ill. 7 Exner - Koldinghus Slot

Program

Ill. 8: Gudhjem

Ill. 9: Østerlars circle church

Ill. 10: Hammershus

BORNHOLM AND HAMMERSHUS

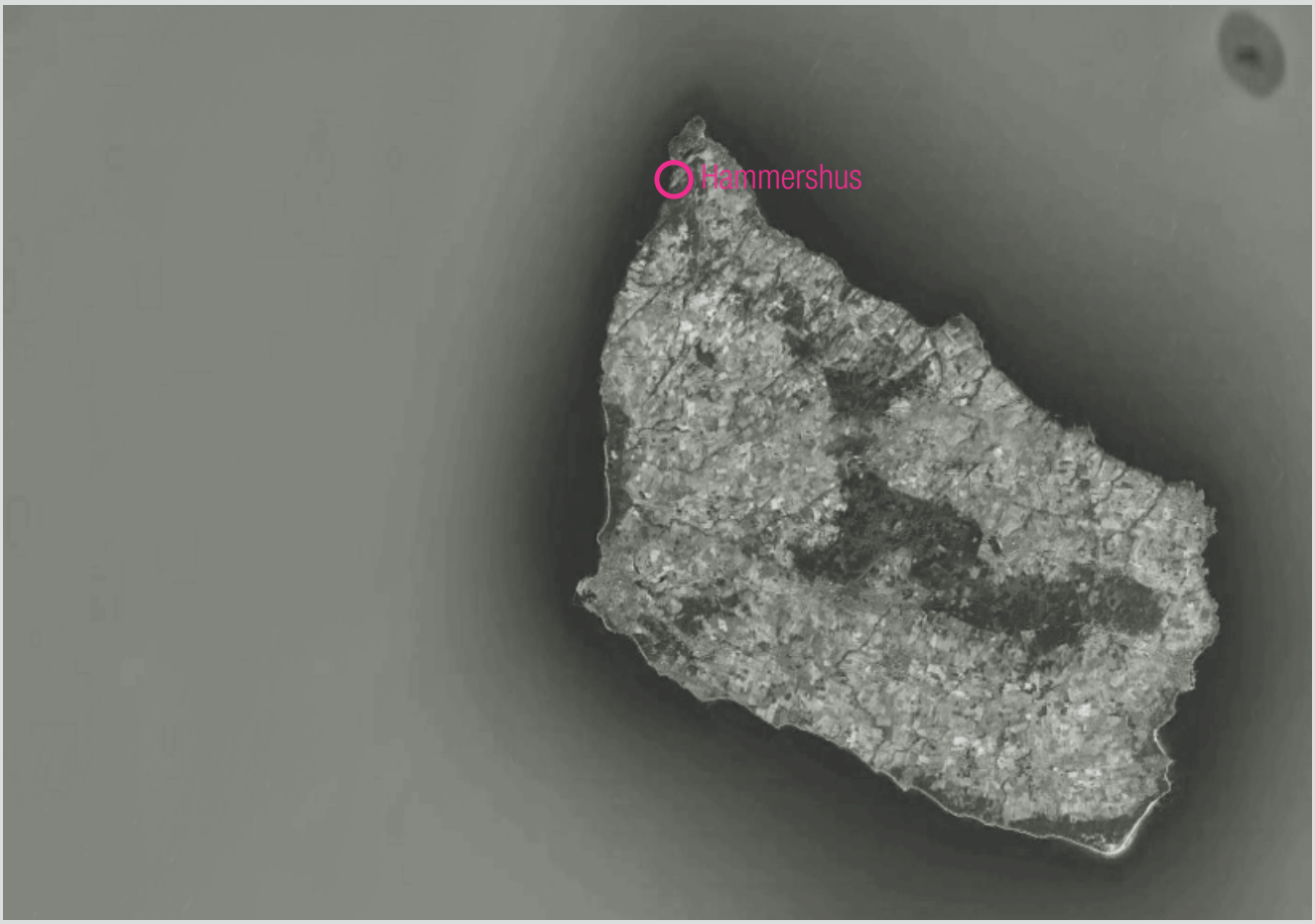
Bornholm is a Danish island in the beginning of the Baltic Sea, south of Sweden, and north of Poland. The main industries on the island include fishing, arts and crafts such as glass making and pottery using locally worked clay, and dairy farming. Tourism is important during the summer. The topography of the island consists of dramatic rock formations in the north sloping down towards pine and deciduous forests (greatly damaged by storms in the 1950s), farmland in the middle and sandy beaches in the south.

Bornholm Regional Municipality covers the entire island. Bornholm was one of the three last Danish municipalities not belonging to a county— the others were Copenhagen and Frederiksberg. On 1st. of January 2007, the municipality lost its short-lived (2003 to 2006) county status and became part of Region Hovedstaden.

Strategically located in the Baltic Sea, Bornholm has been fought over for centuries. It has usually been ruled by Denmark, but also by Lübeck and Sweden. The Hammershus castle ruin, at the northwestern tip of the island, is the largest medieval fortress in northern Europe, testament to the importance of its location. Every year between 300.000 and 400.000 people visit the ruin. It is the most popular attraction on Bornholm. (en.wikipedia.org)

At Hammershus there is at the moment an existing exhibition which the new visitor centre will replace. The existing exhibition consist of an informative exhibition. The space for the exhibition area is about 150 square metres and contains models, planches and an open auditorium for teaching of school classes. Approximately 20.000 people visit the exhibition every year. (Bjerregaard, 2013)

In the farm there is also placed toilets for the visitors of Hammershus and a small restaurant that serves small menus and sell souvenirs.



Ill. 11: Bornholm

HAMMERSHUS AS CASTLE AND RUIN

Hammershus was in the early Middle Ages owned by the archbishop of Lund at that time a part of Denmark. In 1526 Lübeck's captured Bornholm and the castle before Hammershus got back on Danish hands in year 1571. For a short period in the 17th century the Swedish occupied Bornholm.

Hammershus retained its role of defending Bornholm right up until the end of the 17th century, when the defence of Denmark's easternmost territory passed to the defences on Christiansø and at Rønne. In 1743 Hammershus was finally abandoned and was at that time already run-down. Hammershus did then end up as a giant pit, where the people of Bornholm were free to gather building materials. In 1822 the ruins were put on the national historic register. And was from that time preserved.

Hammershus is the biggest castle ruin of Northern Europe. As the castle appear today is a result of hundred of years of additions, modifications, demolitions and disrepair. The time around 16th century was the glory days of the castle. At that time the castle was a big complex with a central fortress surrounded by three precastle walls. Inside the walls Hammershus contained a bunch of different functions. There was warehouses, stables, workshops, brewery, bakery, church, building for soldiers, servants and family. Together all these functions became a self-sufficient unit.

While Hammershus was in use as a castle it had several modifications. These modifications did among things happen because the development of weapon did require different a kind of fortress. For example did the Lübeck's partly give up the precastle walls, and did instead develop further on the inner walls, added the half-round towers and 150 pieces of artillery in different types. (www.bornholm.info)

For summing up the history of Hammershus can be divided into four periods:

1. Period under Danish king and the archbishop of Lund.

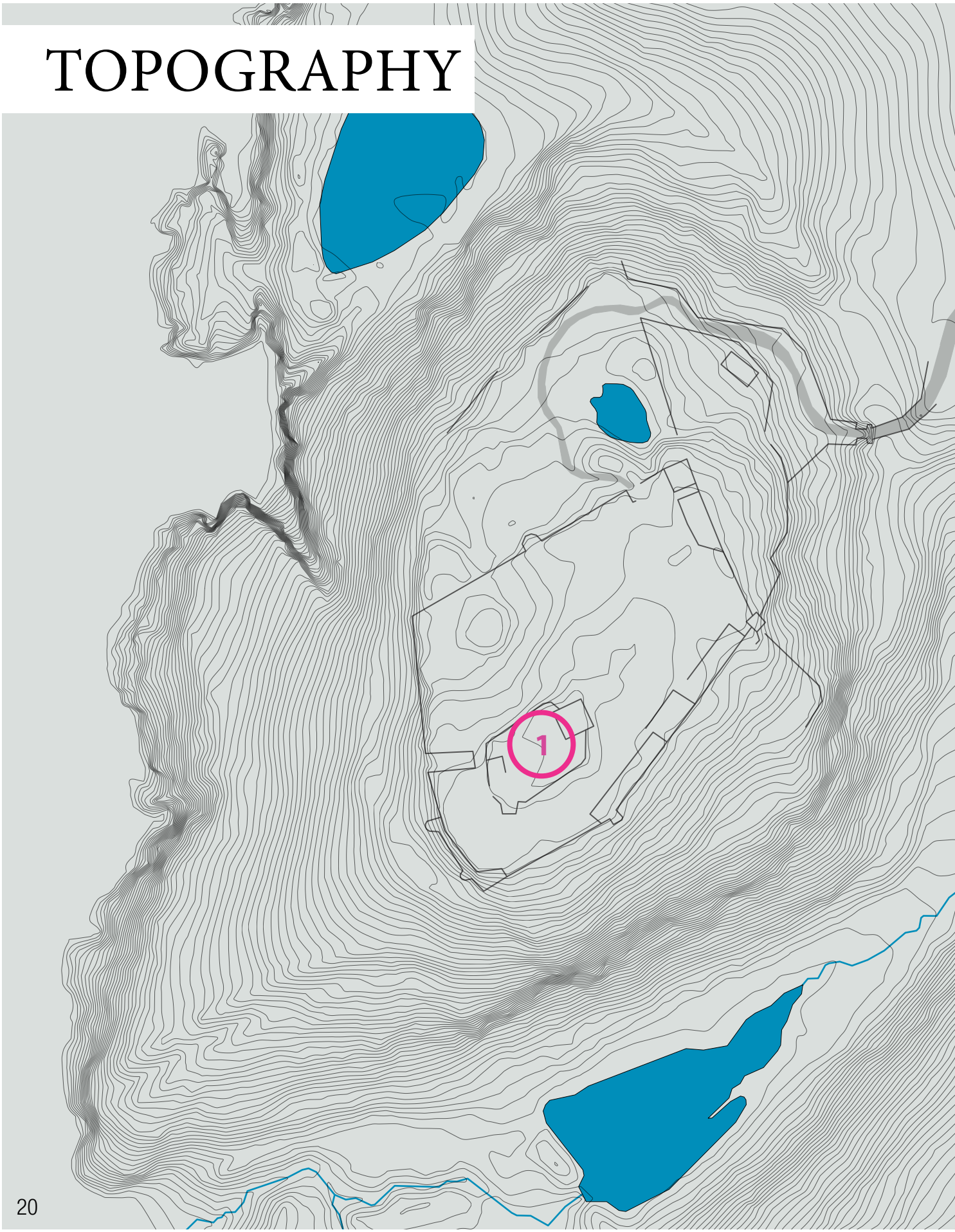
2. Period under the Lübeck's

3. Period when abandoned

4. Period from preservation to now.

Ill 12: Hammershus as it assumed to look like before it was abonded.

TOPOGRAPHY



Topography of the landscape

The topography is at the site very rough. The ground rises from sea level to a height of 74 metres at the highest point inside ruin. In general the plateau where the ruin is build is raised on a solitary hill. Northeast of the ruin is a big green field, which today is experienced as a flat ground. This area is placed 55 meters above sea level. It is in this area the visitors arrive today. South and south-east of the ruin is a small gorge called Mølledalen. Mølledalen rises from sea level in southwest to the same level as the green field in northeast.

The ruin vs. the topography

Hammershus is carefully placed on top of the plateau and following the existing topography on the site. The precastle wall is to the north placed exactly where the steep inclination stops. To the west there is no precastle wall only the inner wall placed in the same way as to the north exactly where inclination stops. Against east the inner wall is placed where inclination stops and the precastle wall is placed on the steepest place. This also counts the southern inner and precastle walls. In this way it was made more difficult for enemies to conquer Hammershus. Inside the inner walls is placed a small hill, and on this hill is the most important building of the castle Mantelgården placed. This both marks the hierarchy of the castle, and gives the tower of Mantelgården a better overview to the areas surrounding Hammershus.

1: Hammershus ruin 74 meters above sea level.
2: Green field 55 meters above sea level.

Ill. 13: Hammershus

INFRASTRUCTURE AT HAMMERSHUS

Hammershus is placed on the north-westerly part of Bornholm close to Sandvig and Allinge. It is possible to arrive at Hammershus in different ways. Arrival can either be done by car, bus, foot or bike.

By arrival the tourists are directed from the parking areas in east (1) to the present visitor centre (2) and further on over a small hill to the bridge (3). The bridge is also the original arrival point for Hammershus castle and marks at the same time the entrance to where the actual buildings of the ruin begin.
Despite that this route marks the original arrival it also gives an overview of the ruin.
From the bridge the path leads up to a natural view point (4) from where tourists can get a clear view of the harbour of Hammer. After the view tourists enter the inner courtyard (5).

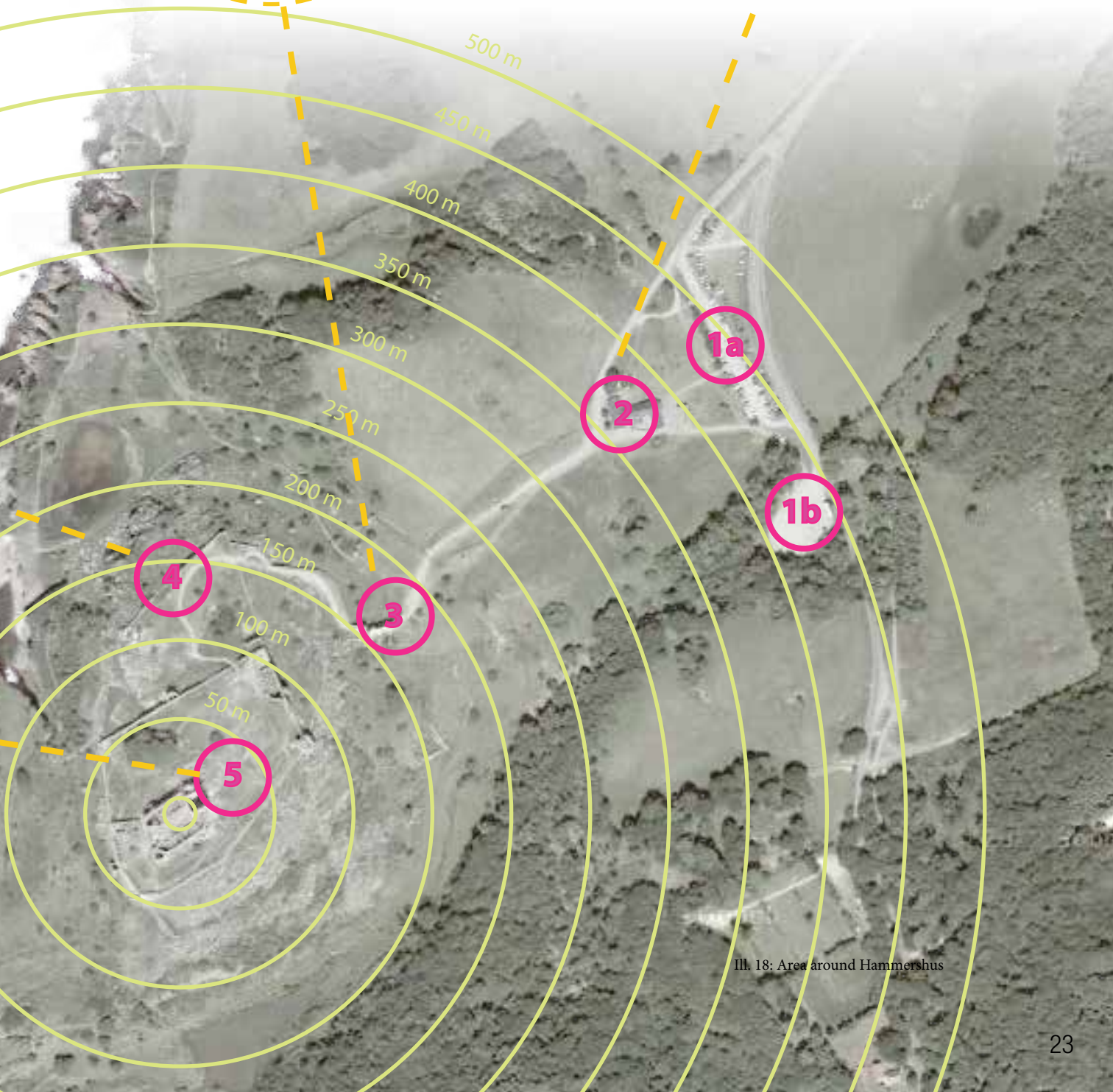
Ill. 15: View

Ill. 14: Mantelgaarden

1a - Parking area for cars and bikes
1b - Arrival by bus
2 - Existing visitor centre
3 - Bridge for entering Hammershus
4 - Natural viewpoint
5 - Inner courtyard

Ill. 16: Bridge

Ill. 17: Existing restaurant

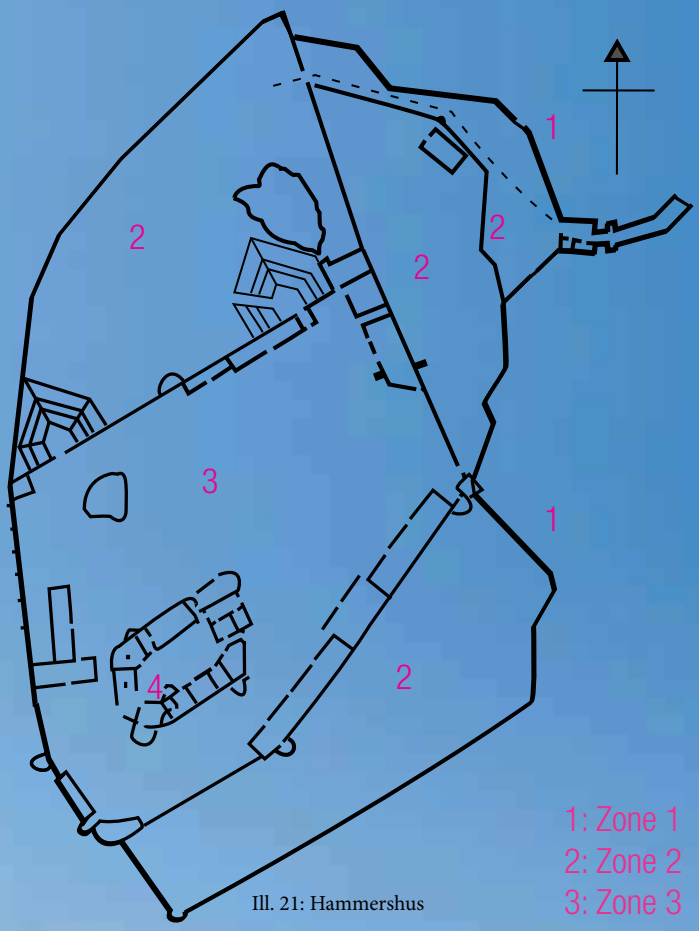


Ill. 18: Area around Hammershus

THE HAMMERSHUS RUIN

Hammerhus ruin is divided into four different zones. **Zone 1** is the outer zone, where the external defences was placed. The external defences were given from nature by the impassable hill. **Zone 2** is between the precastle walls and the inner walls. It is placed just before the drop in the terrain to give the best overview to the surrounding areas. Around year 1600 the precastle walls where given up. **Zone 3** is the inner courtyard. **Zone 4** is the natural centre of the ruin; it is the area inside Mantelgården.

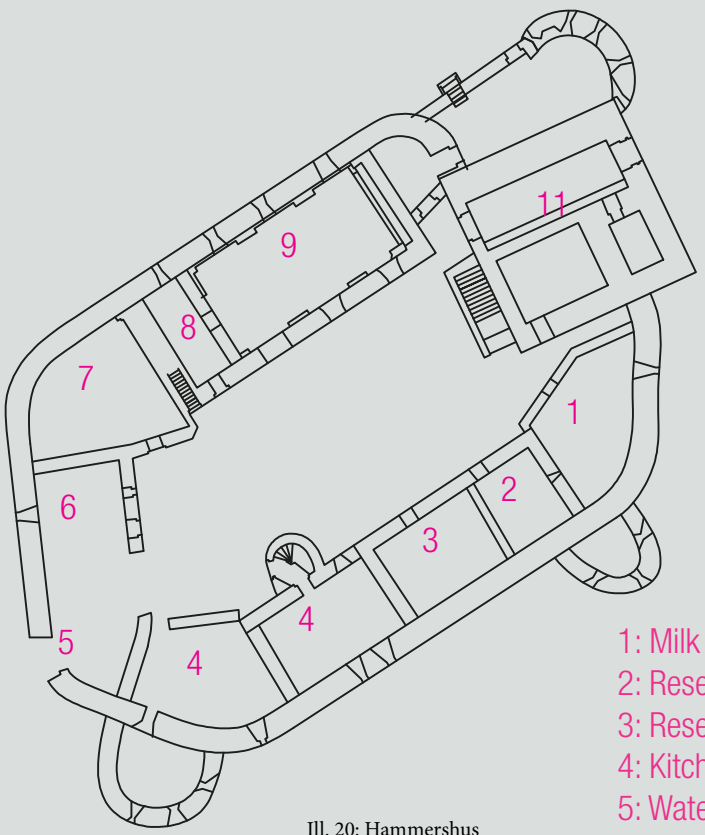
The different walls surrounding the zones have different thickness due to the risk of attack from different directions. This is in particular valid for the inner walls and Mantelgården. In the inner wall the thickness is 0,8 metre towards west and the costal side, and towards east the wall thickness has been made 1,0 metre, due to higher risk of attacks from here. In Mantelgården, the most important place of the castle, the walls are even thicker. Here the wall reaches a thickness of 2 meter towards west.



Ill. 21: Hammershus

Ill. 19: Hammershus

MANTELGÅRDEN IN DETAILS



Ill. 20: Hammershus

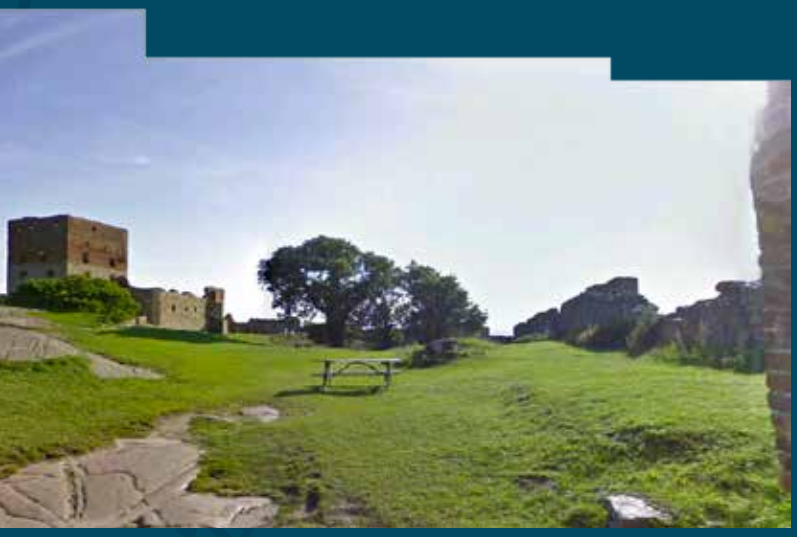
1: Milk room
2: Reserves
3: Reserves
4: Kitchen
5: Watergate
6: The big kitchen with living area on top
7: Castle room, living area for serving personal
8: Hallway for church
9: Chapel with the kings private chambers on first floor.
10: Manteltower, containing:
- Administration of the island
- Representative offices
- Living Area
- Prison
- Storage

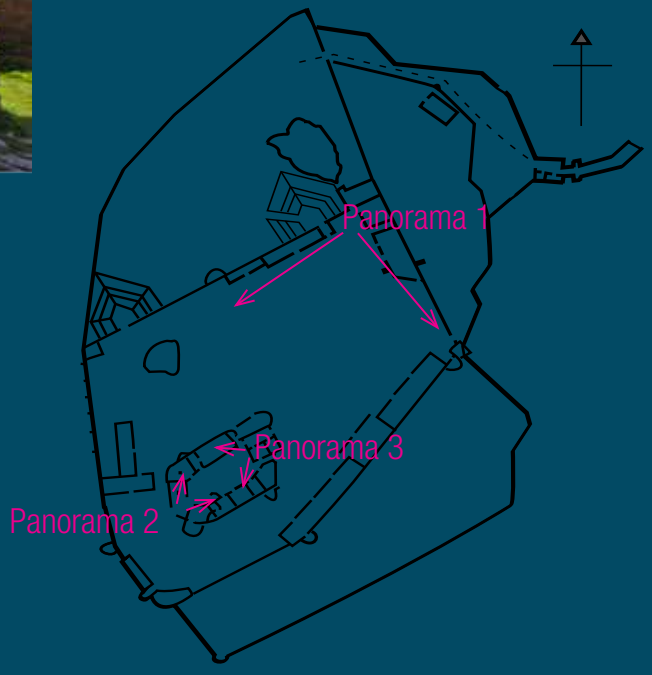
Ill. 21: Panorama 1 - The Inner Castle Yard

Ill. 22: Panorama 2 - Mantelgården

Ill. 23: Panorama 3 - Mantelgården

PANORAMA PHOTOS



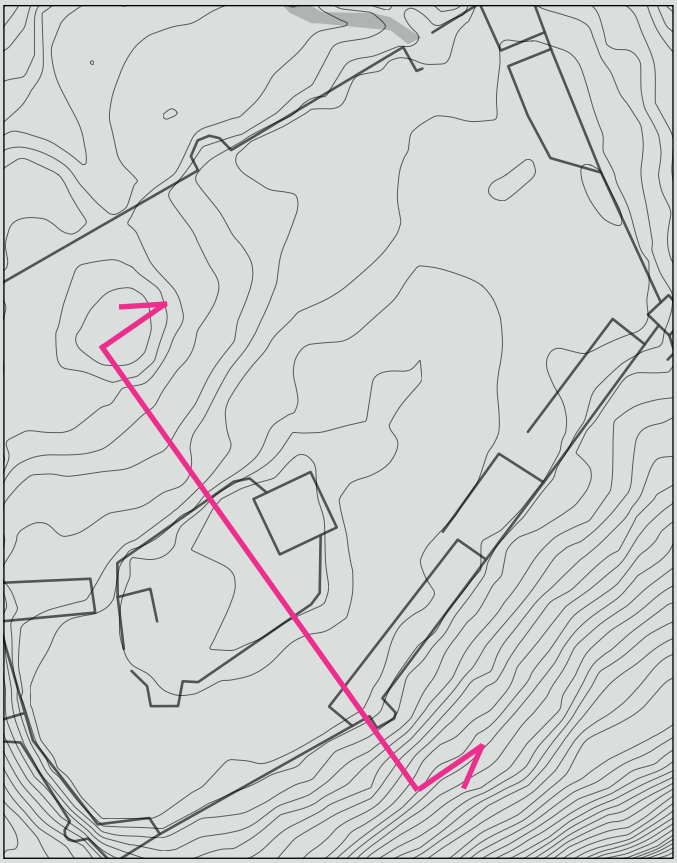


Ill. 24: Panorama overview

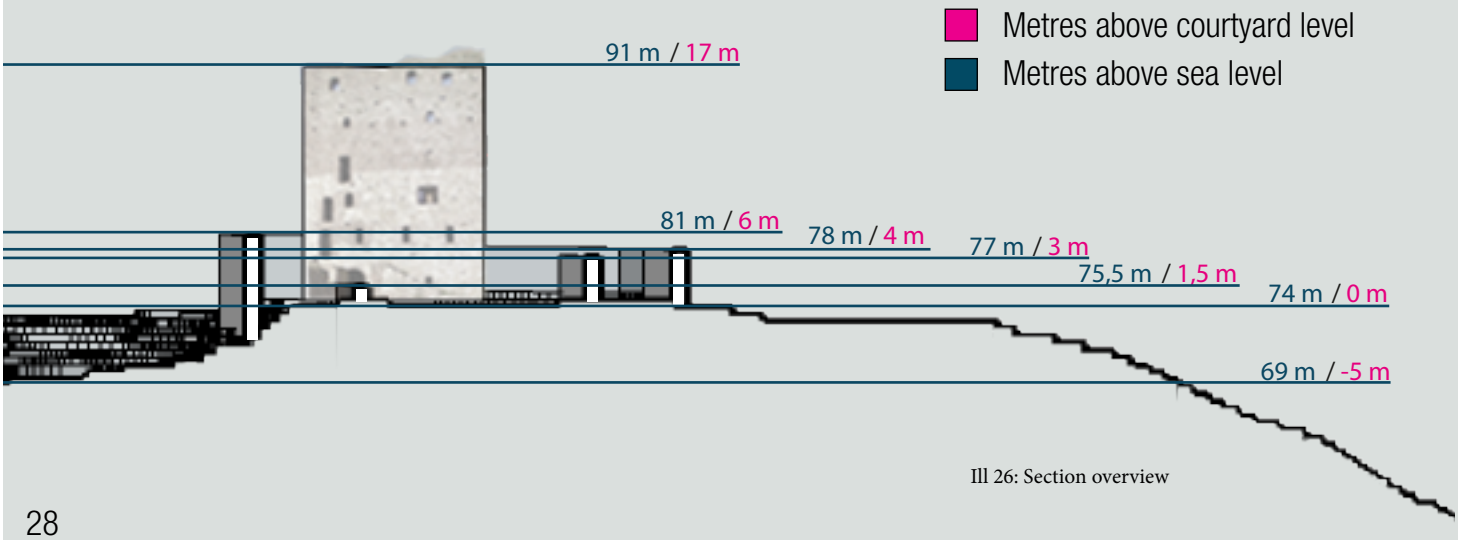
SECTION OF MANTELGÅRDEN

The heights in the existing ruin of Mantelgården reaches up to 17 metres above Mantelgården's courtyard level. This is of course for the tower. The wall heights vary between 6 metres in general, and up to 9 metres in a small part for the northern outer wall. The southern outer wall vary between 4 metres and 6 metres above courtyard level.
The northern inner wall reaches 1,5 metres above courtyard level. The southern inner wall reaches 3 metres above inner courtyard level.

With, the outer walls of Mantelgården, all higher than 4 metres, people who enter Mantelgården will have no chance of to look out into the surrounding areas. At the same time Mantelgården don't have many windows in the outer walls due to the fear of attack. People who step into the Mantelgård courtyard therefore step in to a kind of pupa.



Ill 25: Section overview

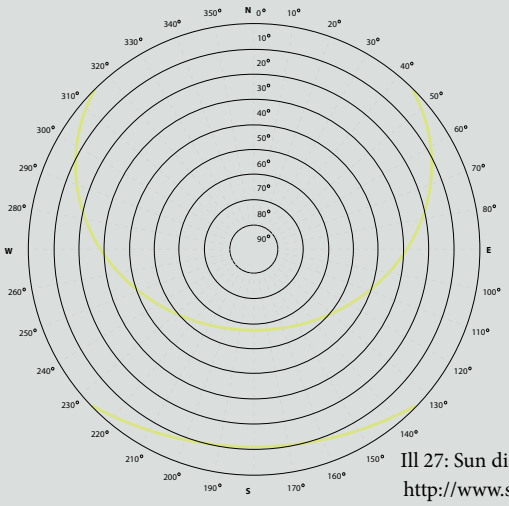


Ill 26: Section overview

WEATHER PARAMETERS

Sun

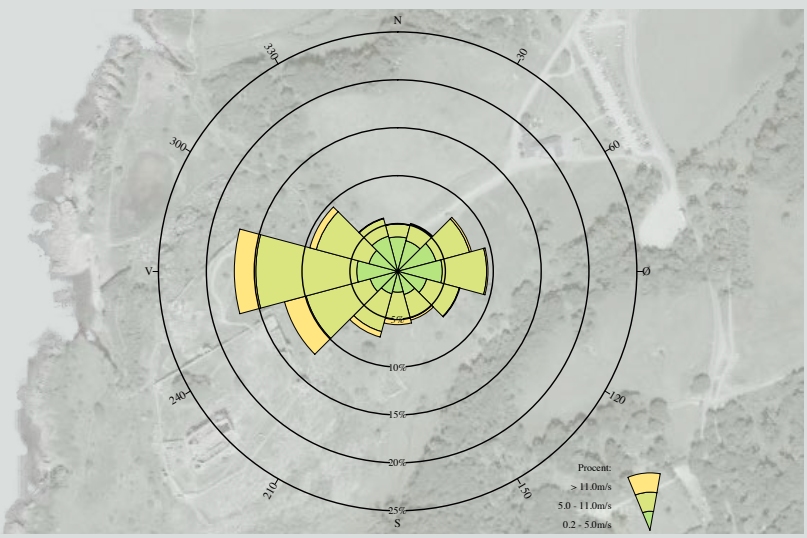
The average yearly sun hours for Denmark as a whole is 1495 hours, but it varies from year to year. On Bornholm the normal yearly sun hours are approximately 1600 hours, a fact that underlines Bornholms brand as The Sunny Island.
Then looking at the sun chart it can be seen that the variation in hours as well as the difference between the sun angel during summer and winter change makeable. This is characteristic for the northern countries and is also an essential parameter to keep in mind when deciding the precise plot for the new visitor centre. (www.dmi.dk)



Ill 27: Sun diagram
http://www.sunearthtools.com/

Wind

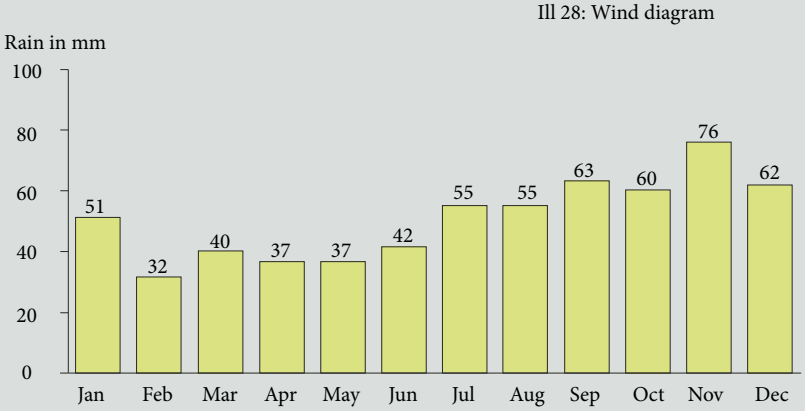
At Bornholm primary wind direction is from the west, northwest and southwest. From these directions almost 45% of the wind is arriving, though the wind coming from the east is remarkable to notice as well.
Compared to the context the hill in front of Hammershus is highly exposed to the wind.
For the current conditions this mean that the old farm housing the visitor centre is placed in such a way that guests sitting in the courtyard will avoid the wind. (www.dmi.dk)



Ill 28: Wind diagram

Rain

The annual rainfall every year is a average of 609 mm. of water for Bornholm. For the rest of Denmark the average annual rainfall is 712 mm. For the time of year when Hammershus is visited the average number of rainy days is between 7 and 10 days a month.



Ill 29: Wind diagram

Temperature

The average day temperature for the visiting period is 8° C. for April the coldest month and 19,5° C. for July the warmest month. (www.dmi.dk)

NATURE AND VEGETATION

Hammershus is placed outermost on a natural protrusion surrounded by The Baltic Sea to the west, a gorge to the south and a stony beach to the north. The area appears rugged and reclusive for the people arriving from east. At the same time the rugged and reclusive area of Hammershus is not the first impression a tourist gets. As mentioned above the main part of the tourists arrive from east. They arrive either by bike, bus or car to parking lots. The parking lots are placed in a distance of almost 400 metres away from the ruin. In this distances they experience the green fields and hills as a contrast to the rugged ground Hammershus. The two areas are very contrasted and are clearly divided by a bridge and the small gorge under the bridge. In this way the bridge gives the tourists two different kinds of the experiences within a very small area.

The different experiences, divided by the bridge, is made by the different vegetation. The flat and hilly area is covered by low vegetation, be it different types of grass and small bushes. The same low vegetation covers the ruin area on the other side of the bridge, but in that area the rock also gets visible. This exposure makes the area appear more rugged. The small bushes in the ruin area are also dominated by yew, which do not appear very welcome due to its needles. Another important area besides the already described areas is the slope on the other side of the gorge. High trees and moss cover this slope; this makes this area the only place to hide in the direct vicinity. The trees also make a natural boundary to the south. Even though this slope is placed in the same distance as the arrival area to the east it seems more far away due to the gorge.

The nature at Hammershus has changed its characteristics several times. Original there was a lot of high trees in the area, this also includes the now a days bare flat and hilly area. When Hammershus was build many trees in the nearby surroundings were used for the construction, and the area ended up flat and bare. Later when the castle was abandoned the trees grew up again. These trees are now removed, because Naturstyrelsen wants an area that reflects the days of glory at the ruin. At the same time Hammershus today is turned into a centre for different small plants among them also preserved types. The hill facing south is for instance one of the places in Denmark with most different types of vegetation. On this specific hill is a variation of more than 300 different types. Some places in the ruin different types of vegetation also have started to grow on the remaining walls.

AUDIENCE AND OPENING HOURS

Ill 30: Nature

The target audience for the new visitor centre is defined by the people already visiting Hammershus and by the spatial program including families, couples and singles visiting Hammershus as tourists, people with interest in the unique nature at the site and school classes. They all have in common the fact that they will only visit Hammershus in the tourist season that is from May until September. In addition a number of local people and walkers will visit Hammershus all the year.

This means that the opening period for the new visitor centre is from May to September, but because of the fact that the ruin is visited all year it should always be accessible to the public.

SPATIAL PROGRAM

In the following text a description of the diferent functions that will be a part of the new visitor centre is made. This description is based on the program for the competition, interview with employees at Hammershus and own observations.
The following descriptions include an explanation of the existing conditions, and future needs and wishes.

Exhibition area

The exhibition area will be used to introduce the visitors to the past of Hammershus.
This area has to include installations of the newest technology meaning that the exhibition is mainly thought as digital though this isn't specified further. Including in the exhibition is a need for a reception for people arriving.

Today the exhibition is placed at Slotsgården in front of Hammershus. It consists of a smaller area which is used for both guided tours, such as school classes, and other visitors; often at the same time. This mix can be quit disturbing to everyone, so a possible division could increase the quality of the visit.

Classrooms

School classes is often visiting the ruin were they will have an introduction to the history of Hammershus followed by a guided tour. In the program space for two classes at one time is required, though a division between these would ensure less interruption.
The area used for the school classes today is at the end of the exhibition area where steps are used as sitting area for the children.
There will normally be used between 45-60 minutes for the introduction and exploring the exhibition area before the guided tour outside starts. Therefore the conditions in which the classes will sit are important to consider as a part of the new visitor centre.
The typical visitors will be children in the age of 11-12 years, meaning that an interaction between the children and the exhibition is of great importance to keep the attention. Today this is done by making smaller role-plays where the children can dress as in the middle-ages or play guess games.

Restaurant/cafe

In relation to the new visitor center a space for up to 250-300 guests is required. Slotsgården café is today placed next to the existing exhibition and serving the tourists visiting Hammershus. Beside the café the building consists of a kiosk and a smaller souvenir shop. The main part of the sitting area is placed outside; where the people passing Slotsgården by can disturb the view to the ruin.
The café is now placed in a transit area between the parking and Hammershus, and is therefore a natural place for the tourists to stop by. Together with the restuarant is also the need of a kitchen area and a storage for food.

Practical issues

Hammershus is as earlier mentioned a popular place to visit with up to 400.000 tourists a year. Therefore the practical functions are essential to ensure a better visit. These functions will for instance be toilets, rooms for storage/wardrobe and a space to be sheltered for the weather. Last mentioned can be an outdoor area also used as meeting point.

Staff facilities

This area is for the nature guides, an official, staff working at the visitor centre and possibly a manager. Therefor there is a need of both working area and relaxing area. The staff facilities should therefore be a place where the physical surroundings invite to a closer contact between these different groups of employees.

Function	Area	Time of use
Exhibition area	290 m2	10:00-18:00
Classroom	150 m2	8:00-16:00
Staff facilities	56 m2	8:00-16:00
Restaurant/cafe	380 m2	11:00-21:00
Practical issues	250 m2	10:00-18:00

Ill 31: Table

INDOOR CLIMATE DEMANDS

To create a great indoor climate it is important to set up some goals to reach. The goals mentioned here is the goals that influence on the visitors experience of the building.

Illumination conditions

The visitor centre has, as earlier described, the presentation and communication in focus. With a building that works both as a museum, restaurant, kitchen, office and has classrooms a range of different demands to the illumination is made. In general the visitor centre should follow the given norms for the specific rooms, but for the restaurant and the museum the demands are different and without standards. For these two specific rooms it is given, that they are a part of the story telling for the place. For the restaurant is given, that the illumination should give the visitors a kind of feeling on how it was living in the dark buildings, but at the same time the light should have such a lux, so it doesn't irritate the visitors. For museum the light should again be a part of the story telling for Hammershus, but also play different roles in the exhibition and still let the exhibition have the possibilities of using video and 3D.

Comfort temperature

Opening hours on yearly basis is placed from Easter until end of middle of October. Most of the time visitors will therefore arrive in a light summer dress (thin trousers, short sleeved shirt, underwear, small socks and shoes), this type of dress can be calculated to 0,5 clo.
For activity level 1,0 met is reasonable, because the activity is a cross between sedentary work and middle activity.
The 0,5 clo and the 1,0 met are then placed in a table for comfort temperature, and a comfort temperature on 24°C is calculated.
To respond to the demands for quality in a thermal indoor climate category A a comfort temperature on 24°C ± 1°C is the goal. (Videnscenter for energi. 2011 p.7)

Fresh air amount

To keep CO_2 on a reasonble low level the fresh air amount is calculated due to standards mentioned in DS 15251 categori 1:

Number of square metre * ventilation rate = Fresh air amount

Ventilation rate, restaurant: 7,0 l/s/m^2
Ventilation rate, classroom: 5,0 l/s/m^2
Ventilation rate, auditorium: 15,0 l/s/m^2

PROGRAM SUMMARY AND CONCLUSION

Hammershus is every year visited by all kinds of people including families, classes, people who pay special attention to the ruin and people who pay special attention to the landscape. With 400.000 yearly visitors, the centre has to be able to handle the great amount of visitors in a way that they will experience as few inconveniences as possible. This means that the visitors come with a variety of different goals that have to be combined to create the best possible experience for them all.

According to Naturstyrelsen it is highly important that the new visitor centre do not overshadow the landscape. Instead, it should fall into the landscape and help to communicate it. The ruin has a very special location in the landscape, and that location the visitors should experience in spite of the new visitor centre. It is also important that the exhibition is a substantial introduction to the castle including the former daily life at the castle and the different periods of time that have marked the development of the castle.

In the program from Naturstyrelsen it says that the new visitor centre should be placed in the area south west of the ruin. However, with its natural location in the middle of the ruin and on the top of the landscape Mantelgården is the perfect place for a new visitor centre. To experience the history of Hammershus it is naturally to place the visitor centre and exhibition exactly where the history has unfolded. In this way, the visitor centre will fall into the history that is told by Mantelgården and it can work as a centre for the visitors from which they can spread out into the area. Furthermore, Mantelgården will frame a room for contemplation, so that dog walkers and families enjoying the view

do not disrupt the many pupils and visitors who want to concentrate about the history. By its location in Mantelgården the hierarchy of the ruin is maintained with Mantelgården as the natural centre whereas the other buildings had secondary functions.

In the transformation process, it is important that all the layers are recognisable so that the visitors can easily distinguish between the ruin and the new building.

A summary of this lead to the vision on the next page.

Ill 32: Hammershu

VISION

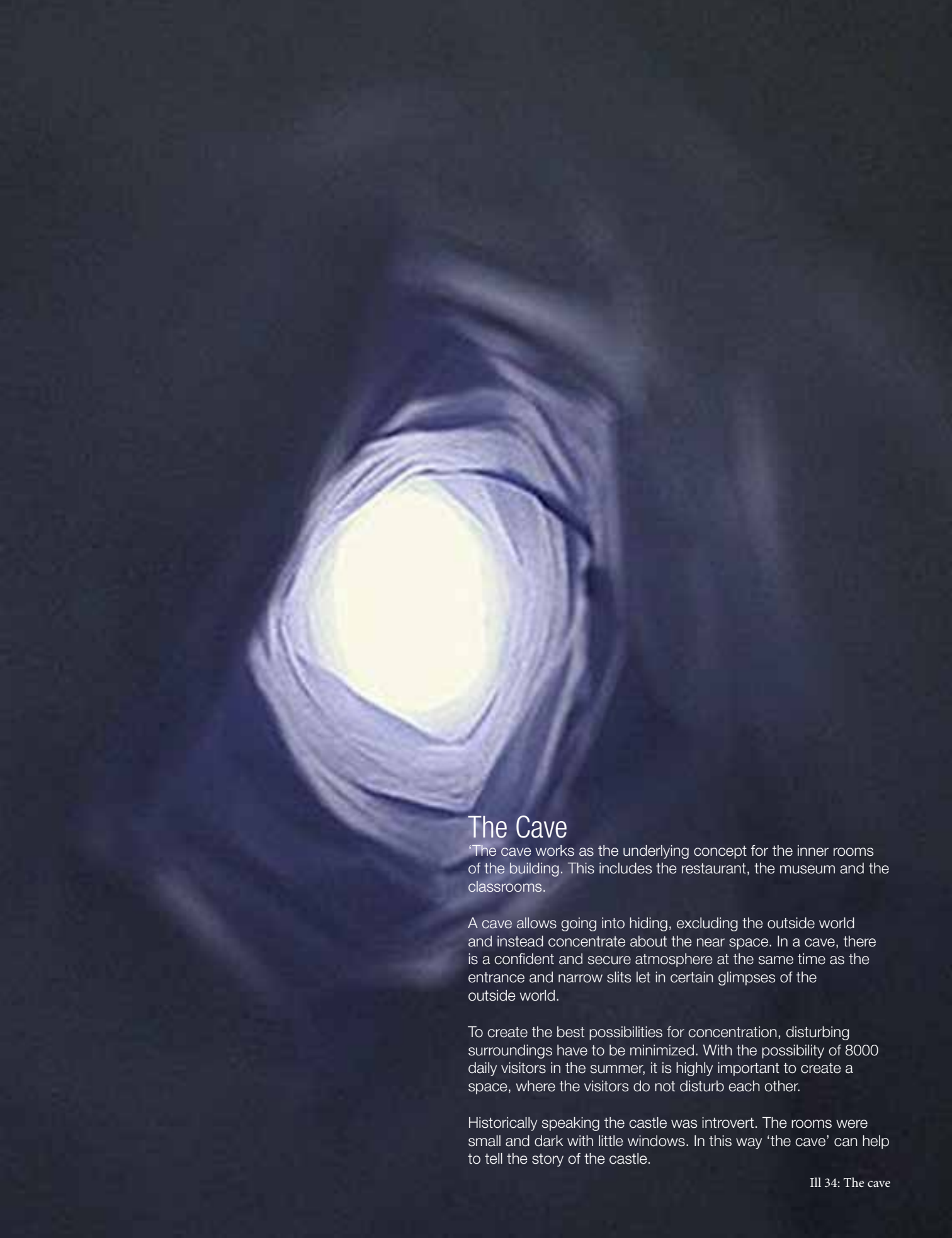
The vision of this project is to create a space that through transformation converts the ruin of Mantelgården into a modern visitor centre. This centre should tell all the aspects of the history of the old castle and at the same time make use of the qualities of the remaining ruin in the new story telling. The narrative of the site should become a natural part of the building so that the visitors will experience it knowingly and unknowingly.
The transformation should frame a room for contemplation that take all the different types of visitors into account, but it has to be designed in a way that maintains the landscape and the hierarchy herein.

Ill 33: Hammershu

Design development

CONCEPT

In order to communicate the vision in the best possible way three architectural concepts are used. Each of these concepts defines different parts of the building, and in order to make them fit a new visitor centre at Hammershus they will be transformed through iterations. The concepts will describe the building inside towards outside.



The Cave

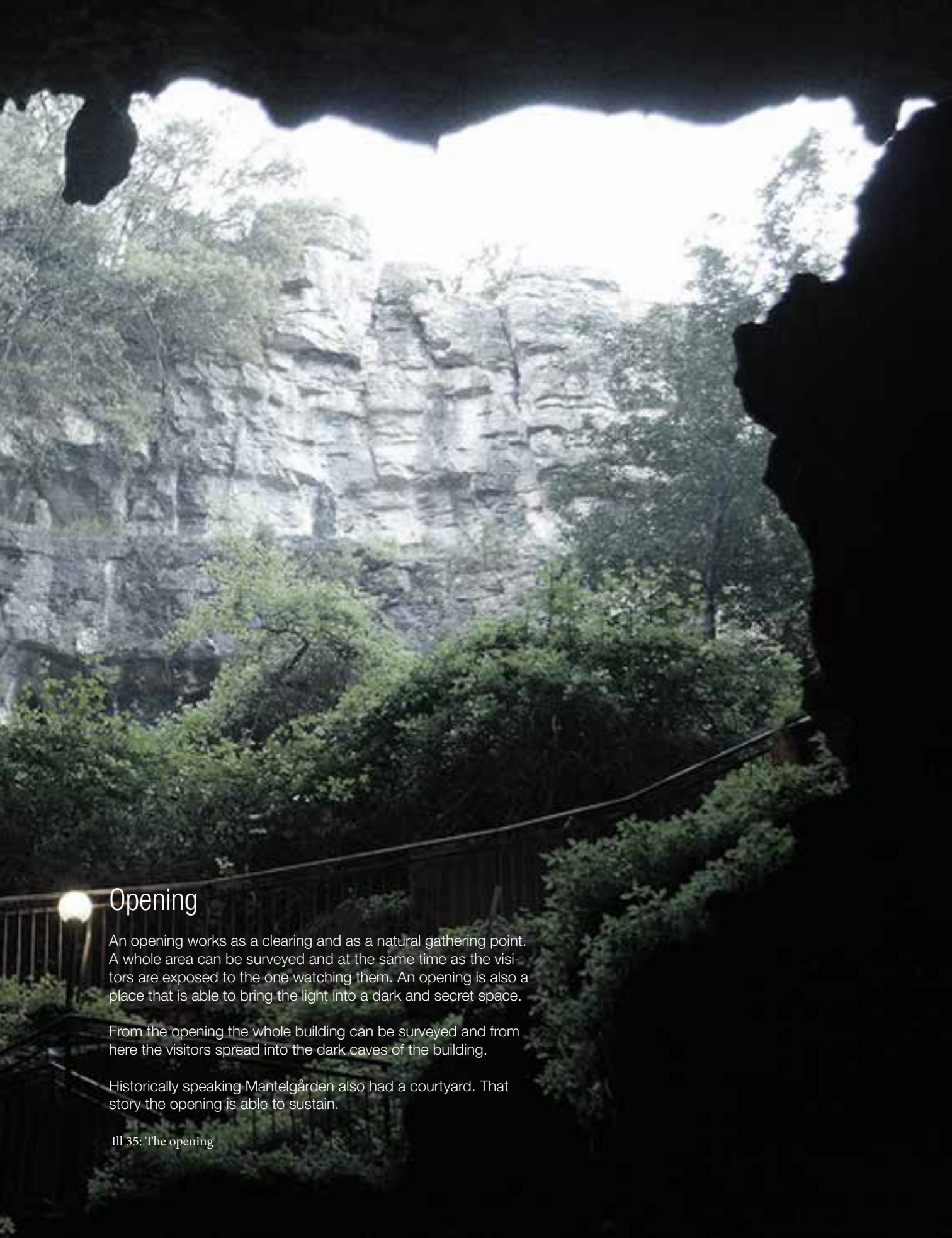
‘The cave works as the underlying concept for the inner rooms of the building. This includes the restaurant, the museum and the classrooms.

A cave allows going into hiding, excluding the outside world and instead concentrate about the near space. In a cave, there is a confident and secure atmosphere at the same time as the entrance and narrow slits let in certain glimpses of the outside world.

To create the best possibilities for concentration, disturbing surroundings have to be minimized. With the possibility of 8000 daily visitors in the summer, it is highly important to create a space, where the visitors do not disturb each other.

Historically speaking the castle was introvert. The rooms were small and dark with little windows. In this way ‘the cave’ can help to tell the story of the castle.

Ill 34: The cave



Opening

An opening works as a clearing and as a natural gathering point. A whole area can be surveyed and at the same time as the visitors are exposed to the one watching them. An opening is also a place that is able to bring the light into a dark and secret space.

From the opening the whole building can be surveyed and from here the visitors spread into the dark caves of the building.

Historically speaking Mantelgården also had a courtyard. That story the opening is able to sustain.

Ill 35: The opening

The gorge

As opposed to a tunnel, the gorge allows light at the surface of the earth and by adjusting the width of the gorge the transition from A to B can be underlined and to some extend exclude the space outside the gorge by eliminating views.

Through the gorge, a transformation from the open space that surrounds Mantelgården to the opening can take place and from here, the visitors can spread further.

Historically speaking Mantelgården has had buildings along the outer walls and since the Lübecks it has had an opening all the way across the castle. By making a gorge, the story about the opening through Mantelgården is sustained.

Ill 36: The gorge

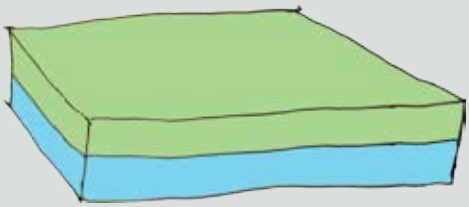
The design process has, as earlier described, been made through several iterations, but is also as earlier described in the concept made from different starting points, who individually effected the final product, hence is the overall design parameters:

Outside towards inside
In this direction, the basis is taken in the existing context, and how this context affects the form and the final product. All seen from an urban scale going towards a smaller scale

Introvert towards extrovert
This way of design based on the different moods and atmospheres that every room needs. This wil be designed from a small scale towards a bigger.

Sustainability
The form of the building is affected by the different parameters related to sustainability.

Outside towards inside



New building containing a restaurant part and a museum part.

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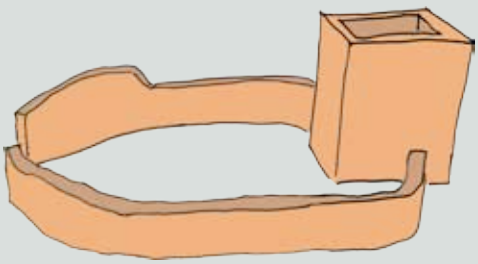

Existing Mantelgård

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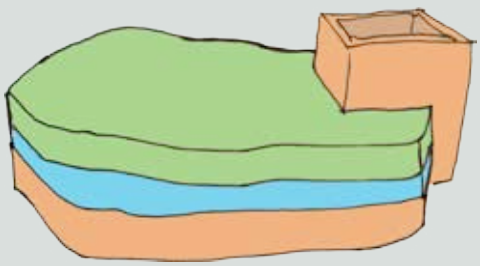
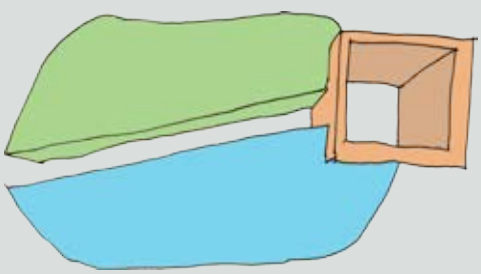


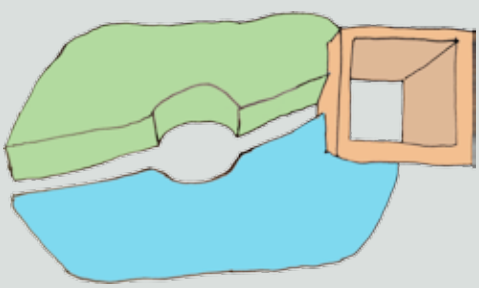
New and old put together

- The communication and presentation is put in the pride of place of the new visitor centre. Therefore, with the ruin of Mantelgården specific placed with its outer walls following the curves of the highest hill, the new building is placed exactly on top of the old, and in this way it has adapted the outer form of the existing Mantelgård. Visitors arriving to the inner courtyard of Hammershus, will in this way better have the possibility to experience Mantelgården as if it was on its glory days.



Natural dividing between restaurant and museum, and free pathway through the building

- Locals and tourists are visiting Mantelgården and Hammershus all year. Therefore the openings in each end are connected, so that people can look inside Mantelgården outside opening hours. This creates two separate buildings, which at the same time live up to the demands from developer of having a restaurant and a museum, who can operate independently.



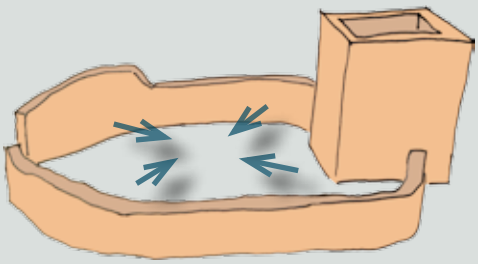
Creating a modern court yard

- In the middle of the pathway between the two openings an opening centre is created. This is a new iteration of the original courtyard and gives the visitors the chance of better survey Mantelgården. In the glory days of Mantelgården you could enter almost every building in the castle directly from the courtyard. The new centre gives the same possibilities with a natural entering point for both the museum and the restaurant.

Introvert towards extrovert - in outline

With up to 8.000 visitors at Hammershus on the most crowded summer days it is important to think of how the best way to make conditions for communication and presentations of Hammershus is made. In that sense it is also worth noticing that the original orientation for Mantelgården was inward for protection against enemies with only a very few windows pointing outwards. Therefore the orientation of the rooms will be inwards. In this way it is possible to cut off visitors who is not visiting the museum, so that these visitors won't disturb the guests at the museum and restaurant. This means, that all the presentation and communication of the rooms in general will be orientated more inwards to itself and inwards towards the courtyard. Again this means from inside and out, there has to be created a natural transformation from communications and presentation of the history to the stunning views from the top of the inner courtyard.

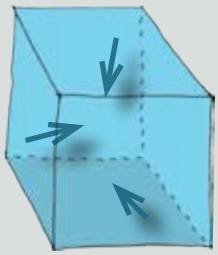
Introvert towards extrovert



Existing Mantelgård

- Orientation inwards for protection against enemies.

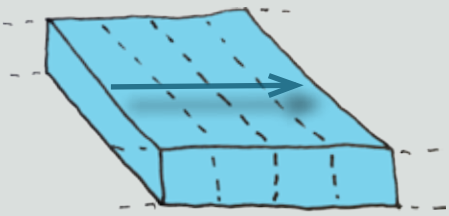
- At the same time the remaining walls of the ruin don't allow visitors to look out with a lowest height of 4 meter. Instead you have the feeling of stepping into a new world.



Each room orientate inwards

- To make the best conditions for communication, each room should orient itself inwards so visitors outside don't disturb visitors inside. Each room orientate itself in this way in to a small "cave", that visitors can walk in to, and from there get an exact special experience.

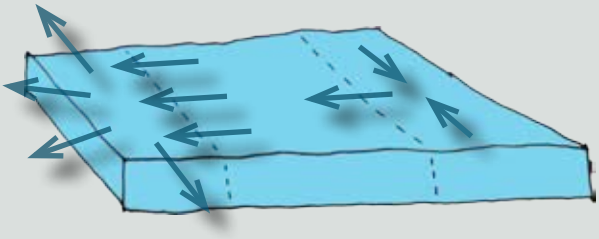
- In example is created rooms where visitors can dive deep into each special periods of Hammershus, and classrooms for teaching without disturbance by other tourists.



Rooms put together to create a history and a progress

- For the museum part of the new building “rooms/caves” is created to tell each time period of the castle. Each “cave” is then combined together in a historical progress, which the visitors will be able to follow.

- For classrooms and other rooms the rules in force are, that they are combined with their logistic natural rooms. These rooms will then orient them selves more outwards.



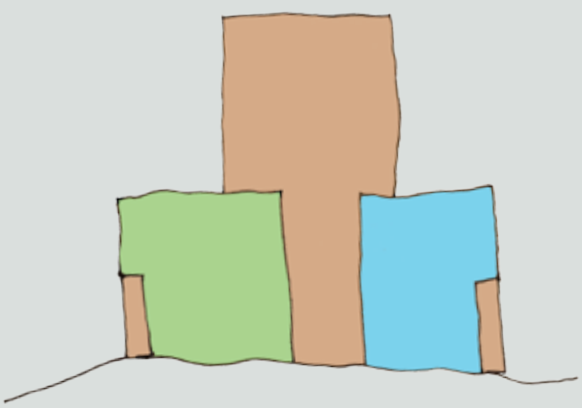
Introverted rooms connect to semi-introverted rooms that connect to extroverted rooms.

- From the most introverted rooms (the exhibition and classroom) a transformation is happening to a more semi introverted room (the foyer) before ending up in the courtyard, which is extrovert and connected to the rest of Hammershus area.

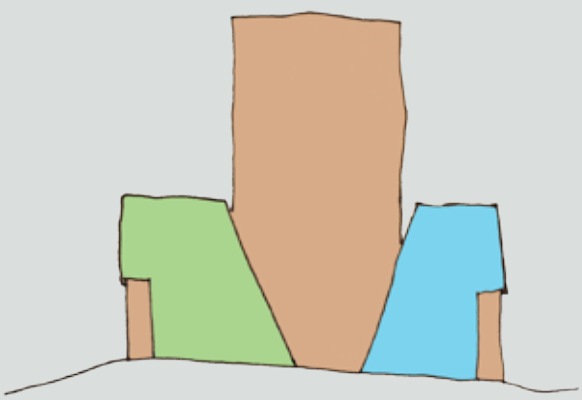
-For both the museum part and restaurant part of the new visitor centre this way to connect the room is valid.

Sustainability
Sustainability is for one thing described as a good indoor climate. In the opening design phase there are two design steps that is able to create a better indoor climate.

Design changes due to sustainability

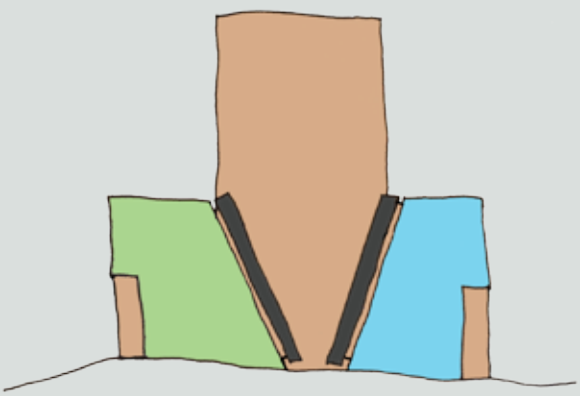


Restaurant and Museum divided



Pulling the facades

By pulling the walls the outer shape paves the way for greater amounts of lightening into the building.



Adding solar shading

The adding of solar shading to the glass facade pointing towards the courtyard. The solar shading helps pretending overheating in the atrium.

Additional initiatives

Beside this different kind of technical initiatives including ventilation, cooling and heating have been made.

INDOOR CLIMATE CALCULATIONS

Investigations of the energy consumption and the indoor climate have been made in Be10 and BSim

Energy demand for the building calculated through Be10

Naturstyrelsen demands that the energy performances for low energy class 2020 are followed, that is consumption at 25 kWh/m2 per year. The entry of the data of the building (area, orientation, u-values etc.) in Be10 shows that the total energy demand is 122,4 kWh/m2 per year. In other words, it is significantly higher than allowed. That is among other things due to the fact that the new building consists of a number of original walls, which is not isolated and because of this have higher u-values than the new walls.
Energy consumption at 122,4 kWh/m2 per year is based upon a comfort temperature at 24 degrees Celsius over the year. Because the visitor centre is closed from October until May the temperature is oversized for this period. Instead, the temperature should be adjusted to minimum 5 degrees Celsius. It is therefore expected that the energy consumption is less than 122,4 kWh/m2 per year, but still more than the energy performance at 25 kWh/m2 per year. In spite of the consumption, the building regulations allows the building to be build: In article 7.2.5.3 paragraph 2 it is described how addition to the energy performance is given in case of extra high rooms and in article 1.2 paragraph 4 in the building regulations it says:

"For bygningsfredede bygninger og bygninger, som er del af et fredet fortidsminde, kan der ske lempelser fra bestemmelserne i kap. 2-8, såfremt bestemmelserne skønnes at være uforenelige med frednings- og bevaringsværdierne".
(Bygningsreglementet.dk, article 1.2 paragraph 4)

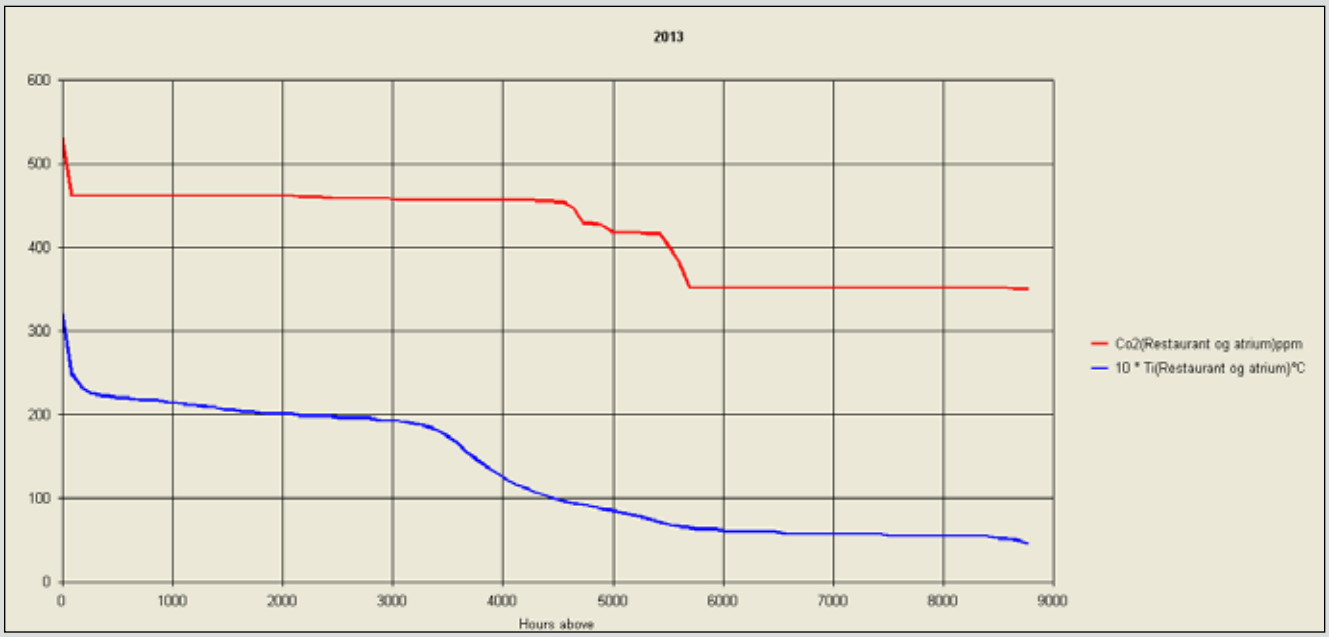
It is possible to get additional dispensations from the energy performance so that the building will fulfil the demands for low energy class 2020.
It is also possible to add active initiatives for energy supply, including solar heating system and solar cell panel.

Indoor climate calculation by means of BSim

Beside a reasonable energy consumption the indoor climate is of a great importance. As already described, a number of demands are defining a well-comforted indoor climate. Creating such an indoor climate without adversely affect the architectural qualities has been the focal point in this BSim-calculation.

The overriding focus points have been avoiding overheating and a CO2-level that is too high. With regard to overheating it is desirable avoid spending energy at cooling in the hottest months of the year. As for the CO2-level it should be compared to both the building regulations and the demands I have outlined myself.

On the opposite page a CO2-level graph is shown in ppm together with the temperature level in degrees Celsius in proportion to number of hours. The calculation includes the areas of the atrium and the restaurant in the northern part of visitor centre. The parameters from appendix A are used in the calculations.



Ill.. 37

CO2

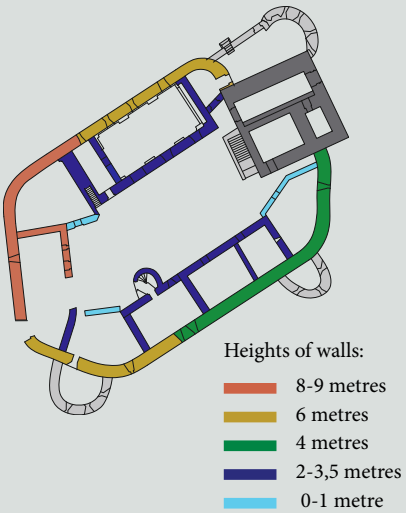
The CO2 level is calculated on the basis of the fresh air amount that DS 15251 recommends in restaurants and cafes. The BSim calculations demonstrate that the yearly CO2 level is under the maximum permitted limit at 900 ppm. In general, it reaches a fair level at about 450 ppm for the period the building is used. Furthermore, the level meets the demands listed in the paragraph 'Indoor climate demands'. A developer should always consider if the quality of the air is too good in relation to the investment that has to be done in the ventilation. Level down the ventilation will economise on the electricity consumption but the quality of the air is getting worse.

Temperature

The building regulation says that the developer decides the amount of hours with a temperature more than 26 degrees Celsius for other buildings that residential buildings. But if the BSim calculation for the visitor centre is compared to the regulations for residential buildings a small amount of overheating is seen.
The graph shows 26 hours per year with more than 27 degrees Celsius, where the law only allows 25 hours. The graph also says 51 hours per year with temperatures more than 26 degrees Celsius, where 100 hours is allowed in residential buildings.
Overall, the graph shows that the temperature in the period where the visitor centre is open is about 24 degrees Celsius as the demand for the comfort temperature says.
(Bygningsreglementet article. 7.2.1 paragrahp 13.)

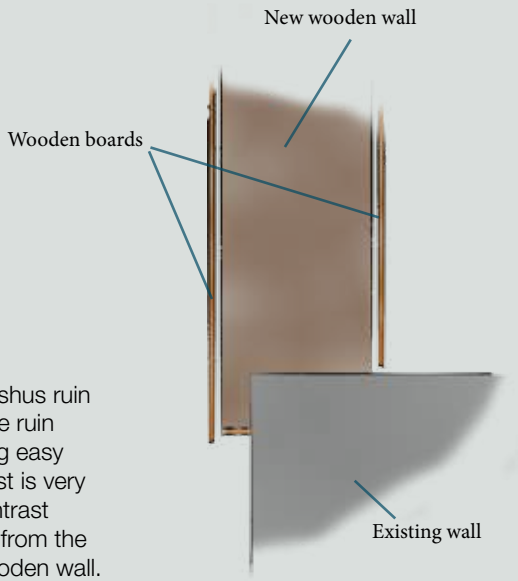
THE FUSION BETWEEN EXISTING AND NEW WALLS

In the development of the meeting between the existing walls and new walls forming the new visitor centre, the presentation and communication of the story of Hammershus has been the important factor. Therefore there have been made systematic look into existing walls condition and height. For most of the ruin of Mantelgården, the outer walls have a height of between 6 and 9 metres for the northern part and 4 and 6 metres for the southern part. The inner walls have a height of 2 to 4 metres, but some have a height of only 1 metre. The walls with a low height are all placed in the ends of Mantelgården.
To get the best possible communication of the story of Hammershus the existing walls will be left untouched, and the new rooms will be fitted into these spaces. In this way the existing walls, that used to divide the different buildings in Mantelgården, will keep defining the rooms, but now only work as a divider of the different spaces.
In spite of keeping the existing walls untouched there will still be some places where the existing walls meet the new building. For these places it is important, that the visitor can tell the difference between the original walls and the new walls and the keyword will therefore be contrasts. The problematics and solutions of each of the collision is described in the following paragraph.

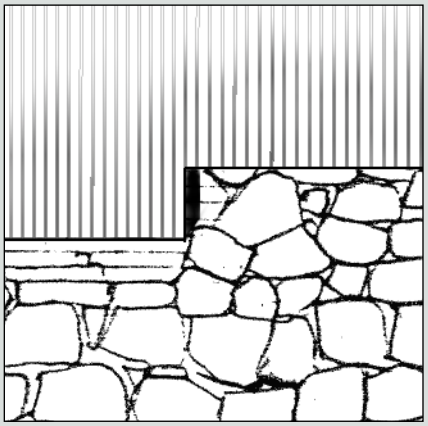


The outer walls

For people arriving at Hammershus ruin it is important that history of the ruin stand out clear and the building easy readable. Therefore the contrast is very important. For making that contrast the new wall is pulled a bit out from the existing wall and build as a wooden wall. The material both inside and outside is boards turned vertical. By turning the boards vertical it is possible to make a wooden wall that still follows the curves of the existing wall.

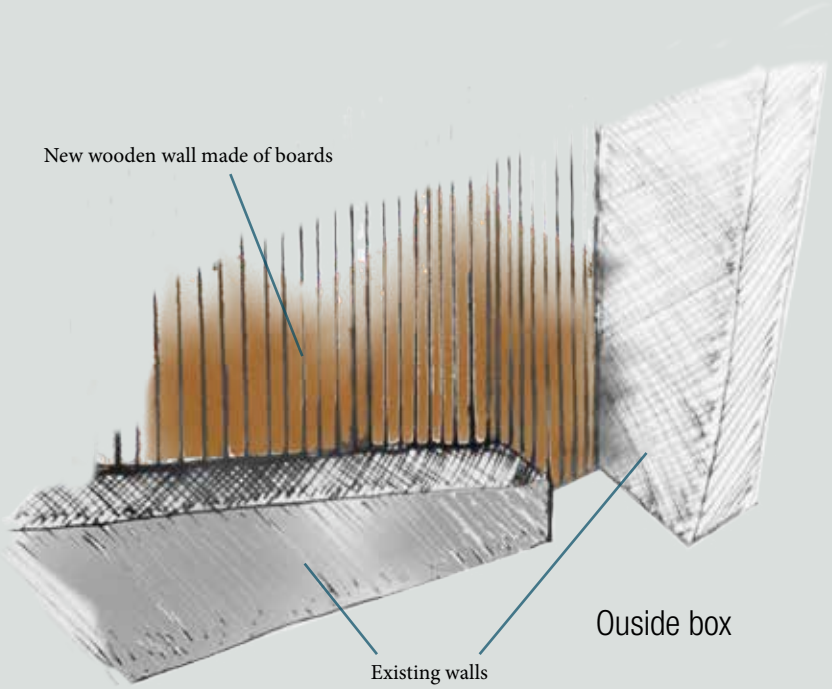


Section of wall - 1:25

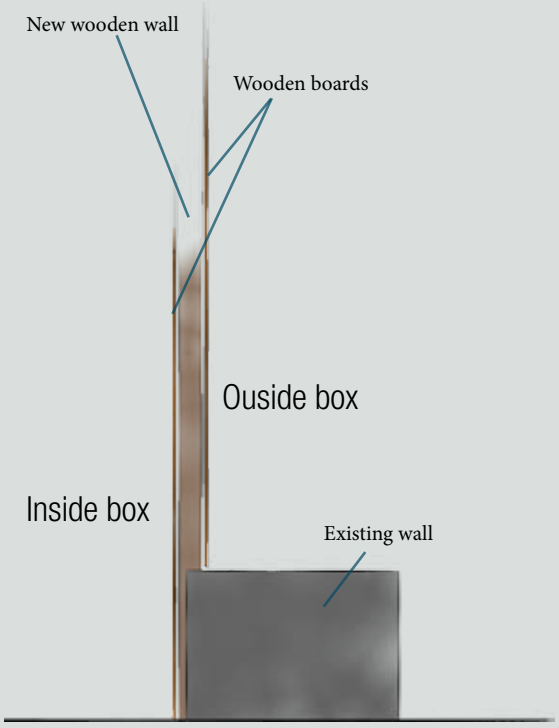


Facade - 1:200

Ill. 38: Outer walls



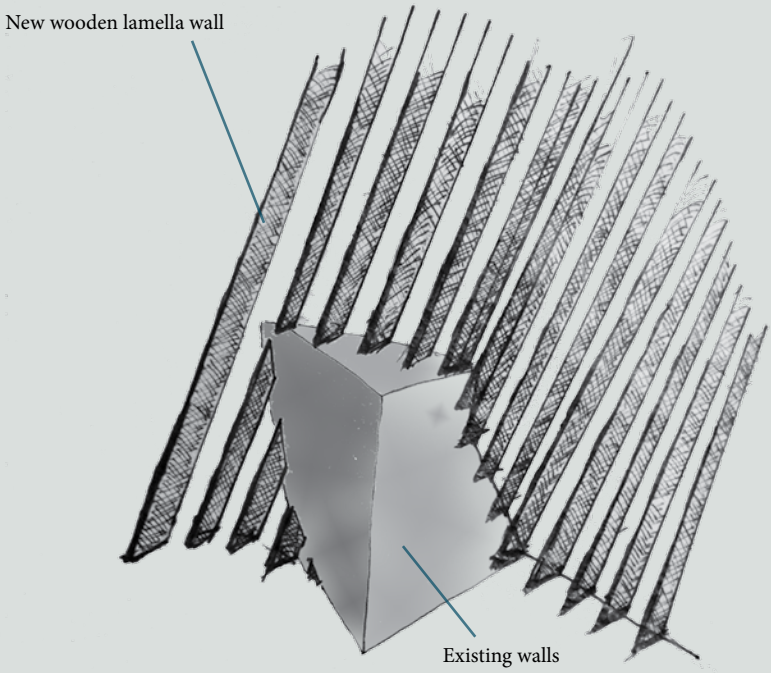
Ill. 39: Box placed inside the existing wall



Section of wall in “box” - 1:25

The low walls

The low original walls in 1 metre define an area but not a space. In program for the project there is mentioned a need for rooms that can define a clearly closed space such as toilets and the classroom. The low walls, which define an area but not a space, will therefore work as an outer line for a space created as a box. The box will allow the possibility to create a space with special demands for ventilation, possibilities of cleaning, dividing to smaller spaces and limitation of sound. In the reason of still keep the marking of the area made by the existing wall, the “box” wall is created just behind that.



Ill.40 : Existing wall break through the lamella facade

Ill.41 : Existing wall break through the lamella facade

The breakthrough through the new walls

By creating an atrium, to connect the existing spaces made by the existing walls, some of the area in the courtyard of Mantelgården will be included in that atrium. And by pulling back the new wall towards the courtyard to give more light, the existing wall will make a breakthrough on the new wall. This breakthrough is designed so that the contrasts between the new and the old walls stand out clear. The breakthrough is made in four places and let visitors still be aware of the transformation of Mantelgården from an old castle and ruin into a modern visitor centre also outside opening hours.

The flooring structure - ground to first floor

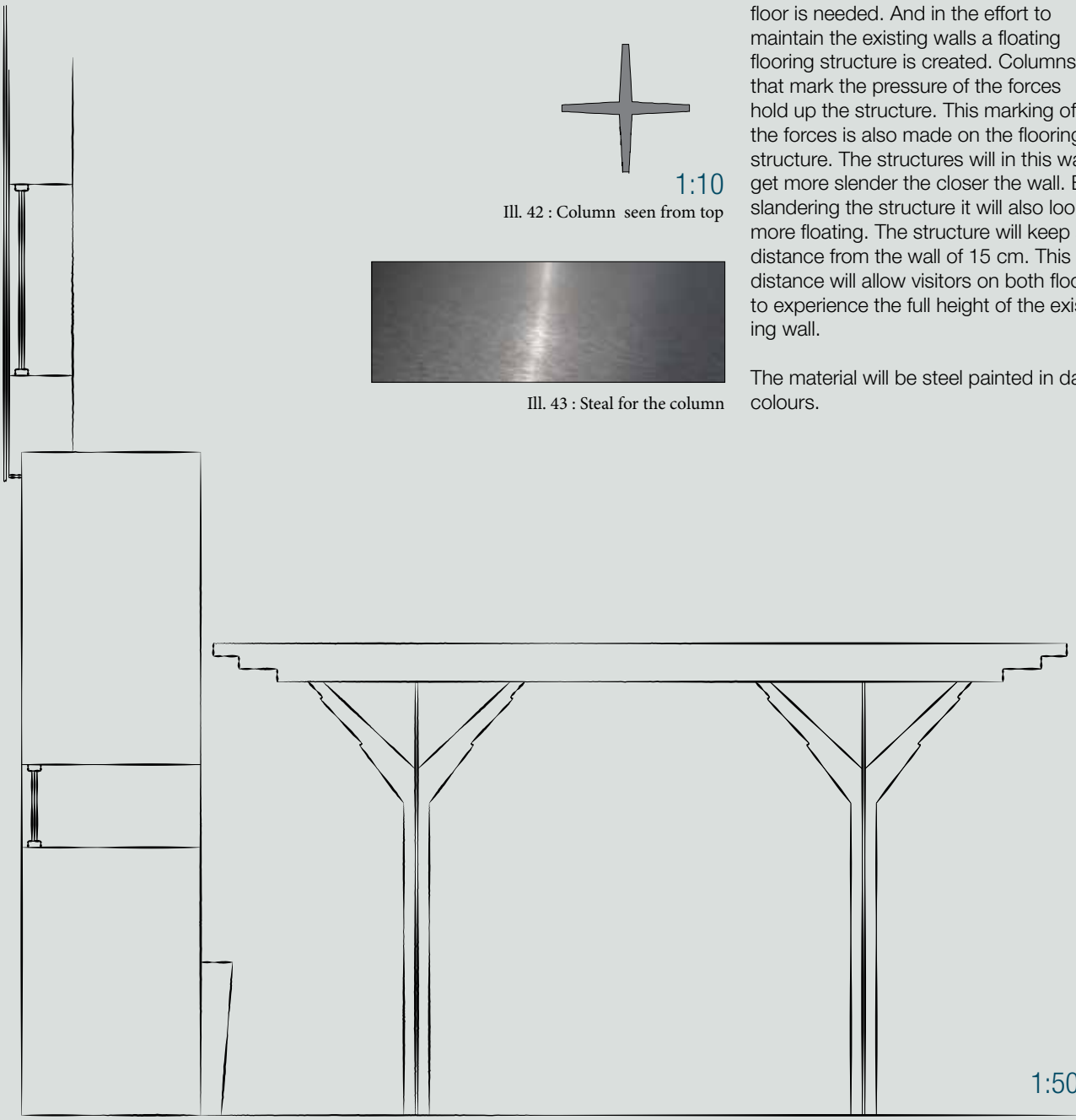
To fulfil the program demands a first floor is needed. And in the effort to maintain the existing walls a floating flooring structure is created. Columns that mark the pressure of the forces hold up the structure. This marking of the forces is also made on the flooring structure. The structures will in this way get more slender the closer the wall. By slandering the structure it will also look more floating. The structure will keep a distance from the wall of 15 cm. This distance will allow visitors on both floors to experience the full height of the existing wall.

The material will be steel painted in dark colours.

1:10

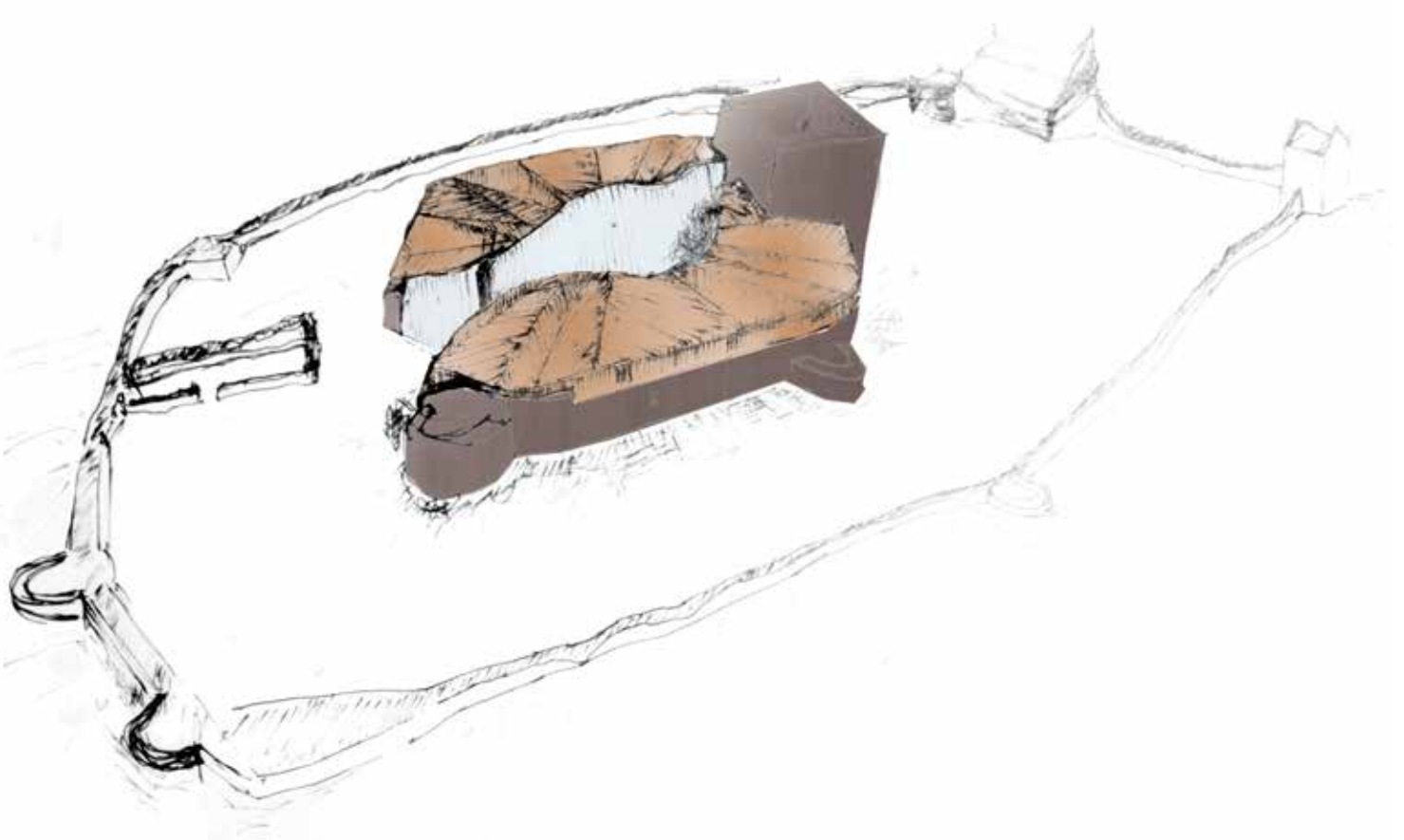
Ill. 42 : Column seen from top

Ill. 43 : Steal for the column



Ill. 44: Column section

Presentation



Ill. 45 : The new visitor centre

The new visitor centre seen from a birds perspective.
The new visitor centre placed on top of the hill at Hammershus. It has from the outside a shape like the old castle, but inside a big gorge divides the centre into two parts.

III

. 46: The new visitor centre from entrance to outer courtyard

The visitor centre as it looks like when you enter the area of Hammers. It is precisely placed on top of the old ruin, so that it gives the impression of how the arrival used to look like.

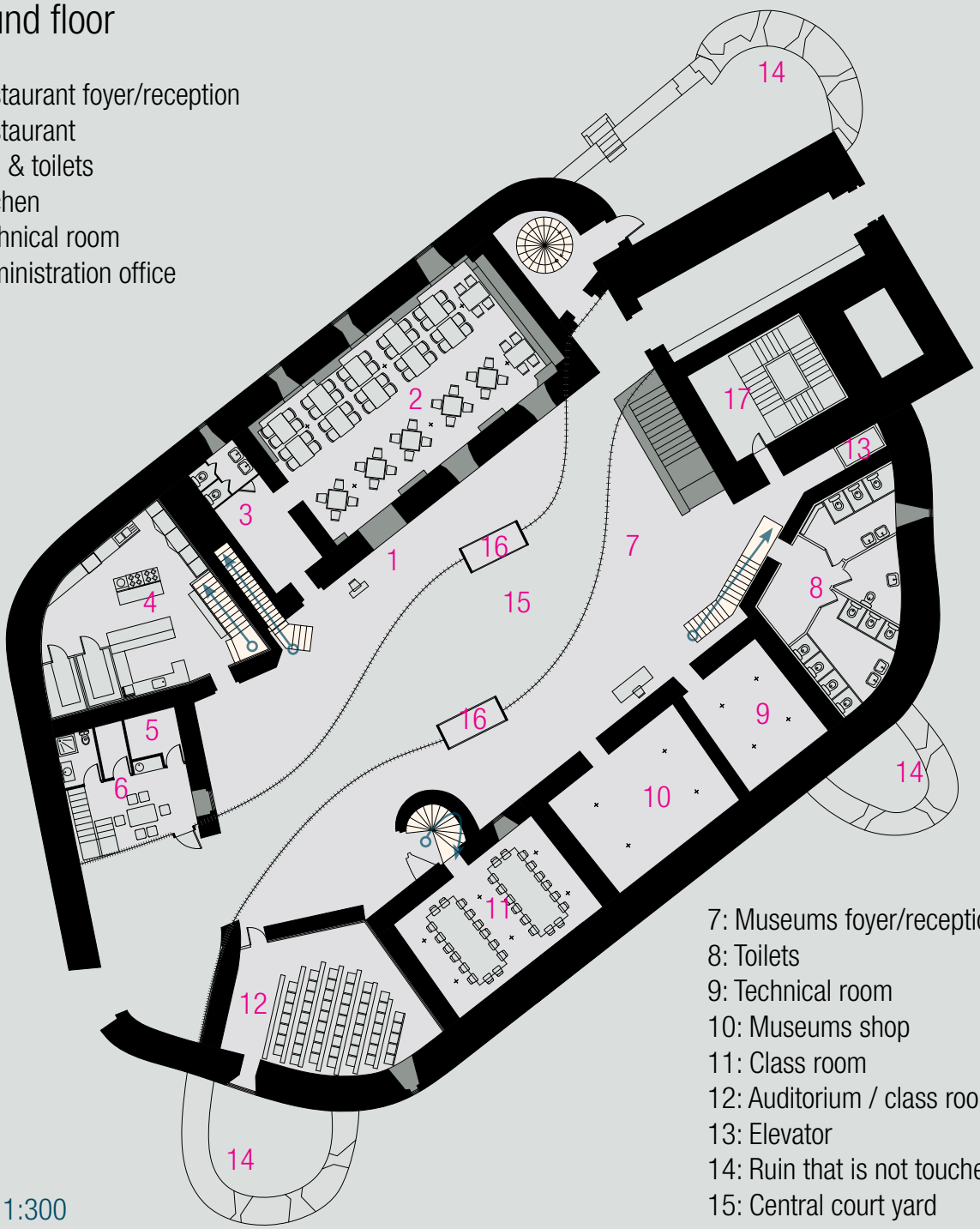
The existing walls are made of boulder and bricks and on top of this the new wooden wall is created. The wooden walls are created by vertical boards follows the curves of the existing walls.

The contrast between the stone and the wood, make a clear difference between the original castle and the newly build wooden walls. In spite of the contrast the wood still make a warm and welcoming impression.

FLOOR PLANS

Ground floor

1: Restaurant foyer/reception
2: Restaurant
3: Hall & toilets
4: Kitchen
5: Technical room
6: Administration office



7: Museums foyer/reception
8: Toilets
9: Technical room
10: Museums shop
11: Class room
12: Auditorium / class room
13: Elevator
14: Ruin that is not touched
15: Central court yard
16: Main entrances
17: Possible access to tower

1:300
N

Ill. 47: Floor plan

First floor

1: Central court yard
2: Restaurant, 1. floor
3: Kitchen, 1. floor
4: Office area

5: Museum area
- 1. period of Hammershus

6: Museum area
- 2. period (Time of Lübecks)

7: Museum area
- 3. period (abandoned time)

8: Museum area
- 4. period (Hammerhus today)

1:300
N

Ill. 48: Floor plan

Roof

1: Roof made of wooden lamels

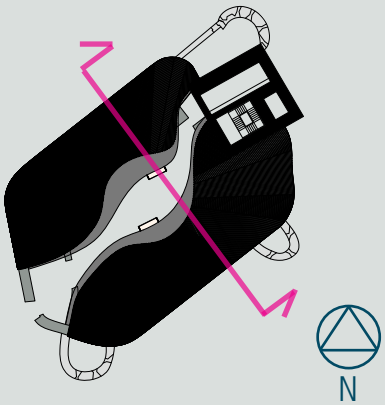
1:300

N

Ill. 49: Roof plan

SECTION

1: Northern part - restaurant
2: Southern part - museum

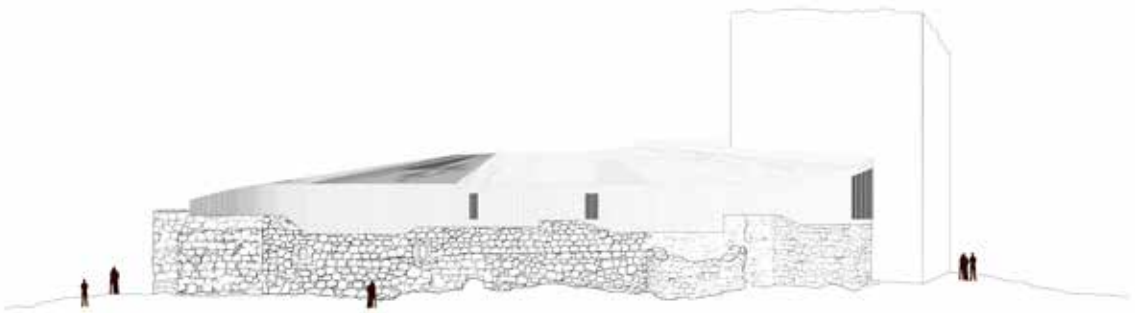


Ill. 50: Section 1:200

THE FACADES

The facades are as described made of horizontal orientated boards. The boards are passing by the windows in a way, that only every second boards are removed so that the windows do not take any focus. But because every second boards are removed, it still gives a lot of light. The boards in the facade are narrow far away from the tower and get wider the closer the tower they are. This is made to tell the story of the four periods of Hammershus, as described in the presentation of the museums room.

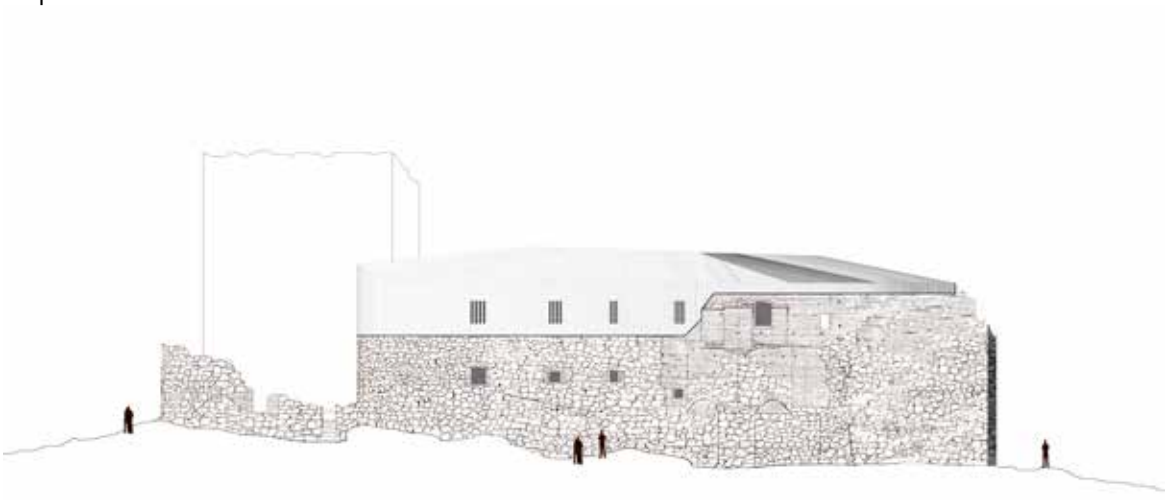
Southern part - museum



Ill. 51

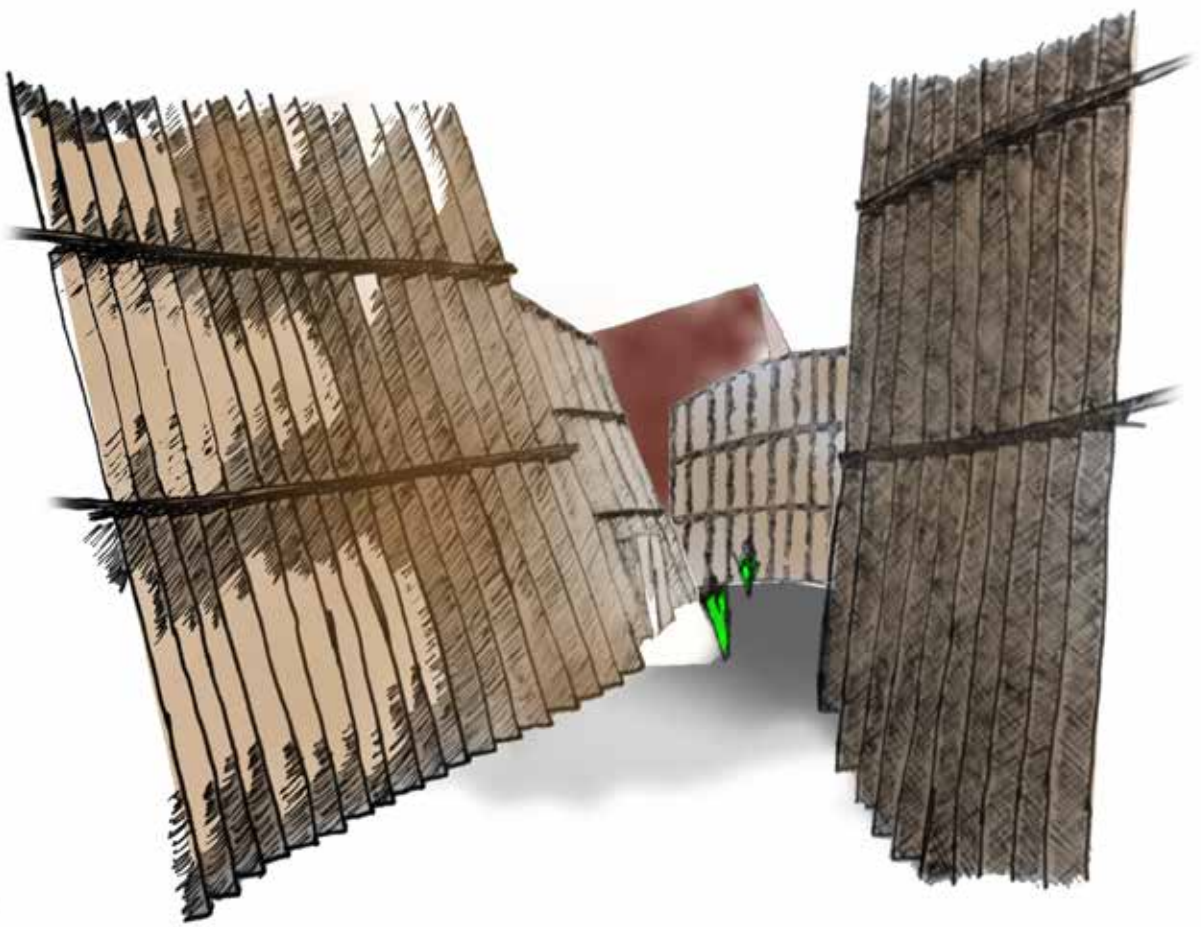
1:500

Northern part - restaurant



Ill. 52

1:500



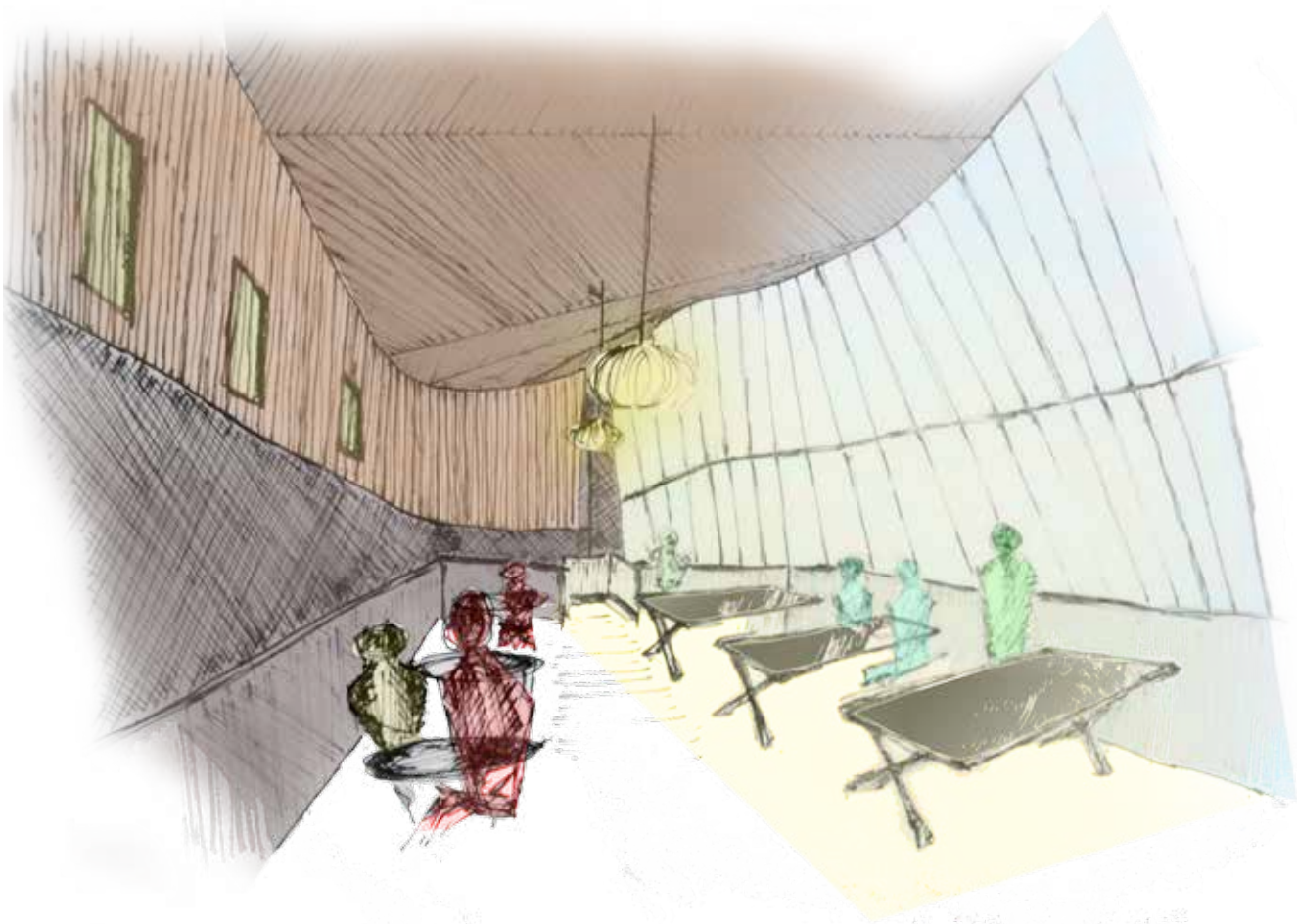
Ill. 52 The gorge

THE GORGE

The gorge is creating the transformation from the hectic area in the outer courtyard to the centre of Mantelgården. The gorge starts wide open to welcome people, then get narrow and only allowing two persons to pass by at the same time, before the walls open up again for the sunlight and for making a courtyard, where people can go in to the buildings.

The courtyard is dominated by big wooden lamellas, who at same time protects the buildings from the sun and the people inside the building from being overlooked, so they in this way get a secret cave.

The space between the boards are smaller in the end most far away from the tower and starts to get bigger the closer the tower you get. This is made to tell the story of the four periods of Hammershus, as described in the presentation of the museums room.

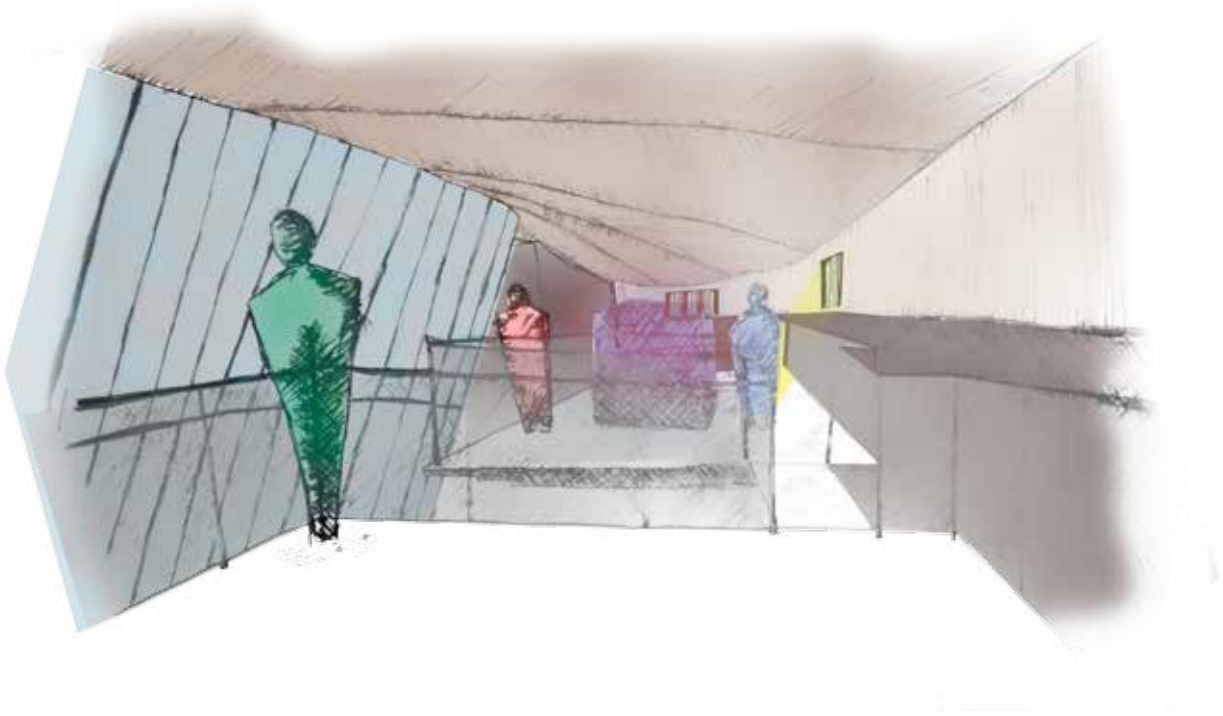


Ill. 53 The restaurant

THE RESTAURANT

The restaurant consists of two parts; a ground floor and a first floor. The restaurant is placed in the old chapel, and the columns in the ground floor help telling the story of the old vaults and the aisle. The floor in the ground floor is made of concrete, and this is general for the whole building.

The first floor is made more open and light, and the materials are the same as outside. The construction of the wall and roof also helps on the acoustics.



Ill. 54 The museum

THE MUSEUM

The same materials create the museum as the restaurant part. The museum part is placed in the southern part with windows pointing north, so that it gets less daylight. In this way it is possible to have dark enough rooms to use electronic devises in the exhibition.

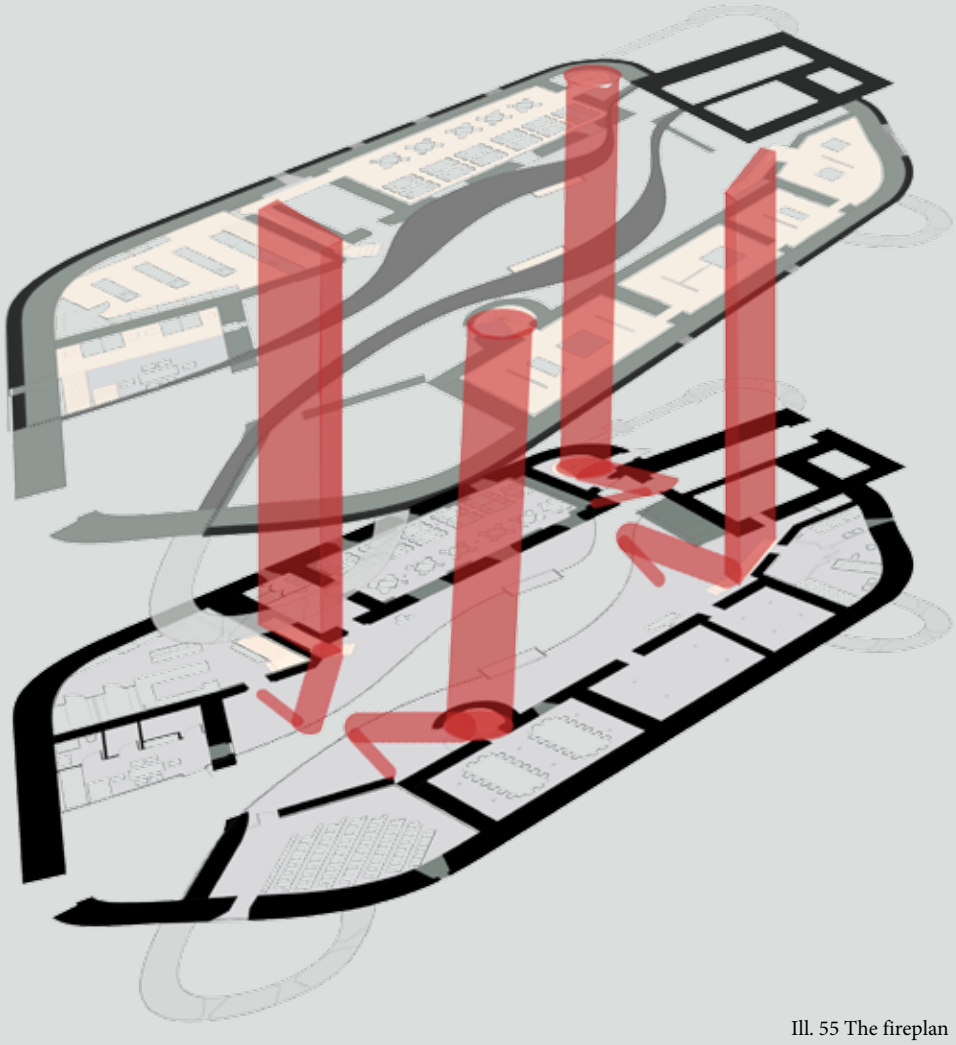
The museum is placed on four platforms on top of the old rooms. Each platform should then be used to tell a part of the history of Hammershus' four periods.

FIRE PLANS

In the new visitor centre there is placed four main fire exits. Two of them is placed in the norther part of the building and two in the southern part. In both of the buildings the fire exits is placed in each end. By placing the four fire exits in this way, the demands from Bygning-sreglementet chapter 5.2 stk 6 has been fulfilled.

First floor

Ground floor



Ill. 55 The fireplan

CONCLUSION

At the top of the rock where Hammershus once enthroned and afterwards was abandoned and forgotton a new visitor centre has been designed within this project. The visitor centre should give Hammershus another golden age. With the location in the middle of the ruin as part of Mantelgården the exhibition will be placed where it belongs: in the same buildings in which the history of Hammershus unfolded. When visitors in the future arrive at Hammershus they will experience Mantelgården as it looked before it was abandoned, including the experience of the exact location at the top of the rock with the outer wall almost falling down the slope. At the same time the castle's clear hierarchy, with Mantelgården and its new visitor centre in the middle and Mantelgården's tower enthroning as the ruin's highest point, is maintained.
The challenge has been to create a natural fusion between the old and the new in which the final expression leaves space for both the new and the old story. The outcome unfolded in this project makes it impossible for future visitors to overlook that they find themselves in an old ruin along with a clear experience of the new building. The original walls and spatialities are maintained and new walls, surrounding these spatialities forming a new atrium, have been designed. This means that Mantelgården comes across as being separated into two parts because the new walls, even though they are made of glass, create a barrier. However, the visitors will experience a more true representation of Mantelgården given that it originally consisted of many different functionalities and building elements. Beside the contrasts between old and new, a contrast between the hectic space and the possibility for contemplation has been a focal point. During the whole process, communication has been a top priority concerning the preparation of spatialities for the exhibition, in which the history of Hammershus should be communicated, and in the story formed by the new building. These considerations have influenced the design of the windows, the size of the lamellas and the frontage boards as well as the construction of pillars in the restaurant.
The vision has been to create the transformation from a ruin into a modern sensory space that both directly and indirectly can communicate the history of Hammershus. Furthermore, the demands from Naturstyrelsen was to both create an 'invisible' visitor centre that would not mar the area and eliminate the attention from the surrounding nature, and at the same time create a space that would be able to accommodate many different functions for many different users. The demands for both a sensory space and different functionalities are thus fulfilled.

REFLECTION

By placing the visitor centre at the top of Mantelgården the challenges of the designing process have been many – this includes the transformation from an old ruin into a new building, the small and many spatialities of the ruin and the lack of isolation. Furthermore, two challenges are obviously: The preservation of Hammershus, the tower of Mantelgården and the ruin of the small towers of the outer walls.

Due to the preservation of Hammershus it would not be possible to establish the visitor centre at that location. That is why Naturstyrelsen in the competition program wants to place the visitor centre at a site nearby Hammershus. After building a site model, I realized the exiting challenges in the combination of the existing ruin and the new building. That is the reason why the new visitor centre is located at the top of the ruin. This decision meant a lot for the challenges that came up, and they have been a governing factor and has entailed that I have not quite reached the depth of the project that I would have liked. For instance, I would like to have some more iterations of the windows from the inside and more iterations of the lamellas at the glass facade. This goes for both the width and the depth of the lamellas and for the space between the lamellas.

Due to the untouched tower in Mantelgården it would be desirable in a further work to use it as an observation post. Concerning the ruin of the small towers at the outer walls of Mantelgården these are untouched because of the fact that they cannot be reached from Mantelgården wherefore they would not appear as a part of the complete building. This means that they would be beyond the concept.

Reflection in relation to sustainability

Sustainability can, as earlier described, be worked on in many ways. In this project I have had a technical approach and a social approach. The technical approach has been used in relate to an overall regulation of the building. However, if I had had the time, it would have been interesting to let more elements come to play such as humidity, the cold from the original walls and their influence on the indoor climate as well as the exhibition. In the same way B-sim would be used in the following iterations of the lamellas in the glass facade, so that they in this way make the best indoor climate.

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Interviews:
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APPENDIX A

This appendix describes the data put in to BSim.

Time schedule: **a:** Opening hours: may 1st.- september 30th., 10 am. - 10 pm.
b: Open period but closed: may 1st. - september 30th., 10 pm. - 10 am.
c: Closed: October 1.st - April 30th.

System	Description		Schedule
People load	136 as 100% loaded		a
Lightning	Task lightning 3kW 200 lux Incandle		a
Moisture load	0,5 kg/h		10am.-1pm. in opening hours
Ventilation	Input: 4,207 m3/s 630 Pa 0,7 Total eff 0,5 Part to air Output: 4,207 m3/s 630 Pa 0,7 Total eff 0,5 Part to air Recovery unit: Max 0,6 Min 0	Temp control: Part of nom flow: 1 Min inlet temp 17 Max inlet temp 40 Heating set point 22 Cooling set pnt. 25	a
Venting	Basic air change: 3/h Temp factor 0,1 Tmp power 0,5 Wind factor 0,2 Max Air change 5/h	Venting control Set point 22°C. Factor 1	a, b, c
Heating	Max power 60 kW Part to air 0,6	Open hours: Factor 1, Set power 19°C, Design temp -12°C, Min power 3 kW, Te min 17°C Open but closed: Factor 1, Set power 17°C, Design temp -12°C, Min power 3 kW, Te min 17°C Closed: Factor 1, Set power 5°C, Design temp -12°C, Min power 3 kW Te min 17°C	a b c