

# Presentation Team 4

The future of Swedish cottage



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# 1 Concept

Our goal for this contribution is to show of our local community, this by merging local sustainable innovations with tradition. Our goal is to demonstrate that eco-friendly solutions can coexist harmoniously with the classic and familiar.

The design is inspired by the Swedish cottage – timeless and simple, yet with carefully crafted details that create an aesthetically pleasing whole.



Picture 1.1 First drawing of the visulation.

The houses will feature vertical wooden cladding and a grass roof, reflecting traditional Swedish architecture. To balance this classic style, we have chosen a mono-pitched roof, adding a modern touch to the design.

To further highlight the craftsmanship, we will incorporate ornamental woodwork (snickarglädje) around the windows and the swing—a detail often overlooked in modern construction. Since the houses will be placed in a museum, exhibiting historic buildings, we want them to blend naturally into the environment while still offering something unique. The cladding, colour and details will be chosen by availability and hopefully be recycled from other projects.



The colour scheme will depend on the materials available, but the idea is to have a solid base colour for the houses, with contrasting colours for details such as windows and decorative woodwork, creating vibrancy and character.

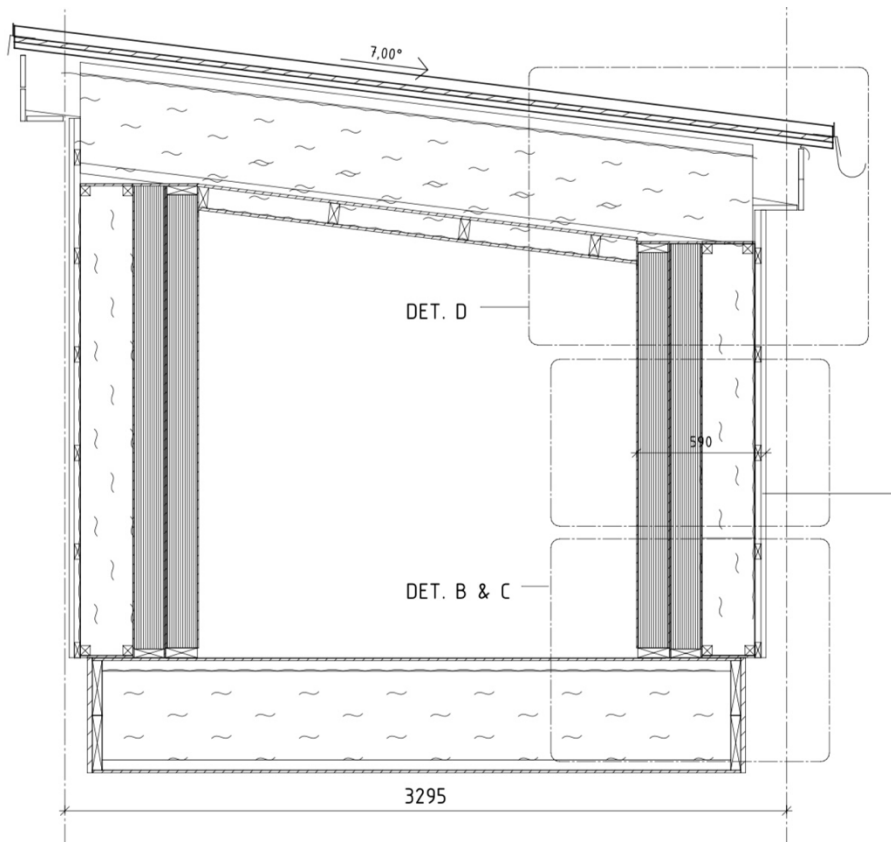
To make the space more inviting for all ages, we have included a swing, encouraging children to engage with the site and become curious about the building. Additionally, we will have a small staircase or ramp leading up to one of the windows, sparking curiosity and inviting visitors to take a closer look inside. This way, the houses will be accessible and interesting for both young and old visitors alike

## 1.1 Visualization



*Picture 1.2 and 1.3 As stated above, colours, cladding and details will be chosen by availability and are not yet determined.*

## 2 Construction details



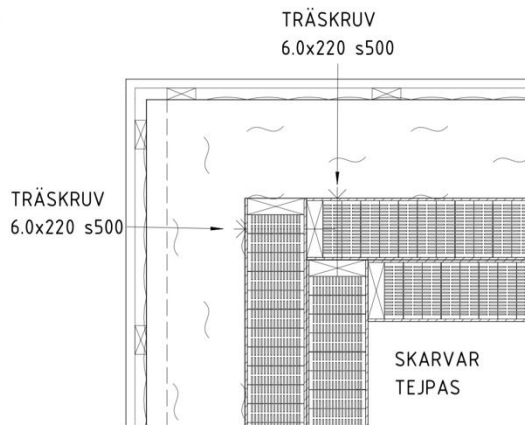
### 2.1 The Walls

The load-bearing wall structure will consist of Isotimber, a material made from sawed timber beams that are pressed together to create air pockets within an otherwise solid wood structure. On the outside of these beams, plywood sheets are glued under pressure, adding extra stability.



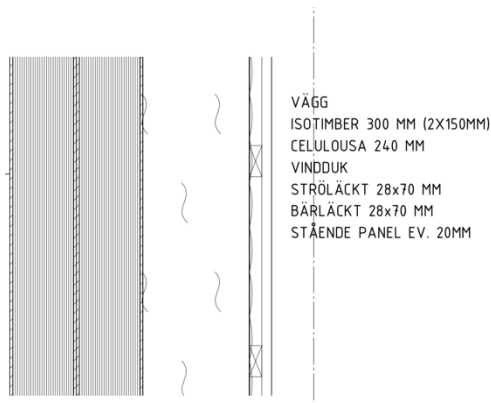
Picture 2.1 Isotimber wall system (<https://isotimber.se/stomssystem/>)

In our construction, we will use two layers of 150 mm Isotimber, arranged in an overlapping pattern to ensure that the joints are positioned at different locations. This helps to minimize thermal bridges and improve insulation. Additionally, to guarantee that the structure is completely airtight, all joints will be taped on both layers of Isotimber.



On the outside of the Isotimber layers, an insulation layer of cellulose sheets with a total thickness of 145 + 95mm will be applied. Following this, battens, counter-battens, and facade cladding will be installed.

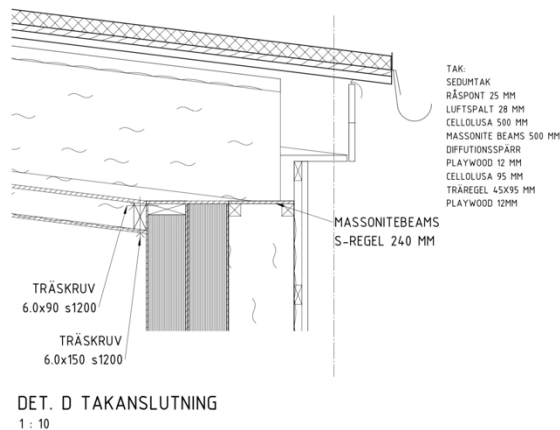
To attach the facade cladding without placing studs in the insulation layer, we have chosen to use 250 mm Masonite Beams at both the top and bottom of the structure, ensuring the necessary rigidity. If the cladding still shows any flex, thin 10 mm spacers will be installed in select locations between the Isotimber and the counter-battens to provide additional support.



## 2.2 The Roof

The roof installation will be carried out using a crane after the walls are completed. To ensure easy and precise placement of the roof, we will install a 45x95 mm frame on the underside of the roof. The frame will match the interior of the wall to facilitate the straight placement of the roof when it is lowered onto the walls. The roof will be secured

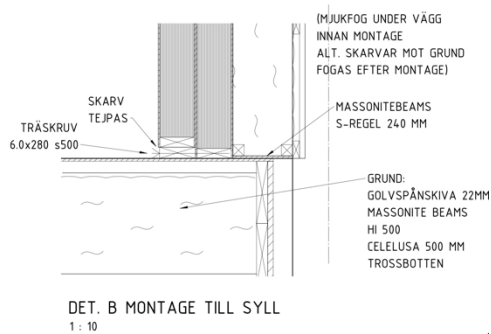
with screws that go into the isotimber wall through the frame. The transition between the wall and roof will be taped, and 95 mm insulation will be installed inside the frame.



The roof will be constructed with 500 mm masonite beams, placed with a c/c distance of 120 mm. The space between the beams will be filled with loose cellulose insulation to optimize thermal performance. A ventilation gap will be created above the beams, followed by a subroofboard. The outermost layer of the roof will consist of grass, placed on top of tar paper and a platon matt.

### 2.3 The floor

The foundation will consist of 500 mm Masonite-beams, loose cellulose insulation, and 22 mm chipboard flooring. Unfortunately, the technical solutions for the foundation are not yet fully designed, as we only found out yesterday that Evia will no longer be sponsoring the competition. Hence, we had to change our design in all haste.



## 3 Recycling

### 3.1 During Ice box challenge

The structure of the passive house will be built using 2x150 mm Isotimber, a material that combines the natural properties of wood with energy efficiency. We have chosen to use reclaimed Isotimber, offcuts from their production, for our build. By repurposing leftover materials that would otherwise go to waste, we promote a more sustainable use of resources and minimize material waste.

For the facade of both houses, we aim to use reclaimed wooden cladding or planks, depending on what is available. This approach not only gives each building a unique character but also breathes new life into old materials.

When it comes to painting the houses, we plan to use surplus paint from hardware stores or construction sites, this will lead to reducing in waste while creating a naturally varied colour palette. Through this sustainable approach, we combine aesthetics with environmental responsibility.

### 3.2 After Ice box challenge

After the competition both the passive house and the BBR house will be part of "The Meadow", a new residential project focused on sustainability and self-sufficiency. The houses will serve as demonstration buildings, offering visitors somewhere to go inside, on-site to read up and see pictures of the project. The passive house may also be used as inspiration to the residential houses that will be built on-site.



## 4 The ICE

On the day the ICE is to be placed inside the houses, it will not go through an opening in a wall. We know that this was a requirement, but it will not be possible because of the weight of the Isotimber. We know we could have chosen another material. We decided that the usage of materials from our local community with shorter transportation emissions was more important to us than to get the ICE through the wall.

We hope the judges have the same priority as us.

Instead the ICE will be lifted in using a crane truck through the roof of both buildings.

When the time comes to remove the ice, a trained chainsaw operator will be on-site at Jamtli to cut open a section of the Isotimber wall, allowing the ice to be easily lifted out. After the competition, a door will be installed in the opening, enabling the building to be repurposed within "The Meadow" project.

In the BBR house, a designated opening will be pre-prepared in the structure, making it easy to cut open the wall to remove the ice. This opening will also serve as a doorway after the competition.

We have chosen this method of removal not only to ensure that the houses can be easily repurposed after the competition but also to create an engaging and memorable experience for visitors. By carrying out the removal of the ice in a visually striking way, we aim to attract a larger audience and generate interest during the official opening on June 6th.

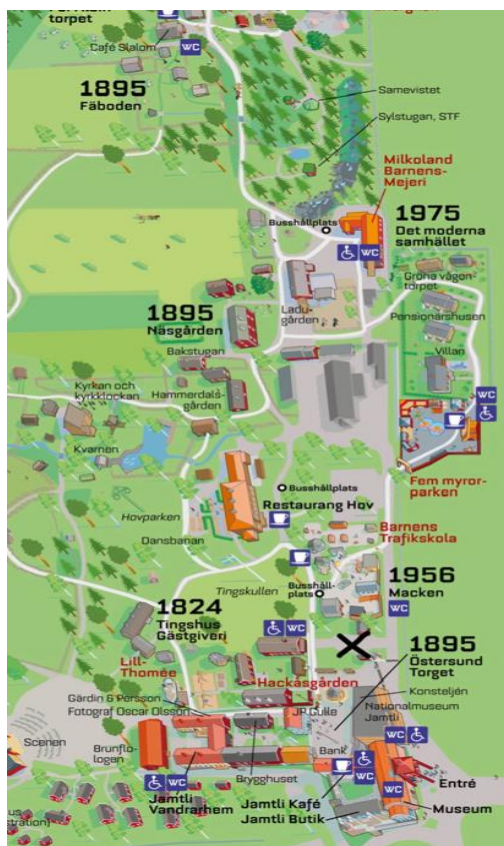
## 5 Location of the Houses

The houses will be placed at Jamtli Museum, located in central Östersund. Jamtli is a popular open-air and cultural history museum that attracts many visitors throughout the year. During spring, several smaller events take place, and on Sweden's National Day, a large celebration is held, drawing a significant audience.

The location of the houses has been strategically chosen near the entrance, along a well-trafficked pathway that all visitors will pass by. Additionally, the houses will be visible from outside the museum gates, allowing even those who do not enter the museum to catch a glimpse. This ensures maximum exposure to a broad audience.

To provide visitors with a deeper understanding of the project, we will be on-site during major events and on selected weekends to answer questions and share more information. When we are not present, informational signs and QR codes will be available for visitors to scan and access additional details about the houses, their construction, and the sustainability principles behind the project.

The exact location of the houses is shown on the map below of the Jamtli area.



Picture 5.0 The black cross marks the gravel area

where the buildings will be placed.

## 6 Visualization through Additive Manufacturing

In the Ice Box Challenge project, we have utilized additive manufacturing (3D printing) to create a 1:20 scale model of the house using an Original Prusa MK4. The model is used to provide a clear visual representation of the building's design and how the ice block is positioned inside. By 3D printing the model, we can pedagogically demonstrate the construction and its function, which is especially useful for demonstrations and educational purposes. See picture 6.1 and 6.2.

During the spring market at Jamtli on May 24-25, 2025, we will showcase the model to children and visitors. The goal is to explain in an engaging and interactive way how the building's design affects insulation and, consequently, the melting process of the ice block. By allowing children to see and touch the model, a better understanding of energy-efficient building solutions is created.

This model is an example of how 3D printing can be used to visualize and communicate knowledge about energy efficiency in a concrete and engaging way.



*Picture 6.1 and 6.2: The pictures show what the house looks like after additive manufacturing and decoration*

## 7 Assembly and dismantling

### 7.1 Assembly

The Passive House and the BBR House will largely be prefabricated at Isotimber's facility outside Östersund. A total of eight separate walls, two foundations, and two roofs for both houses will be transported from Isotimber's facility and assembled at Jamtli. A crane at Jamtli will assist with the assembly of both houses. The foundation will first be assembled on four piers. Then the walls will be assembled, and attachments and sealings will be done according to Isotimber's instructions for the Passive House and the AMA specifications for the BBR House. Before the roof is lifted into place the ice will be placed in the center of each house. Finally, the roof will be lifted into place, and internal attachments and sealings will be completed. The window on the gable will be installed last and will be opened one month later, after the competition is finished.

### 7.2 Dismantling

After the competition is completed the Passive House and the BBR House will be carefully dismantled in the same order that the assembly was carried out. Once the competition is finished, the window on the gable will be removed, and an opening for a door will be cut out, partly to make it easier to access the house for measuring the ice's melting and because a door will be needed when the houses are moved to The Meadows area. After the walls, foundation, and roof are dismantled, the houses will be transported for reuse in The Meadows project on Frösön.

## 8 Buildability

By combining prefabrication with carefully developed construction drawings, construction details, and efficient assembly methods, we have optimized the buildability of both houses and ensured that they can be exhibited at Jamtli at the beginning of May with minimal risk of delays or issues during the construction process. Two members of the group have previously worked as carpenters and possess valuable practical knowledge that we will greatly benefit from when constructing the houses. By prefabricating large parts of the work at Isotimber's facilities, we can ensure that both houses are built under controlled conditions. In the event of any questions during the construction of the Passive House, we are confident in being able to consult Isotimber's engineers if issues arise. Financially, we do not have a fixed budget to adhere to, but the project's building materials are provided partly by Icebox Challenge sponsors and partly from companies we have personally contacted.



## 9 Transportation

An important aspect for us from the beginning has been to minimize material transportation distances. One reason we chose to construct the houses using Isotimber's system is that it is a local company located in Östersund. From their factory to Jamtli, where the houses will be displayed, it is only 3.7 km. After the competition is finished, both houses will be transported to Frösön, which is only 4.5 km away. The transportation emissions for the other materials are accounted for in our calculations.