

FROM ROADS

TO WAVES

A Sustainable Transport Solution for Väjern, Sotenäs and Beyond.

INTRODUCTION

Sotenäs and its coastal towns, including Väjern, have a deep-rooted connection to the sea. Historically, boats were not just a means of transportation but a lifeline for these communities. The rugged landscape made water the most practical and efficient way to travel and trade. People used boats for commuting between settlements, fishing, and transporting goods, which shaped the development of these towns.

However, as cars became the dominant mode of transport in the 20th century, the focus shifted from waterways to roads. Infrastructure expanded, cutting through the natural landscape and altering traditional patterns of movement. This transition marked the decline of water-based transport, and with it, some of the unique maritime identity of these towns.

Today, advancements in electric boat technology offer an opportunity to revive water-based transport as a faster, more sustainable commuting option. By reconnecting Väjern and the region through boats, we can reduce travel times, improve regional connectivity, and honor the area's maritime heritage.



CONTENT

ABSTRACT

The project "From Roads to Waves: A Sustainable Transport Solution for Väjern, Sotenäs, and Beyond" envisions a transformative shift in regional mobility by reintroducing water-based transport to the coastal communities of Sotenäs. By leveraging advancements in electric hydrofoil ferries and demand-responsive transport systems, the project aims to reduce car dependency, alleviate congestion, and lower emissions while enhancing connectivity and preserving the region's maritime heritage. A strategic plan and design proposal for a modular dock in Väjern focus on integrating sustainable transport with existing infrastructure, supporting year-round accessibility for residents and fostering sustainable tourism. This initiative seeks to unlock new opportunities for regional development, improve quality of life, and establish Sotenäs as a model for sustainable coastal mobility.

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BACKGROUND

BEFORE THE ROADS - THE ERA OF BOATS

The first settlements in Sotenäs were established due to its favorable location along the coast, where the sea provided both a livelihood and a natural transport route. Boats played an essential role in the community, supporting fishing, trade, and travel. In a rugged landscape with few passable roads, the sea was the easiest and fastest way to connect people and resources across the region.

For centuries, boats remained the backbone of transportation in Sotenäs. They enabled the movement of goods, supported the fishing industry, and linked coastal towns that would otherwise have been isolated. Marine traffic shaped the identity and development of the communities, fostering strong ties to the sea.

However, with the rise of automobiles in the early 20th century, this reliance on boats began to decline. Cars offered a cheaper and faster alternative, supported by an expanding network of roads cutting through the landscape. As land-based transportation grew, boat traffic gradually diminished, marking a shift in how people navigated the region.

Today, while marine traffic persists, it is primarily for recreational purposes rather than daily transport. Cars and roads dominate modern life in Väjern, serving as the primary means of getting around. Despite this, the historical significance of boats remains deeply rooted in Väjern's identity, highlighting a wealth of knowledge and potential that could be reimagined to meet modern transportation needs



Photo of passenger ferry "ÄGIR" unloading people in Smögens dock. Around 1950, Bohusläns Museum

MOBILITY IN VÄJERN TODAY

Bus lines currently serve Väjern and the surrounding communities, but they are limited and slow, making frequent stops in small settlements. This creates long travel times and unreliable connections for residents.

For essential services like high schools and hospitals, which are located far from Väjern, buses are often impractical. As a result, most residents rely on private cars for daily transportation.

Commuting to Lysekil, a common route for high school students and workers, takes between 45 minutes to an hour by bus, one way. This lengthy journey highlights the challenges of relying on the current public transport system in Väjern.

NEW DEVELOPMENTS IN LYSEKIL

In Lysekil, there is an existing ferry line connecting Lysekil and Fiskebäckskil, operated by Västtrafik. The service runs as “by-call” traffic, with some scheduled departures but requiring passengers to pre-book their trips.

In 2024, the ferry was upgraded to an electric vessel, and a dedicated electric boat charger was installed to support its operation. While currently only used for this ferry, the charger has the potential to serve additional electric boats in the future, showcasing opportunities for expanded sustainable marine transport in the area.



The electric ferry “ELISE” currently transporting passengers between Lysekil and Fiskebäckskil

CASE STUDIES

ÅKTUREN - VARBERG

Åkturen is a seasonal summer bus route in Varberg, distinct from regular public transport, designed specifically for tourists. It connects key tourist destinations, significantly reducing car traffic during peak summer months. By promoting eco-tourism, Åkturen supports sustainable travel and contributes to the local economy, as the generated income benefits the region.



VÄSTTRAFIK - BUS ON DEMAND

Västtrafik's Buss on Demand operates on the principle of demand-responsive transport (DRT), where buses adapt to actual demand rather than fixed schedules or routes. Through a simple app-based booking system, passengers can request rides within defined areas, providing flexibility and access that traditional public transport cannot achieve in low-population regions. This makes it a cost-effective solution where regular bus services are not economically viable.

The service is highly adaptable, allowing stops to be added or adjusted based on local needs, and it removes the constraints of fixed timetables and stops. For example, passengers can travel to a specific destination, stop to pick up their kids after school, or visit the store before heading home. By offering greater convenience and freedom, Västtrafik's Buss on Demand improves rural accessibility while supporting a more sustainable alternative to private car use.



KOM I LAND - V.G. REGIONEN

KomILand is a project improving rural accessibility through demand-responsive transport and shared mobility solutions. Implemented in locations like Broddetorp, Dals Långed, Nossebro, Tanum, and Uddebo, it combines local engagement, tailored services, and a user-friendly app to complement public transport and reduce car dependency. KomILand shows that flexible, collaborative mobility can enhance transport efficiency and sustainability in rural areas.

KOCHI WATER METRO

The Kochi Water Metro in India demonstrates the large-scale potential of electric boat systems for public transportation. With 38 terminals and 15 routes, it seamlessly integrates into the city's existing transport network, moving thousands of people daily across rivers and lagoons. This model improves commuting efficiency, showcasing how electric boats can serve as a sustainable and urban-friendly alternative for mass transit.



HYDROFOIL BOATS - CANDELA

Electric hydrofoil ferries use submerged hydrofoils to lift the hull above water, reducing drag and energy consumption by up to 85% compared to conventional ferries. This allows for higher speeds with minimal energy use and no wake, which prevents shoreline erosion and reduces environmental impact. Already in use in Stockholm, these ferries demonstrate their ability to reduce congestion, provide fossil-free transport, and improve connectivity for residents and visitors.

PROPOSED PLAN

SOTENÄS EXPRESS - THE SUMMER COASTAL FERRY

A summer ferry route from Gullholmen to Bovallstrand could transform tourism in Sotenäs by connecting the most popular destinations along the coast. This service would allow tourists to park their cars and travel by boat, reducing emissions and traffic in the region while offering a more sustainable way to explore the area.

The route would not only serve as a transportation option but also as an attraction in itself, enhancing the tourist experience while generating income to support the project. By promoting greener travel, this initiative could pave the way for more sustainable tourism, and even enable car-free zones in heavily visited areas like Smögen, encouraging visitors to embrace the convenience and charm of water-based travel.

HUNNEBO- & BOVALLSTRAND

These charming coastal towns are popular summer destinations known for their picturesque harbors and rich cultural heritage. As key stops on the summer route, the ferry would provide a convenient way to access these towns. Improved water-based connections would enhance the towns' appeal as tourist hubs and supporting local businesses.

GULLHOLMEN

A popular tourist destination that will serve as a key stop along the summer ferry line. With its extensive parking facilities, it provides an ideal starting point for tourists to leave their cars and explore the entire coast by ferry. This reduces road congestion and supports sustainable travel while still giving visitors easy access to the region supporting a more sustainable tourism

SMÖGEN

A key stop on the summer route, Smögen is one of Sweden's most popular tourist destinations, attracting thousands of visitors each year. The ferry provides an alternative to car travel, reducing congestion in the area and supporting efforts to make Smögen more accessible while preserving its unique charm.

BOHUS-MALMÖN

Bohus-Malmön is an island currently accessible only by a road ferry, making it an essential stop on the summer route. Known for its scenic beauty and historic quarrying sites, the island would benefit from improved accessibility while supporting more sustainable tourism.



FLEX-FERRIES: A YEAR ROUND SOLUTION

An On-Demand ferry system would completely transform Sotenäs transportations system and offer a faster, more flexible, and sustainable alternative to current transportation options. Instead of relying on fixed schedules, ferries would operate based on passenger requests, making it easier to get where you need to go, when you need to go.

Using a mobile app, passengers could order a ferry to their nearest stop, with the vessel typically arriving within 20–30 minutes. The ferry would then take you directly to your destination, picking up and dropping off other travelers along the way to optimize the journey.

On-demand systems are not only flexible and efficient but also highly economical, making them a cost-effective solution for rural areas. This modern approach to transportation would reconnect the areas coastal towns, making travel faster, easier, and more sustainable, while supporting the region's vision for a greener, more connected future.

VÄJERN

A ferry stop in Väjern would greatly enhance connectivity for this and other smaller towns, making it easier for residents to access essential services, educational opportunities, and employment in nearby areas. Improved transport links would support full-time living by reducing reliance on cars and enabling a more convenient, sustainable lifestyle. This connection would strengthen Väjern's appeal as a year-round community.

KUNGSHAMN

Kungshamn serves as a smaller hub for the region, with new ferry stops at the city centre, Bohus-Malmön and Smögen. These connections make it easy to travel to the islands without the need for cars, reducing congestion and environmental impact. Establishing a new charging station in Kungshamn would complement the existing infrastructure in Lysekil, ensuring efficient operations and expanding the reach of the sustainable ferry network

PREEM REFINERY

The Preem Refinery is the largest private employer in the area. With 725 permanent employees it is the biggest private employer in Lysekil and is comparable to the number of people employed by the Sotenäs Municipality itself. With its location by the sea, connecting the refinery via electric ferry would provide workers with a sustainable and efficient commuting option, further enhancing regional connectivity.

LYSEKIL

Lysekil stands as the largest coastal town near Sotenäs, serving as a key regional hub with essential services including the nearest high school, a hospital, and numerous specialty shops. With existing infrastructure for electric ferries already in place, a hydrofoil connection could reduce commuting times to just 20 minutes in good conditions, offering a fast, reliable, and sustainable link to this vital center.

VÄJERN

HOVENÄSET

KUNGSHAMN

SMÖGEN

BOHUS-MALMÖN

PREEM REFINERY

LYSEKIL

FISKEBÄCKSKIL

GRUNDSUND



KUNGSHAMN - LYSEKIL



45-60min



20-30min

Not to scale

DOCK SHELTERS

DESIGN AND FUNCTION

To complement the transport network, a simple yet flexible shelter design has been developed. The shelter features a simple and functional design, inspired by the traditional structures used for drying fish and nets, reflecting the maritime heritage of the region. Local materials, such as granite flooring and wooden elements, are incorporated to ensure the structure harmonizes with its surroundings and showcases the area's craftsmanship and resources.

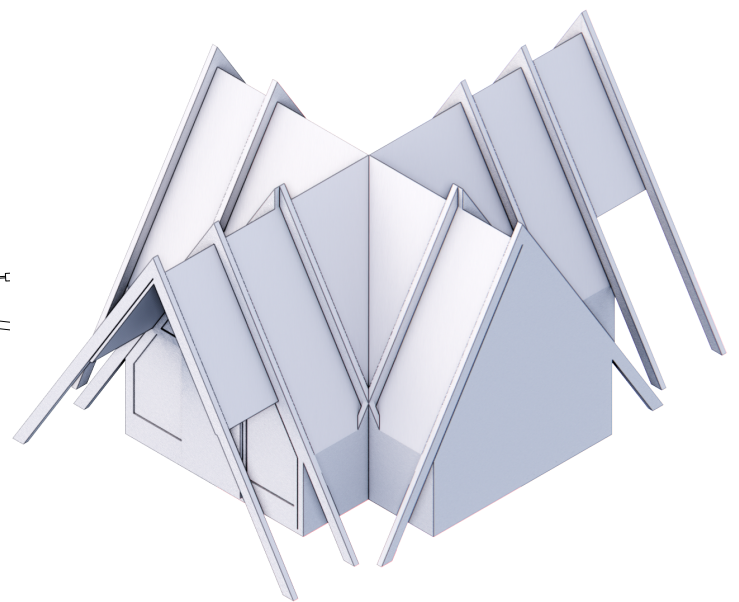
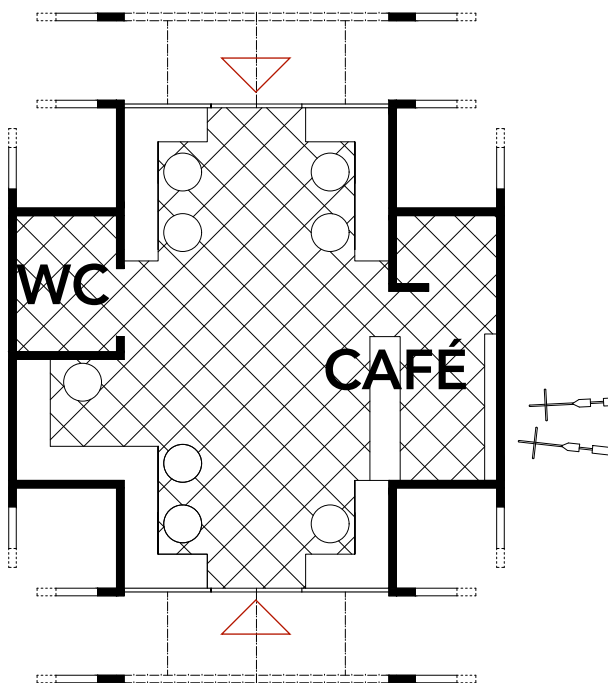
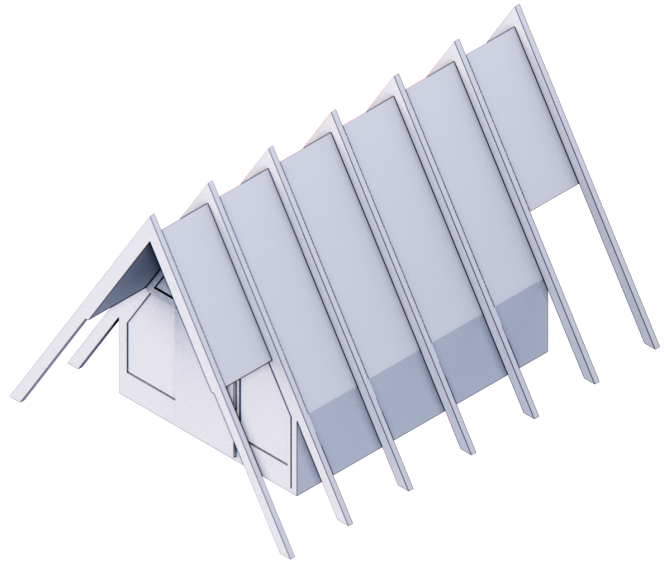
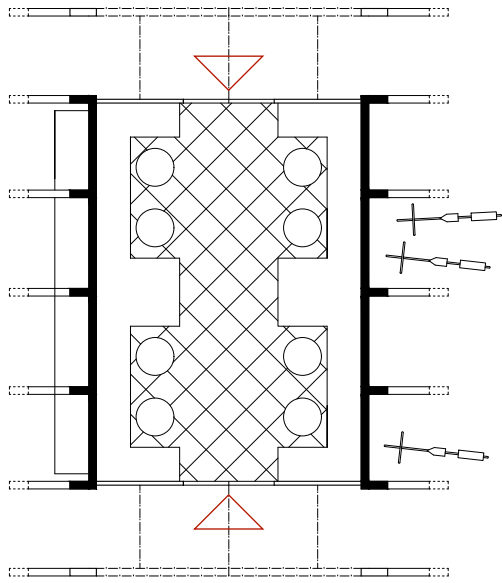
Inside, the shelter includes tables and access to electricity, enabling passengers to work or charge devices as they wait. Outside, the design accommodates practical needs, such as areas for parking bicycles or sitting down, creating a welcoming and user-friendly environment for all. The thoughtful use of materials and design ensures that the shelters are both durable and aesthetically aligned with the coastal landscape

MODULAR AND FLEXIBLE

The shelter is designed with modularity in mind, allowing it to adapt to various locations along the transport network. Its size, layout, and functions can be customized to meet the specific requirements of each site.

On the right, we see two examples showcasing this flexibility. One is a simple design that fulfills the essential functions of providing seating and shelter, while the other is larger, incorporating additional amenities such as a café and restroom facilities.

This adaptability ensures the shelters not only serve as practical transit stops but also integrate with their surroundings, supporting diverse uses and user groups. By tailoring each station to its local context, the design fosters a sense of place while meeting both current and future needs.



TUMLAREN DOCK

The new boat stop near Tummlaren in Väjern is strategically located to integrate seamlessly with existing infrastructure. Tummlaren is a well-loved facility in the region, close to spacious parking lots and a bus station. This makes it easy for visitors and locals to park their cars or transfer between bus and boat.

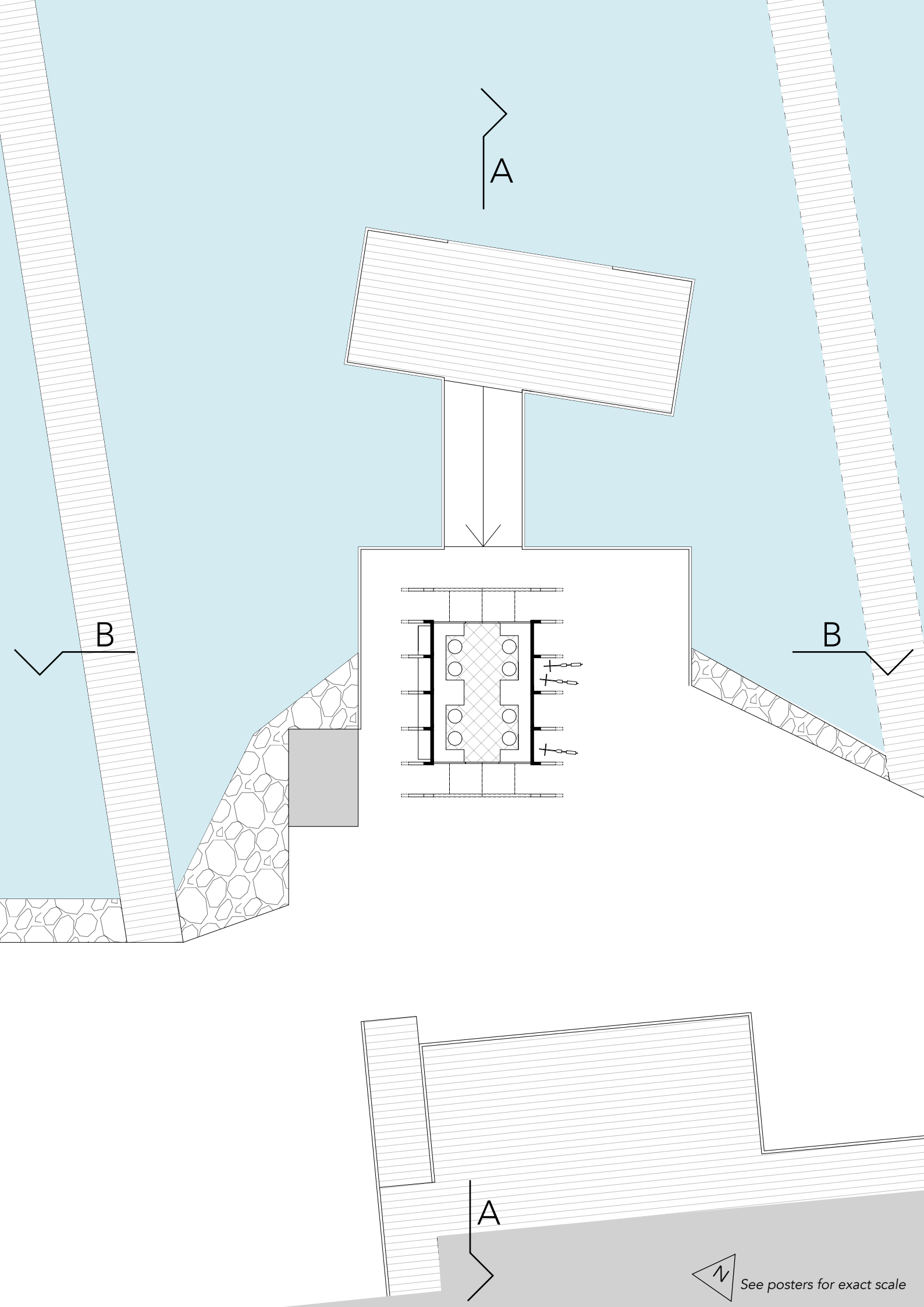
To make room for the arriving ferries one of the current piers needs to be relocated. To ensure safe movement between the bus stop and the boat dock, an elevated pedestrian crossing could also be added.





In Väjern a simple version of the modular shelter is chosen. With Tummlaren's café and lobby nearby, the shelter does not aim to replace these amenities but to support and attract more visitors to the area.

By making it possible to live here without being dependent on a car and enabling children, youth, and the elderly to travel more independently. This project can make Väjern a more attractive place to live, helping to create a stronger foundation for full-time residency.



A

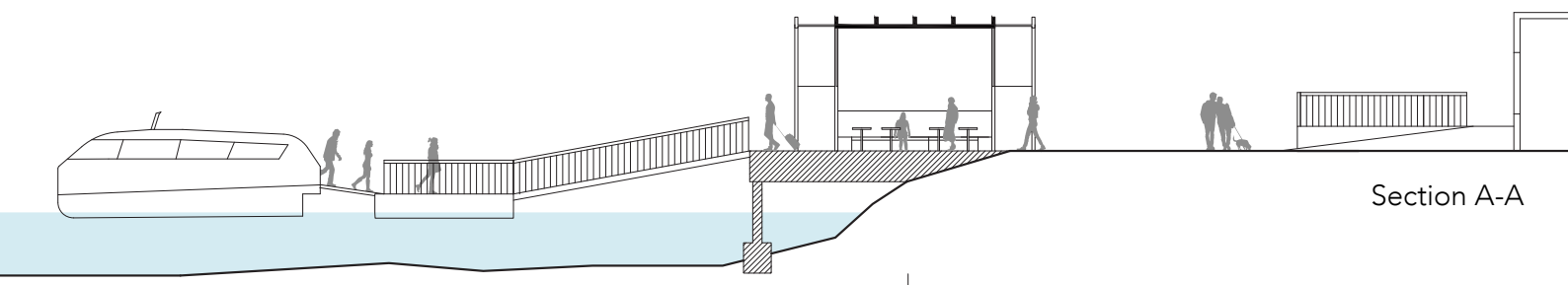
B

B

A



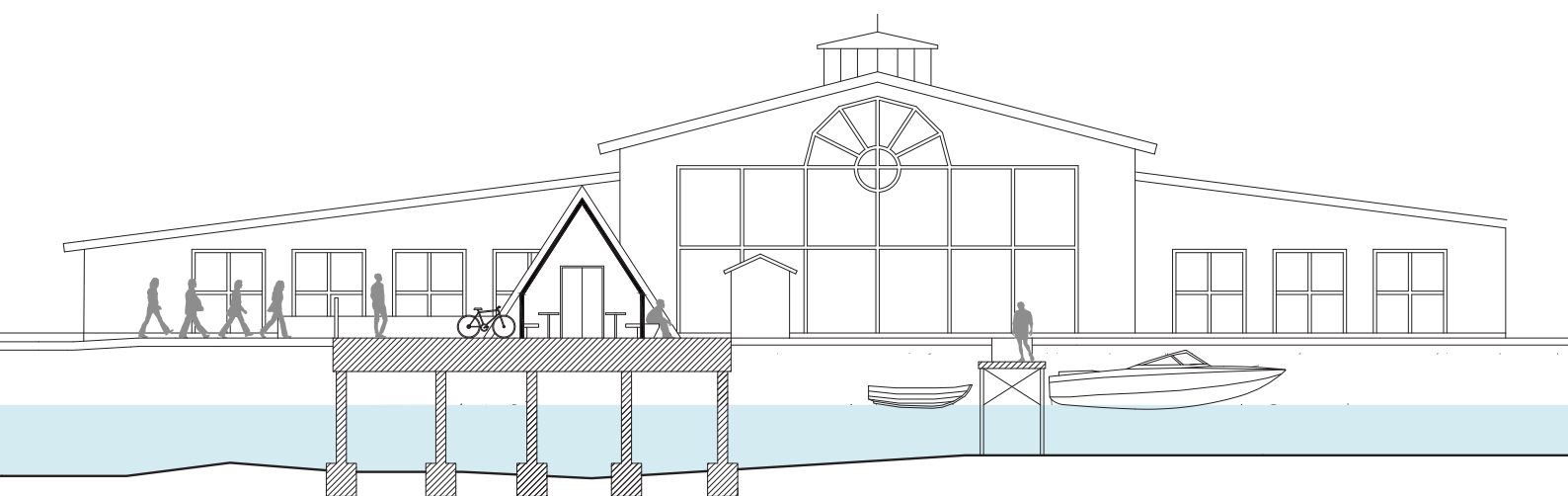
See posters for exact scale



Section A-A

The shelter is placed on an existing concrete dock structure in front of Tumlaren, currently unused. This gives easy access to the water and ensures minimal new resources are used for construction and

When arriving in Väjern the great facade of Tumlaren welcomes both residents and visitors. A ramp connects the shelter to a floating platform where the ferries moor, ensuring safe and easy access to the ferry.



Section B-B

NEXT STEPS

UNLOCKING VÄJERN

A Water-based public transport system could redefine Väjern's future, making it more accessible and sustainable. With fewer cars, particularly during the summer, the town could see reduced congestion, lower emissions, and a more welcoming environment for both residents and visitors.

Improved transport connections would make full-time living easier, allowing residents to access schools, workplaces, and services more conveniently. This could attract new year-round inhabitants, fostering a vibrant, thriving community.

By addressing current accessibility challenges and lock-ins, Väjern could evolve into a more connected and sustainable community, offering a higher quality of life and unlocking opportunities for long-term growth.

CATALYST FOR REGIONAL DEVELOPMENT

By revitalizing waterborne travel, the region could save valuable time in transportation and establish stronger, more efficient connections between communities. Reducing dependence on inland road networks and hubs, once again becoming a strong and unified coastal region.

This transformation would also support sustainable tourism to the region by providing an eco-friendly attraction. This project has the potential to highlight the area as a pioneer in sustainable transport, setting an example for other regions to follow, and be a catalyst for new developments in the whole region.

SCALABILITY AND TECH ADVANCEMENTS

This system is extremely flexible and scalable. Additional stops and ferries can be seamlessly added to the network, further reducing travel times and improving connections. Over time, a comprehensive coastal transport network could emerge, linking towns and regions along the whole coast with ease.

As technology continues to advance, this network's potential will only grow, offering faster, smarter, and more sustainable connections along the coast, ensuring adaptability to future demands. New developments are already showing potential for hydrofoil ferries going up to 75knots which would open the door to unprecedented possibilities. Routes like Göteborg to Oslo could be completed in under two hours and Kungshamn to Göteborg in only 45 minutes.



Concept image from Lazzarini design showcasing future 75knot ferry.

ENVIRONMENTAL AND SOCIAL IMPACT

This project marks a significant step in the transition to more sustainable and community-focused lifestyles. By reducing car dependency and promoting low-impact transport, it aligns with the urgent need for environmental responsibility. On a broader scale, it encourages living in smaller, connected communities where people support each other, fostering a sense of shared purpose and resilience.

Beyond transportation, this initiative strengthens the coastal region's identity, creating an inclusive and adaptable environment capable of withstanding future challenges. It is not just about moving people—it is about creating a framework for sustainable growth, deeper connections, and a thriving, unified coastline that sets an example for generations to come.

CITATIONS

PEOPLE

Anna Ohlin Ek, VD, Destinationsbolaget Läkö Kinnekulle

Hans Arby, Senior Researcher in Sustainable Mobility, RISE

Lukas Foljanty, On-Demand Transit Expert, Technische Universität Berlin

Magnus Fredricson, Strateg för hållbar samhällsutveckling, Skaraborgs Kommunalförbund

Nils Björling, Lecturer and researcher, Chalmers University of Technology

PHOTOS

Ferry Ägir, Bohusläns Museum, [1950s].

Electric ferry Elise, Lysekil Kommun, [2024].

Bus "Åkturen", Hallands Nyheter, [2021].

Bus on demand, Västtrafik, [2023].

KomILand, Västra Götalandsregionen, [2022].

Kochi Water Metro, Geospatial world, [2023].

Hydrofoil Boats, Candela Technology, [2024].

Concept Image, yacht "Plectrum". Lazzarini design. [2023].

INFORMATION AND RESEARCH

Bohusläns Museum

Candela Technology AB

EIT Urban Mobility

Energimyndigheten

K2 Centrum

Kochi Water Metro - watermetro.co.in

REGIO-MOB Interreg Europe

Skaraborgs kommunalförbund

Statistiska Centralbyrån

Turistrådet Västsverige AB

Varbergs Kommun

Västtrafik

Västra Götalandsregionen

Thank you for taking the time to read my project.

If you have any questions, wish to discuss the ideas further, or need additional information, please do not hesitate to reach out.

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