



EXPOSING THE INVISIBLE



MATTER SPACE STRUCTURE 3

Ellinore Olofsson
Chalmers School of Architecture
Department of Architecture
& Civil Engineering
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Examinor Daniel Norell
Supervisors:
Jens Olsson
Sara V Olsson
Malgorzata Zboinska

INTRODUCTION

I grew up and live on an island in the northern archipelago of Gothenburg. I have always been surrounded by water and it is my element, I love to be around and in it, not only at home but wherever I travel, it is the sea and water that makes me calm and clear my mind.

The affection I feel for water, is just as much I dislike strong winds, the effect the wind has on staying or not staying outdoors, which is the starting point in my choice of subject.

The progress of the wind is also a decisive factor in this place where I have intentions to develop my Master Thesis - outside the eastwest side of Öckerö right next to Lammholmen.

The curiosity to explore surrounding elements and how the narrative of the wind in this environment will emerge a toolbox and guidance to create living qualities in a windy environment.



WIND breeze gale storm tornado hurricane
cold warm salt sun WATER stone rocks
wood space atmosphere spatial SHELTER

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AIM & PURPOSE

The purpose of the project has grown out of a curiosity to explore surrounding elements, in addition to developing a narrative of the wind in the context of the project.

The aim is to investigate how to use a toolbox and guidance, to create living qualities in a harsh climate. Find tools how different configurations of building volumes and elements can create shelter.

METHOD

The method for this project is research by design through explorative research. To create a discourse connected to the aim.

Observations and mapped movements and speed of wind in the archipelago, to create a story about the wind in this context. Existing natural structures in nature and on landscaped volumes in shape of buildings and erected artifacts has been observed and taken into account for the explorations. The library of artefacts, historical objects, sheds and volumes in the area has been moduled for the experiments.

Mapping of the site will create a basis for Master thesis next semester. The method for this is to be on site and in the area with a kayak. To visit the island, collect species and get to know the place.

One part of the experimental research is analogue and experience based. Outdoor visits on different sites, with soap bubbles, anemometer and camera. To study the movement speed, swirls, direction, loops and where the calm areas appears.

Another part is to study the movement of the wind indoors. In a controlled and closed environment, without disturbing flows and influencing parameters. An animation of the observed wind fluctuations illustrates the analysis.

Acrylic illustrations of the site, and of the wind phenomenon are a recurring moment throughout the process.

In order to achieve the ambition with this project, to find an experienced and intuitive feeling for the wind's progress, the methods will be used back and forth.

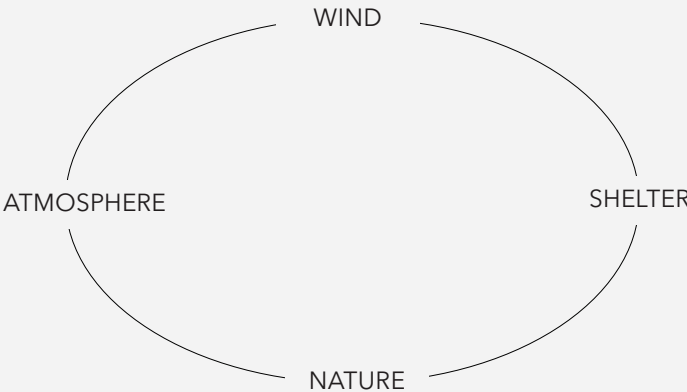
”Litting lullabies drift through the breeze,
Gales howl above stormy seas
The north wind growls fierce and loud
Gentle gusts move along the cloud..”
@stormpoetess

RESEARCH QUESTION

How can the knowledge of the wind be incorporated in the design in order to give shelter in the outdoor inviroment ?

MT QUESTION

How can apartments at Lammholmen be designed based on the needs in the municipality in order to provide housing qualities for its residents, respect the surrounding landscape and bring further values to the community as a whole?



SITUATION



SITUATION ARCHIPELAGO

Approximately 30 kilometer from the core of the city, towards the west, we find the northern archipelago of Gothenburg. It is an independent municipality, which consists of 10 more or less connected islands. The islands have no permanent connection, and the short distance to Hisingen takes 5-12 minutes. The transport by ferry, to either Hönö or Björkö, leads forward to the other islands, either by bridges or by boat.

Barren cliffs, small and large islands that form a landscape at the foot of the horizon. Where Skagen's tip is the only obstacle towards west before the North Sea takes over.

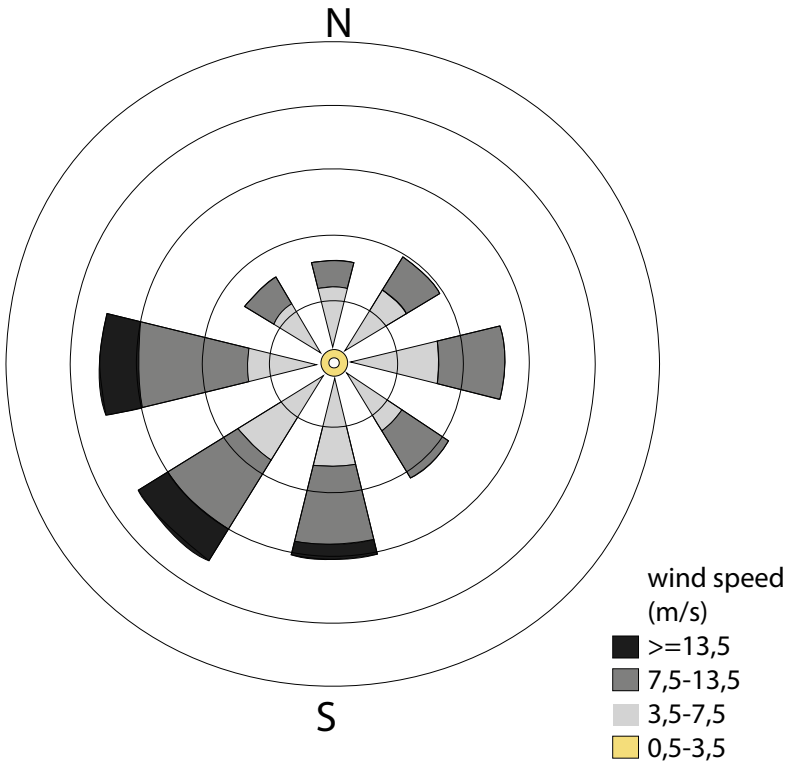
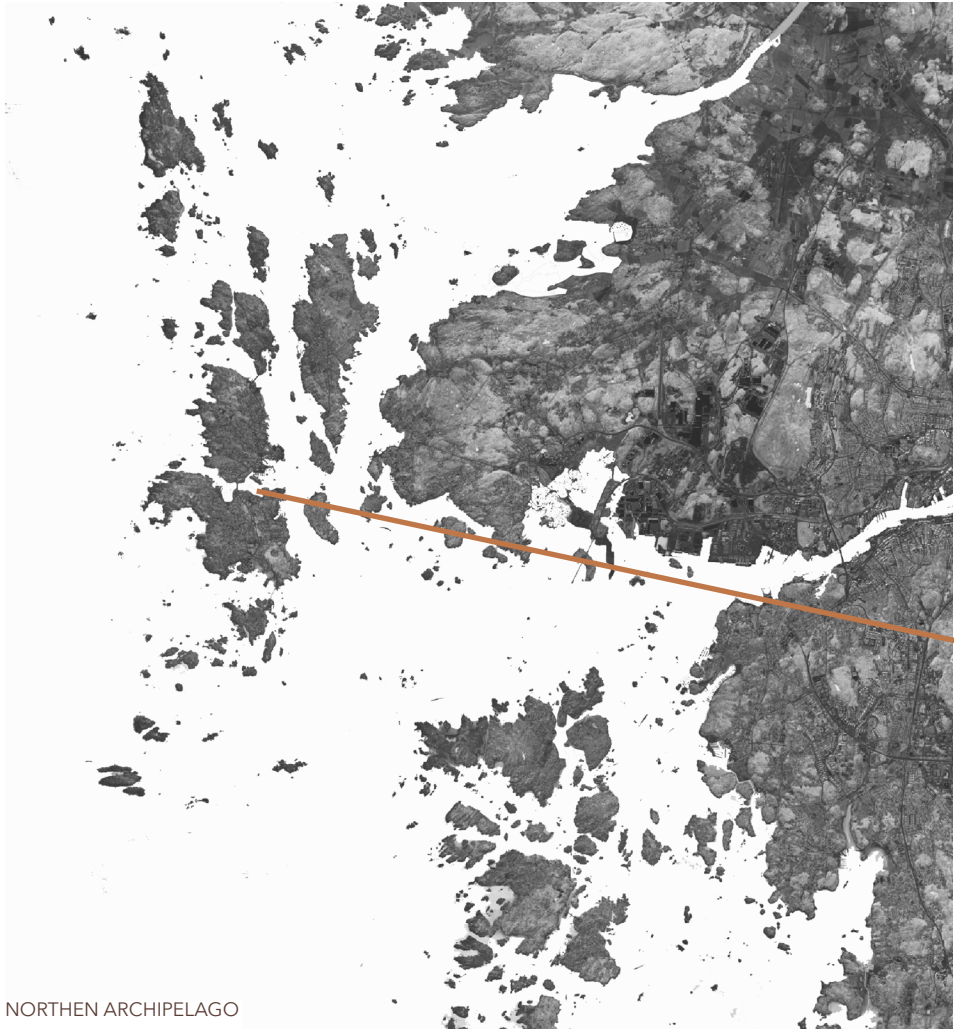
This idyllic place is shaped and built out of the historical fishing tradition, a heritage which is traced and seen all over the islands. This tradition has shaped a population with a huge respect for the power of nature and weather. The houses is built in a low scale and often accommodates more than one household. The harbours on the islands are located in the more sheltered places, protected from the most exposed western winds, and the oldest houses are built and placed nearby. Andersson about the village – "Fischermen usually lived here with their families. The houses are located densely, to be close to neighbors, and irregularly, to protect from the wind. In the in-between spaces, a common shelter is created where one can meet and help each other out." (Andersson, 1983)

Then after decades large areas have been built upon and nature protected areas had to be preserved which results in increased space for new building areas able to expand. Changed situation plans take years to develop and are often appealed to a higher court. When the availability of solid ground is limited, along with expansion for new accommodations to develop, the possibility to place buildings on the water is further to explore.

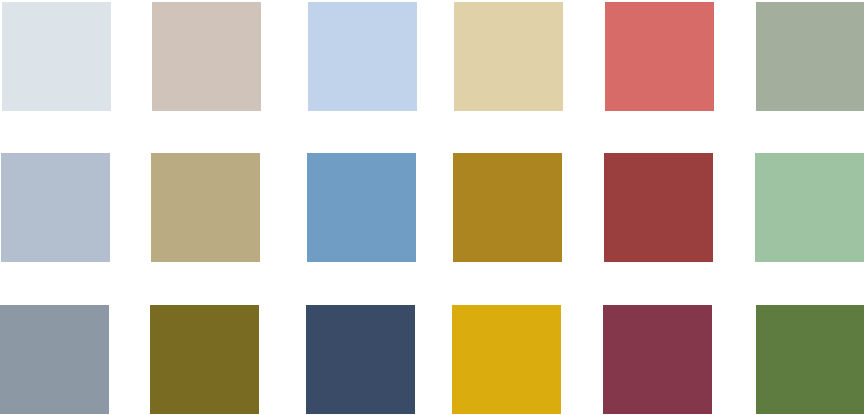
SITUATION SITE

The harsh weather generally enters the west coast from the south west direction, wich generates that the east side is most protected. The place for the pontoon block area is near the harbor at Öckerös south east side, sheltered by the small island Lammholmen and the bridge gap that connects Hönö and Öckerö in south direction. The area has a low topography that rises smoothly towards the island's highest points from the water and cliffs. On the eastern side, the ferries and boats pass in the fairway, in the south direction the cars sound slightly from the ferry departure, and the sight of wind turbines spins in interaction with the wind.

CONTEXT







LAMMHOLMEN



MAPPING

18 october 2021

My journey to the site was made by kayak.

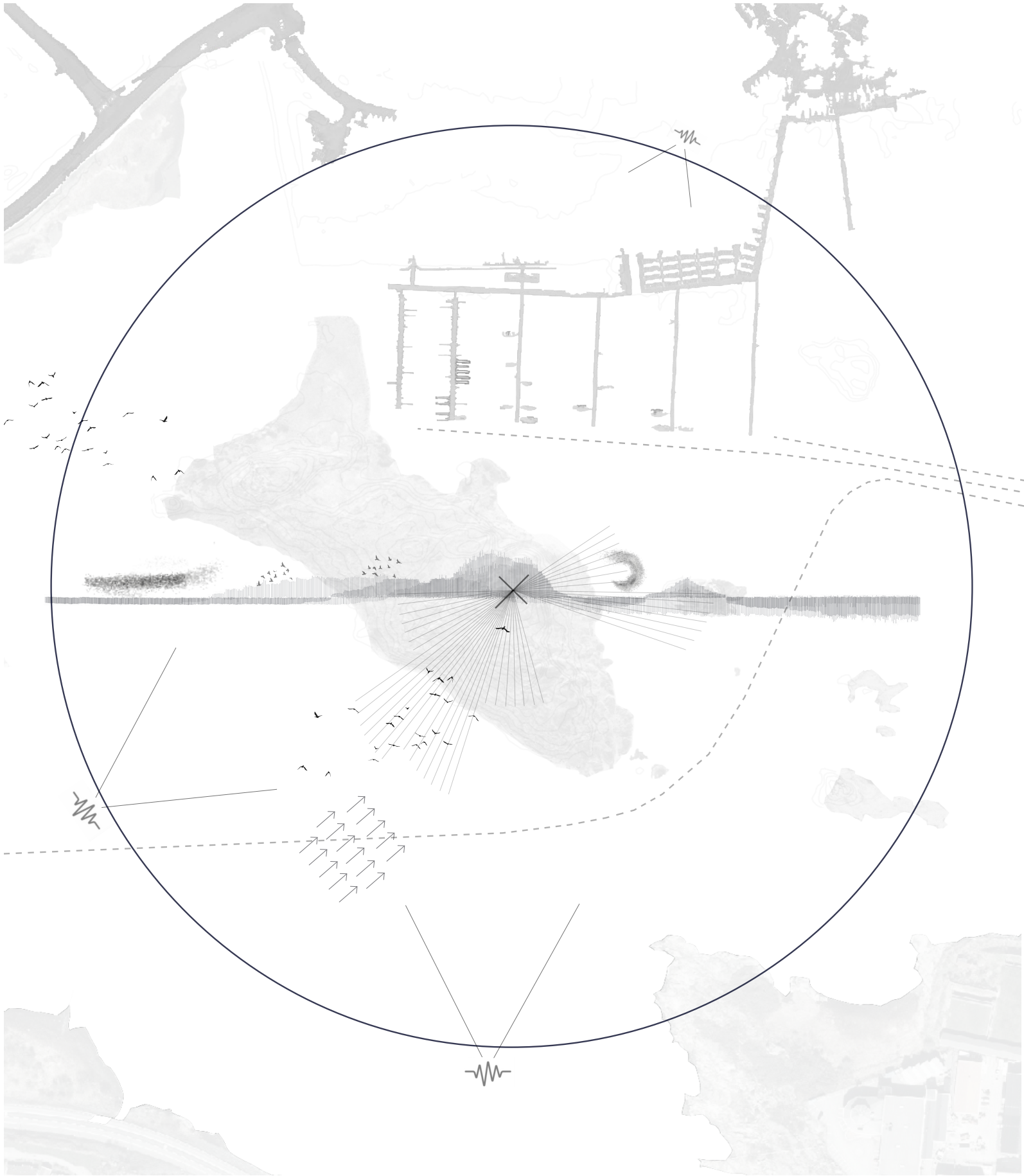
To map the context in order to capture my impressions. I started my turn counterclockwise, on the west side of Lammholmen. There, the shallow water resulted in the kayak touching the sandy bottom several times.

The rich bird life appeared on this part of the island, bird nests, dried remains of animals and several species were observed. The island's topography on this side slopes easily towards the water with stone cairns before the waterline takes over.

A persistent faint murmur from traffic in the background mixed with the sounds of the island's boat yards, the water and the animals. This day the sea was calm and the wind breezed softly, the sounds were easily transported in the area.

The closer I got to the small boats' fairway for passage under the bridge between Öckerö and Hönö, the deeper the water became. I rounded the southern tip of Lammholmen and landed on the island, the muddy sandy bottom reminded me and a balance act on rocks and stones kept me almost dry. On this eastern side of the island the cliffs rise more dramatically and I was amazed at the height. I noted plants, mountain lava, tree varieties, wreck wood and seashells.

The depth of the water was observed on the departure from the island. When arriving at the port in a northerly direction, a pleasant activity was noted, boats were picked up for winter storage, a boat came in from a fishing trip and people were tinkering with the boats on land. Finally a swim in the sea ended this trip.



LABORATION



ARCHITECTURE AND NATURE

In addition to studying context, this thesis project is also focus on allowing natures changes and variations to set the tone in the design work. In Sweden, the educations in architectural building and city design are separated from those in landscape architecture, which means that the holistic view of surrounding outdoor environments is mainly emphasized in the landscape architecture area. (Sveriges Lantbruksuniversitet, 2021). Nature and architecture (the built environment) is seen as separated things. But this matter is looked upon differently of understanding in Eastern society. The two fields, architecture and nature is intertwined in a holistic sight of view.

The aim, to conceive architecture for this new environment where the role of nature is present, the Japanese architect Junya Shigami message is that we should look at architecture in a new way:

”To embody in architecture that which has never been architecture before - I wish to explore this possibility. Today, we can no longer draw a line between the natural environment and man’s artificial environment in our conception of architecture. The artificial environment we are creating has grown enormous in extent. So much so, it has even affected the natural environment, and the natural environment in its turn is heavily affecting our artificial environment. As the boundary between these environments, natural and artificial, has grown steadily more ambiguous, a new environment is taking shape”
(Ishigami, J. p.04).

Glaumann and Westerberg wrote that “Planning with a notion of the wind in the outdoor environment is based on how the wind is experienced. There is no doubt that winds in our climate have a negative impact on the outdoor environment in general.”(Glaumann mfl, s.8)

TO ENTER A PLACE

Our bodies’ relationship and perception of the architectural environment includes so much more than the visual experience. The body’s senses interact between the tactile, visual and sonic in a harmony that evokes either a beneficial environment or its opposite. Many aspects of the architectural design can be analyzed through the knowledge of our senses. The Finnish architect Juhani Pallasmaa criticizes the modernist architecture, that it has included the intellectual and visual but left the body and its other senses, memories, notions and dreams, left to be homeless. “The inhumanity of contemporary architecture and cities can be understood as the consequence of the neglect of the body and the senses, and an imbalance in our sensory system.” (Pallasmaa, J. 2012, p.21)

The notion when we enter a place, the sublime notion of the senses interacting. “Every touching experience of architecture is multi-sensory, qualities of space, matter and scale are measured equally by the eye, ear, nose, skin, tongue, skeleton and muscle. Architecture strengthens the existential experience, one’s sense of being in the world, and this is essentially a strengthened experience of self. Instead of mere vision, or the five classical senses, architecture involves several realms of sensory experience which interact and fuse into each other.”(Pallasmaa, J. 2012, p.45)
To either experience unpleasantness or calmness. Sometimes it’s just a feeling of wellness, an empathy, nothing is disturbing. The favorable feeling when architecture provides this, is often weaker than its opposite. When the architectural composition in interaction with its context has found a degree of perfection, neither the visual, the tactile nor the sound interfere.

THE WIND...



...IS THE WEATHER ELEMENT THAT AFFECTS US THE MOST, IT MAKES THE AIR COLDER AND IT GENERATES SNOWSTORM IN THE MOUNTAINS...



THE WIND MAKES THE SEA ROAR AND THE RAIN FALLS VERTICALLY...



IT BLOWS INTO THE EARS, FINDS ITS WAY THROUGH THE CLOTHES AND CHALLENGES THE BALANCE...



BUT WHEN ABSENCE OF WIND APPEARS, YOU FORGET IT EXIST.

EXPOSING THE INVISIBLE

The ambition was high in order to visualize the wind in the context of the archipelago. The tools for the subject were soap bubbles, smoke and a camera. To observe the wind advancing outdoors and around different volumes. However, it was harder than I thought to catch my time with the right winds for observation. Although these visits to different places did not give the exact results I had expected, they gave an intuitive sense of the wind's progress and sensitivity. The places and the stay in the area gives me a well-known feeling, which I got to experience in several other ways with these observations.

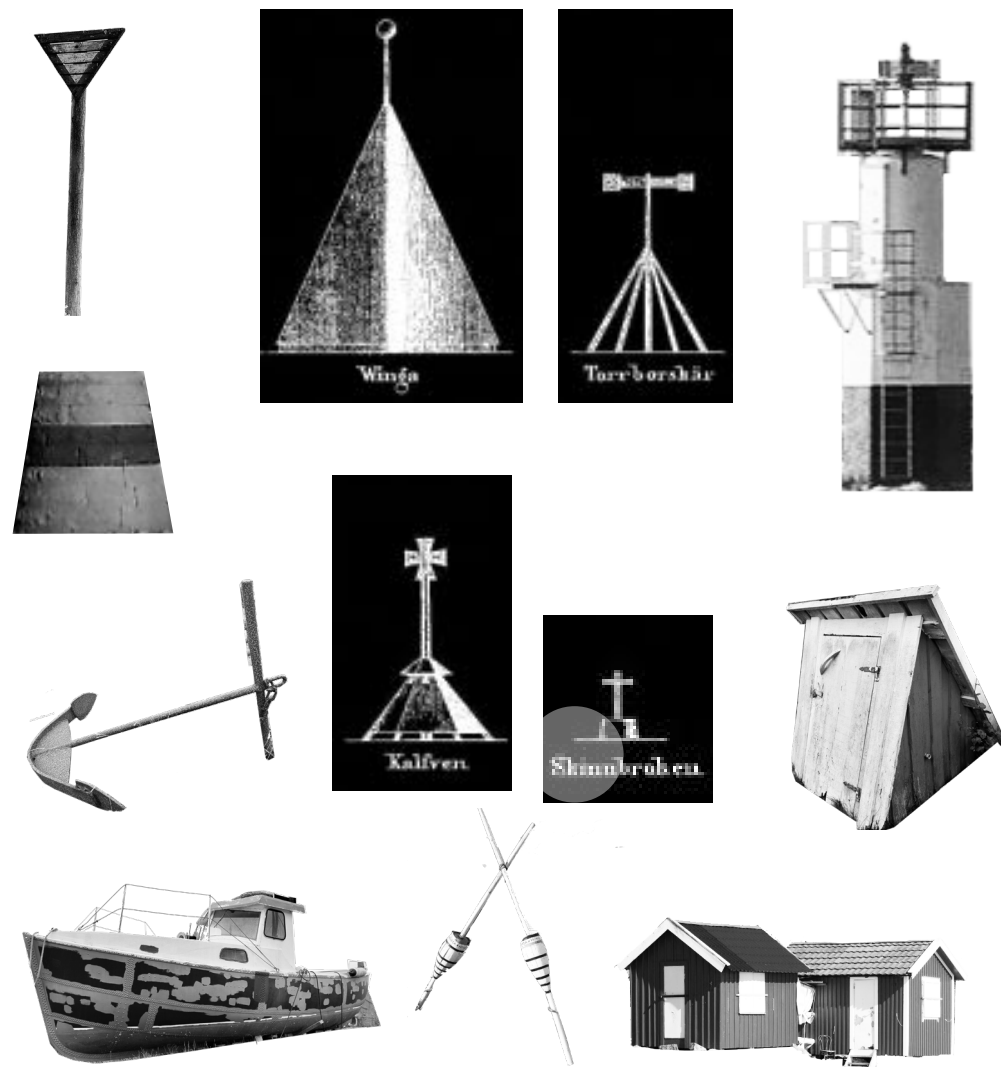
Glaumann means, when planning an outdoor environment in exposed places, the existing vegetation and topography should first and foremost be used. Single tall buildings should be avoided and strive for a grouping of buildings to provide protection in the most exposed directions. Air movement is caused by air differences caused by temperature variations and the biggest difference is between sea and land. In the case of turbulent air currents, the wind changes direction and speed within short time intervals, and laminar air currents continue to be smooth paths, usually along buildings. When the wind hits objects, we talk about the boundary layer around buildings, the laminar air flow hits the edges of objects and turns turbulent. Behind the object, an area arises with more or less shelter dependent on the shape of the object. (Glaumann mfl, p.9-11)

OUTDOOR VISITS

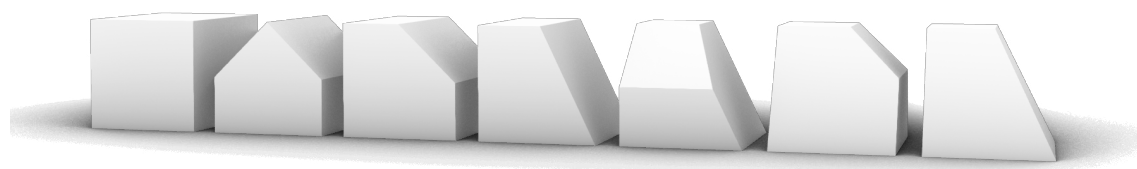


Furthermore, the analysis of the outdoor experiments resulted in a curiosity to study the small deviating angles and movements that create vortices and change the direction of the wind. I started experimenting with a controlled air direction indoors. I used a fan, smoke machine and vacuum cleaner. But the small variations in the indoor environment and the negative pressure in the house made fluctuations of smoke and it became unreadable.

COLLECT

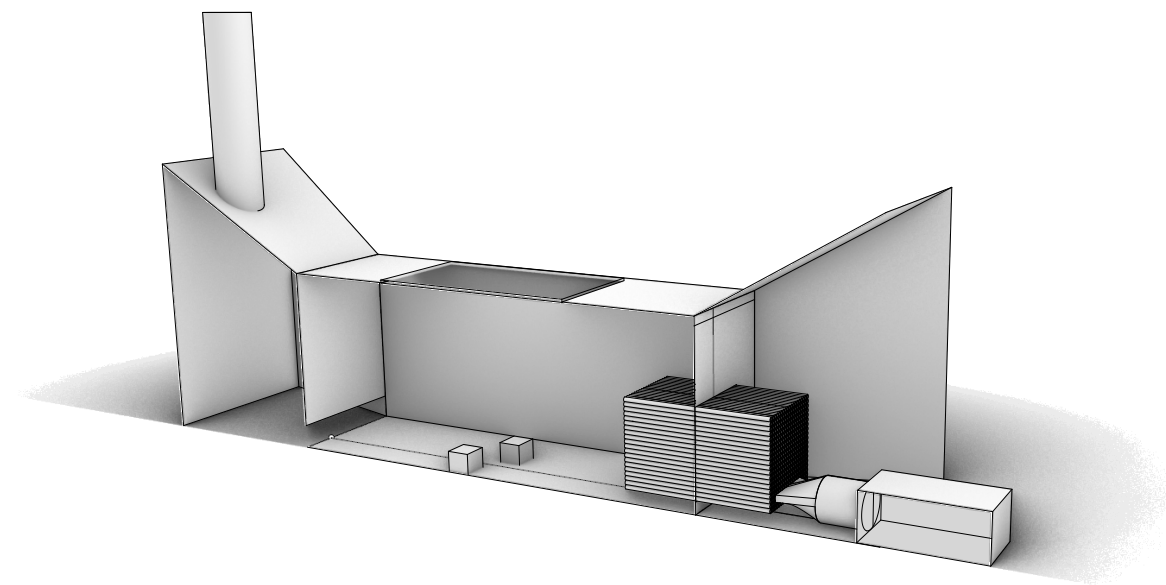


TRANSLATION



EXPOSING THE INVISIBLE

Collected objects, volumes and artifacts from the area were interpreted into volumes and shapes. These shapes were first designed in cardboard at a scale of 1:50, in an attempt to study the linear air flow. The tools for the method were a smoke machine fan and a vacuum cleaner, as well as a tripod for the camera. The experiment failed with the proposition that the air flow needed to be controlled more, that the smoke needed extraction and the volumes were too large.



EXPOSING THE INVISIBLE

The volumes were scaled down to 1: 200 and were made of wood.. The exploration of a wind tunnel for the correct linear airflow began. Cardboard and silver tape were assembled, for the linear air flow into the tunnel, 150 straws were used, which were attached to the lower part of the entrance. Plexiglas windows on the top and on the side to film and observe through were taped. At the end of the tunnel, a cardboard was placed 2 cm from the bottom of the tunnel so the passage of air would take place along the lower parts. A pipe connected to the kitchen fan was added at the end, which controlled the pressure in the tunnel and carried out the smoke. At the beginning of the tunnel, the smoke was directed into the lower straws. Many adjustments were made but in the end analysis could be performed and results was filmed.



TOOLS FOR OBSERVATIONS

DIRECTION
Wind direction



SPEED
Where the wind speed increase
in speed



SWIRLS
Swirls next to or behind the
volume



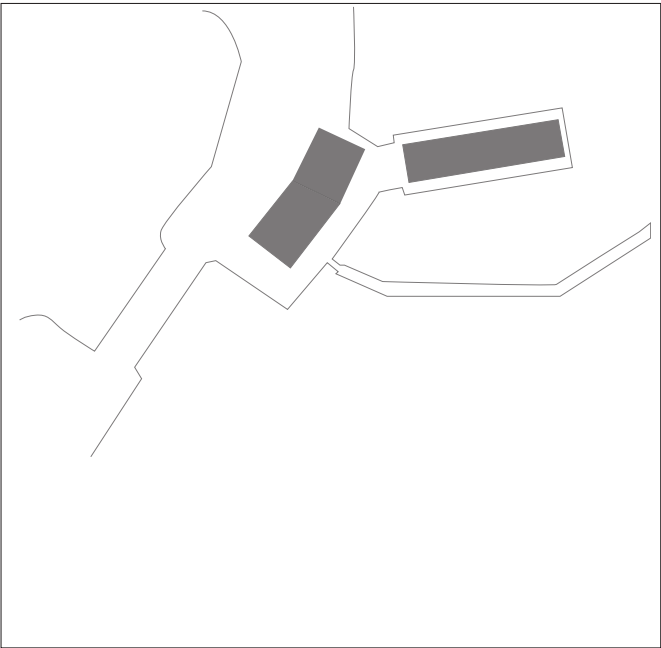
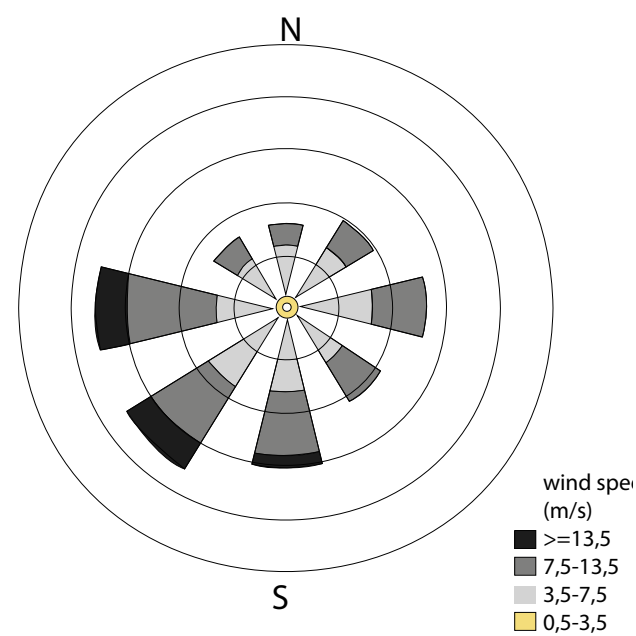
LOOP
Large vortices shaped like an
arc over objects



CALMY
Lung area, also a place with
lower speed and decreasing
vortices



SURFCAMP

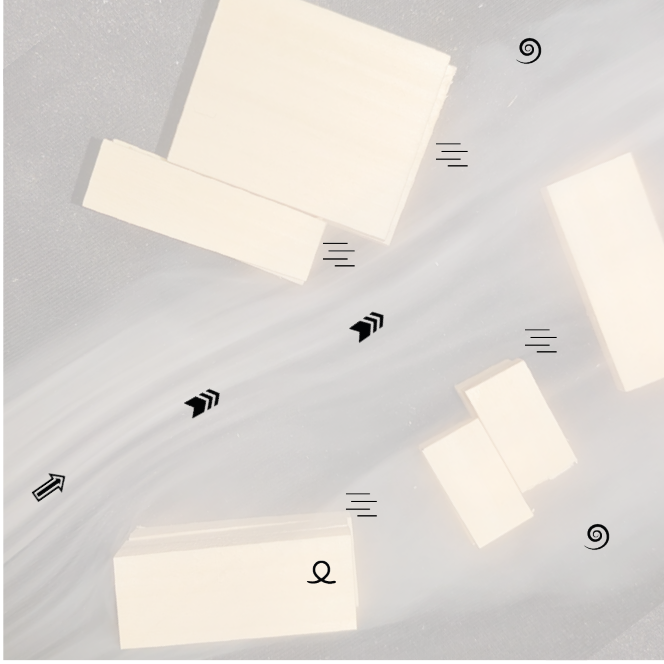


The beachside surf hostel at Bore on the West coast of Jæren is located back behind the line of sand dunes, the architecture mimics a hamlet of small two-storey volumes, organised around a shared, sheltered courtyard. The modules are stacked together and arranged to create sheltered pockets of outdoor space for drying of equipment and storage. Here is also a place for outdoor showers and communal places for barbecues and social gatherings.

by HELEN & HARD

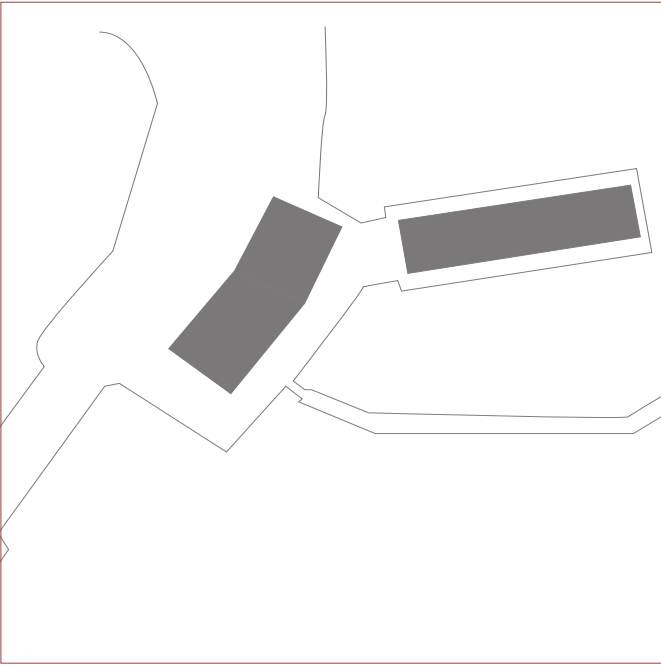
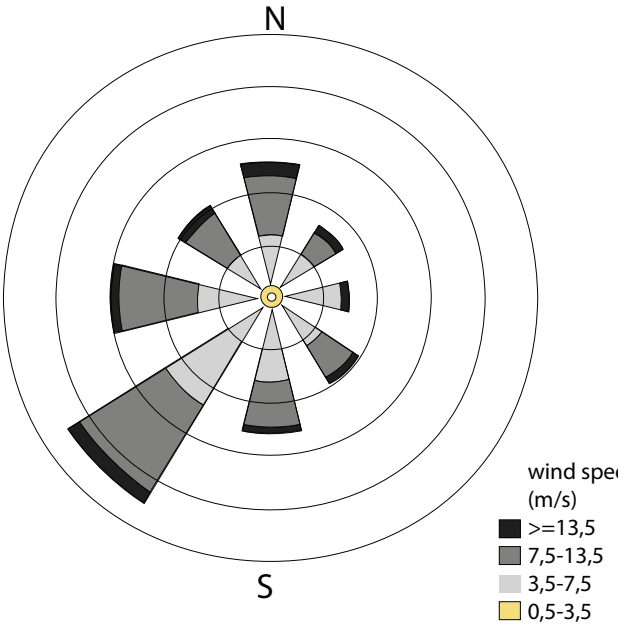


Experiments performed on the most common wind direction according to the wind rose from SMHI



The wind from the southwest splits and flows linearly along the facades. In the middle part of the area the speed increases. Small loops appear over the first volume and smaller vortices appear as a tail after the buildings. Calmly places only appear in angles and corners.

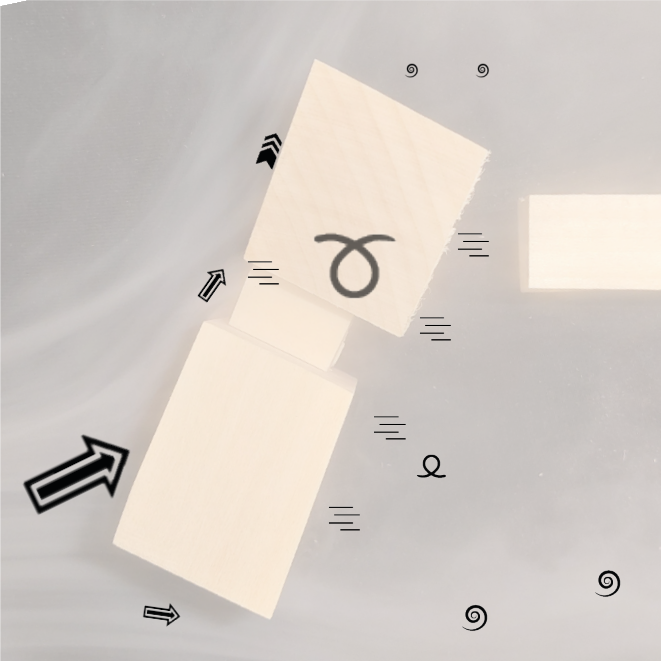
SLOTTSHOLMEN, VÄSTERVIK



Hotel that is partly based on pontoons, with interesting encounters in the exterior environment with volumes placed in a relationship where the outdoor environment is worth studying in more detail.
by SANDELL SANDBERG Architects

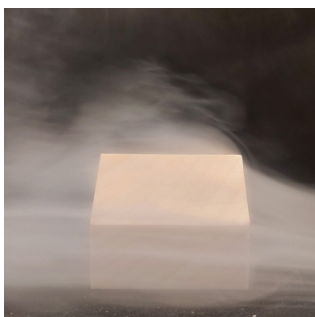
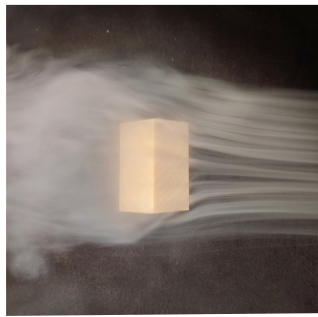
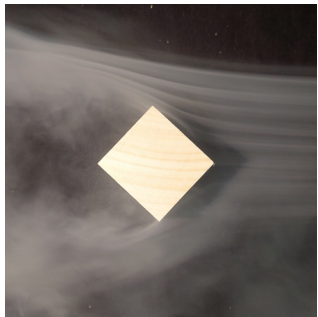
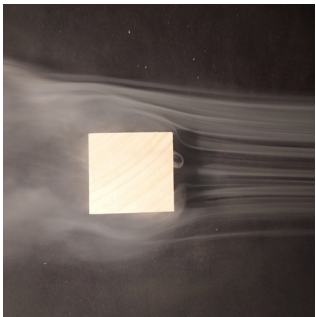
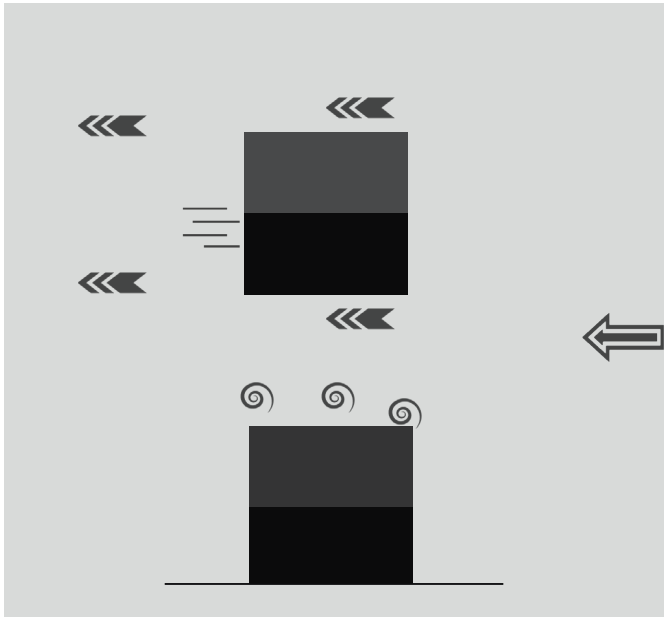
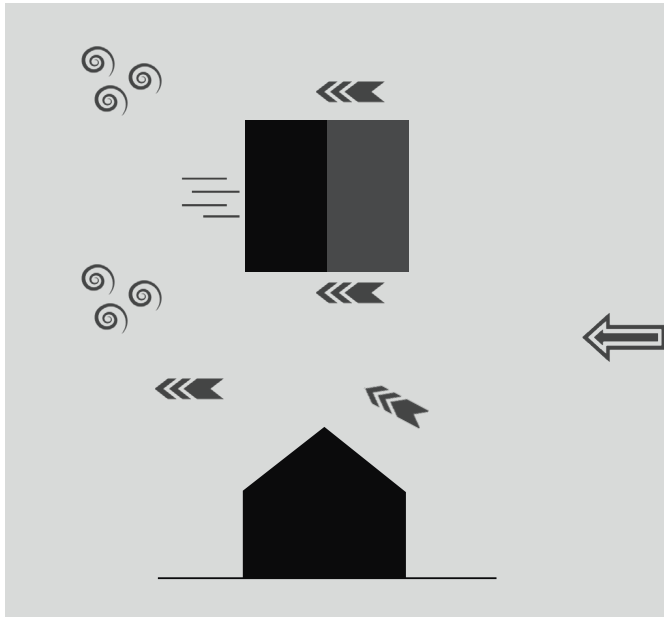
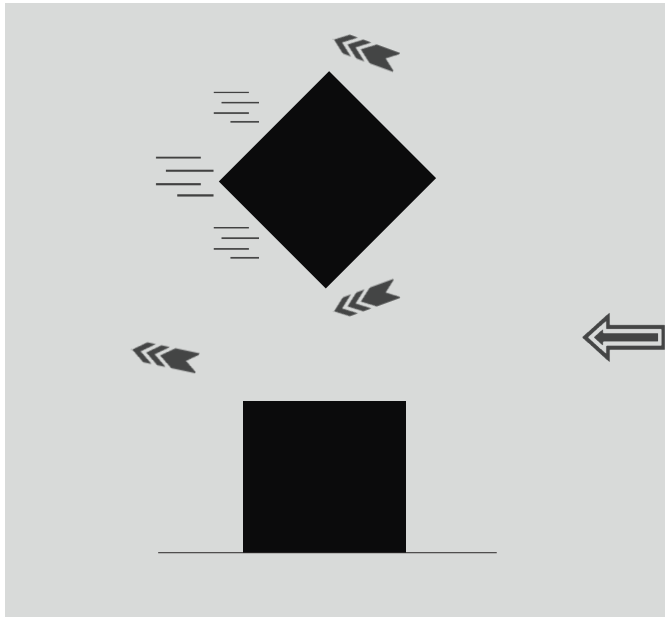
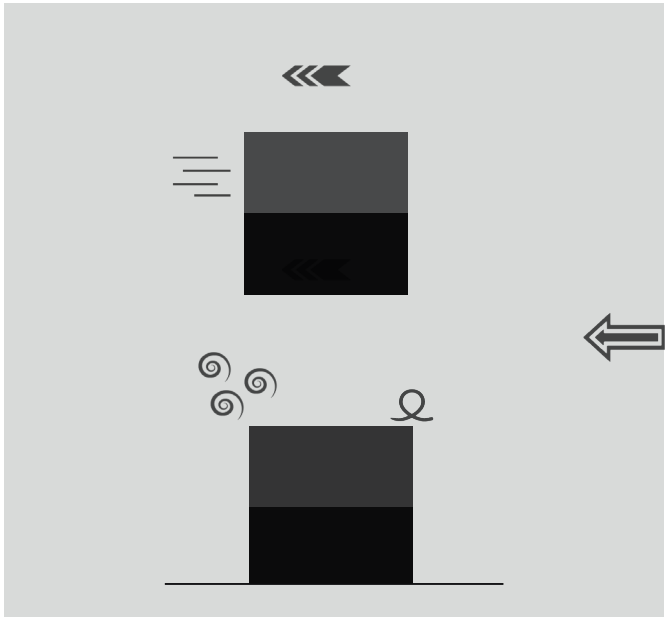


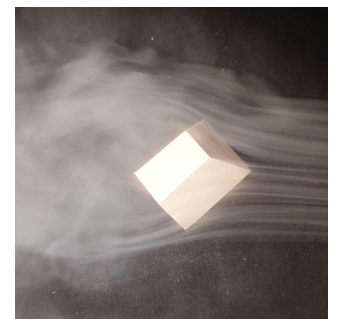
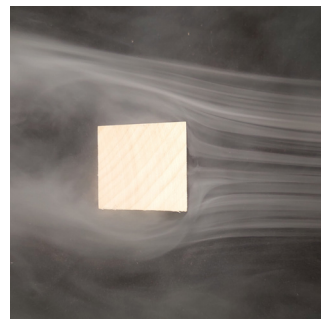
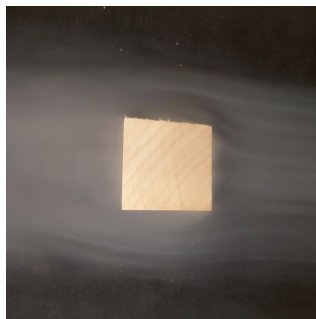
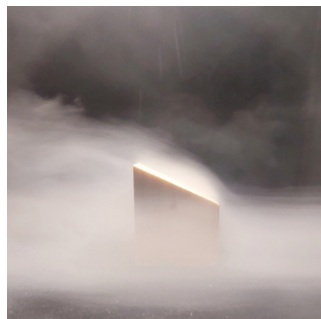
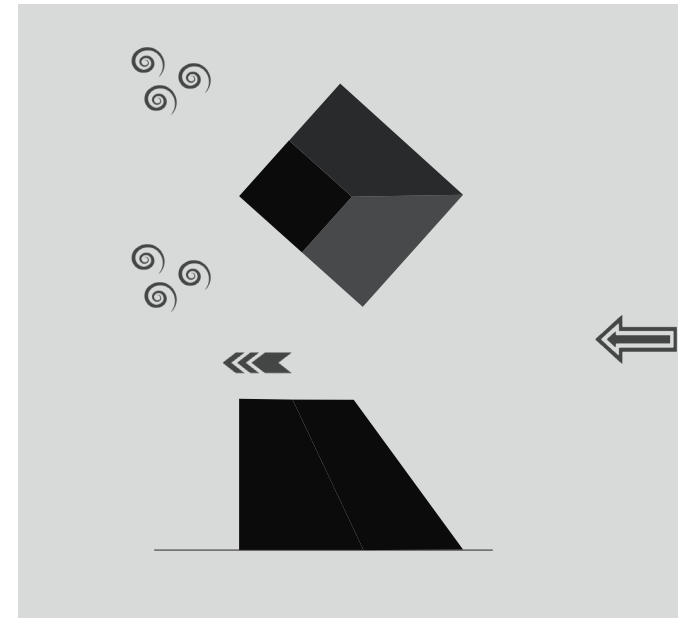
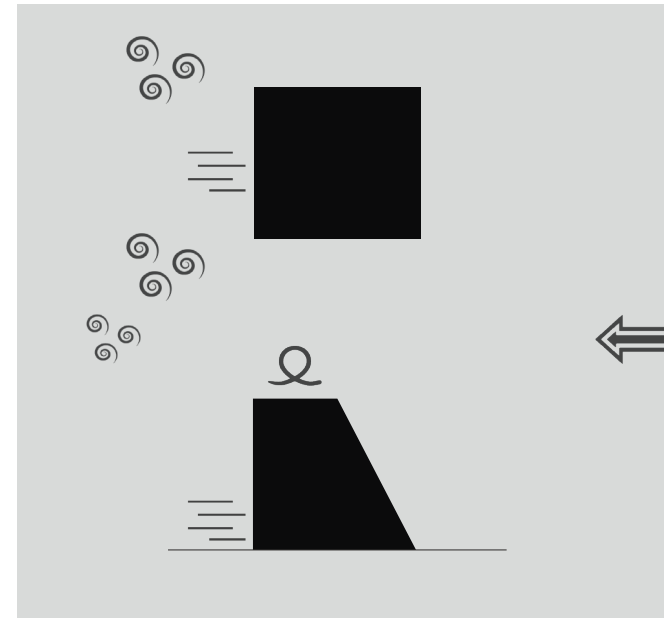
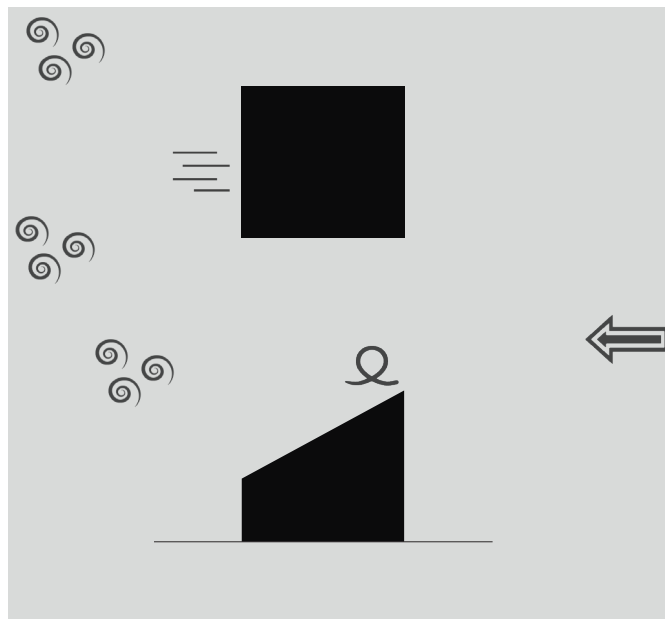
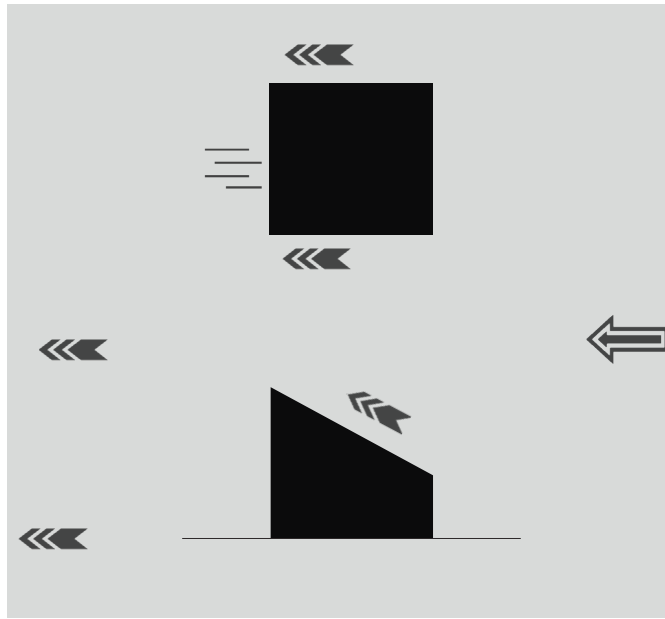
Experiments performed on the most common wind direction according to the wind rose from SMHI

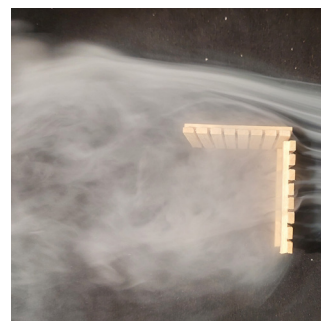
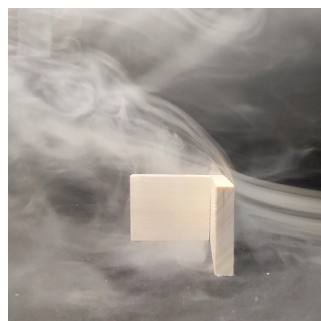
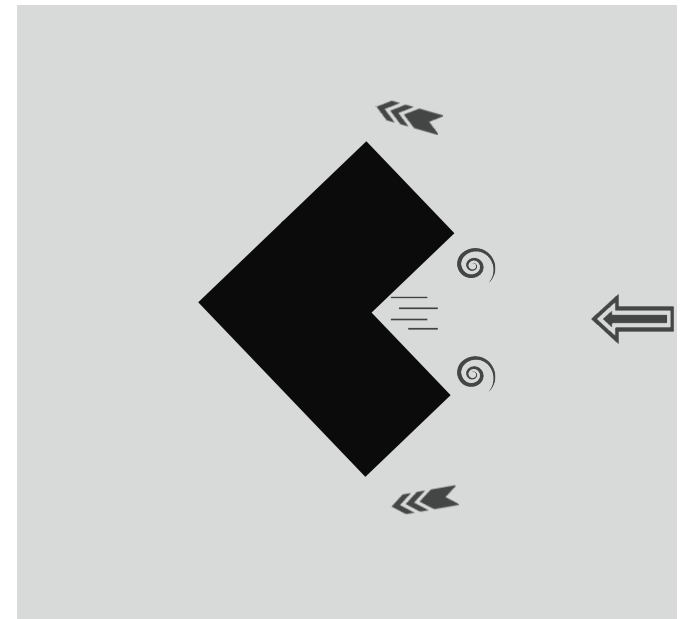
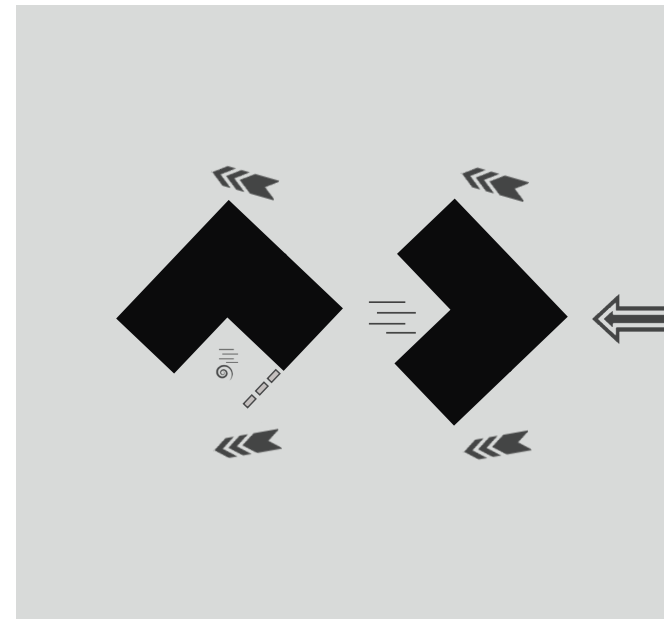
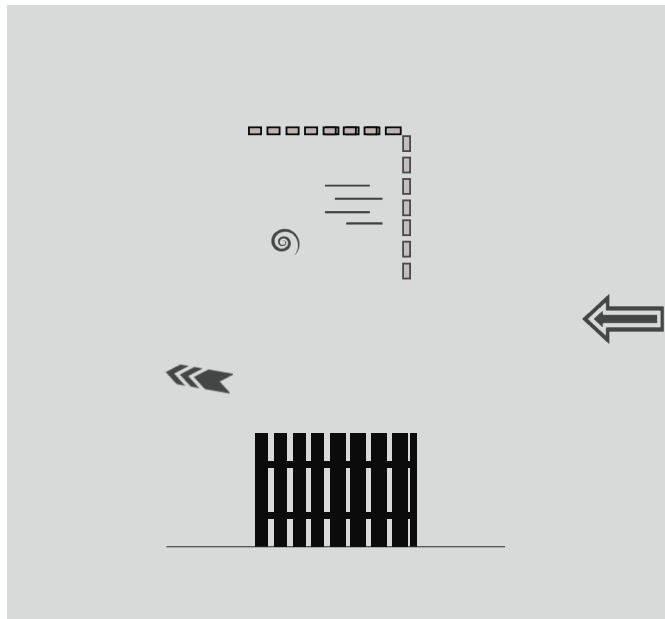
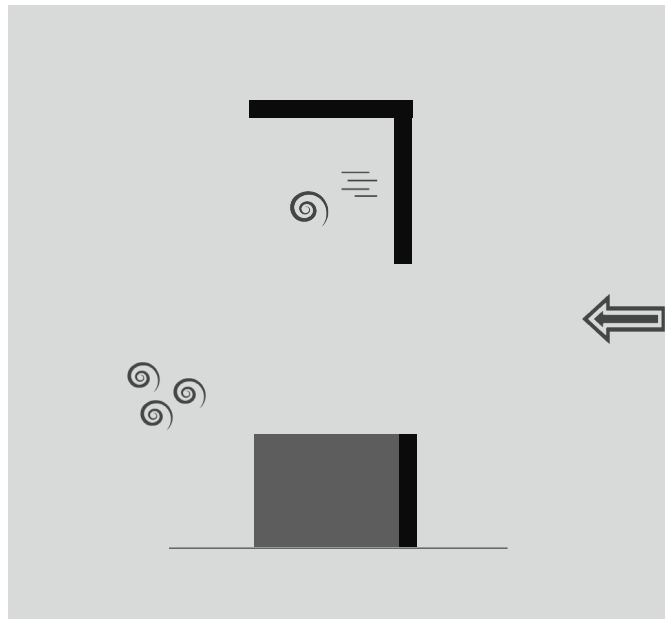


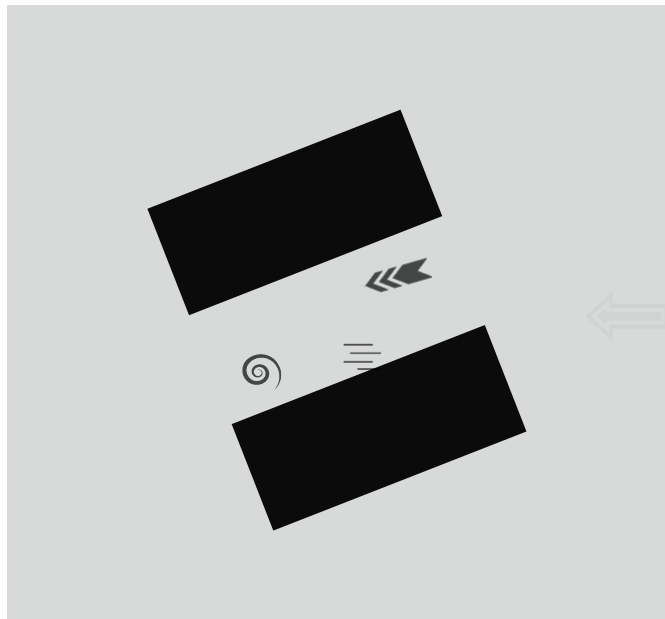
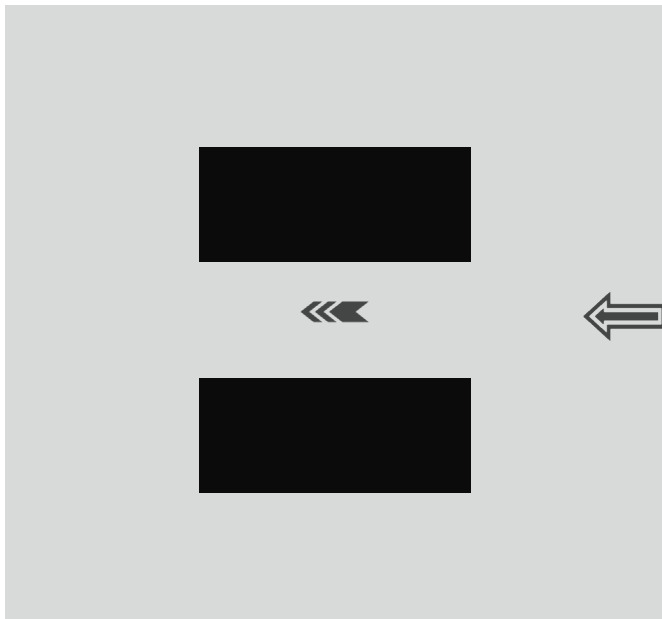
The wind from the southwest splits and flows linearly along the facades. At the middle part of the building, the smoke accelerates to a high loop and along the far part the speed increases. On the opposite side, a calm area emerges, small vortices appear some distance from the facade.

WIND TUNNEL EXPERIMENTS









FILM
The film illustrates sequences
of the observed wind fluctua-
tions, both in the environment
and in the wind tunnel.



SUMMARY

In the project, the context has been the driving force, leading me forward in an iterative and exploratory process. My aim has been to use the context as an anchor to showcase and develop an understanding of the harsh weather situation in the archipelago. During the whole process the investigating steps were iterative outdoor visits and analogue experiments. Several steps have been taken, in the journey to find an intuitive knowledge of the winds movement and fluctuations. It is obvious that I have not captured the whole complexity of the movements in the situation with several volumes composed in groups, which is left to investigate in my thesis.

REFLECTIONS

It has been a privilege to study the first part of the subject, for the upcoming Master thesis next semester. To studie my site in advance, and in the end be given the opportunity to observe it for several seasons. I discovered that the chosen topic, wind, can be analyzed from many aspects and views. Which had been difficult to keep up with during the schedule of this master studio. But some time into the semester, I decided to just do the things I find inspiring and fun. I mostly opted out of digital tools and have indulged in working analog. The mainly digital part, where I explored and started learning, was created in, for me,a new film editing program. The ambition with the film is to convey in my best way what I have experienced during my process.

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THANK YOU