

ON TRACK

Repurposing Of The Inland Track

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TABLE OF CONTENTS

1 BACKGROUND

1.1 Abstract	5
1.2 The Inland Track	7
1.3 Depopulation and its effects	11
1.4 Pictures from excursion on Inlandsbanan	12
1.4 Dairy from excursion on Inlandsbanan	20
1.5 Model studies from preparation course	22
1.6 Physical conditions	27
1.7 Conclusions	29
1.8 Program	29

2 PROGRAM

2.1 Mobile Hotel	31
2.2 Mobile Community House	51
2.3 Mobile Country Store	63

3 REFLECTIONS

3.1 Reflections	71
3.2 References	72



1.1 ABSTRACT

Population on the rural countryside of Sweden is steadily decreasing, and will continue to decrease in the coming decades. The decrease is greatest among young adults and is leading to a substantially higher maintenance burden for public institutions (Karlsson, 2012). The population decrease also effectively reduce the communities' capability of sustaining everything from public institutions to businesses and social meeting places.

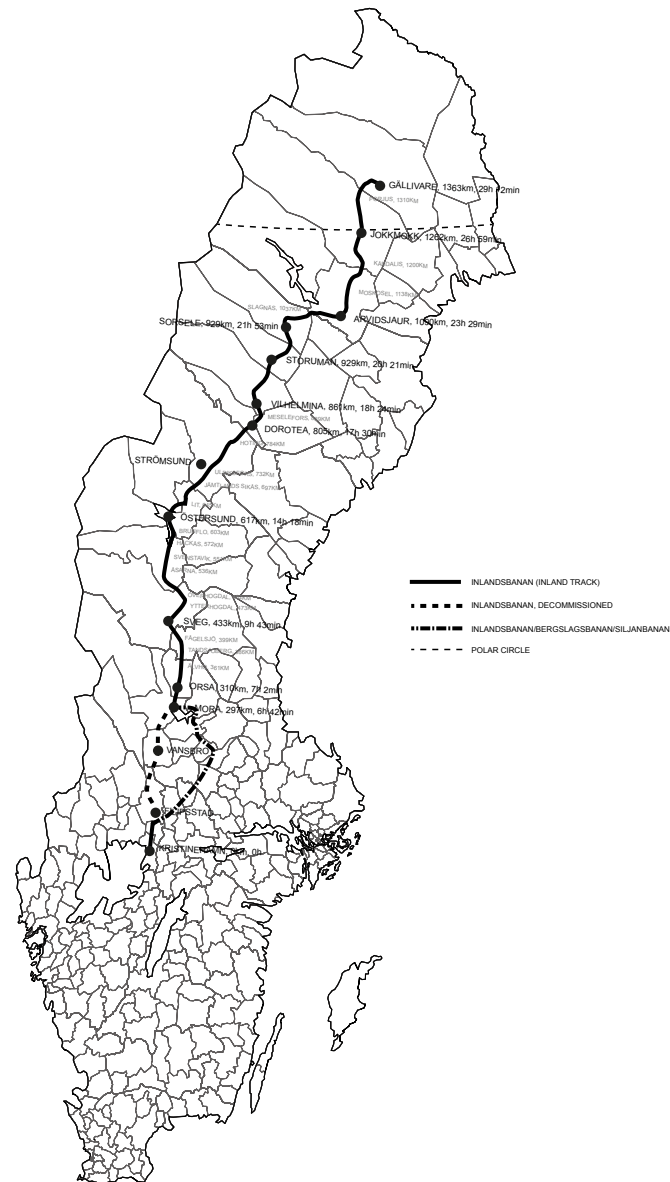
The issue is especially relevant to many communities in inland Norrland, along Inlandsbanan (The Inland Track), where many communities suffer from decreasing- and aging population as well as a low median income (see diagrams on p10-11). This thesis seeks a way to use Inlandsbanan as an infrastructure for a new kind of mobile architecture, making it possible for communities to share benefits and maintenance burden for a variety of programs.

The railway offers a possibility of further linking municipalities and communities together by means of shared institutions and businesses, increasing both financial support, accessibility and quality of the selected programs.

The chosen programs seeks to develop a selection of topics related to the issue at hand, including: increasing and supporting the tourism industry, supporting local production and processing of raw materials and produce, sharing public institutions between municipalities, providing local meeting places.

The end result of the thesis is a design proposal which tries to give an answer to how different programs can be translated into a mobile architecture on rail-cars, granting good qualities to rural life despite an ongoing depopulation and perhaps even help to counteract it.

1 BACKGROUND



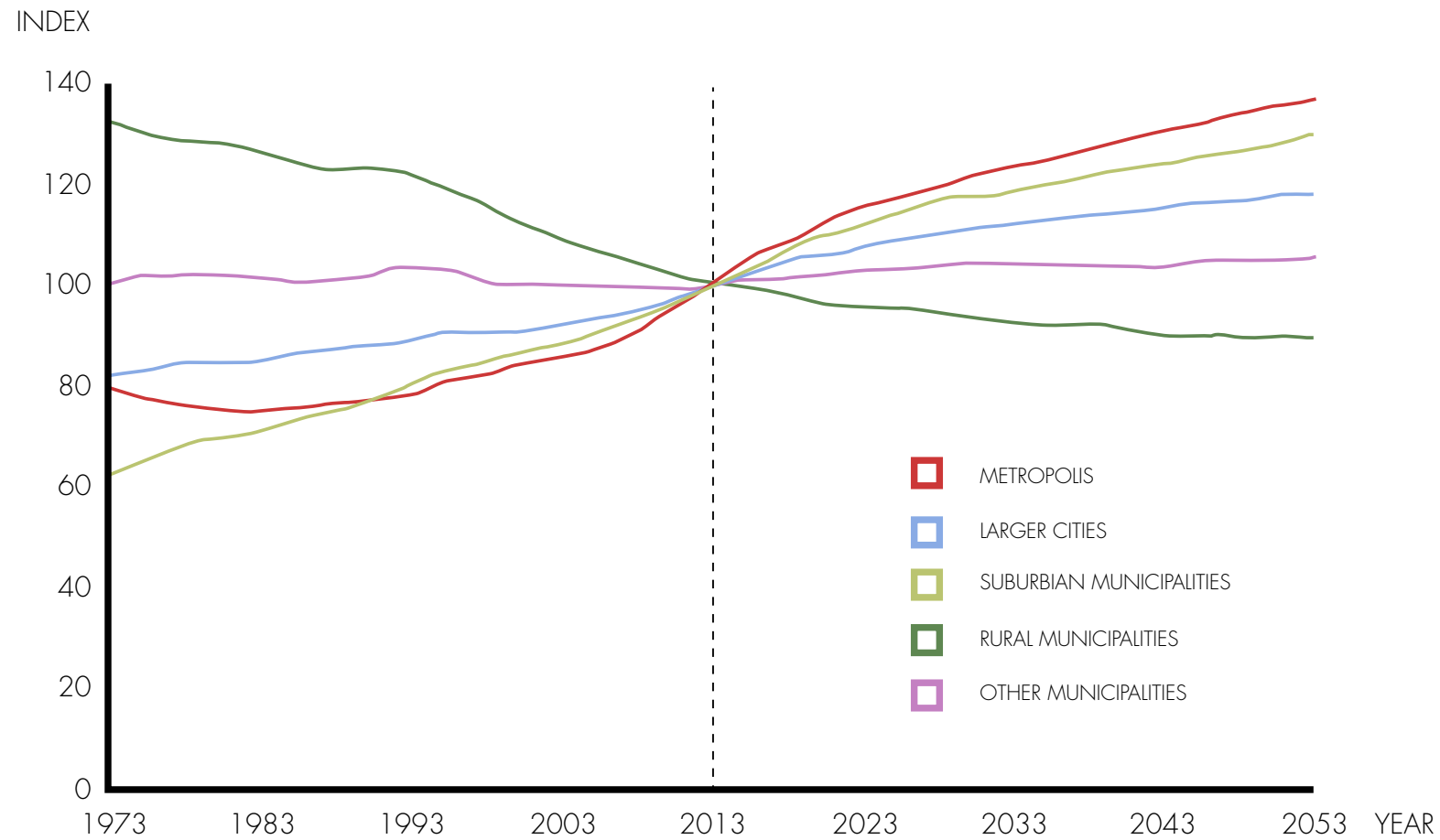
1.2 THE INLAND TRACK

The Inland Track travels a vast distance from Kristinehamn in the south to Gällivare in the north, passing through the majority of inland Norrland and a considerable stretch of Sweden. The track was created by the state by buying several private railways and building additional tracks. It was primarily built in the early 20th century to strengthen the business and industry of the inland and stood finished in 1937. (Nationalencyklopedin, Inlandsbanan)

The track was unfortunately built with a low technical standard, lacking the capacity to assume the position as a main train-line (Nationalencyklopedin, Inlandsbanan). Both the freight and passenger traffic declined during the latter part of the 20th century and was eventually under the threat of closure. The connecting track Sveg-Hede was closed as early as 1966, barely 30 years after the opening, and from the latter parts of the eighties the entire track was threaten by closure (Järnväg.net 2016). The southernmost part of the track, between Filipstad and Mora, was decommissioned in 1985 and is currently in a state of disrepair (Nationalencyklopedin, Inlandsbanan).

From 1993 the operation and administration of the track was taken over from the state by surrounding municipalities, forming the municipality owned company Inlandsbanan AB, while the ownership of the track is still with the state (Nationalencyklopedin, Inlandsbanan). The passenger traffic between Mora-Östersund was definitively closed in 1994 with the exception of tourist trains in the summertime. In latter years limited passenger traffic called "snötåget" (the snow train) runs in wintertime transporting people to the ski slopes of Vemdalen (Järnväg.net 2016).

Trains still operate between Mora and Gällivare focusing mainly on freight traffic transporting peat, lime and timber as well as tourist trains in the summertime (Nationalencyklopedin, Inlandsbanan). Many of the smaller stations along the track are decommissioned and transformed into private homes. The track is not electrified and runs with diesel locomotives and motorwagons. Currently the passenger traffic runs exclusively with motor-wagons of the Y1 model. (Järnväg.net 2016)



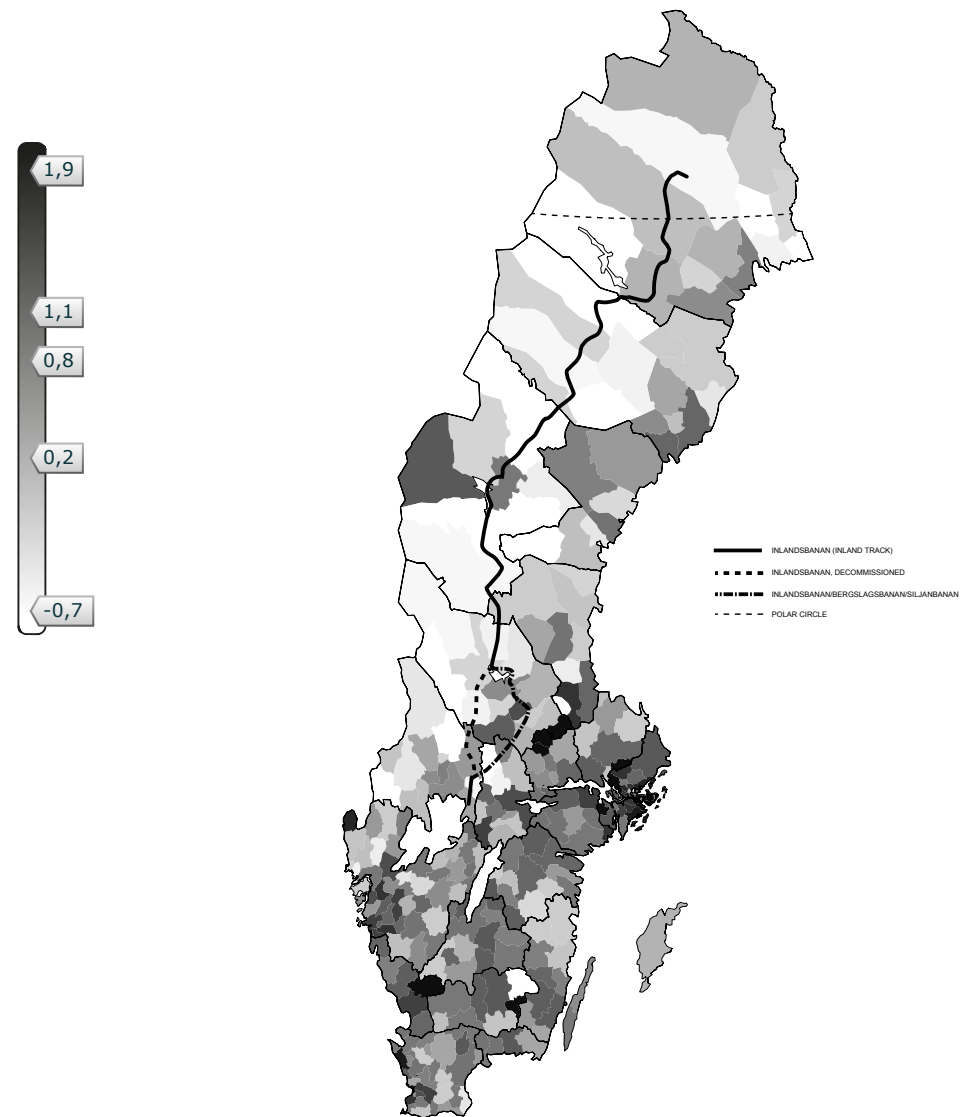
DEVELOPMENT OF POPULATION (in sweden). Actual development 1973-2013 and projections 2014-2053 for different types of municipalities (Karlsson, 2015).

1.3 DEPOPULATION AND ITS EFFECTS

As previously mentioned depopulation most often leads to decline and closure of both municipal institutions and businesses. This leads to the disappearance of local meeting, impairing the social life of the community.

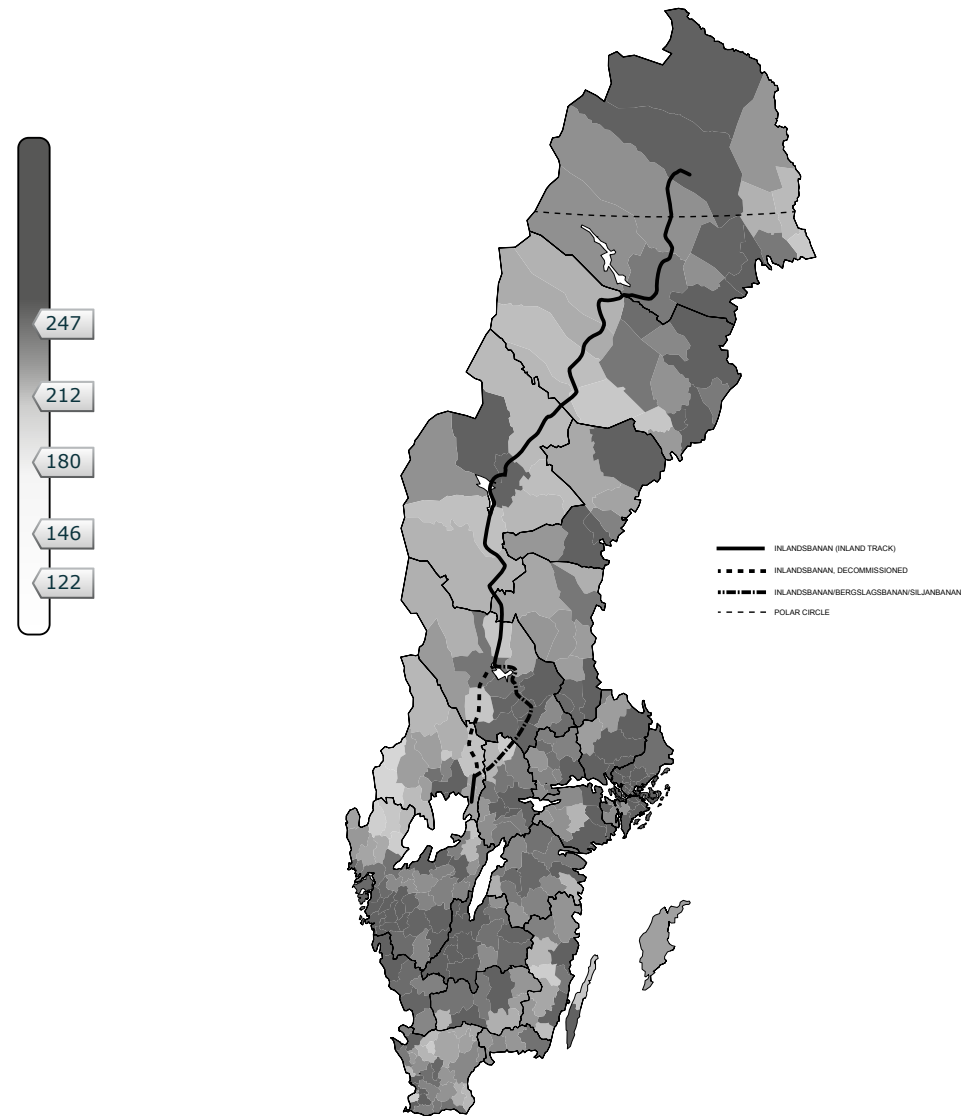
The population on the rural countryside is not only decreasing but also aging due to the fact that it is primarily younger people who move away (SCB statistikatlas, 2015). Studies also show that residents on the countryside suffers to a greater extent from a number of welfare problems, than larger cities. Most of all they lack sufficient employment possibilities (Johansson, 2008).

Some exceptions can be seen when it comes to depopulation and economic strength. The municipalities of Åre and Östersund as well as the neighbouring municipality of Krokom seems to be less affected by depopulation when studying diagrams showing population change and median income. These municipalities has a high level of tourism and studies have showed that communities with high levels of tourism often have a high level of communal services, despite a relatively low level of population (Andersson, 2014).



POPULATION CHANGE BY MUNICIPALITY, 2014 (SCB statistikatlas, 2015)

Many of the municipalities surrounding the track is decreasing in population. The major exceptions being the municipalities of Åre and Östersund.



MEDIAN INCOME, 2013 (SCB statistikatlas, 2015)

Many municipalities surrounding the track has a lower median income compared to the rest of the country.

1.4 PICTURES FROM EXCURSION ON INLANDSBANAN 2015



COFFEE AND FLATBREAD IN JÄMTLANDS SIKÅS

The tourist trains routinely stop along the track where locals are selling food and beverages.



RAILCAR Y1

The passenger traffic on the track runs mainly with these rail-cars, built between 1979-1981. The traffic is a tourist attraction in itself and not primarily a means of transportation.



JÄMTLANDS-SIKÅS STATION

Many stations along the track are decommissioned and used as private houses.



MESELEFORS CAMPSITE BY ÅNGERMANÄLVEN

Ångermanälven is one of several rivers crossing the inland track, most of them regulated. Ångermanälven has several power plants along the way towards the Baltic sea.



NORTH OF VILHELMINA



NORRA LÅNGÖN, FROM TRAIN WINDOW.



JÄMTLANDS-SIKÅS STATION.



SILJANSFORS, DECOMISSIONED.

1.5 DIARY FROM EXCURSION ON INLANDSBANAN 2015

In Swedish

06:55 Tåget avgår från Östersund. Vi är kanske 30-40 resenärer i ett tåg som tar ca 60st. Tåget är motorvagn som drivs med diesel, det brummar! Vi får information om diverse matstopp längs vägen. Korsar Indalsälven, vackert.

08:15 Jämtlands Sikås, första stoppet. Två pensionärer säljer kaffe och tunnbröd i storstugan på nått gammalt byhus som ser ut att vara från början av förra seklet. Ett förmodat barnbarn hänger i en fåtölj. Tågstationen är numera privatbostad och skyltar hänger som avbeder besökare från tomten. En tjej i 3-4års åldern leker kurragömma med mig bakom stolsryggen. Hon har orange lockigt hår, ser ut som Birk. Vi åker förbi björkar, granar och myrar.

09:30 Hoting. Timmerterminal. Här samlas timer som sedan fraktas till sågverk längs med kusten. Dom har hittat gamla gravar och en 3500år gammal skida. I Hoting bor det ca 900 innevånare och Inlandsbanan kom hit 1914. Tåget stannar, en dagisgrupp ska på. Dagisgruppen beståra av en salig blandning barn i olika åldrar och etniciteter. Efter 3-400 meter hoppar dom av, framme vid dagis. Vi kör förbi ett servicefordon från InfraNord. Inlandsbanan kör förutom turister även torv, kalk och timmer.

09:55 Norra Långön, vacker utsikt. Vi kör på en ö, med vatten på båda sidor om spåret

10:09 Dorothea. Här tillverkar dom husvagnen Polar och har ett husvagnsmuseum. Orten hette tidigare Bergvattnet men bytte namn samtidigt som Vilhelmina och Frederika när dessa ville skapa ett eget stift. Namnen kommer från dåvarande drottning och prinsessor.

10:20 Vi åker förbi ett gäng bärplockare i björkskogen.

10:30 Meselefors Camping vid Ångermanälven. Här ifrån kom Jon-Erik Öst som var en känd riksspelman. Han är numera begravd i Vilhelmina.

11:00 Strax norr om Vilhelmina. Matstopp vid Gårdsbutiken, en ganska oansenlig prefabricerad timmerstuga på en ganska oansenlig plats. Dom säljer lunchmat, lokala

matvaror och souvenirer. Tåget stannar vid en enkel perrong av sträckmetall.

12:09 Någonstans mellan Vilhelmina och Storuman. Landskapet varierar mellan björkskog och tallar, myrar och steniga backar. Flacka berg i fjärran, kalhyggen ibland.

12:16 Vojmån. Här ligger en populär flugfiskecamping.

12:40 Strax i Storuman, passerar Ume älv. Älven är reglerad och fåran ser ut lite som ett månlandskap eftersom vattnet leds i stora turbiner under jord. Ser ut som ett sår av sten genom landskapet.

12:55 Storuman. Här kliver jag av. Spenderar 2,5 timmar i Storuman, går till apoteket och äter på 3ans gatukök vid centralstationen.

15:27 Åker från Storuman söderut mot Östersund.

15:39 Vinningsberg. Ytterligare en omlastningscentral för timmer.

17:58 Dorothea. Vagnen är skällhet, det finns ingen air-condition. Har sett alla orter och landskap tidigare, guiden är sämre än förra resan och jag börjar tröttna på att sitta på tåget...

21:10 Tillbaka i Östersund. Konduktören frågar passagerarna om vi har nånstans att bo i Östersund i natt och försäkrar sig om att vi vet vägen dit. Jag tar bilen tillbaka till Kaxås, spelar hög volym i solnedgången och känner mig fri...

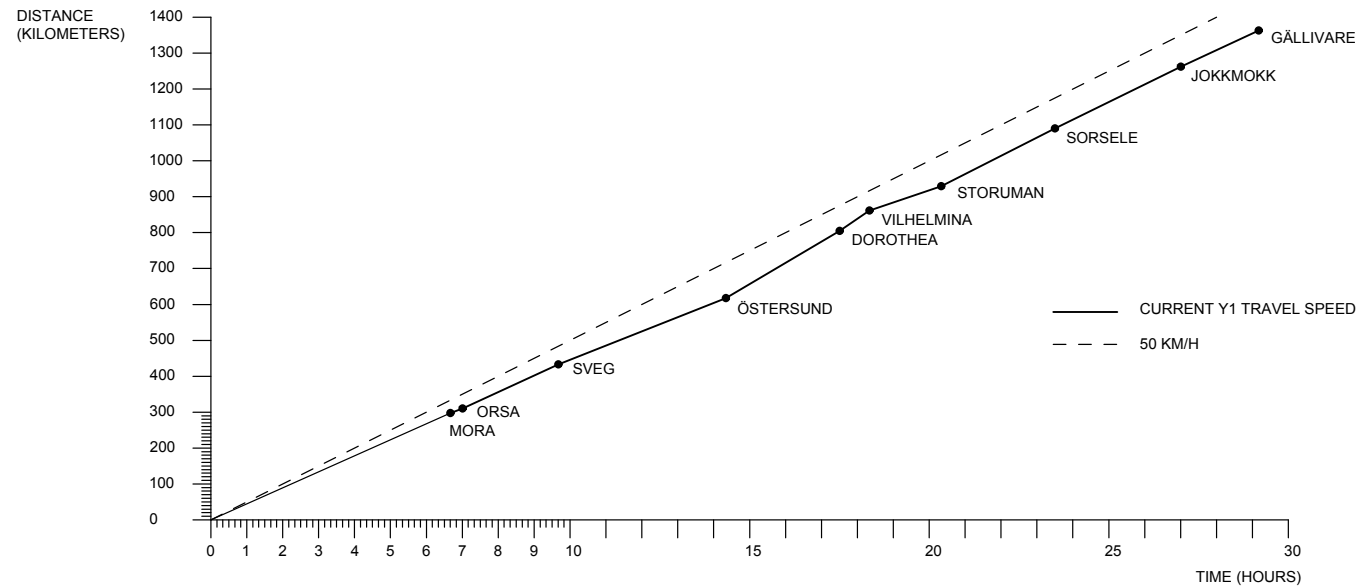
1.6 MODEL STUDIES FROM PREPARATION COURSE 2015





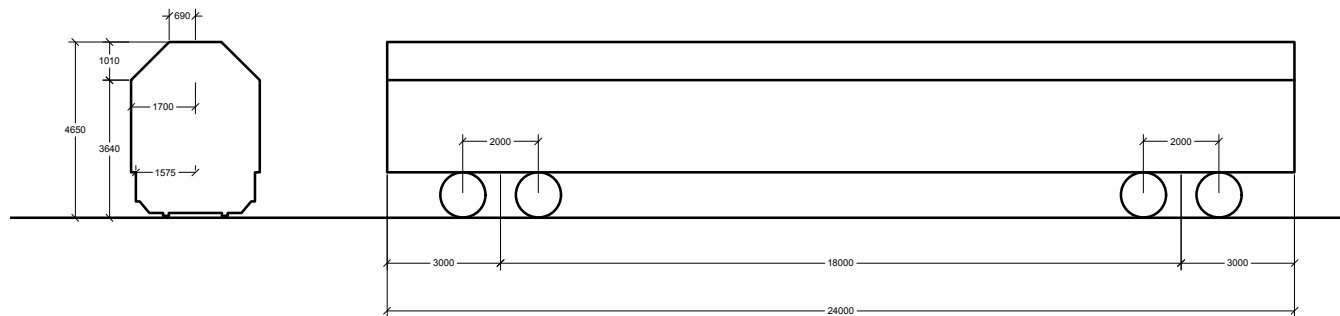






TRAVEL SPEED AND DISTANCE

The current passenger route (run with motor wagon Y1) travels at an average speed of just under 50km/h, with various stops along the way included (Inlandsbanan AB Tidtabell, 2015)



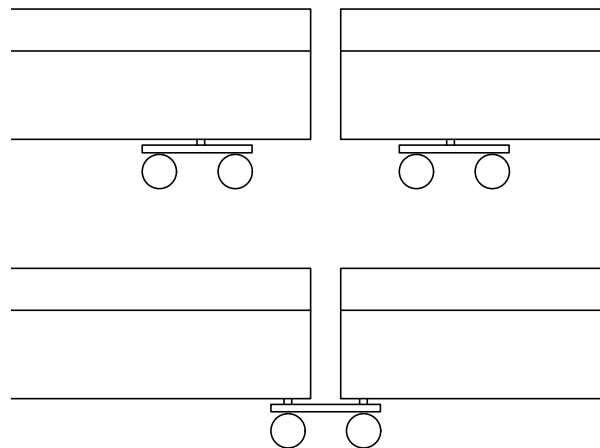
LOADING PROFILE AND STANDARD CARRIAGE LENGTH

The Inland Track can be operated by vehicles fitting within loading profile A, with standard carriage length. Carriages up to 27,7m are prevalent in Sweden (Inlandsbanan AB, 2015).

1.7 PHYSICAL CONDITIONS

The site, being a railway track, has certain conditions and limitations that needs to be considered. Most parts of the track is currently not electrified and runs with diesel locomotives and motor wagons. Attempts to run the trains with rapeseed oil was made in 2015 and the results are yet to come (Inlandsbanan AB Årsredovisning, 2015). The track is not adapted for high speed trains and the standard motor wagon on the track, the Y1, has a maximum speed of 130km/h, but travels at an average speed of 50km/h including stops. The track is a single track and as used mainly by freight traffic and tourist trains during the summer season. Stations do not always have platforms and accessing the train is made possible by steel grate stairs by the track or integrated steps on the rail-car. The track can take an axle load of maximum 22,5t. (Inlandsbanan AB, 2015)

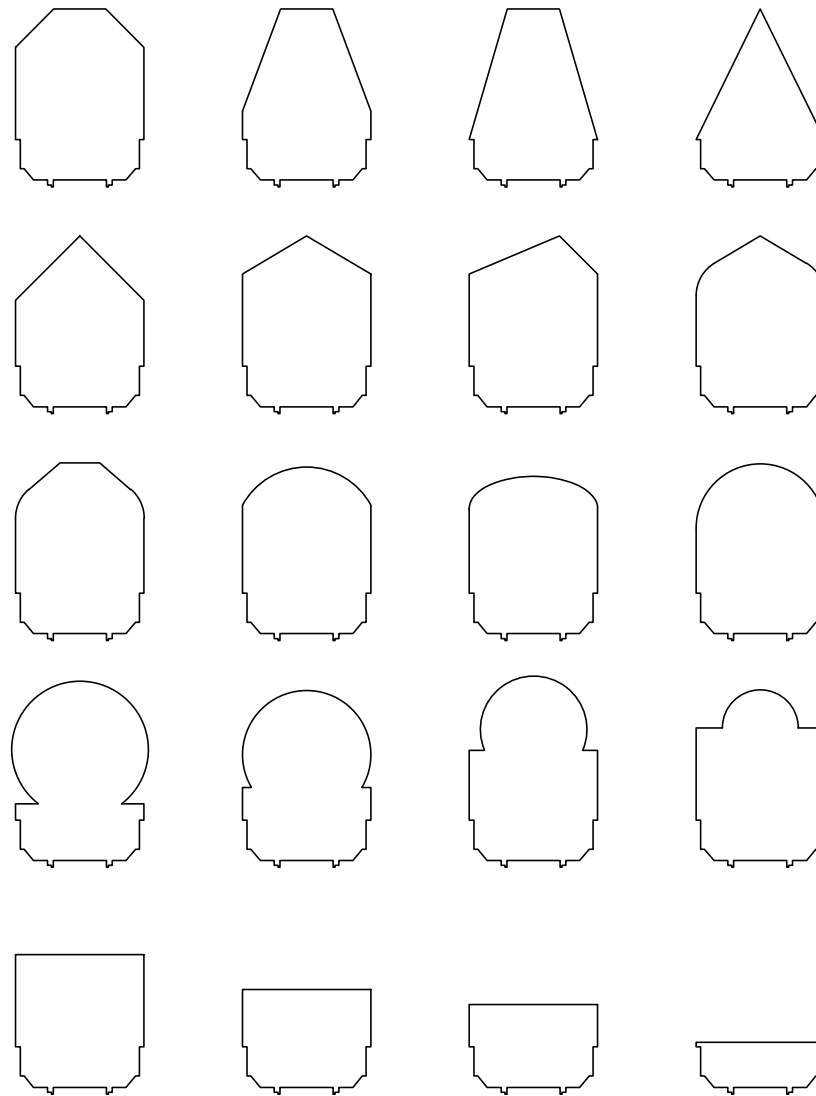
The drawings and models of the project will mainly be displayed in scale 1:45 (1:90 in this booklet), which is one of the standard scales for model trains enabling usage of model train standard components.



BOOGIES 1:200

Top: conventional bogie, easy to connect and reconnect wagons, sharper curve radius.

Bottom: Jacobs bogie, fewer bogies decreases the cost.



Sections 1:200 Typographic studies of train sections possible within the limits of loading profile A.

1.8 CONCLUSIONS

This project aims to hypothesize the idea to use the Inland Track as a new kind of infrastructure which may greatly benefit communities in inland Norrland. Some areas of usage has been identified as particularly interesting as they respond to challenges which many communities in the area face. The area struggles to with problems like depopulation, aging population, lack of work opportunities, lack of local revenue from raw materials, increasing costs for maintaining communal services etc. These areas of use include:

- Increasing and supporting the tourism industry.
- Supporting local production and processing of raw materials and produce.
- Lowering maintenance burden of public institutions
- Providing local meeting places.
- Providing local cultural venues.

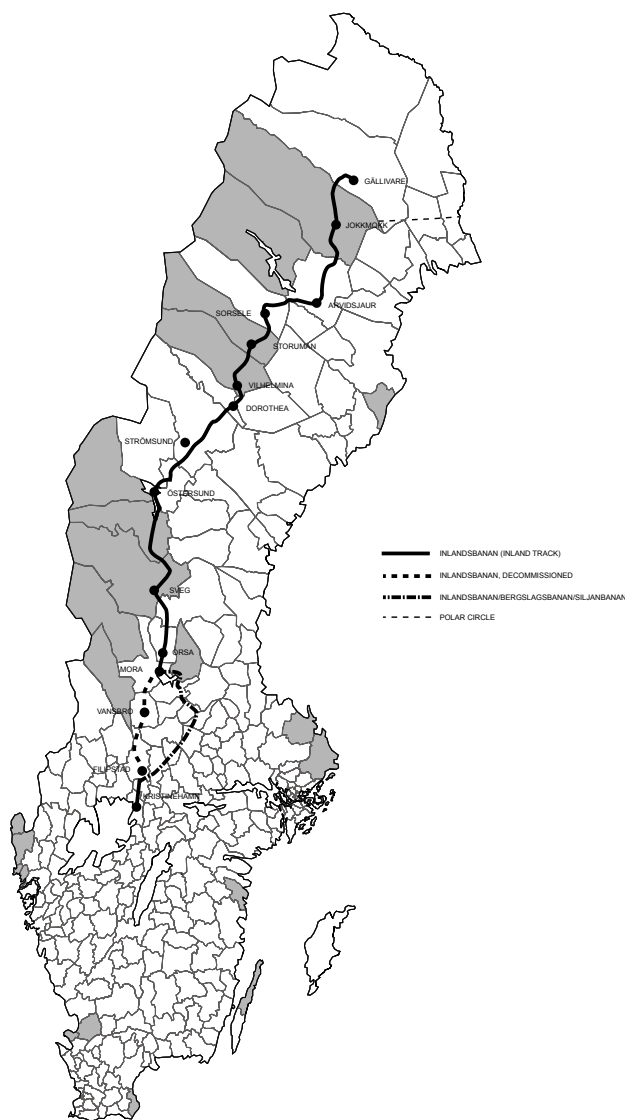
The project aims to create a new public infrastructure and strengthen participation and inclusion in a local and global context, possibly upgrading the perception of the northern inland communities and the inland track.

1.9 PROGRAM

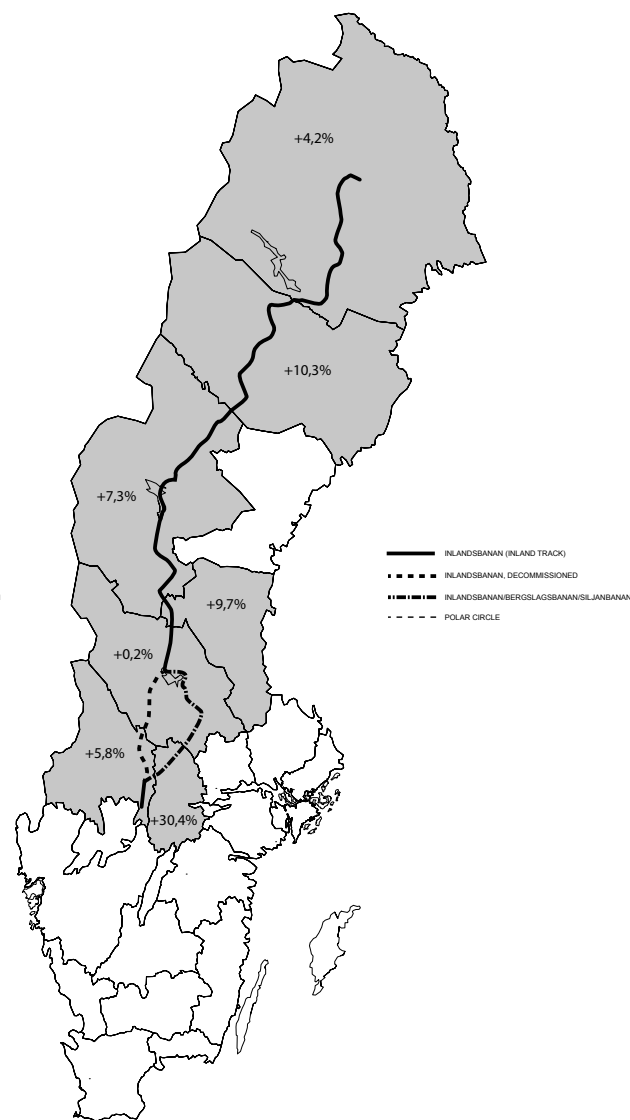
The programs have been selected from a wide spectra of proposals all answering in some way to the stated areas of use. The programs have been selected on the basis of how well they correspond to the these criteria, but also how interesting I as the author think they are as an architectural project.

The chosen programs are:

- A Mobile Hotel
- A Mobile Country Store
- A Mobile Community House



Tourism industry municipalities (SCB
statistikatlas, 2015)



Development of total accommodation revenue per region during June-Aug 2015, with %-change from 2014, at Hotels, Holiday villages and Youth hostels. (Tillväxtverket, 2015)

2.1 MOBILE HOTEL

The inland track stretches a vast distance and offers some incredible vistas and outdoor experiences along the way. Tourist trains runs in the summertime, focusing more on the experience of traveling the track, than on fast transportation. The hotel train is intended as a further development of this theme, bringing both revenue and work opportunities to communities along the track.

The inland track is currently being used for two economic purposes: Cargo trains and tourist trains. The tourism industry is becoming increasingly important in Norrland and several municipalities along the track are labelled as Tourism municipalities by SCB (Central Bureau of Statistics). The revenue from tourism is increasing in the region and the communities able to profit from tourism is the communities that seems to be most prosperous. Studies show that municipalities with a high level of tourism also have high level of communal services. The hotel train is intended to increase working opportunities and revenues within the region as well as providing an entirely new and unique way to experience the Inland Track.

Local processing of raw materials may serve an important role in our future society where the possibility of greatly increased transportation costs due to fuel shortage may be a possible scenario. Increased local refinement of raw materials can take many different shapes. For instance could tourism be an example of local refinement of the forest industry. (Johansson 2008, s262)

The mobile hotel travels along the track and stops at interesting destinations, much like a cruise ship, a land cruise along the inland of Norrland. A multitude of experiences is offered along the way, including sampling the local cuisine from local producers along the track as well as eating at world class restaurants such as Fäviken at Frösön, for example. Fantastic natural experiences can be found nearby including for example the world heritage of Laponia with the national parks of Sarek, Muddus, Padjelanta and Stora Sjöfallet where day trips can be made.

Providing the guests with food and cultural/natural experiences help to stimulate other sectors of the tourism such as the experience industry and culinary businesses.

The hotel vitalizes the local community by increasing tourism related jobs and serve as a meeting point when the hotel rolls in to town.

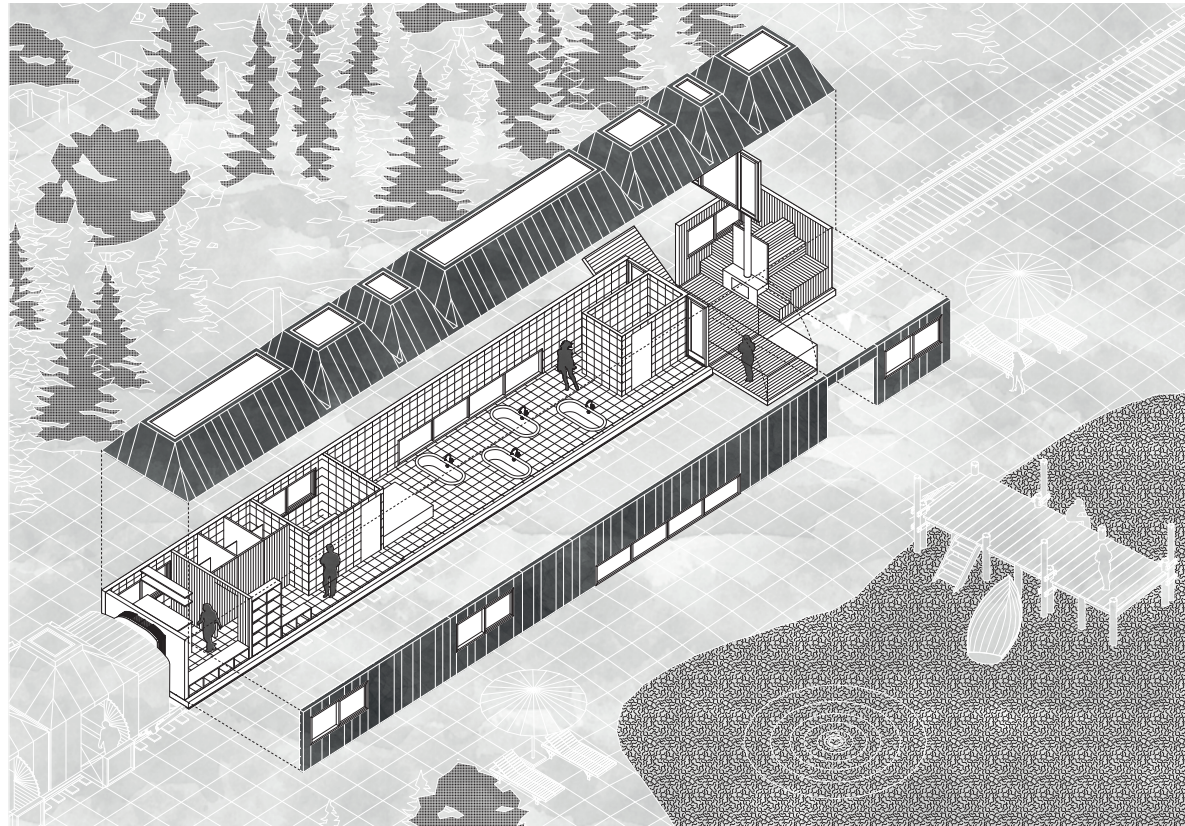
The hotel may offer its services to the locals as well, bringing an exclusive restaurant and a spa to town. In some ways the arrival of the hotel becomes a spectacle, similar to the circus coming to town. In many smaller cities the hotel is the main restaurant and bar not just for guests and tourists but for the local residents as well. In some ways a hotel symbolizes the city and sets it aside from smaller communities. The mobile hotel brings a part of the city and a part of the international community to villages that are too small to normally house similar premises.

The mobile hotel resembles the roof landscape of a city, clad with metal sheets of different materials; a rolling city traveling along track. The interior samples local materials such as pine and limestone to create an exclusive and contextual experience as well as benefiting local producers.

The hotel consists of several wagons, including a restaurant, bar/reception, hotel rooms, spa and a service wagon. I have chosen to focus on the spa wagon and the hotel rooms, to be able to develop them in a higher level of detail.

HOTEL SPA

In the Spa you can take a refreshing bath in one of the copper bathtubs while watching the pristine nature lining the track. Or perhaps sit in the sauna and cool off with a bath in a local lake or a drift of snow. The Spa also comes with a steam bath, a hamam stone, a massage room and a mini-bar. A balcony can be lowered, where you can grab a bit of fresh air and relax outside the sauna.



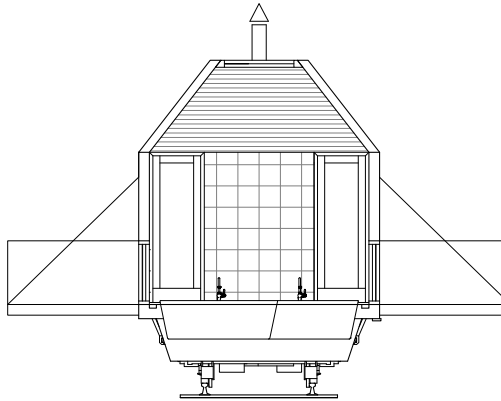
Axonometric perspective: Hotel spa



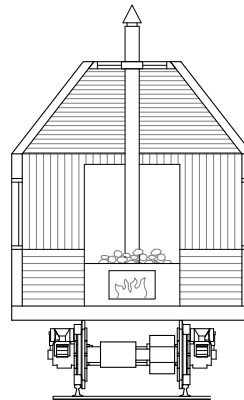
Exterior perspective: A balcony can be lowered from the spa to enable a pleasant cooling after the sauna or the steam bath. The exterior of the Spa is covered with tombak, a brass alloy with a high content of copper



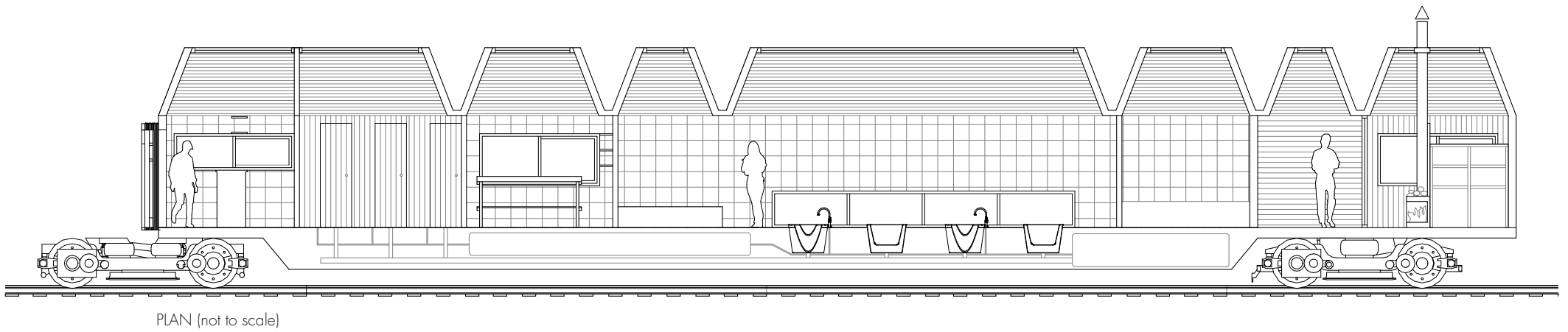
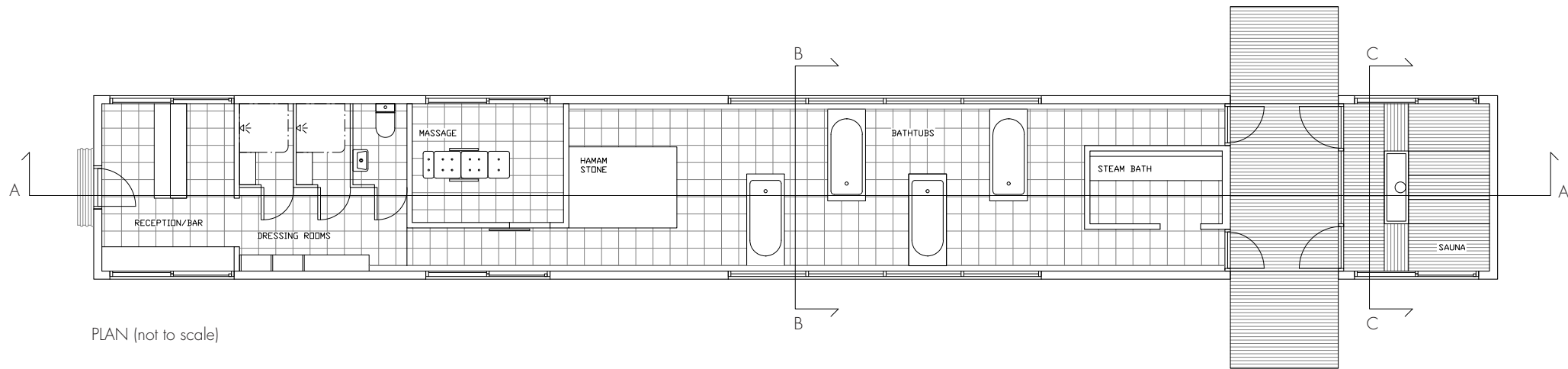
Interior perspective: The brass tubs placed in a zigzag pattern lets you have a relaxed conversation with other bathers while taking in the magnificent view through the low windows. Pine boards line the roof lanterns, limestone from Jämtland cover the floor and the walls.

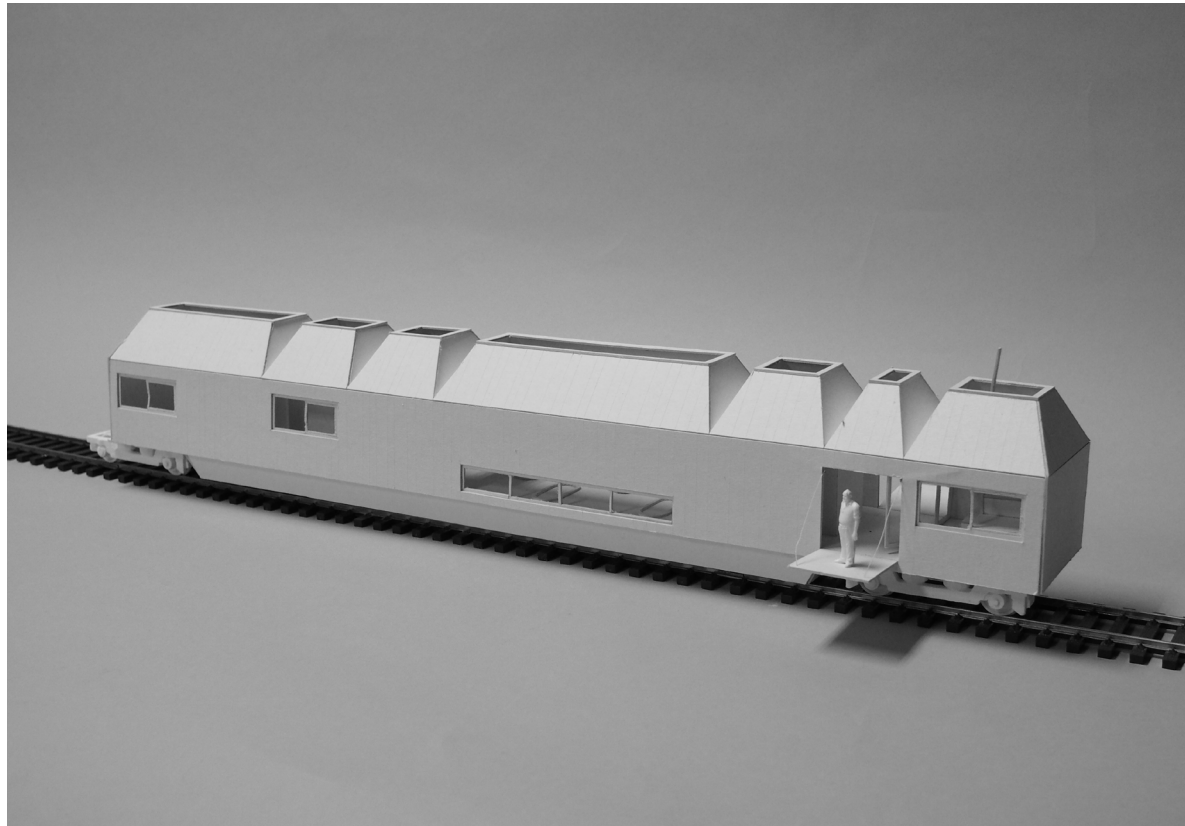


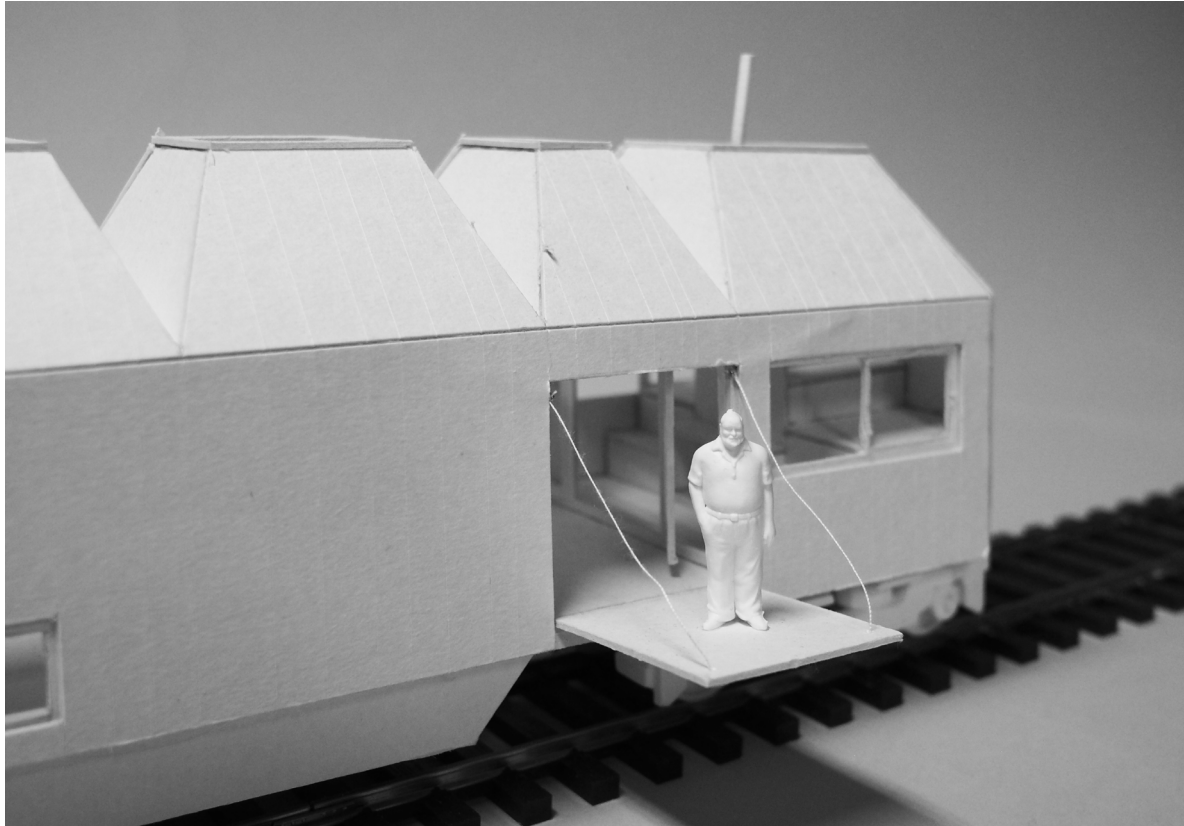
SECTION B-B (not to scale)

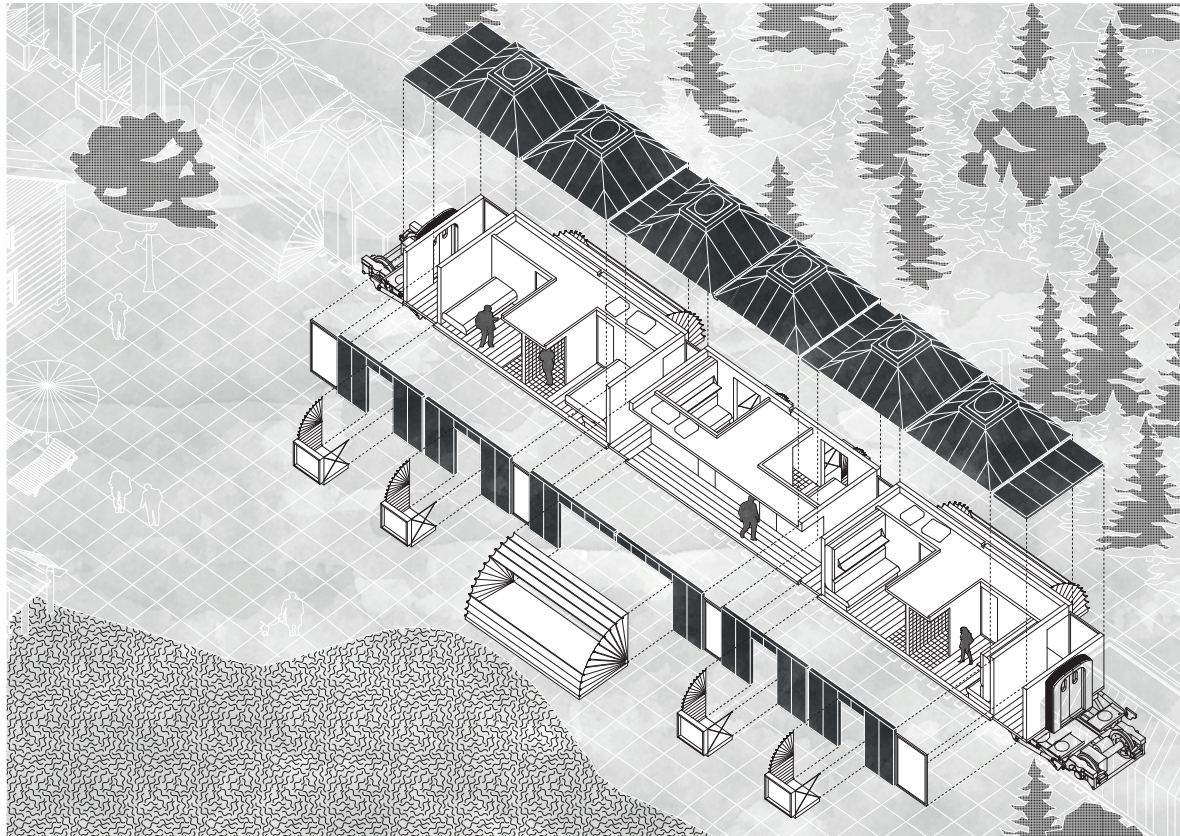


SECTION B-B (not to scale)









Axonometric perspective: Hotel rooms

HOTEL ROOMS

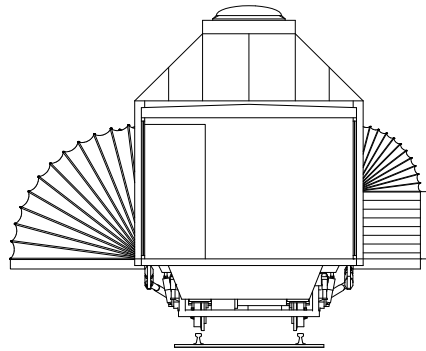
The rooms are equipped with a cabinet bed that can be folded up to create more space when not needed, revealing a couch and shelves on the walls. Each room has a bathroom with a toilet and a shower as well as a retractable balcony that can be lowered from a section of the wall. A storage loft takes care of bags and other equipment. Three larger common balconies can be lowered from the corridors to encourage social interaction among the guests. Each hotel room wagon has one accessible room with extra space for wheelchairs etc.



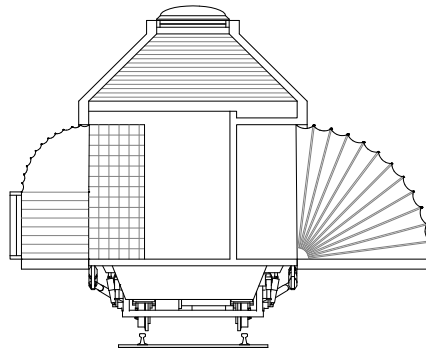
Exterior perspective: The hotel room car is clad with galvanized steel panels and forms a roof landscape with each hut marking a bedroom.



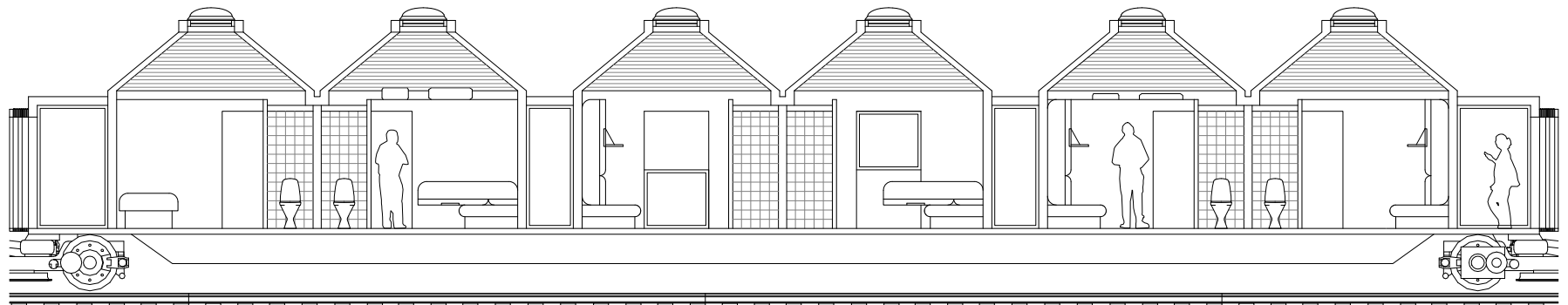
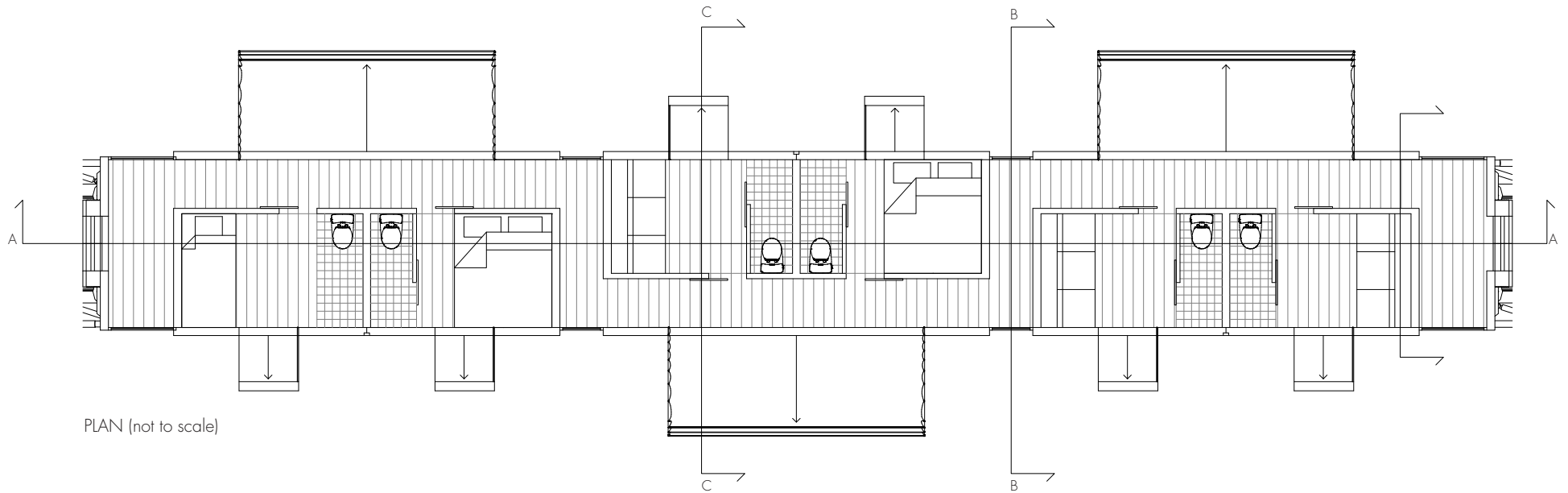
Interior perspective: Floor and roof lantern is clad with bright pine boards contrasting with the walls of pale green fibre board.



SECTION B-B (not to scale)

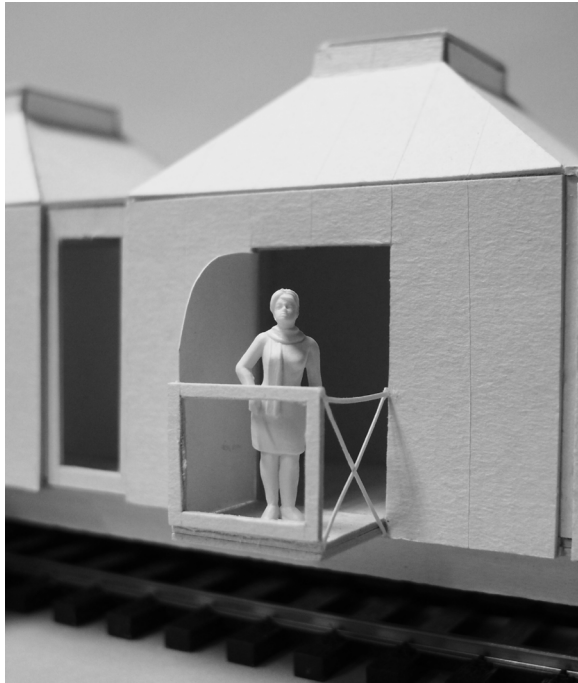


SECTION C-C (not to scale)



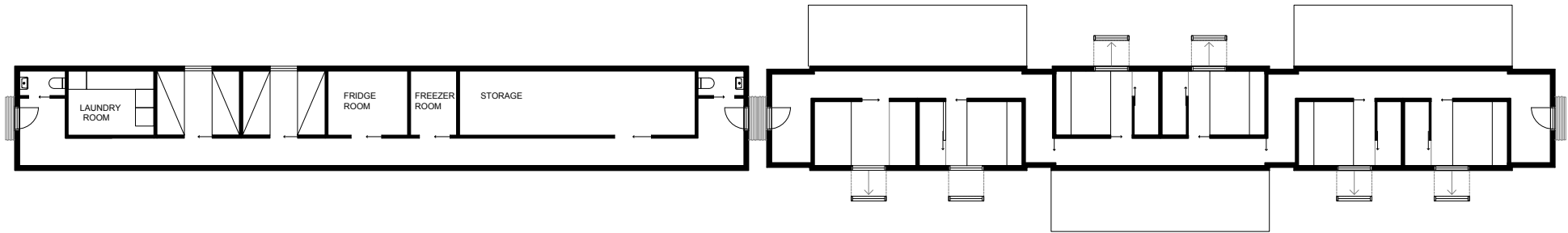


Model picture: Hotel Spa



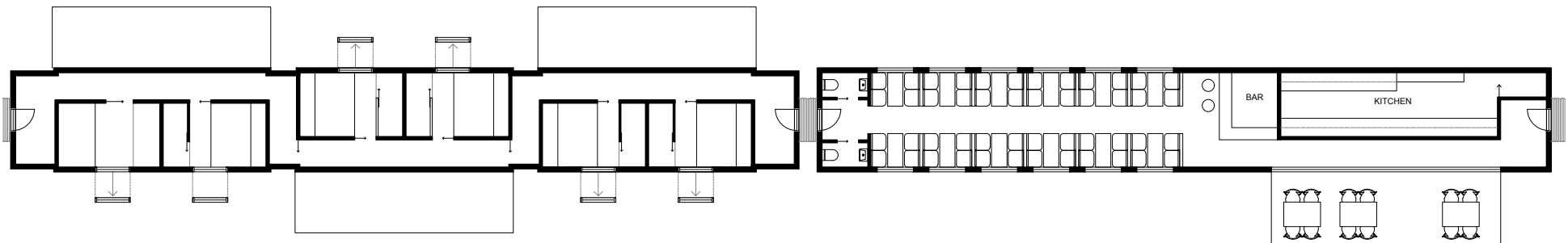
Model pictures: Hotel Spa

HOTEL TRAIN PLANS, 1:200



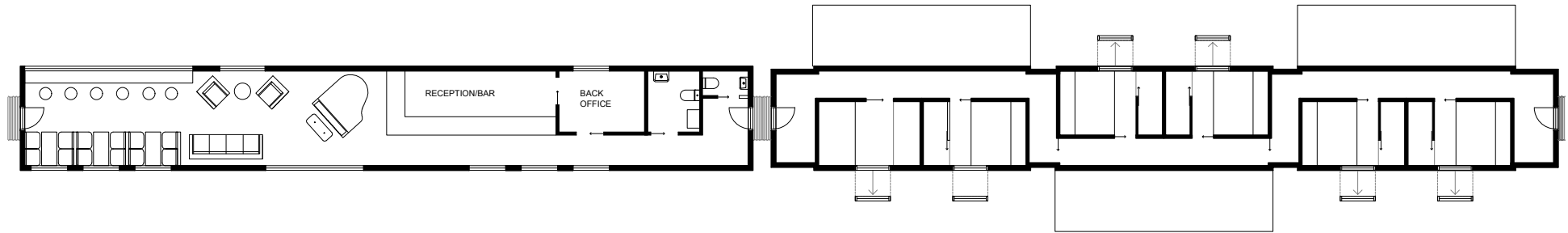
- SERVICE & STORAGE
- Storage
 - Freezer & fridge
 - Staff dormitory
 - Laundry

- HOTEL ROOMS
- Doublebed rooms with balcony
 - Public balconies
 - Accessable hotel room



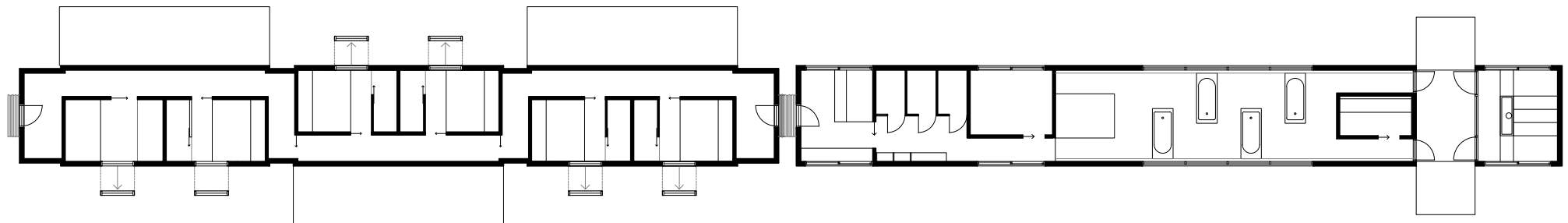
- HOTEL ROOMS
- Doublebed rooms with balcony
 - Public balconies
 - Accessable hotel room

- RESTURANT
- Kitchen
 - Bar
 - Terrace
 - Serving area



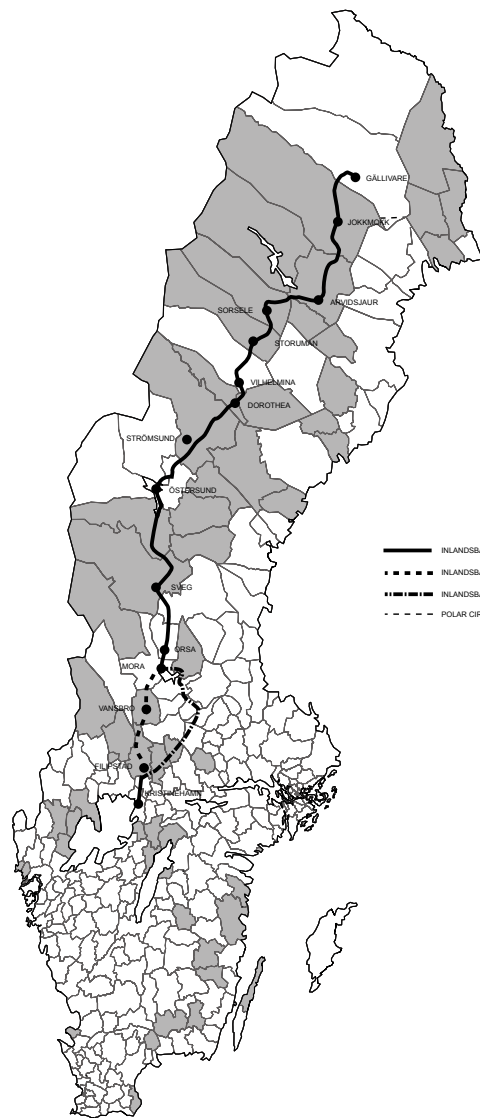
RECEPTION & BAR
 - Pianobar
 - Lounge
 - Reception & back office

HOTEL ROOMS
 - Doublebed rooms with balcony
 - Public balconies
 - Accessable hotel room

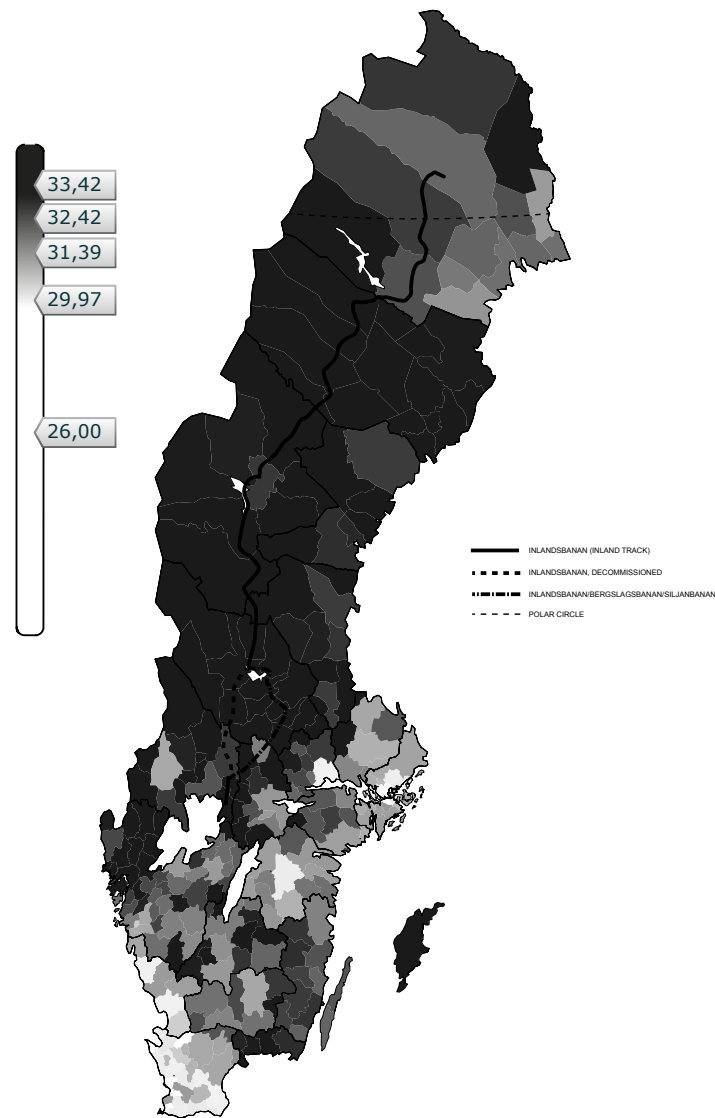


HOTEL ROOMS
 - Doublebed rooms with balcony
 - Public balconies
 - Accessable hotel room

SPA
 - Reception
 - Changing rooms
 - Massage rooms
 - Hamam stone
 - Bathtubs
 - Steam bath
 - Balconies
 - Sauna



Municipalities with more than 24% of population over 65 years. (SCB statistikatlas, 2015)



Municipality tax level (SCB statistikatlas, 2015)

2.2 MOBILE COMMUNITY HOUSE

Our infrastructure and welfare institutions functions basically in the same way throughout the country, even though different parts of the country has very different conditions. Maybe the way forward for the countryside is to adapt infrastructure and welfare institutions to local conditions?

The Mobile Community House aims to let municipalities share public institutions in order to maintain a high level of quality and service for a reduced price per municipality as well as increasing accessibility for remote communities along the track.

The Community House contains several different programs, including a health care centre, a dentist, a library and a pharmacy. The dentist, health care centre and pharmacy aims to deliver vital health care services while the library serves as a local meeting point and learning centre. The thesis presents a design proposal for the library and meeting wagon.

The Community House will migrate along the track, covering a predetermined number of communities that are subscribing to the services offered. Wagons can be disconnected and reconnected to support different configurations depending on the needs of the community.

The community house is an extension of the services normally provided by the state and municipality and therefore perhaps an extension of the state itself. The library and meeting car becomes a symbol of the state and municipality and an invitation to participate in the greater society. Like the state and authorities must produce a sense of transparency and openness the mobile community house strives to symbolize those values both metaphorically and aesthetically.

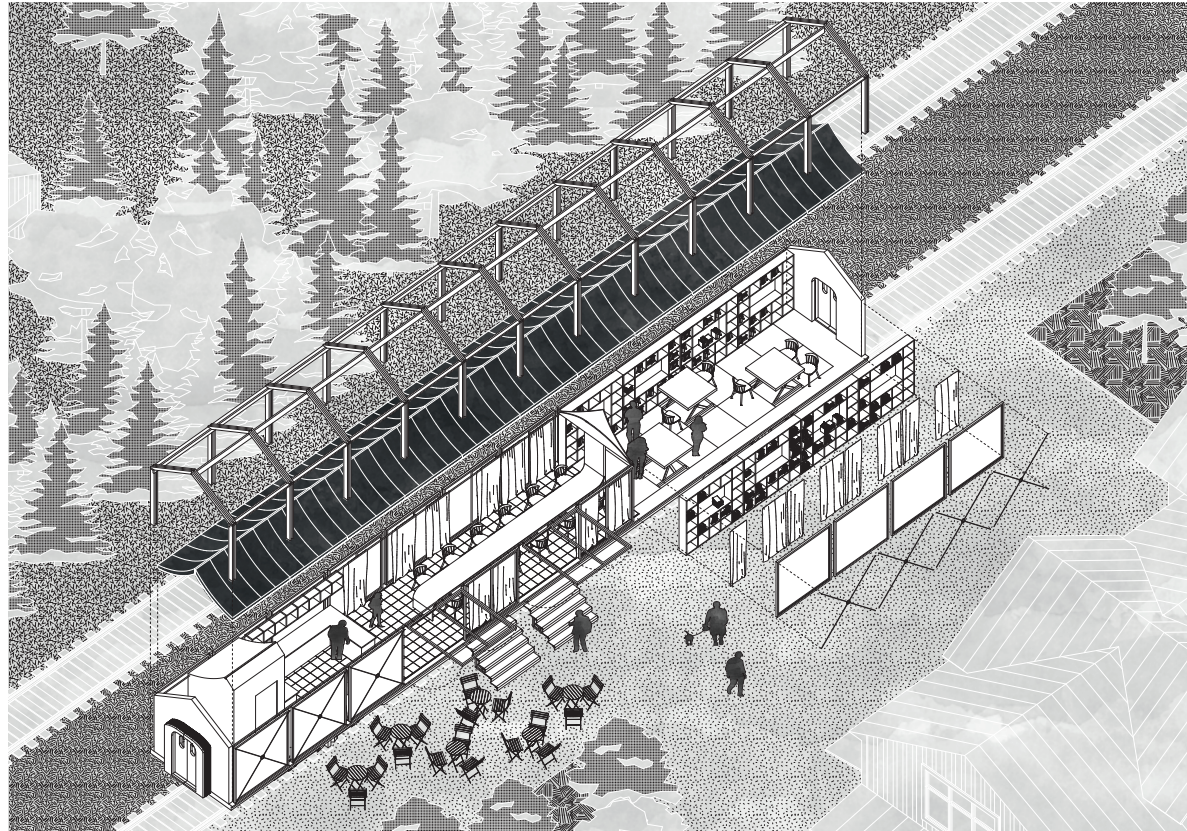
Transparency, lightness and openness is in the library and meeting space portrayed as a flowing curtain gently marking and dissolving the border between the state and the citizens. The meeting space is meant to be taken in possession by the local residents, using it for purposes that benefit the social life of the community. When not used for public purposes the function of the library takes precedence and the meeting space may be used for studies and reading.

LIBRARY

In the library sections of the floor can be raised and lowered to provide working tables as well as gallery seating for smaller lectures and meetings.

In the middle part of the wagon the windows are pivot hanged to enable a greater openness as well as rain shelter for outdoor seating. The windows also have sliding doors that can be opened conventionally if one does not want to open the entire train.

A smaller kitchen for catering purposes enables the library to hold events and conferences as well as functioning as a cafe for the library guests.



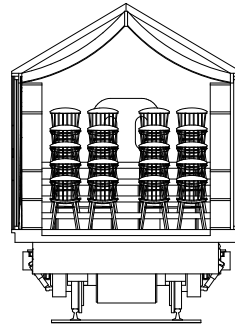
Axonometric perspective: Library



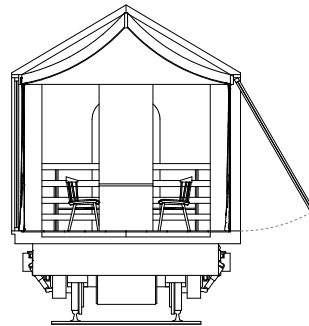
Exterior perspective: The timber frames are exposed to highlight the lightness of the hanging structure.



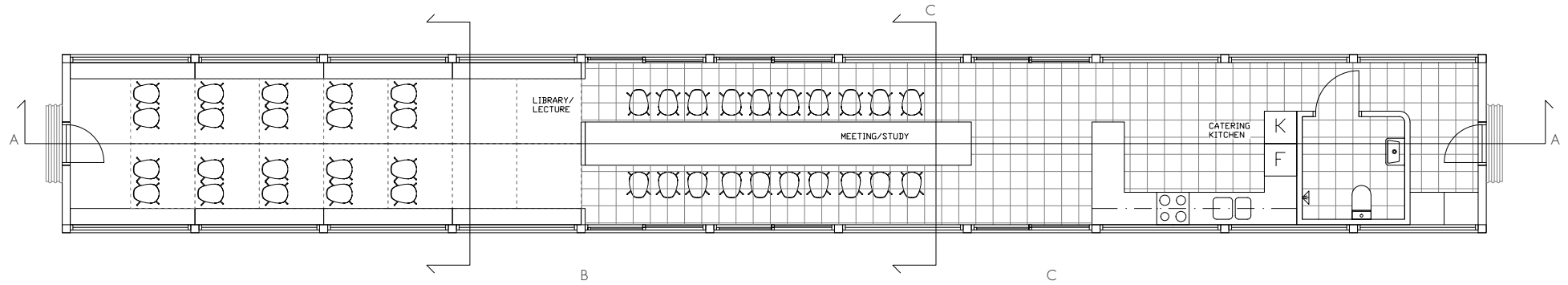
Interior perspective: Oak veneer and terrazzo tiles gives the library an flair of elegance.



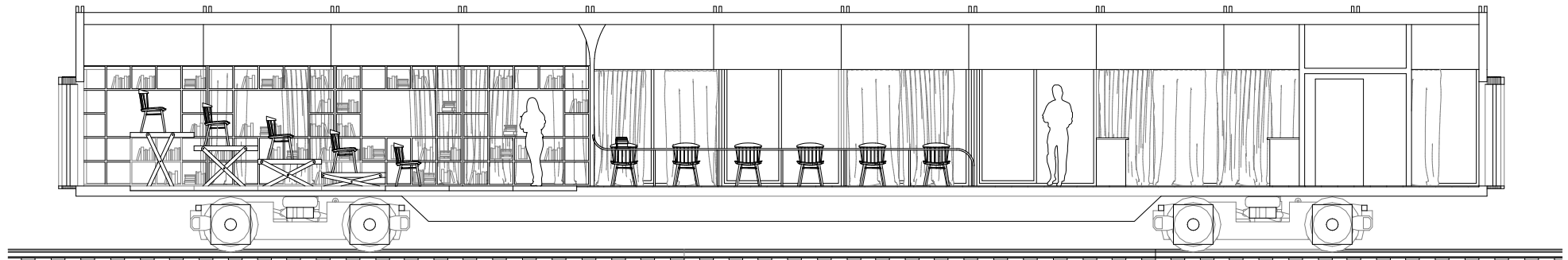
SECTION B-B (not to scale)



SECTION C-C (not to scale)



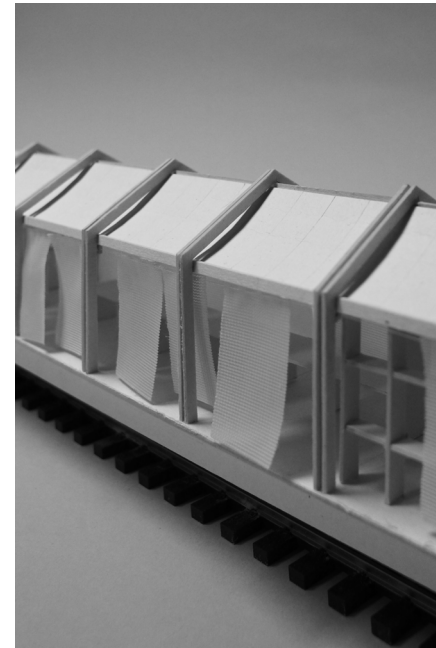
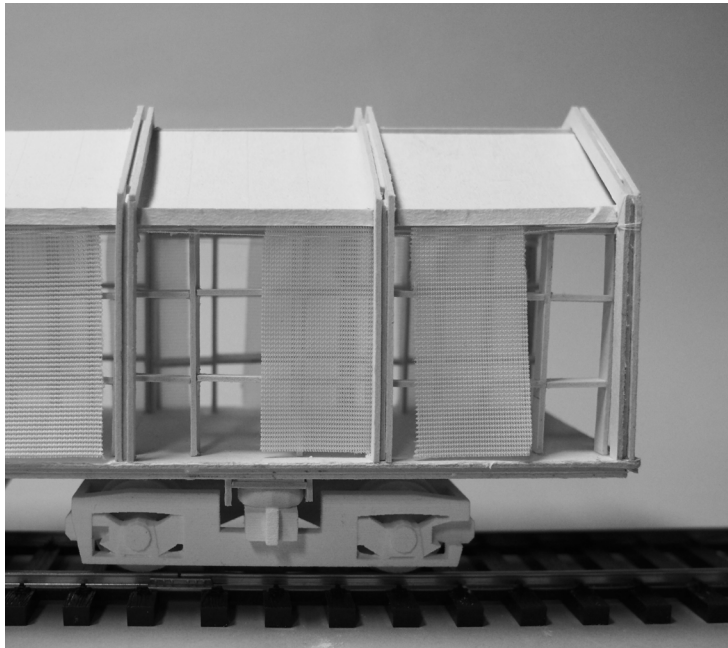
PLAN (not to scale)



SECTION A-A (not to scale)

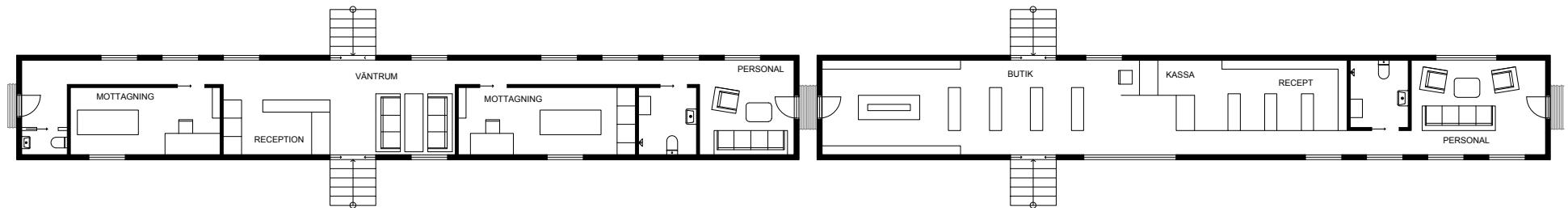


Model picture: Mobile community house, Library



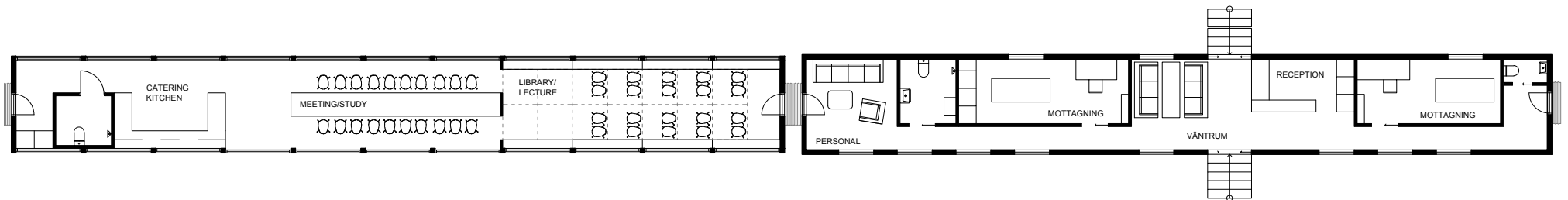
Model pictures: Mobile community house, Library

COMMUNITYHOUSE PLANS, 1:200



HEALTH CENTRE
- Reception
- Waiting room
- Examination rooms
- Staff room

PHARMACY
- Prescriptions
- Counter
- Staff room
- Shop

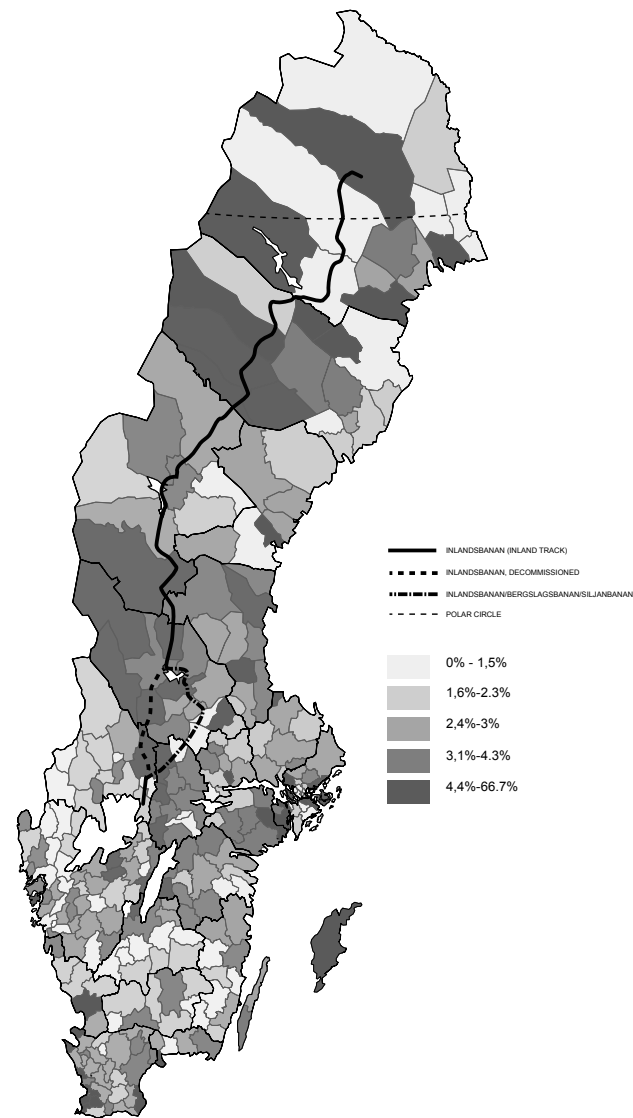


LIBRARY & MEETING PLACE

- Library
- Catering kitchen
- Study desks / Meeting table
- Gallery seating

DENTIST

- Reception
- Waiting room
- Examination rooms
- Staff room



Percentage of farms with combined operations in in-house processing (SCB statistikatlas, 2015)

2.3 MOBILE COUNTRY STORE

Many areas along the track cultivate a tradition of local food production. Different kind of dairy products, bread, wild game and fish products are often of high quality and produced locally with local raw materials and labour. Hunting and fishing is important in the whole region and the fish and game is of high quality.

The tradition of keeping mountain pastures (fäbod, fäbodvall) is still prevalent to a greater extent than in the rest of the country and gives part of the identity to the cultural and culinary life of the region. The mobile country store is an attempt to further increase the importance and economic viability of these activities.

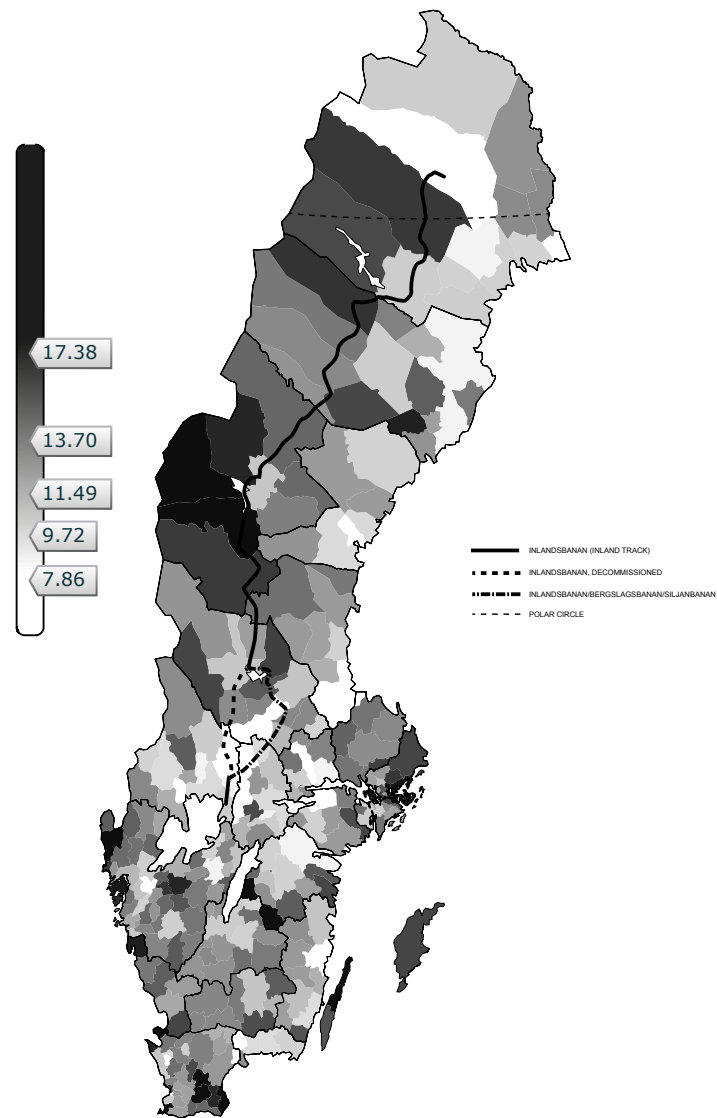
The region surrounding the Inland track is especially rich in smaller companies and enterprising individuals, as can be seen in the diagrams. Many farms have a combination business in processing to further increase their revenue as well as keeping artisanal traditions alive. This gives good conditions for the type of operation suggested.

The aim of the Mobile Country Store is to support local food producers by selling and distributing products along the track, increasing the catchment area and the revenue. A number of wagons will operate along the track, collecting products as well as selling them. The store is motorized and will migrate along the track following a predetermined schedule, stopping at specified communities for an amount of time before moving on. The country store can also to some extent decrease the need for traveling to supermarkets, that sometimes are far away.

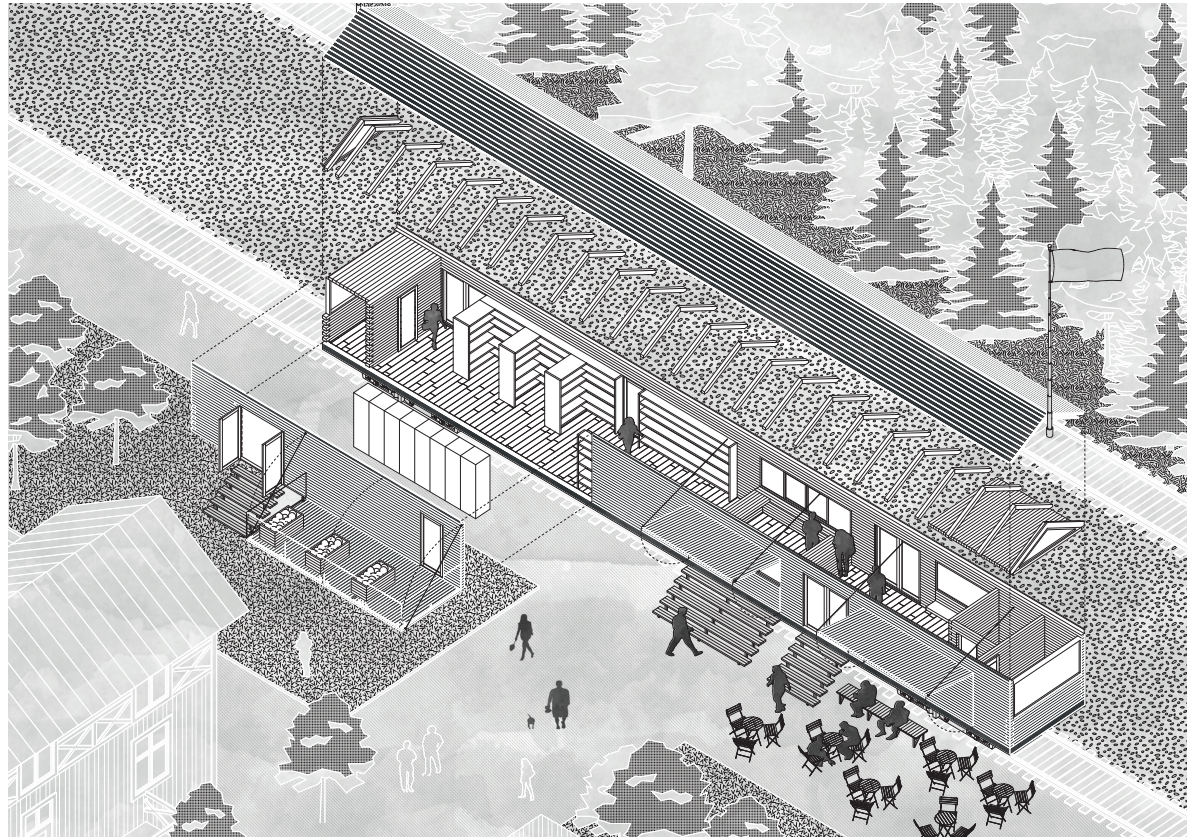
The Store is also equipped with a café where you can enjoy the products in a more direct manner, as well as creating a local meeting point and event within the community.

The mobile country store is constructed of sharply milled timber, a modern interpretation of the traditional chalet, giving a hint of the origins of the products being peddled. Hatches can be opened at different parts of the car providing rain shelter and sign spaces. The timber is charred externally and treated with a light linseed wax on the inside.

The country store buys and sells local produce along the track and local producers may sell their products directly to the car.



Amount of enterprising individuals (SCB statistikatlas, 2015)



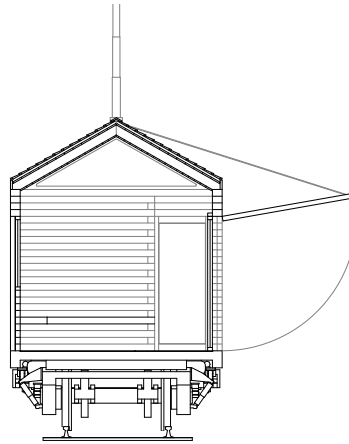
Axonometric perspective: Country store



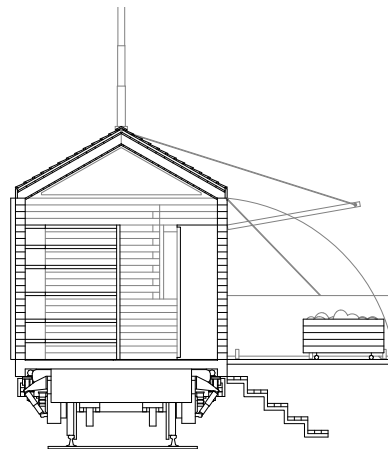
Exterior perspective: Hatches can be open from the charred timber walls, providing rain shelter and sign space.



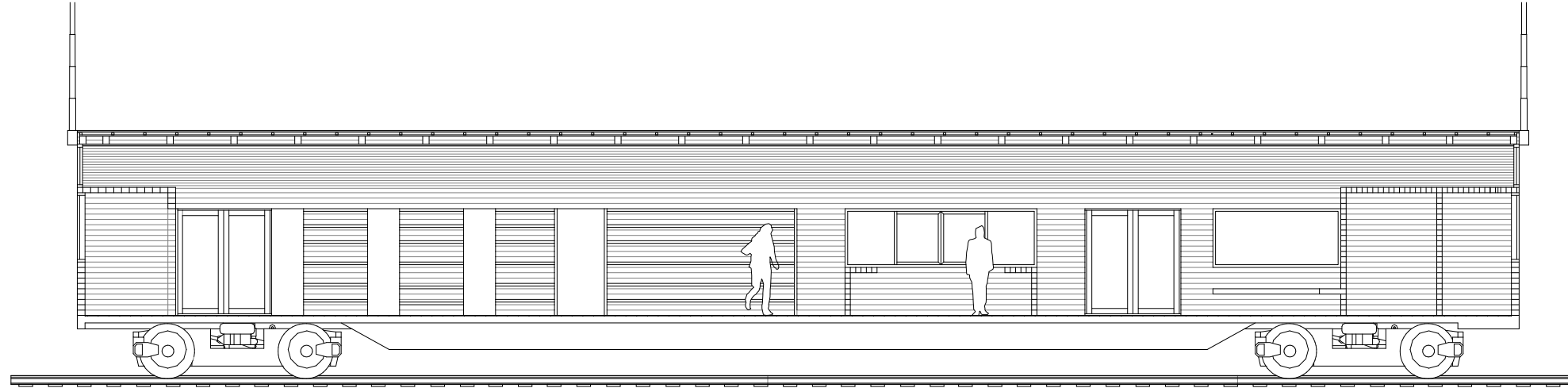
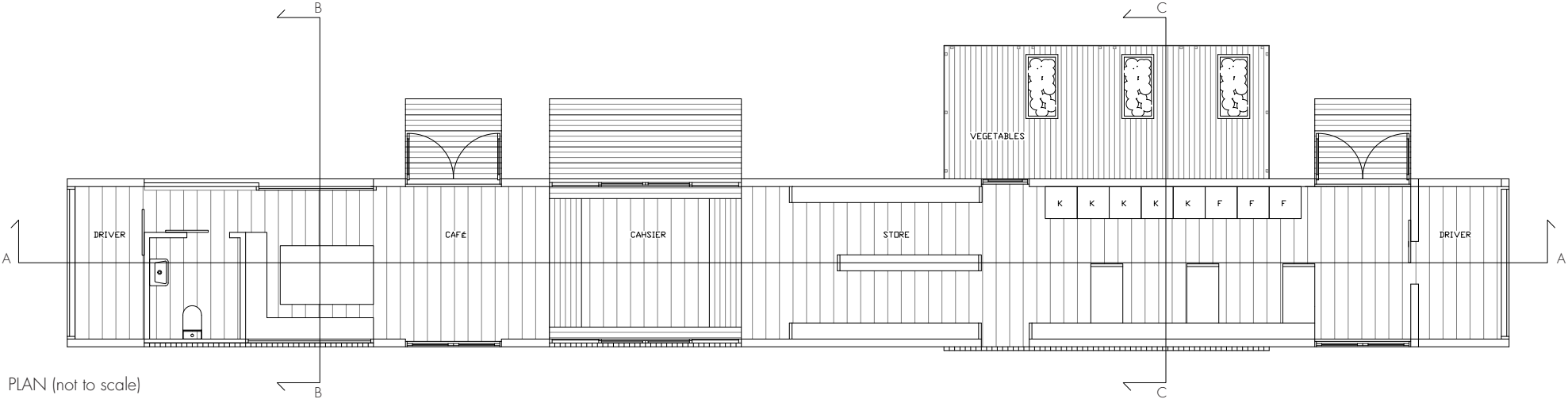
Interior perspective: The timber is treated with a light linseed wax, to give a warm and natural finish.



SECTION B-B (not to scale)



SECTION C-C (not to scale)



SECTION A-A (not to scale)



3.1 REFLECTIONS

Throughout the project I have tried to formulate a potential answer to how the Inland track could be used and repurposed to serve the community in a better way. The rural countryside is under transition mainly due to the issue of depopulation, which demands new answers to how the society functions. I believe that the Inland track holds great a potential in developing the local community as well as including it in a greater context.

The project has also been a programmatic research where I constantly during the process have questioned the viability and the relevance of proposed programs. A multitude of programs have been investigated, but only a few has been resolved in the designs presented. Further investigations into other programs would be very interesting for the purpose of making the project even more relevant.

The question of fabrication has been deliberately left out of the project at this stage in order to be able to resolve the design in a higher resolution without being limited by the high technical demands of constructing a vehicle. During the process I have identified several different interesting questions concerning fabrication. The project could perhaps be implemented by using timber or mining wagons as a structural base. Another question that would be interesting to develop would be that of local construction. There is a mayor caravan producer close to the track in Dorothea that could perhaps build the trains, keeping the revenue and work opportunities within the local community in the construction phase as well.

It would of course be interesting to work with a programmatic research as well as fabrication and implementation with local stakeholders and inhabitants in order to make reality of the project. It is the intent to present and discuss the ideas of the project with local municipalities and businesses as well as trying to spark a public debate, perhaps through local newspapers and other channels of information.

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