THE RE-USE AND RE-ACTIVATION OF NORDSTAN PARKING GARAGE

MASTER THESIS IN ARCHITECTURE 2013
CHALMERS UNIVERSITY OF TECHNOLOGY

ANNA GYLLENSWÄRD
MARTINA BOYTON

STUDIO: MATTER SPACE STRUCTURE
EXAMINATOR: MORTEN LUND
TUTOR: JONAS LUNDBERG

HOW TO DENSIFY CITIES AND REACTIVATE INEFFICIENTLY USED AREAS WITHIN THE CITY?

More and more people are moving into cities which in turn are growing larger and larger. Recent studies show that the housing density at the same time has decreased, and that one reason for, this so called urban sprawl, could be the emergence of the suburbs. Consequently distances between different functions and areas of the city has become larger and therefore the dependence of cars are increasing. Huge parking areas dominates large areas of the city and create big barriers for its inhabitants. Cars have in some cases taken over the role of the pedestrians. When it comes to achieve a more lively and well-functioning city, reducing the dependences of cars, cities must be built more dense. Parking garages structures and open parking lands are areas that often stand empty, and are inefficiently used.

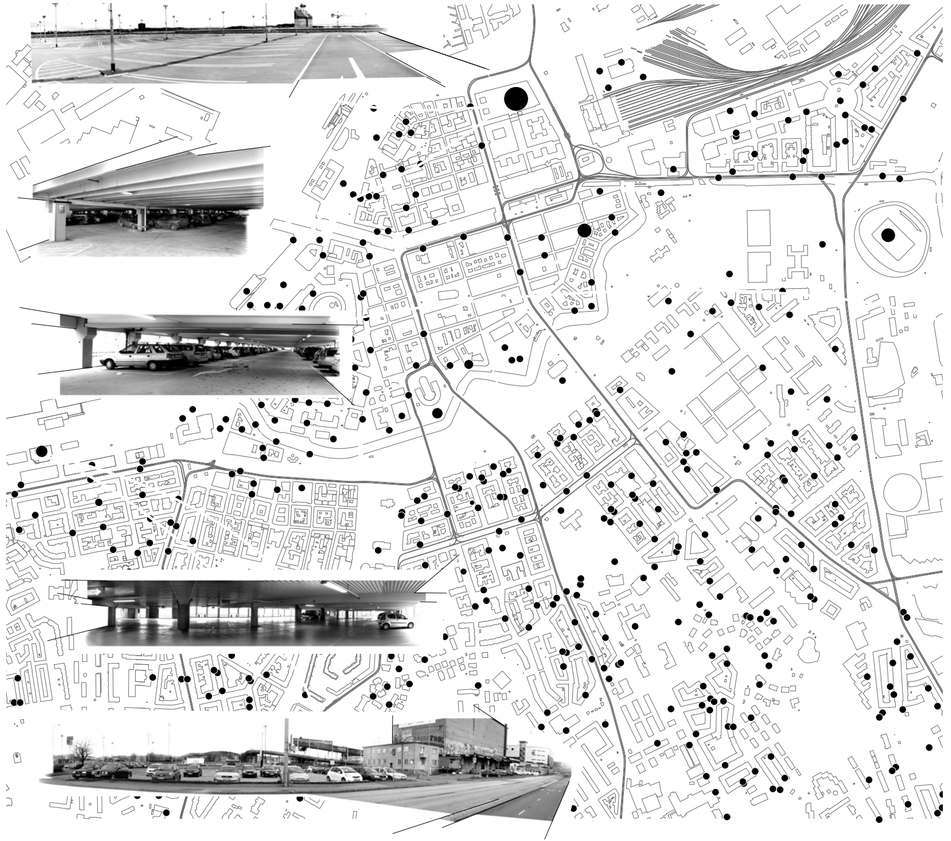
This project aims to develop the idea of activating garage structures, 24 hours a day, 365 days a year. The site chosen for the project is an existing parking structure, called Nordstan parking garage, located in the centre of the city Gothenburg. The parking garage, with its area of over 80000 square meters, divided on 9 floors, has the ability to provide 2720 cars with parking spaces. The usage of the parking spaces seldom reaches over 70%, leaving a big area empty.

By placing public areas, with flexible spaces that can increase and decrease during the day, the Nordstan garage will be a place for the inhabitants of Gothenburg to stay at. The ideas shown in this project can later be used on any garage around the world and areas that today often stands empty will be activated in a way never seen before.

EXISTING CONDITIONS

A COMPLEX PROBLEM

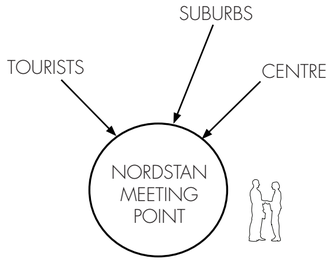
Spots of parking in central gothenburg, where the land area is inefficiently used. During daytime the parking spaces are mostly used by the office workers from nearby areas and in the nighttime the areas are mostly used by inhabiters in nearby residential buildings.

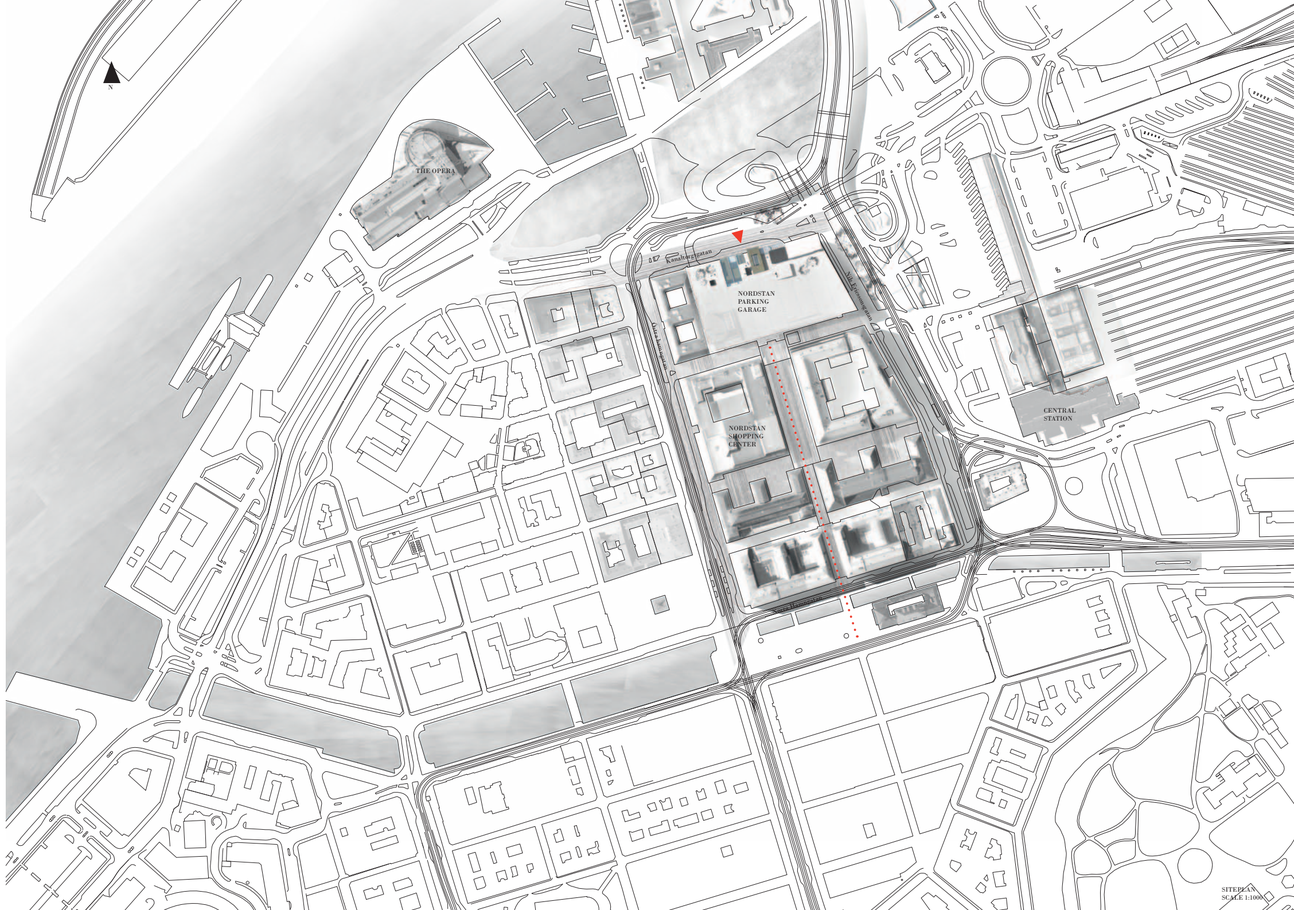


CONTEXT - NORDSTAN SHOPPING MALL

Nordstan shopping mall with its garage is situated in the middle of gothenburg and is one of the largest shopping malls in scandinavia, surface area counted. The mall is spread over eight blocks connected with pedestrian paths and occupies an area of 72300 square meters in total. More than 200 stores are found in the mall and about 150 offices are situated in the same complex. during year 2010, Nordstan had approximately 37 millions visitors. The mall connects directly to the train station, the large tram stop called Brunnsparken and the Göta Älv river with the city opera nearby. Due to its location Nordstan is a meeting place where a wide variety of people meet. People from the city centre, from the suburbs of Gothenburg and tourists from all over the world get together here.

The garage itself is situated closest to the river and creates a large barrier, both visually and physically. The flow of pedestrian towards the river practically stops because of the location of the garage and visitors and workers within the area have no chance to catch the beutiful view over the river. Still Nordstan is a great meeting point but with its function, dominated by shopping, it is not a place where people stay during a longer period of time. This projects will add new functions to the site and with these functions, Nordstan will hopefully be a place where people can relax, meet and stay.

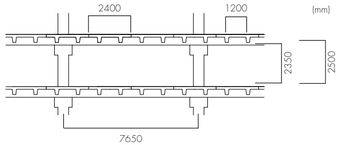




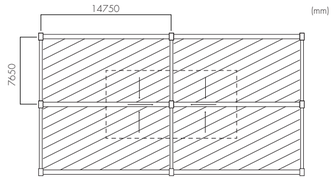
EXISTING STRUCTURE

STRUCTURE DIMENSION DRAWINGS

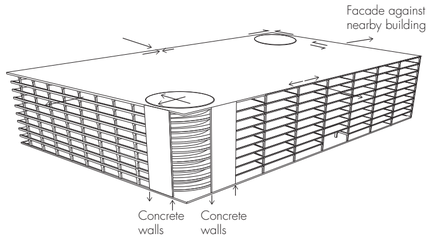
SECTION ROOF PRINCIPLE



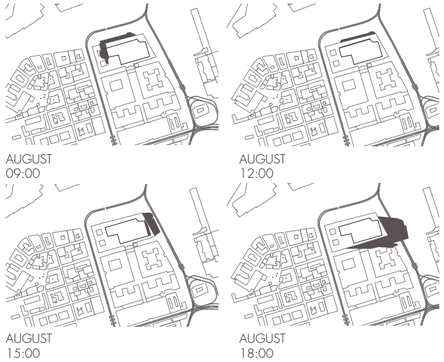
PLAN PRINCIPLE OF ELEMENT



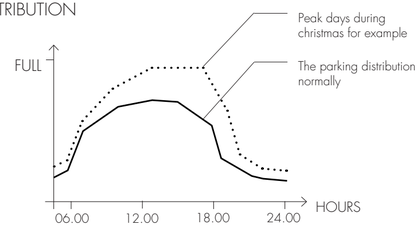
EXISTING BEARING PRINCIPLE PILLAR BEAM SYSTEM



SUN STUDIES



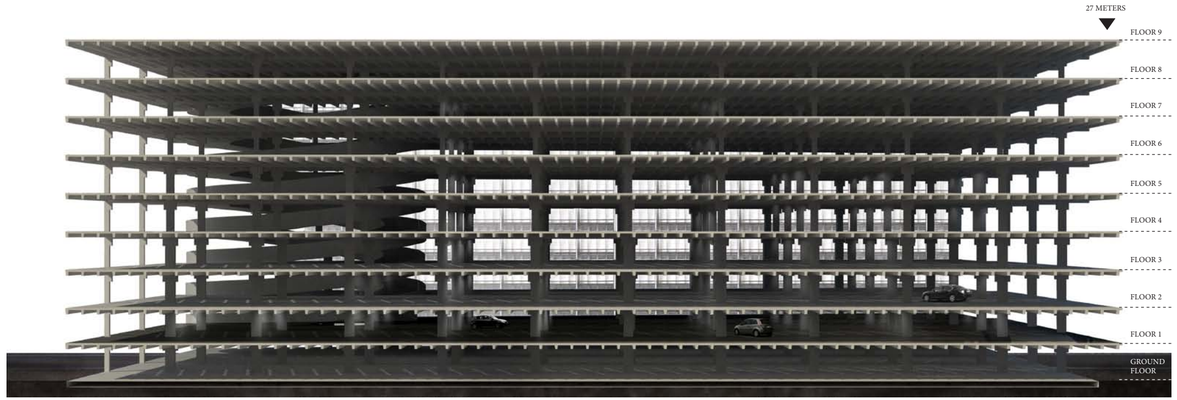
PARKING DISTRIBUTION

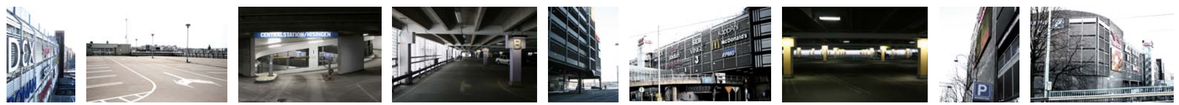


CONSTRUCTION AND CLIMATE

The structure today is made of pre-fabricated concrete elements. It is engineered based on a pillar slab system, where the slabs are made of pre fabricated tt-cassettes (cc 1200 millimeters). The building is built like a house of cards, where the slabs are placed on the vertical pillar bearings. Wind loads are taken by the facade against the nearby building and the concrete walls around the corner of the circulation point. In the existing structure, no indoor climate is present, except for an elevator shaft close to Nordstan shopping centre, on the south facade. Except for that, air flows free in and out creating an outdoor zone in the entire garage.

CROSS SECTION OF EXISTING STRUCTURE

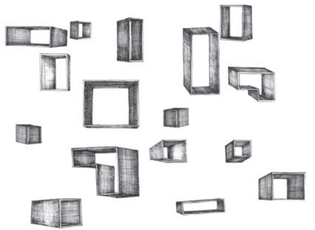




CONCEPT

SPACIAL CONCEPT

The spacial concept is to keep most of the existing slabs and place new solid volumes inside the structure, centrally along the facade and vertically from the ground floor to the roof. The volumes create large and small rooms, both inside and in the spaces in between, where each new volume has indoor climate. Each parking slab is also connected in some way to one or several volumes, which in the end will make the garage area more safe and pleasant. All floors are connected with elevators and escalators.



NEW VOLUMES OF FUNCTIONS

KEEP MOST OF THE EXISTING
FLOOR SLABS

VOLUMES INSERTED IN THE
EXISTING SLABS

FUNCTIONAL CONCEPT

The proposed function for the building is a public space with activities for everyone. Because of the surrounding commercial and business functions in the area there is a large need for a public space for people to stay at.

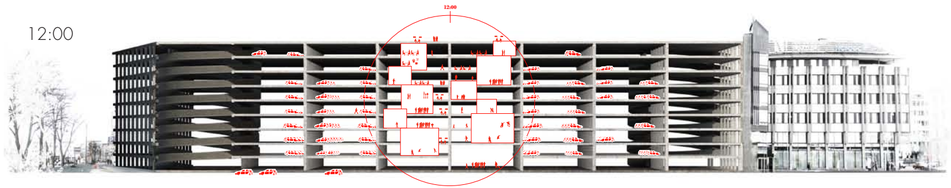
MIXED USED FUNCTIONAL PROGRAM
A public space with activities for everyone

RESTAURANT
CONFERENCE CENTRE
SPORT CENTRE
FOOD COURT
COFFEE SHOP
GALLERY
BAZAAR
YOUTH CENTRE
GRAND EXHIBITION HALL

ACTIVATION CONCEPT

The activation concept is to keep the building activated during most of the day and year. The functions can therefor expand into the parking areas when the need for parking is reduced. The same is also true for the opposite, where new volumes can be turned into parking spaces when needed.

12:00



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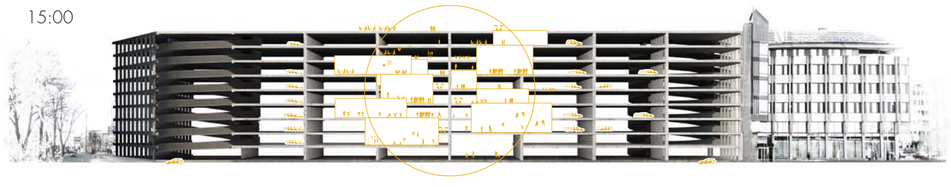

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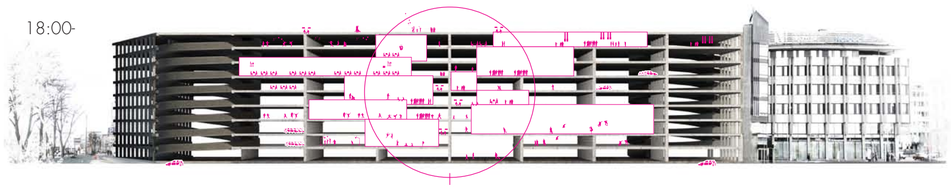


HOW TO ATTACK THE MONOTONIC STRUCTURE

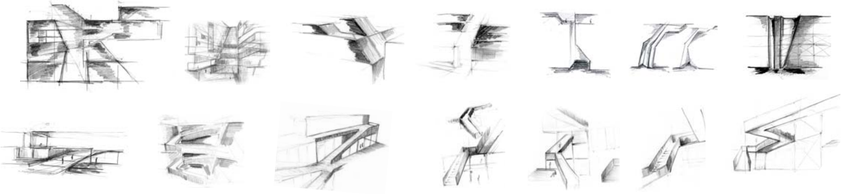
Exterior and interior drawings

Public rooms

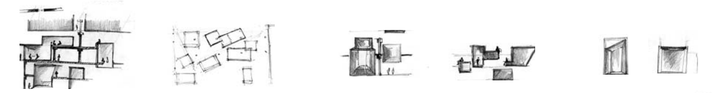
Zoning

Openings

Communication



Spaces in between



Volumes in existing structure

ATTACK THE MONOTONIC STRUCTURE WITH OPENINGS AND SLITS

The low ceiling height are enhanced by openings and slits. The differences between the low and the high create contrasts in space and light experiences.

The model shows how continous large floor plans let little light into the deep structure. New openings and slits will bring light into the structure. Small openings give diffuse light qualities and overviews.

ATTACK THE MONOTONIC STRUCTURE WITH VARYING CEILING HEIGHTS

Volumes create different spaces of sensations within each volume. The spaces they create in between also create different sensations for the visitor. Low ceiling heights and large open slabs become interesting with walls and openings.

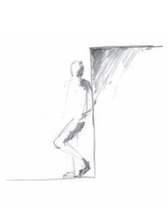
WITH VOLUMES INSERTED IN DIFFERENT LEVELS

Situations for inserting volumes between slabs. Create places for sitting, standing, views out, interactions and meetings.

Openings create overviews and communication

Double sitting possibilities

Sitting height



Standing height

WITH REFINEMENT OF EXISTING CONCRETE ELEMENTS

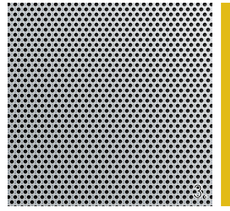
The existing slabs and pillars made of concrete are diamond polished. In this way dirty, gray floors are transformed into brilliant, easy-cleaned, environmentally friendly and durable floors. Concrete in itself is a sustainable building material in ways that it has a long lifetime, is fire resistant, damps noise from cars and can be used as an heat supply with its thermal properties.

MATERIAL PALETTE

1. Polished concrete floors simplify cleaning and enlightment
2. Walls of wood create warmth in the overall hard concrete structure
3. Perforated steel panels get glimps of activities from volumes
4. Colorized concrete

WITH ARTIFICIAL LIGHT

WITH COLORS



DESIGN PHASE

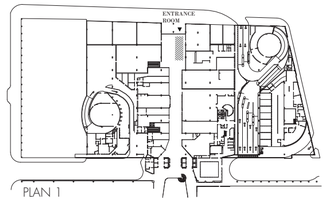
DRAWINGS

SECTION DRAWING
SCALE 1:100

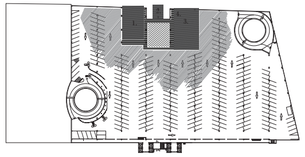
EXPANDABLE AREA

SECTION DRAWING
SCALE 1:100

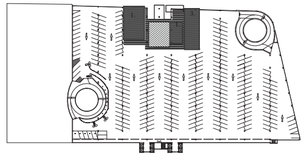
FLOOR PLAN ORGANISATION



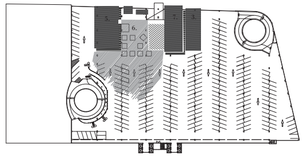
PLAN 1



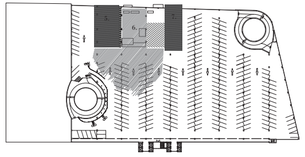
PLAN 2



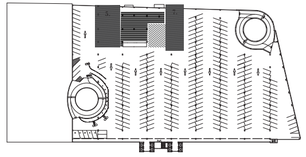
PLAN 3



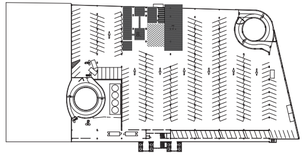
PLAN 4



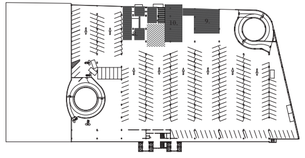
PLAN 5



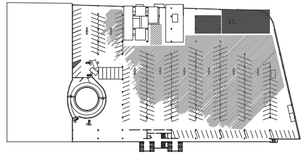
PLAN 6



PLAN 7



PLAN 8



PLAN 9

PERMANENT FUNCTIONS

SPACES IN BETWEEN

FLEXIBLE AREAS

COMMUNICATION AREA

Functional program

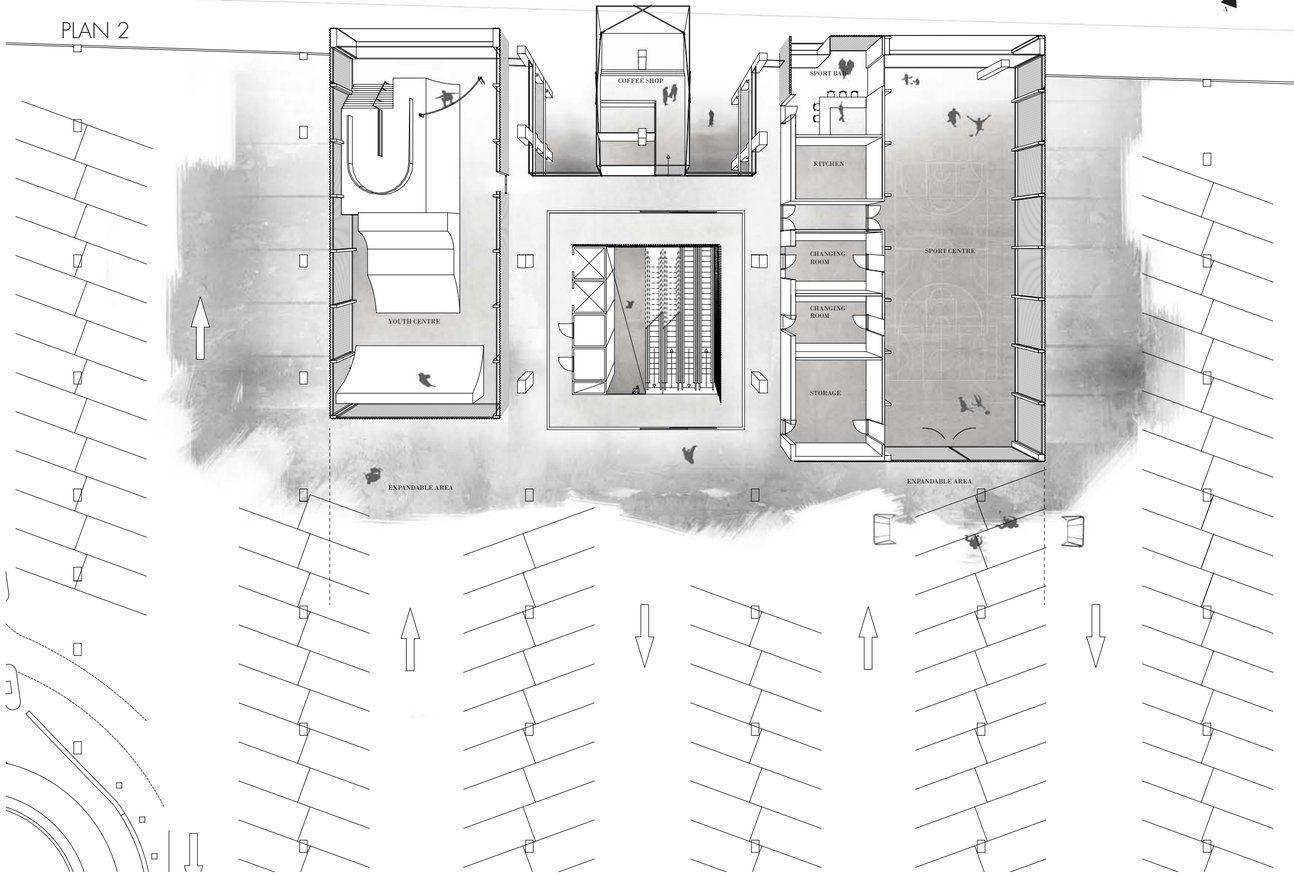
1. Youth centre	280 m²	7. Food court	275 m²
2. Coffee shop	65 m²	8. Gallery	660 m²
3. Sport centre	380 m²	9. Scene	120 m²
4. Sport bar	65 m²	10. Conference centre	240m²
5. Grand exhibition hall	330 m²	11. Restaurant	500 m2
6. Bazaar	825 m²		

Total areas

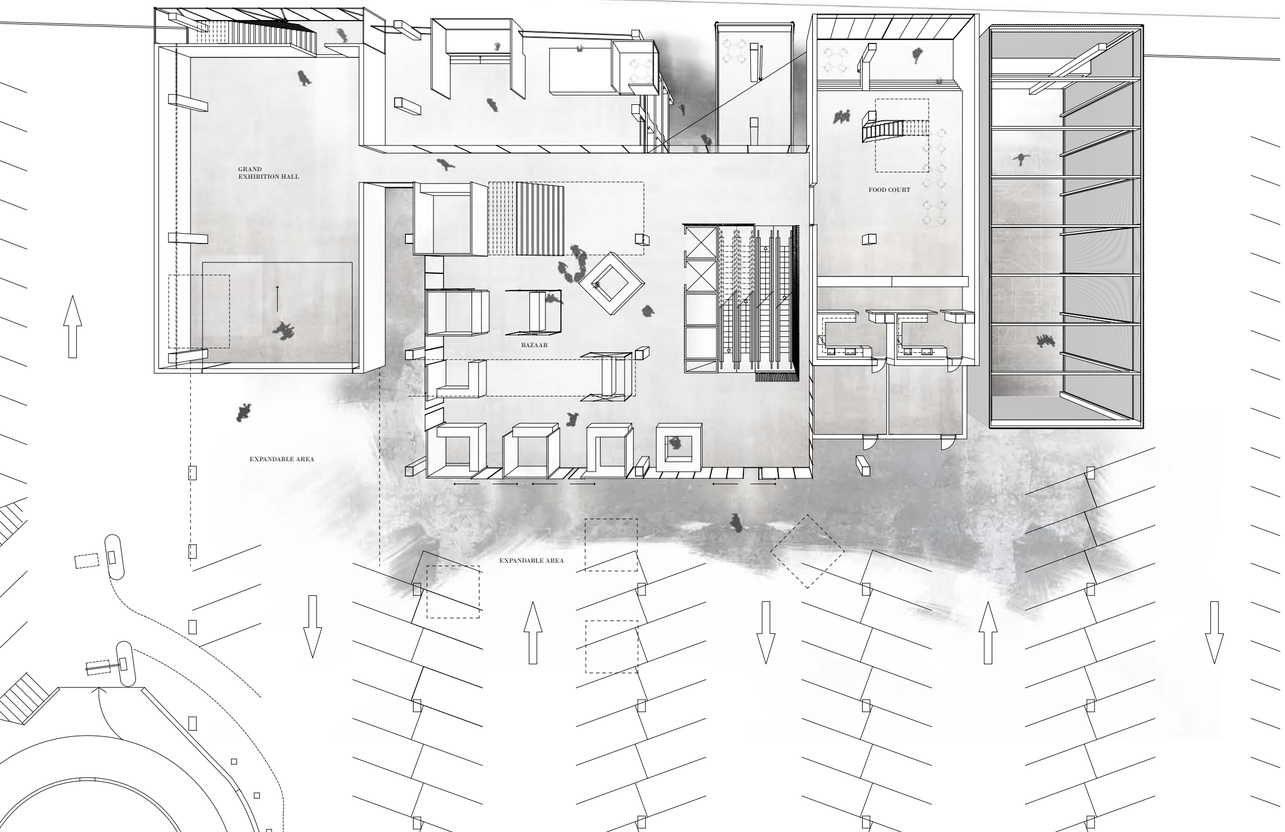
Existing parking area	82000 m²
Proposed permanent area	7700 m²
Spaces in between	1300 m²

11% of the total parking area is used

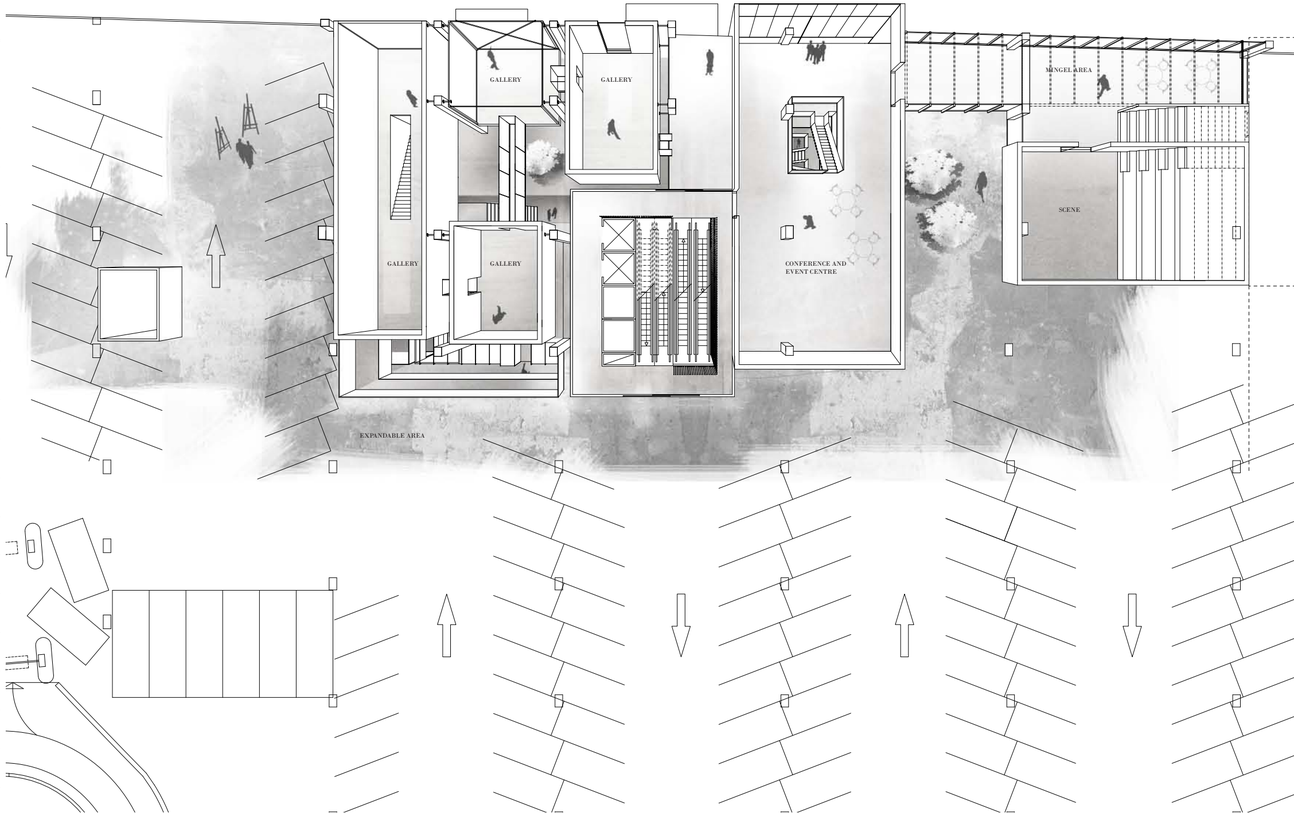
PLAN 2



PLAN 4


GRAND
EXHIBITION HALL
FOOD COURT
BAZAAR
EXPANDABLE AREA
EXPANDABLE AREA

PLAN 8


GALLERY
GALLERY
GALLERY
GALLERY
CONFERENCE AND
EVENT CENTRE
MINGLE AREA
SCENE
EXPANDABLE AREA

DESIGN PHASE

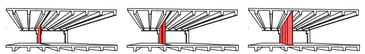
ENTERING THE BUILDING

FLEXIBILITY SOLUTIONS

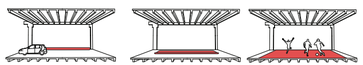
PARKING
SITUATION

MARKET
SITUATION

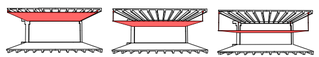
Walls on rails between tt-cassettes make it possible to enlarge areas during times when the amount of cars is small



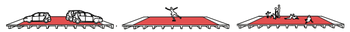
A foldable carpet is rolled out when the parking space is used by functions that demand an other ground cover than concrete



Rooms can be changed by textile hanging from the roof



Ground covering like grass are added on the roof which can be used for several function

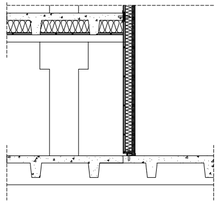


BAZAAR

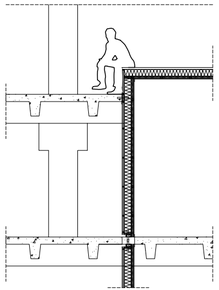
DETAIL DRAWINGS

Principle section drawings on how The new volumes meet the existing structure

Wall meets the existing structure and creates an indoor zone. Insulation are placed between tt-cassettes



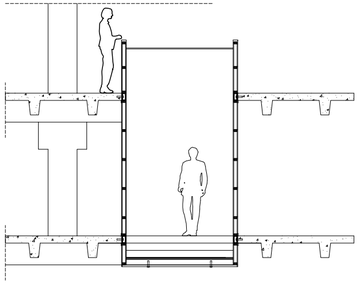
Wall and roof create an indoor zone and seem to cut through the existing structure



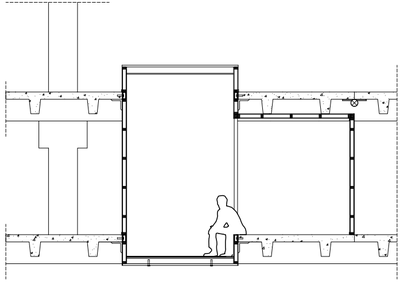
Ventilation and insulation installations

The space between the TT-cassette beams are used for installations of ventilation, electricity and insulation. The pipes are connected to the to two ventilation shafts in the Installation modules that are placed on top of each other.

Volume placed in an indoor climate zone between two slabs creating standing heights

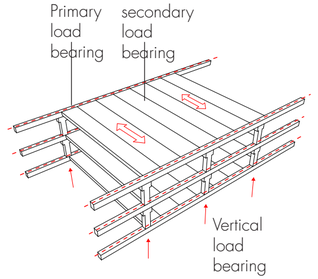


Volume placed between two slabs creating sitting heights



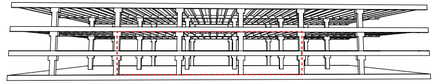
CONSTRUCTION PRINCIPLES

PRINCIPLE FORCE PATHS

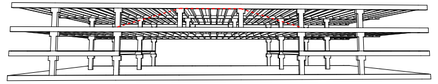


PRINCIPLE FOR REMOVING PILLARS AND CREATE LARGER ROOMS

A larger room shown by the red square wants to be created

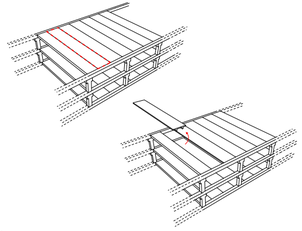


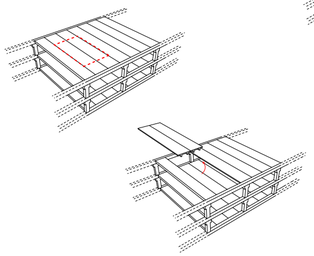
An arch on the floor above is added and takes the forces that the pillars earlier took



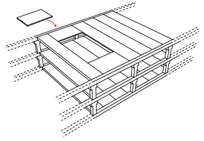
PRINCIPLES ON HOW TO MAKE HOLE IN EXISTING SLABS

Each tt-cassette can easily be taken away



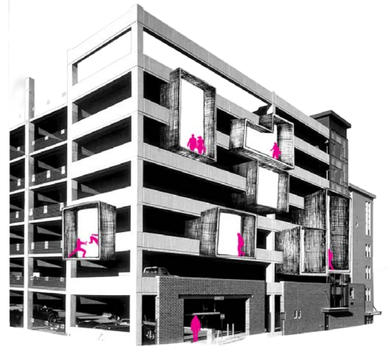


If a hole wants to be made in the middle of the slab, a third order bearing are put after tt-cassetes are taken away

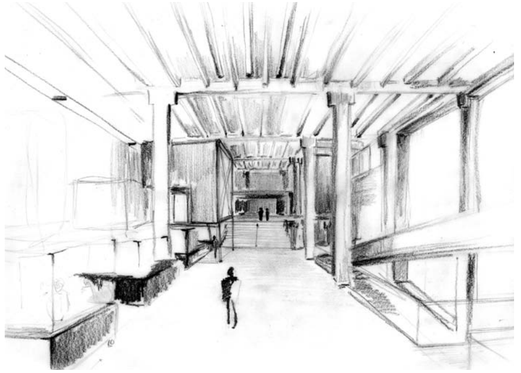


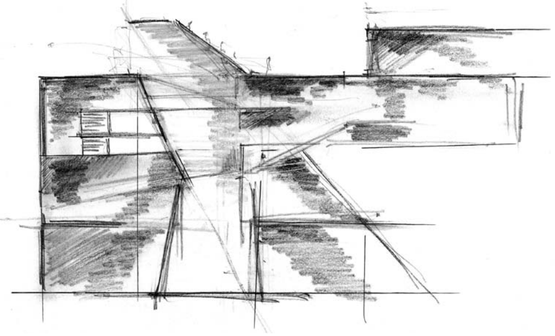
VISIONS OF FURTHER DEVELOPMENTS

The concept for the re-activation of a parking garage can be applied in a larger scale, on garages all around the world. The illustrations show conceptual visions for four randomly chosen garage structures. The choice of functions within the inserted volumes are dependent on the location of the garage. If the garage is situated in a residential area, the need of parking increases during evenings and nights, hence the added volumes will mostly offer daily activities. This project could be the start of celebrating the hybrid structures of humans and cars.



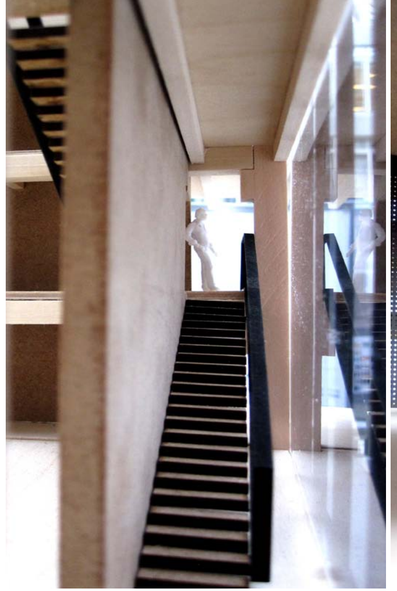
WORK PROCESS

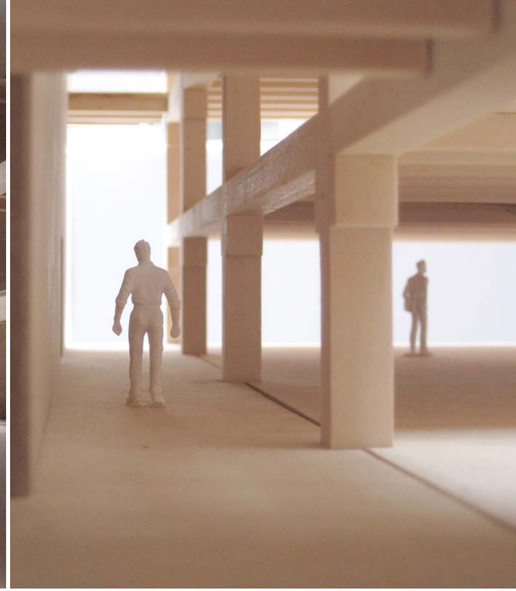




PHYSICAL MODEL

Final presentation model in scale 1:50. Showing light situation and new spaces. Visualises how the new elements meets the existing structure.





PHYSICAL MODEL

Conceptual model in scale 1:100. Showing how the new volumes are inserted into the existing grid.

In factory
hand made elements to
physical model

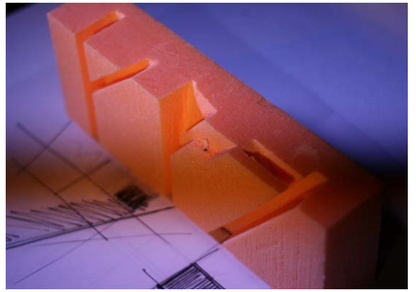
FInal roof

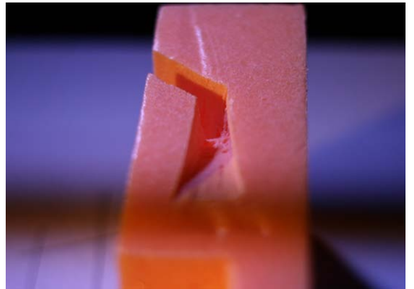
Concept model to analize
the experience of volumes

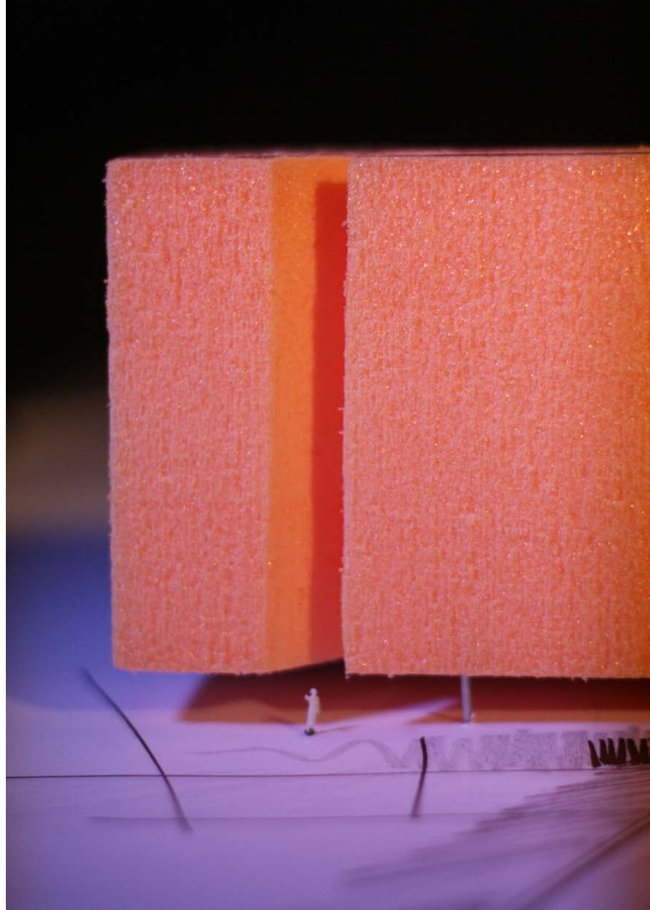
PHYSICAL MODEL

Conceptual studies in models. Investigating different light shafts and openings.

Light shaft investigations

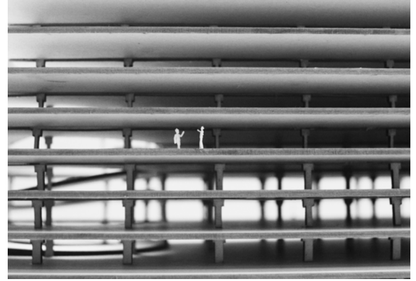


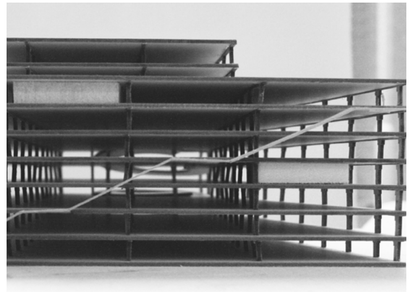


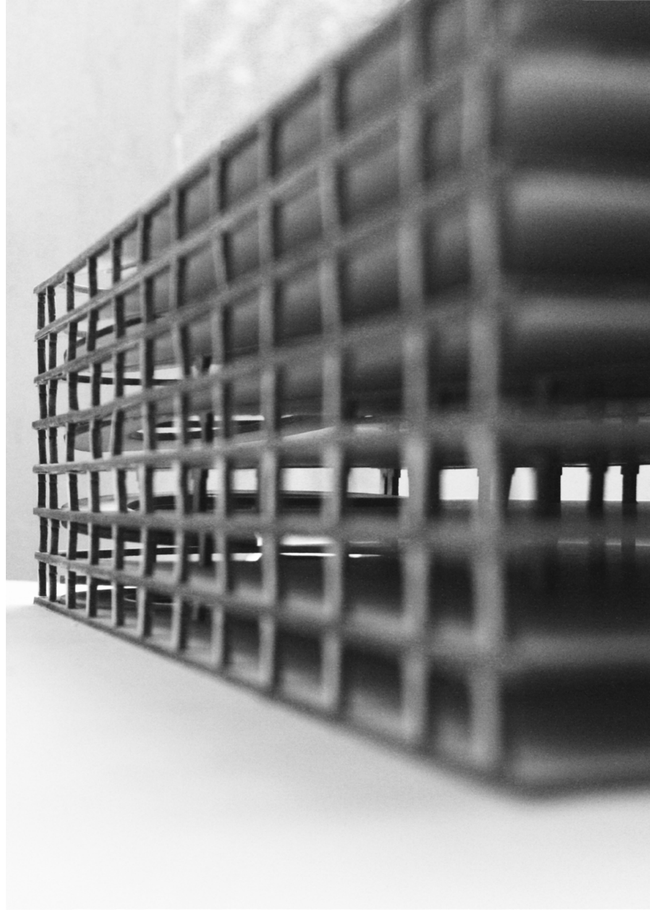


PHYSICAL MODEL

Model of existing structure in scale 1:400. Visualising the continuous floor slabs and low ceiling height.







PHYSICAL MODEL

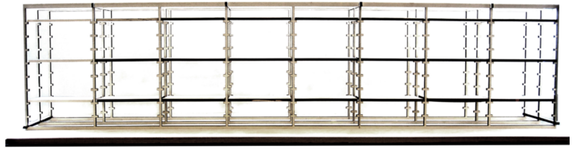
Studying how to open up the existing grid. Random or repetitive structure give different qualities.

The existing condition with 2.4 m ceiling height, creating narrow and intimate spaces

Every other kept, every other removed creating diversity.

Removing every other floor, creating larger and lighter spaces.

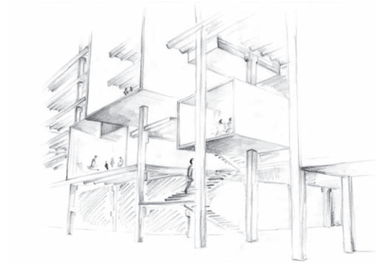
Larger differences between floors will experince more differences.



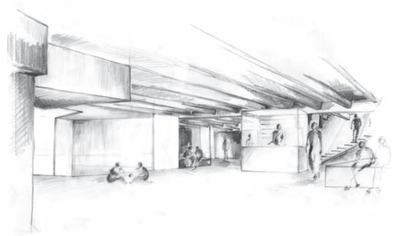
Removing every third floor, creating large and public scpace.

Random openings

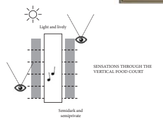
EARLY IDEAS



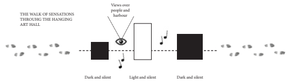
The Entrance



The Bazaar

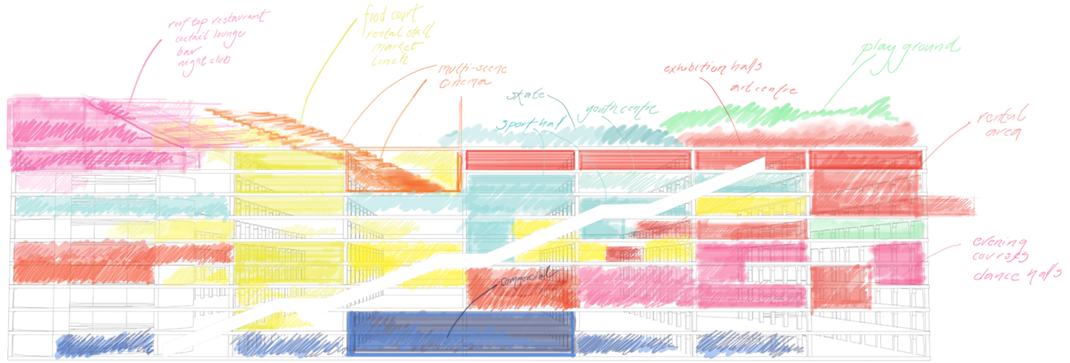


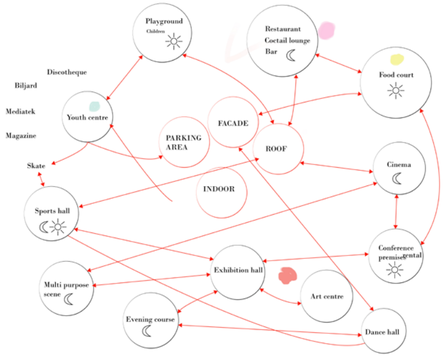
The Food Court



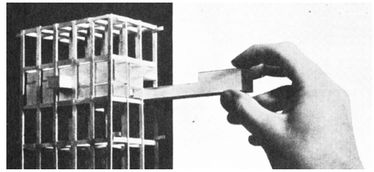
The Gallery

SCEME OF ACTIVITIES





MODULKONCEPT



THE LIGHT MODULE

What feelings shall the module of light bring forward? Openess, lightness, softness, pleasantness, airness, calmness

How can this be done? Perforations, slits, openings, gaps, trusses, grids, light colors and light materials such as fabrics

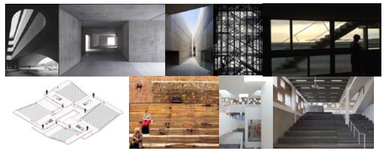
THE DARK MODULE

What feelings shall the module of dark bring forward?
Cold, hard, narrow, high, dark...
The feeling of being a small person.

How can this be done?
Walls, borders, corridors, passageways, distances - too close or too far away, heavy and dark materials

THE COMMUNICATION MODULE

Vertikal kommunikation
Ledas uppåt eller nedåt
Horisontell kommunikation
Ledas framåt, vidare
Visuell kommunikation
Synliga kopplingar, glas mellan funktioner och moduler. Upplever avstånd.



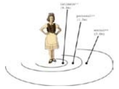
PUBLIKA MODULEN

Vad får en plats att bli publik?
Modulens koppling och kommunikation till omgivningen.
Funktionen. Avstånd mellan mellan människor, Storlek.
Känslan, välkomnande, öppenhet, tillgänglighet.

PRIVATA MODULEN

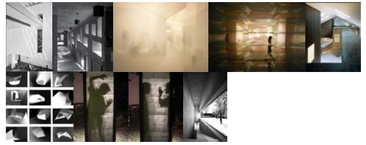
Feelings: Warmth, intemacy, privacy, cosiness, homelike atmosphere, quite, calm, safe

How can a public space be experienced more private? Small spatial units, seating possibilities, overviews, transparency



THE TEMPTING MODULE

Reveals what's in a different location in the building. Gives a sensation and an idea of what you'll find in another module.
"The module in between"



THE FLEXIBLE MODULE

What feelings shall the module of light bring forth? Changable, inconstant, mutable, expanded, movable open and close

How can this be done?
Folded walls, something that can be folded out, walls on rails

THE BORDER MODULE

The border between the exciting structure and the new public space.

Visually, levels, refinement of concrete, corridors, climate shell

THE PROVOCATIVE MODULE

Surprising, illusions, maybe not completely in its right element
Unconventional ways to get ahead.

THE GREEN MODULE

The threshold between indoor and outdoor.

Greenary, vertical gardens, green walls, trees, view towards greenary

UTÅTRIKTADE MODULEN

Visar vad som pågår inom strukturen till utsidan. Skyltfönster mot förbipasserande. Avslöjar funktionen innanför lagret. Transparens, spegling, projicering.
Hänger utanför, balkonger.

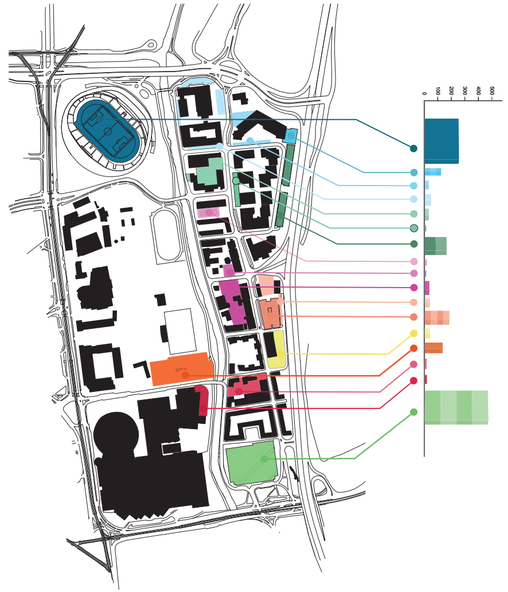
INSTALLATIONSMODULEN

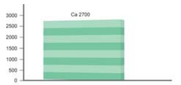
Tekniska funktioner som är slutna och icke publika. Ventilation, vatten, kök, förråd, hiss mm.
Modulen skall placeras med hänsyn till avstånd och smart placering.

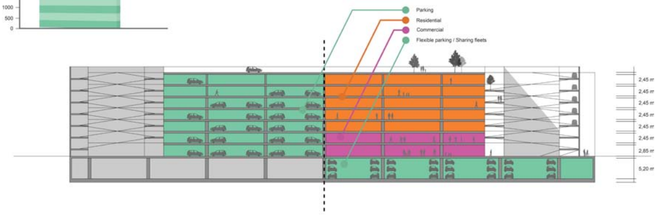
PREPARATORY WORK

At the very start of the master thesis project the idea was to investigate how a city of the future could look like when the technology of new cars had been implemented to our cities. Technology that assumes that cars will be able to park themselves, that they will be much smaller and hence will take much less space in our cities compared to today. Roads, parking areas on and off roads, and parking garages were objects that we started to look further into. Pretty fast the task to search for a scenario of the future felt too floating and hypothetical. Instead an already built garage structure and its characteristic architecture felt more interesting to investigate. How can these structures be changed in a much more efficient way in a nearby future with today's technology and conditions?

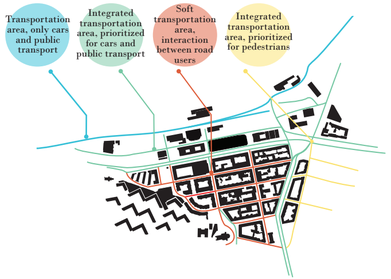
AMOUNT OF PARKING ZONES AND PARKING AREA FOOTPRINT IN RELATION TO BUILT ENVIRONMENT

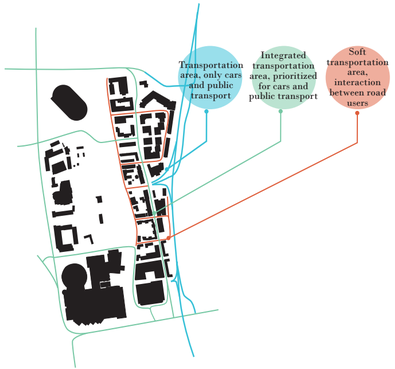






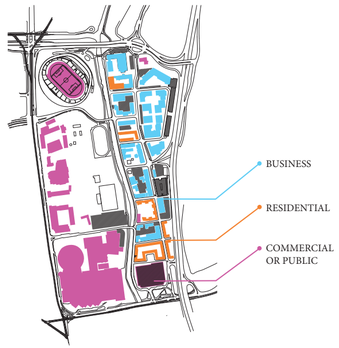
PRIORITIZATION OF DIFFERENT ROAD USER IN THE AREAS

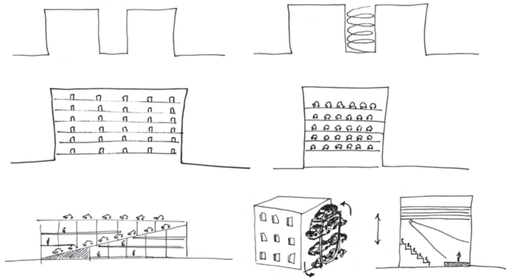




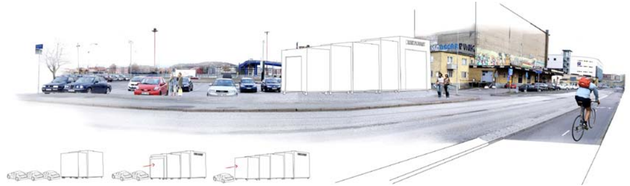
TYPE OF ACTIVITY IN THE BUILT ENVIRONMENT ON THE SITES

The parking situation changes during a day depending on functions in the area






Change parts of Nordstan parking garage into residential and commercial areas



FLEXIBLE PARKING SOLUTION
Use the area for parking when needed and change activity in the area when there are less cars

STREET PARKING TODAY
On street parking and an inactivated area

STREET PARKING IN THE FUTURE
Reactivate the street scape by integrating people and transportation.
If you choose a type of living you choose a type of lifestyle


Reactivate empty parking garages