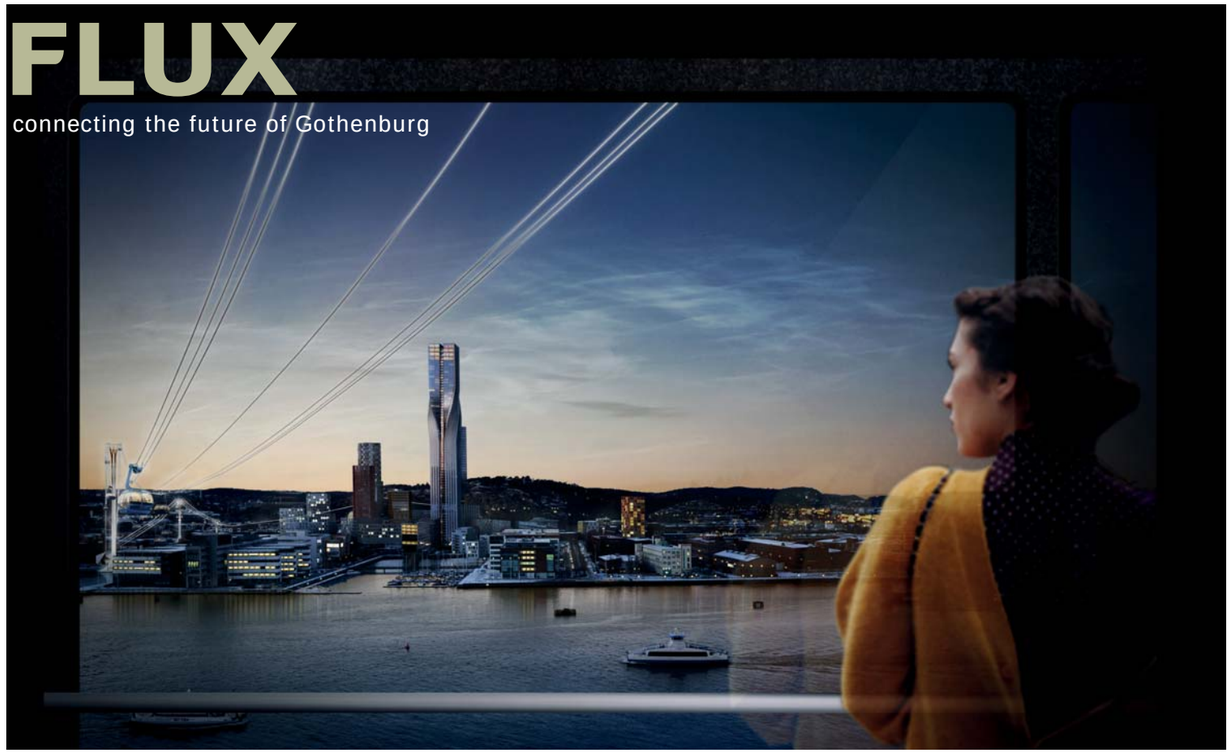
FLUX

connecting the future of Gothenburg



view from the Gothenburg Cable Car

here we go:

The Gothenburg Cable Car must be much more than just a means of transportation – it will communicate and connect people across the water, transform the skyline, enable new opportunities for living and work, and enliven the culture of the city day and night. A monumental infrastructure for mobility, it must both connect to the character of the city and create a vital sense of place where it meets the street and the waterfront - a place for daily movement, experience, identity, and convergence, shaping Gothenburg's future.

The cable car is for everyone--a positive addition for all--from the daily commuter, to the tourist, to the person on the street.

Its dynamic stations and soaring towers must seek to embed themselves into and become part of the cultural fabric of Gothenburg, finding their character in the fusion between an industrial past and digital future.

Unlike the subway, the cable car is entirely visible, it is right in front of us. The challenge is to make this imposing infrastructure naturally fit to the character of the city, connected to its heritage and an integral part of Gothenburg that clearly communicates with its users.

At the same time, at the larger scale, this infrastructure must seamlessly integrate divergent and isolated parts of the city into the new whole, using technology to collapse distance. Stations and towers both will take underutilized urban spaces and make them focal; they will enrich the whole city by knitting disparate parts together and calling new urban identities into being and new destinations on the map. Our design offers a systematic and adaptable strategy for the existing forces and creative drive within the city that will shape the city's future character. The structure is both an infrastructure for mobility and one for place-making: conceived to positively foster the changing of its immediate urban programs and the evolving growth of the city around it. The stations and towers are catalysts for the city's ecological and urban ambitions, but also creators of new urban experience and identity.

The Gothenburg Cable Car will continue the reimagining of the city as a vibrant place where two sides of the water become one, the port and ship building pasts meet a data-driven future, the architectures of concrete, steel, and timber converge with pixels and bits and, even as the city expands, local feeling and identity remain.

GOTHENBURG 2021

"The Cable car is not only about building a new landmark - it is about uniting the city, working together towards the future.

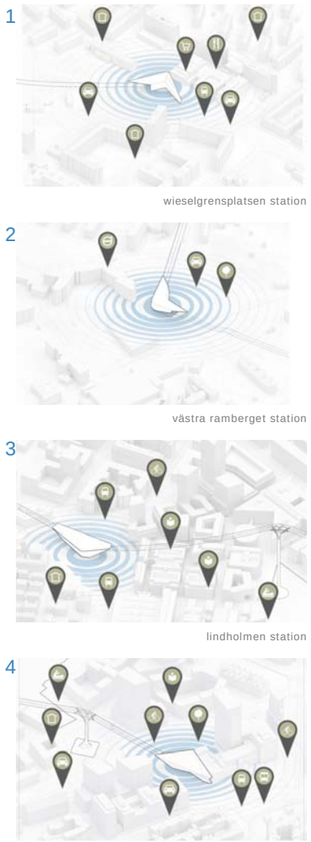
infrastructures of place:

The design offers an adaptable system, an architectural strategy for situating the proprietary infrastructure of the Cable Car stations and towers seamlessly within diverse urban neighborhoods. Unlike utilitarian infrastructures which often are indifferent to and disruptive of the historic fabric of places, the stations employ a language of seamless enclosure and connection: removing barriers and forced direction, offering an intuitive sense of access and movement, and enhancing the existing flows around them. The users will find their way naturally and the non-users will find enticing short-cuts and amenities to draw them in and through. Where the towers contact the ground, they will land in ways that unexpectedly produce sheltered places of gathering beneath them. Both will provide new public spaces for meeting and interaction, strengthening communities.

The station design is conceived as a fluid continuation of the context, an urban landscape, spatially extending what already exists into and around the platform. In concept, it is a folded urban surface wrapping-in the technical machinery of the cable car system and protecting the users from the elements. Urbanistically, the station structures form connections at different levels with existing and future programs—urban squares, parks, restaurants and cafes, hotels, offices, and residential de velopments. They are embedded in each neighborhood where they land and catalyze future planned development. Architecturally, the stations comprise a hybrid of the sculpted and solid concrete piers and a platform with engineered timber beams and ETFE pillow roof structure combing over the top.

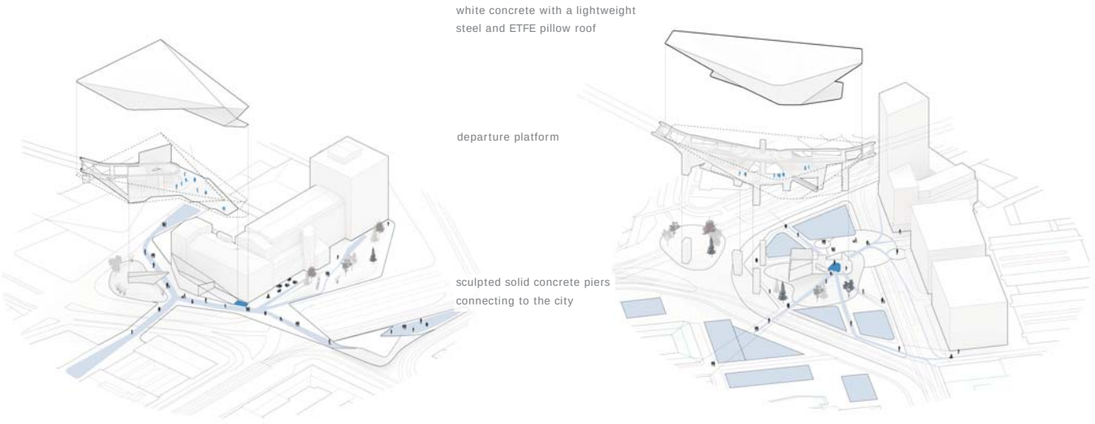
The towers, emerging from the same DNA as the stations, act in dialogue with each other and their surroundings. Also a fusion of a concrete base shaft interlacing at the middle with lightweight steel tower above, these structures create a delicate branching expression against the sky and their solid three-point base supports produce a covered public gathering place. The hollow shaft within each tower creates an unusual oculus to the sky above. The towers will be icons grounded in a sense of place, forming new places where Gothenburg will meet and interact, whether within a bustling square, a relaxing green park, or an island in the water.

cable car overview · 1:10 000



Site planning at each tower and station envisions quality place making from opening day through to the transformation of surroundings as urban improvement advances over time. Always a connector, a gathering place and a destination, the cable car structures produce programmatic anchors for a densified, ecological, secure, connected and compact future city.

"The Cable Car is the start of the future of Gothenburg, a sustainable compact and green city open to the world proud to be handed down to future generations.



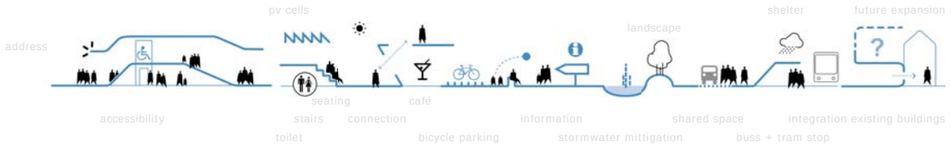
perspective view / Lindholmen

perspective view / Lindholmen

perspective view / Lundby

perspective view / Järntorget

here we go:



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view from Masthamnsgatan

for all:

The design for the cable car gives equal consideration to those who will not use it. A seeming paradox, this is instead a paradigm shift which also places focus on the non-user and answers the essential question how the cable car can be of benefit for all. The proposal identifies three different user groups and gives their specific needs equal importance:

The **one-time user** may be the tourist, who rides the cable car as an amusement and a way to see the city. Their experience will consist of arriving in town, finding the stations, purchasing tickets, and ascending towards the view over Gothenburg.

The **frequent user** may be a commuter, simply aiming to get from point A to point B as quickly, comfortably, and safely as possible. The cable car for the frequent user needs to simple and fast, making it easier and more attractive to manage daily life on foot, by bike and by public transport in a seamless combination.

The **non-user** may have little interest in the cable car system, but it must still enhance the experience of their daily life. Because the stations and towers are conceived as the seeds of new public spaces and programs in the neighborhoods where they land—supporting encounters with people, art, food, music—they will foster new social and urban vitality.

a seamless experience:

The cable car can only be successful when providing for all user groups while functioning fluidly and intuitively as a means of transportation. Functionality and accessibility together with security and safety – "upplevelsen av trygghet" – lie at the core of our design. The tempo of contemporary life leaves little time for waiting, so the tourist or commuter experience must be as fast and comfortable as possible, from the street to the station through the air and back to the street. Our design shapes space for intuitive wayfinding, with stairs and bike ramps, escalators and elevators all receiving riders in direct lines of trajectory from their approach to the station up onto the platform. Site planning at stations and towers creates connections that improve the urban fabric to enhance the flux of people and traffic. The design adopts a strategy of accessibility for everyone and deliberately makes no distinction between persons with disabilities and others.

connected travel:

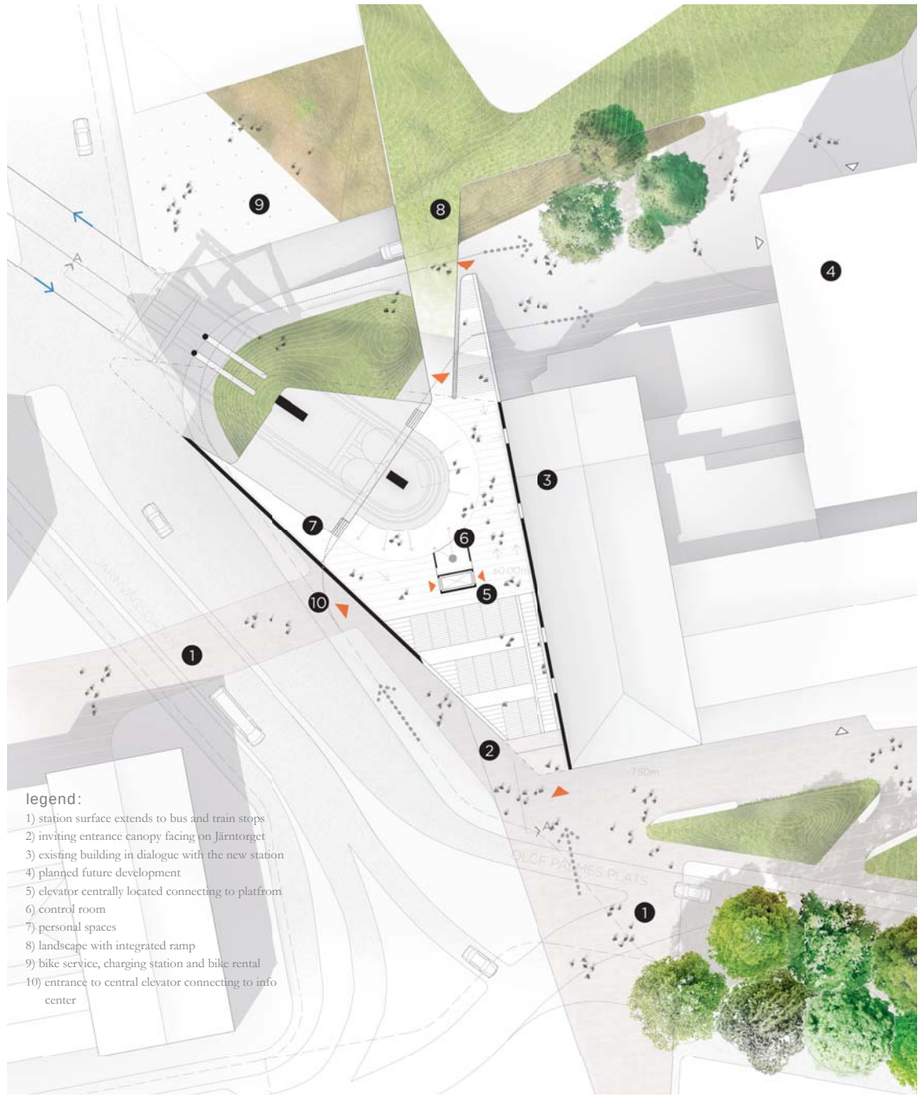
The Cable Car will be the center point for a multitude of different means of transportation, a transport hub connecting the variety of transportation means that radiate from it. They will simplify intermodal changes from existing networks of trams, buses, cars, cabs, taxis, ferries, boats and bicycles, ensuring accessibility for people with disabilities not only to the cable car, but across the entire network. This should include Mobility As A Service (MAAS), a concept of integrated mobility solutions provided as a service creating and managing personized travel solutions.

flow:

The natural light and wood interior of the stations are welcoming: queuing is arranged in wide isles within ensuring a smooth flow of passengers. These queuing isles form a generous pedestrian path wide enough to bring a bicycle. The design anticipates that a group may enter the cable car, including one with a bike or wheel chair, and queuing spaces allows such groups to remain together. The stations provide two parallel flows for entering and exiting. During peak hours the design allows for separation of the two to ensure a rapid and natural flow of travelers.

come on in:

Ample ticketing and associated queuing space is provided within the stations. Day one, ticketing will be fully integrated with the system of Västtrafik. In the future ticketing could change to a system with open control points, sensing and permitting through riders with physical tickets or phone apps without having to take it out of their pocket. Stations will have a ticket vending machine with clear wayfinding and instructions. The gates will close for a user without a valid ticket. This reversed system is to avoid breaking the flow of people passing the ticket control and communicates that all people are welcome and trusted.



legend:

1) station surface extends to bus and train stops
2) inviting entrance canopy facing on Järntorget
3) existing building in dialogue with the new station
4) planned future development
5) elevator centrally located connecting to platfrom
6) control room
7) personal spaces
8) landscape with integrated ramp
9) bike service, charging station and bike rental
10) entrance to central elevator connecting to info center

siteplan · 1:400

siteplan · 1:2 000

J-Station:

In the complexity of Järntorget, the Cable Car Station creates a clearly defined place between this square and Heurlins Plats, establishing a natural connection between the two and beyond. It transforms the existing public square to a more connected and functional transit space. The tangle of street car lines, car and bus routes, bicycles and pedestrians, physical barriers and infrastructure characteristic of Järntorget is relieved. The station includes functional programming that supports the surrounding community, such as bicycle storage and maintenance and an information center. In addition, it connects to the Folkteatern and future hotel development.

The surface that gives shape to the station and the context stretches out in a paving expression to introduce the station at the bus and train stops on Järntorget across Olof Palmes Plats to communicate clearly for intuitive way finding from and to the station and connecting seamlessly to existing public transportation networks. In addition, secondary access to the north draws in riders arriving from future development toward the waterfront.

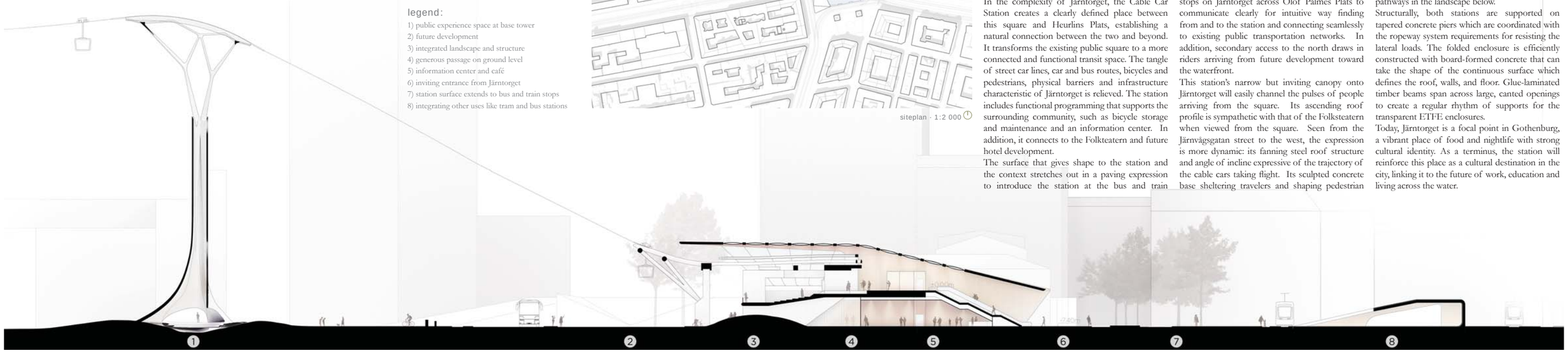
This station's narrow but inviting canopy onto Järntorget will easily channel the pulses of people arriving from the square. Its ascending roof profile is sympathetic with that of the Folksteatern when viewed from the square. Seen from the Järnvågsgatan street to the west, the expression is more dynamic: its fanning steel roof structure and angle of incline expressive of the trajectory of the cable cars taking flight. Its sculpted concrete base sheltering travelers and shaping pedestrian pathways in the landscape below.

Structurally, both stations are supported on tapered concrete piers which are coordinated with the ropeway system requirements for resisting the lateral loads. The folded enclosure is efficiently constructed with board-formed concrete that can take the shape of the continuous surface which defines the roof, walls, and floor. Glue-laminated timber beams span across large, canted openings to create a regular rhythm of supports for the transparent ETFE enclosures.

Today, Järntorget is a focal point in Gothenburg, a vibrant place of food and nightlife with strong cultural identity. As a terminus, the station will reinforce this place as a cultural destination in the city, linking it to the future of work, education and living across the water.

legend:

1) public experience space at base tower
2) future development
3) integrated landscape and structure
4) generous passage on ground level
5) information center and café
6) inviting entrance from Järntorget
7) station surface extends to bus and train stops
8) integrating other uses like tram and bus stations



section · 1:400

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view from Karlavagnsgatan

L-Station:

At Lindholmen, the Station lands in the historic center between highly diverse areas of housing, Chalmers Lindholmen, the Science Park and Gothenburg Studios. This station has a unique opportunity to be the centerpiece of future development, connecting between these diverse functions, old and new. Our design proposal transforms the existing traffic circle and parking structure into a new urban transit node that can be developed with restaurants, cafes and other commuter and tourist amenities. As the pass-through station is quite large relative to its context, we propose a bermed landscape beneath it to connect the higher elevation of the adjacent residential area down to roadway level across the site and to ease access to the platform level, thus reducing the perceived scale of the Station within the neighborhood. As at Järntorget, a durable series of sculpted concrete piers supports the platform above and carefully shapes the urban pedestrian and vehicular flows below. Interlaced with this concrete base at the platform level are engineered timber beam and ETFE enclosures, folding over the top, and expressing the trajectories of coming and going cable cars. Station platforms within are sheltered from the weather and flooded with daylight. Glass lifts, escalators, and stairs convey riders easily up and down to each side of the platform. The mezzanine level provides areas for car storage and maintenance, as well as public amenity programs.

> "The Gothenburg Cable Car will connect the city where nothing is far away.

legend:
1) tram stations
2) main entrance with escalators and stairs
3) a café on ground level below departure level
4) bicycle parking rental
5) possible future development
6) entrance to elevators on ground level
7) view connecting ground level to departure level
8) station surface extends into direct surroundings

siteplan · 1:400

a sustainable city:

Sustainability demands a holistic approach, taking into account social and ecological challenges and opportunities of place, and the Cable Car design aims to fulfill an important role to ensure a sustainable city of Gothenburg minimizing environmental impact.

By engaging existing, underutilized sidewalks and roadways with new, highly efficient public transportation technology, the greening of Gothenburg is a central mission of the Cable Car. Using the necessary structures and the related public spaces we have proposed as seeds for growing an ecological urbanism in currently underutilized spaces of the city, our proposal improves accessibility--better transit, bicycle and pedestrian planning as an architectural language of sustainability.

Natural, renewable, and durable materials shape the architecture, the user experience with a humanist sensibility. The public areas around the towers are designed with lighting to create a natural visibility and sense of security in the evening. Flexibility and adaptability are key aspects of the design to ensure the city's wellbeing for the long run: the Cable Car's built elements are also infrastructures for growth, supporting programmatic changes in the surrounding urban development over time. Integrated vegetation and permeable surfaces ensure regulated storm water mitigation improving the urban environment as it contributes to noise reduction and improved air quality, both outdoors and indoors. An architecture of natural lighting, active and passive solar heating, wind control and carbon neutral or low-carbon construction materials makes sustainability a center piece of the identity of the newly created urban nodes along the system. With public toilet facilities, bicycle parking, landscape and hardscape integration and storm water management, these structures will set a benchmark for sustainability. Secure, durable, low maintenance and elegant, these urban interventions will enrich the city while enhancing its ecology.

material:

The folded surface of the stations is made of white concrete at the base, and interlaced steel beam structure over the top. The stations can be seen as a shelter from the elements like a "sydväst" protecting from wind and rain closed towards the prevailing wind from the west, but open where possible to communicate visually with the cable car system. Wood paneling on the inside of the surface provides a warm interior with comfortable acoustics. Natural light is brought into the center of the station through lightweight roof structure with ETFE cushions filtering light to generate a pleasant and calm atmosphere, an atmosphere of security and safety.

siteplan · 1:2 000

sound:

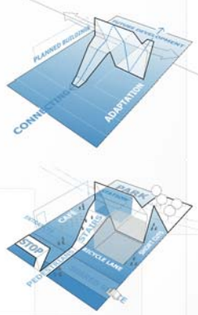
Ropeway technology has innovated quickly, especially since it has been implemented in urban settings for public transportation. Sound and vibration mitigating strategies—such as dampening sheaves, low-noise bullwheel design, and optimized cable grip alignments—have been developed by the ropeway manufacturers to increase passenger comfort and greatly reduce environmental disturbance due to noise. These silent systems may allow for semi-open structures integrated seamlessly in urban areas.

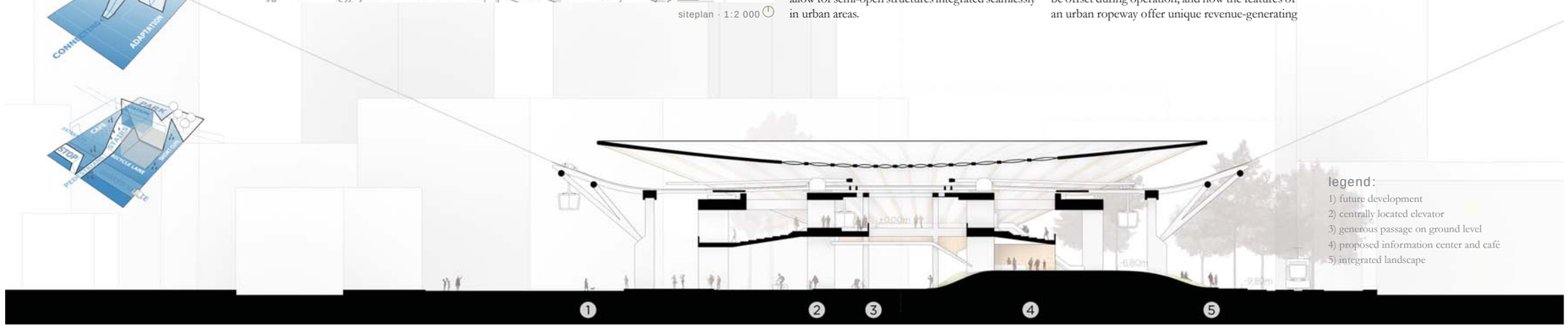
cost:

In order that the towers' structure and the sophisticated design of the stations avoid the potential for preliminary budget overruns, the team advises that budget analyses for construction costs are undertaken based on the concepts at the earliest stage for value management. Costs of the system as a whole should be considered in coordination with a ridership and revenue analyses to assess how the capital costs for construction can be offset during operation, and how the features of an urban ropeway offer unique revenue-generating public benefits that other public transportation systems lack. The future economic development potential associated with the improved urban form and transportation integration at the stations should also be considered.

> "The Cable Car connects the city to the water, it connects the people by enriching urban space.

perspective view / Lindholmen





legend:
1) future development
2) centrally located elevator
3) generous passage on ground level
4) proposed information center and café
5) integrated landscape

section · 1:400

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view from Diagonalen

tower design:

Inspired by both the masonry solidity of the city's medieval past on the south, and the dramatic steel harbor cranes of Gothenburg's collective shipbuilding history on the north, the Cable Car towers are a hybrid of concrete below and steel above. Structurally, each ropeway tower springs from grade on an efficient tripod base that narrows to a slender shaft with a dynamic trefoil cross-section. This portion of the tower is made of high performance concrete, and gives way to the branching upper structure which supports the saddle, and is envisioned to be made of darkened stainless steel. Both the high performance concrete and stainless steel are appropriate materials for a robust infrastructure located in a marine environment since both are resistant to corrosion caused by exposure to salt water and do not require coatings or paint which often need a costly routine maintenance plan. The tri-pod base, the central shaft, and the steel crown offer a highly adaptable system for use in different settings.

The tower design places focus on the inside of the structures as well as the outside, framing urban plaza, landscape and water recreation spaces below, with an aperture to the sky above framed through its hollow core. The towers will introduce unique and recognizable structures into the skyline while making places below where Gothenburg meets and interacts, whether in a bustling square, a relaxing hang out, a green park or a design attraction in itself. The landscape underneath the tower is slightly recessed to define the place and allow for differentiation in character and usage during the seasons.

Järntorget Tower:

Along Emigrantvägen the tower creates a new urban event in between Järntorget and Göta Älv. Situated in a new parkland within the future development of the waterfront, the base of the tower forms a sheltered amphitheater. On a sunny day in spring people gather underneath the tower to relax and meet, with light offerings of food, coffee or beer, and present music, art or performance. On a rainy autumn day young children play in the water collected in the shaped landscape securing controlled storm water runoff for the larger context.

Lindholmen Tower:

Located in the water in front of Lindholmspiren and extending the square at Diagonalen the tower provides for a unique place on the water. A wooden pier beneath the tower tri-pod provides an urban beach, a place to watch the city in the evening, a dock for arrival by boat.

lighting design:

In the evening, the Cable Car system will awaken, the towers becoming integrated beacons and points of orientation within the Gothenburg skyline, and the stations creating hubs for the city's nighttime pulse. The lighting design will be carefully employed to create an atmosphere of comfort and safety throughout the system. Long-life LED fixtures will be employed throughout the system for high quality illumination and low operation and maintenance costs. Lighting controls will be on a GPS based time server, synchronized across the system and pre-programmed to adjust for the seasonal variation in daylighting.

At the towers, 3 high-output LED flood lamps mounted in protective housings at grade will bathe the outer shaft and crown in soft white light, rendering the sculptural form and giving it nighttime presence without over-lighting. Additional LED flood lights mounted within the hollow center of the tower shaft, focused up and down, will create a bloom of light from within at the branching crown of the structure and at the public area sheltered at the base.

At stations, the timber and ETFE roof structure is up-lighted from within to create a distinct, softly glowing expression to orient and invite the public in. LED up lights give the concrete based structure a subtle visibility, while low lights in the surrounding landscape, stair and escalator balustrades and on the platform clearly illuminate pathways while concealing the lighting sources from view.

Cars are externally illuminated with integrated continuous linear LED fixtures, to appear at a distance as 'bubbles' floating back and forth across the water. Low lighting at the interior below the seating level minimizes glare within, making the views of the city at night as dramatic as possible.

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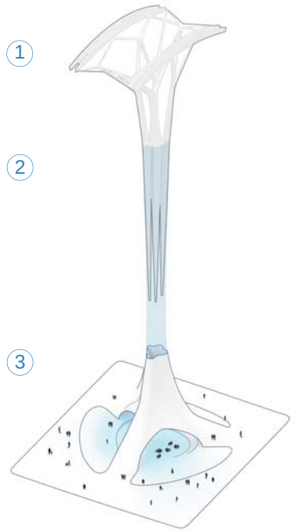
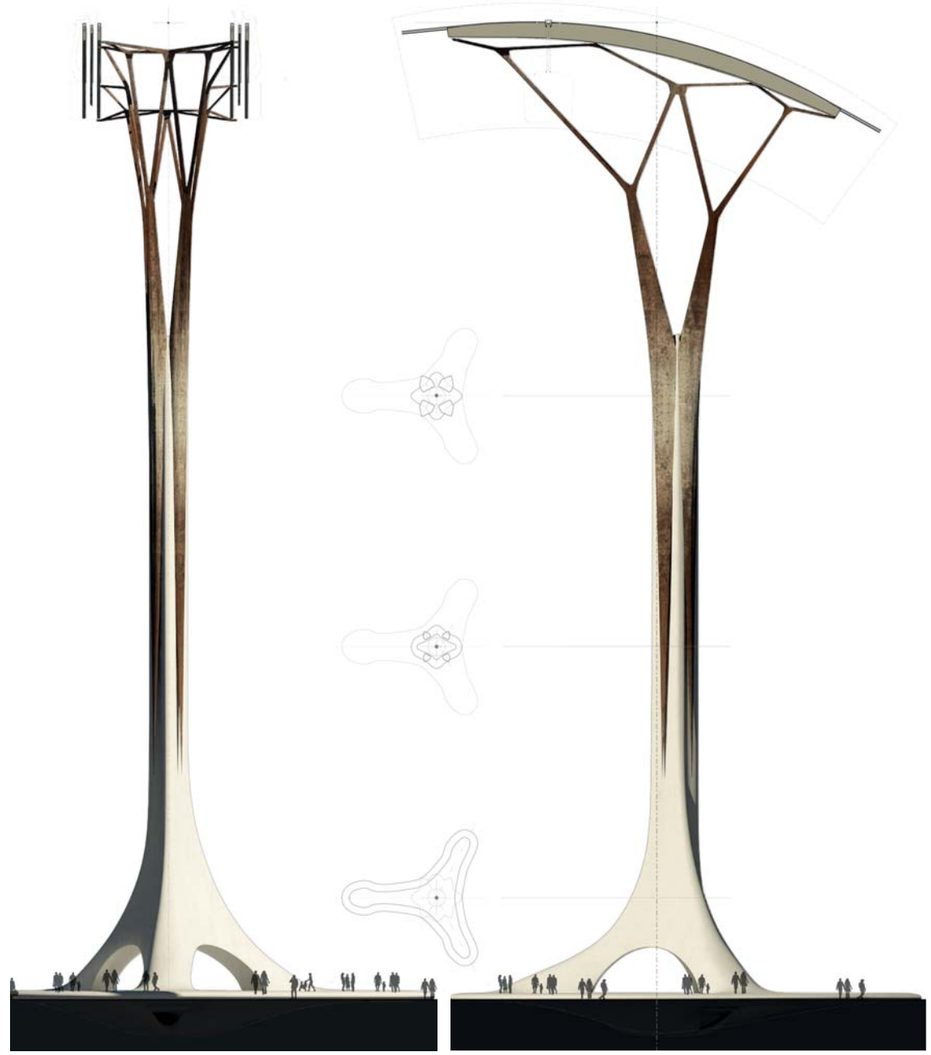
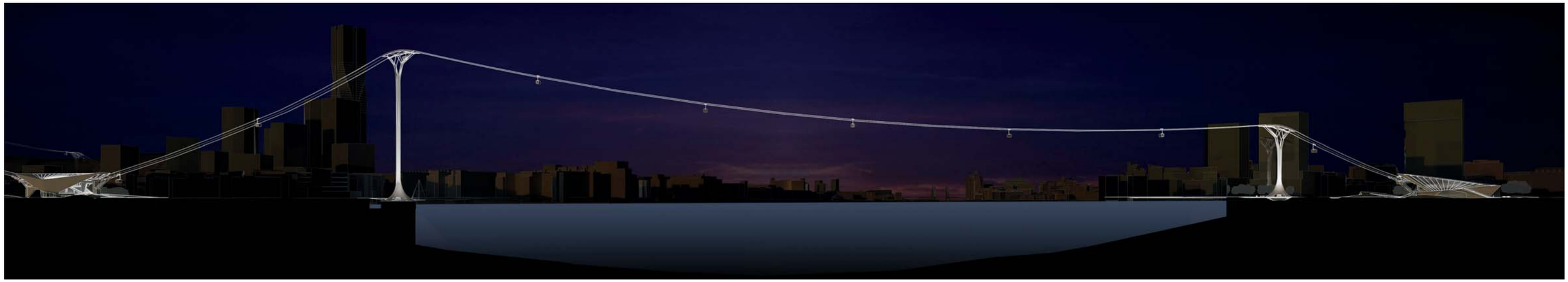




elevation 65m tower · 1:200

The tower consists of a concrete tri-pod base, the central shaft, and the steel crown. The base is adaptable for different context. The central shaft - reminiscent of the trunk of a tree - can be adjusted to the required tower height while the crown and the base remain the same.



section · 1:2 000