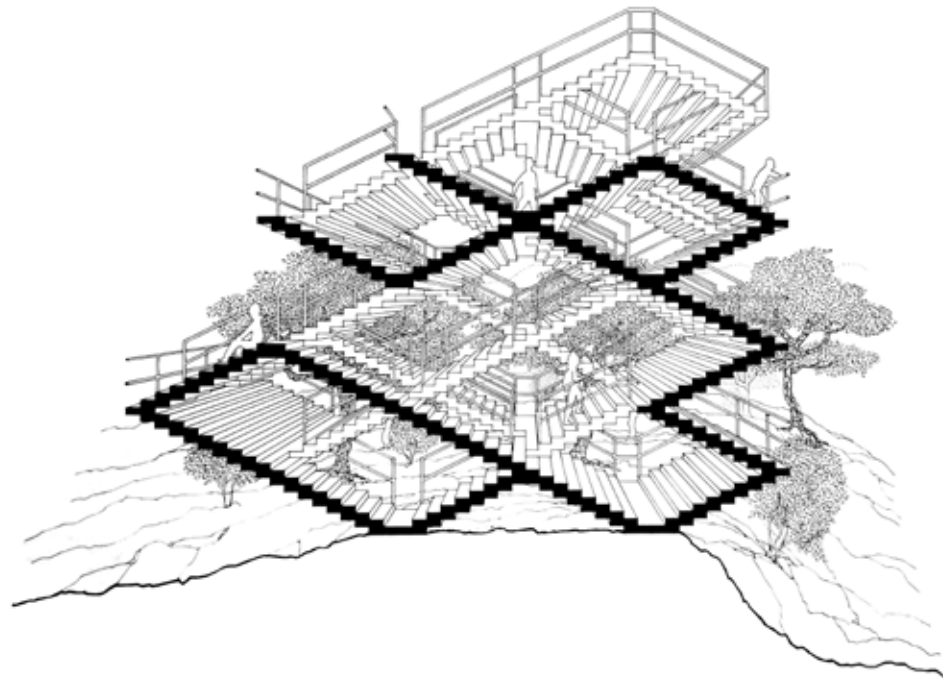


STAIRWAYS OF EXPLORATION

A sequence of exploration across the mountain



Markus Åsberg

Chalmers School of Architecture Department of Architecture and Civil Engineering

Tutor: Johannes Luchmun

Examinor: Morten Lund

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MPARC - ARKX03 - 2017



CHALMERS

ABSTRACT

In the rapid urbanization, lots of people want to get to know their new home. When new in town, we explore our immediate surroundings, and then gradually expand our area of exploration, patching puzzle-pieces together. The mountains of Gothenburg play a crucial role in understanding the city. The structure of the city is a result of the constantly challenging relation to the difficult topography. This has resulted in weak connections between neighborhoods, making the placement of puzzle-pieces harder. Therefore, these places are important as the last pieces of the puzzle. Some areas, like Johannebergshöjden, were left unbuilt, leaving a puzzle-piece out.

Today, the stairway across Johannebergshöjden provide the fastest, most convenient way across the mountain. Instead, the stairs should celebrate Johannebergshöjdens qualities; its dramatic topography, its city views and its natural spaces in a sequence that activates the body and imagination in playful exploration. "In addition to the door, the stair is that element of architecture which is encountered most concretely and directly by the body. "(Pallasmaa) The stair show the possibility of bodily interaction and movement, in this way it attracts exploration. By allowing the stair to become larger structures that interplay with the qualities of the site, an architecture of exploration is created. By adding explorative stair structures and movements on the mountain that incorporates its qualities and adds new experiences and activities, architecture can invite for the exploration of the mountain and at the same time provide the explorer with a greater understanding of his/her position in the city through views along the way.

In this thesis I connect characteristic places on Johannebergshöjden that shows its qualities of topography, views and natural space, and design these places as rest spaces in the form of stair structures in an alternative path across the mountain.

STUDENT BACKGROUND

Bachelor studies

BSc. Architecture – Chalmers University of Technology

Master studies

Master's Program: Architecture and Urban Design

Architectural competitions

Design and communication tools

Matter, Space, Structure 1

Matter, Space, Structure 3

Future visions for healthcare, housing and work 2: Housing inventions

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CHALMERS

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INTRODUCTION

SUBJECT

The major fields of the thesis is the stairway, the mountains of the city and exploration. The scale ranges from the whole path across Johannebergshöjden down to the detail of the the staircase. Focus has been to find characteristic places in the mountain for the rest places of the path, and then how to design these rest spaces as stair-structures that uses the qualities of the stair to create an architecture of exploration that relates to the qualities of their sites.

ARCHITECTURAL RELEVANCE

This thesis is relevant in the discussion of

...architecture as acts instead of objects: rather than seeing architecture as what it *is*, we could instead focus on what it *does*. The staircase shows its possibility of interaction through movement; in this way the stair has a great potential of creating an architecture of acts, movement and exploration.

...public stairs as architecture that can activate and showcase lesser known natural areas in the city and invite for the exploration of them

...architecture that relates to and strengthen the experience of nature

RELEVANCE FOR SOCIETY

This thesis is relevant in the discussion of

...getting to know your city: it is relevant now because of the urbanization and the fast growth of the city. Lots of people are moving to the city and they want to get to know their new home.

...the structure of Gothenburg and how connections between neighbourhoods can create a better understanding of the city

...the spatial identity of the city: to recognize and take advantage of these places as big qualities and to create interest in them for both natives and newcomers.

QUESTIONS

The major questions that this thesis raises is: how can a stair across a mountain in the city be made into a movement of exploration that take advantage of the characteristic qualities of topography, nature and views that are present in the mountain? How can the staircase be developed to into an architecture of playful exploration that adds purpose and experiences in line with the qualities of the site? How can architecture bridge gaps and allow for exploration of the city?

This should be studied because the stairs and paths over Johannebergshöjden do not fully take advantage of the characteristic qualities of the mountain, it is made to direct movement across the mountain in the shortest, most effective way. The subject should also be studied in a broader sense because these kind of city-mountains are a big part of the spatial identity of the city and should be seen as a big asset for the city. The mountains deserve a more refined treatment, they should be celebrated and shown as the fantastic places that they are. These places should also be studied because the topography of the city has influenced the way the city has be built, sometimes resulting in weak connections between neighbourhoods and a city that is difficult to orient in. The staircase should be studied because of its potential to create an architecture of exploration.

What are the problems?

A problem when building in nature can be that architecture that is meant to strengthen the existing natural qualities changes the site into something new, and therefore one must accept that the site will be something else after architecture is introduced. The outcome of this problem can be that architecture adds something that is in line with the effects of the existing natural space, and helps explaining to the site and the explorer what it is or could be.

BACKGROUND

The background to this thesis is my own interest in exploring the city and its lesser known places and detours, a curiosity about the places between, where you shouldn't be, the backside, the forgotten. I have moved to the city and I like to explore it to get to know it better, a situation I think is common now due to the urbanization. Coming from a place where nature is more present, I search for nature also when moving to the city. Not just parks and trees but also the topographic properties and the explorative unplanned aspects of nature.

This material would be relevant for people like me who have moved to the city and are curious to explore and get to know it, a situation that is relevant as the city is expanding. It is also relevant for the natives; to discover their own back yard again in new light. It is also relevant in the bigger discussion of the identity of the city. The city has been focusing on the river and the water as the identity of the city (Älvstaden, River City), but the mountains are also a big part of the city's identity which risk getting forgotten in the process.

METHOD/APPROACH

My method of working has involved many site visits to find characteristic spots for my rest places, and also to determine the route of my path between them. I have researched the staircase, movement in terrain and the mountain in sketching, writing, interviews and field research.

I have designed rest places as stair structures. With the stair as a design tool, I have created spaces to provide exploration in movement, weather shelter, social situations, viewpoints and natural connections. In addition to these qualities, the different stair structures have been given unique properties such as historical connection, fireplace and noise silencing.

The stair structures have been designed in relation to the specific topographical properties of the chosen sites, the trees and the openings in the trees, and their views over the city. The sequence of encountering and entering the structures have been an important factor when designing.

DELIMITATIONS

I don't make the path fully accessible by wheelchair. This has several reasons: what I am building is a staircase with rest spaces, a more refined version of the pre-existent stair that is already there. To make this path accessible to wheelchairs would dramatically change the identity of the site and wouldn't address the inherent characteristic qualities of the mountain; the inaccessibility of the topography. This also has impacts in the choice of programs of the rest spaces along the path: they must be relating to the qualities of the sites.

I will not cover the discussion of the homeless that in periods live on the mountain. I am aware of the problem, but to integrate it into my thesis would make it into a whole different thesis.

THEORY

JUHANNI PALLASMAA - STAIRWAYS OF THE MIND

Acts vs objects and the bodily encountered stair

*- A building is not an end in itself. It alters our experience of reality; a building frames, articulates, structures, relates, separates and unites, facilitates and prohibits. **Deep architectural images are acts instead of objects. As a consequence of this implied action, a bodily reaction is an inseparable aspect of the experience of architecture.** (Pallasmaa, 2010)*

The image of the stair shows acts of interaction and possibilities of movement to the observer, in this way it attracts people to interact and explore. By creating architecture that implement the action-based nature of the stair, it becomes an instrument that makes actions and reactions its only purpose.

*- In addition to the door, the stair is that element of architecture which is **encountered most concretely and directly by the body**. As we ascend or descend a stair, our step measures its dimensions and the hand caresses the smooth surface of the banisters. To be precise, a stair is not an 'architectural element', but rather one of the primary architectural images. Works of art in general are not composed of visual 'elements', they constitute lived images and fantasies underlying our recollections, and the parts always acquire their meaning through the whole, not vice versa. (Pallasmaa, 2010)*

Because the stair is the element in architecture that is encountered most directly with the body, the stair has a strong appeal of movement possibilities, creativity and exploration. Therefore, by designing stairs as larger structures that connect to the qualities of the site, architecture can become a bodily experience of exploration and curiosity.

PSYCHOGEOGRAPHY

Red arrows and ambiances

*- One or more persons committed to the derive abandon, for an undefined period of time, the motives generally admitted for action and movement, their relations, their labor and leisure activities, **abandoning themselves to the attractions of the terrain and the encounters proper to it.**" (McDonough, 1994)*

This inspired both my choice of the city mountains as my site and also my choice of topographically characteristic places on the mountain. The explorer is attracted into the mountain and then between different ambiances of the mountain in differences of topography and nature by the architecture.

*The psychogeographic slopes were symbolized by red arrows indicating the forces the city exerted on drifters freed from other motivations for moving: **drifters would be pulled in the direction of the arrows from one unity of ambiance to another.** (Wood, 2010)*

I use this in my entrance spaces; to give a hint of the ambiance of the mountain and the stair. I insert a new red arrow which attracts drifters into areas not normally walked through, then guide them through architectural ambiances situated at characteristic places on the mountain.

SOU FUJIMOTO - PRIMITIVE FUTURE

Nest and Cave

Fujimoto(2011) discusses the two notions of nest and cave: the natural and the man-made space. Fujimoto proposes an architecture more like the cave where interactions with the surroundings are free and relying on the creative use by the user, rather than the pre-determined functions of the man-made architecture he describes as nest.

I am inspired by this line of thought and it has influenced my view on creative and explorative interaction with architecture. Also in the choice of site: the architecture of the mountain is in some ways a role model of this type of thinking due to its non-planned spaces.

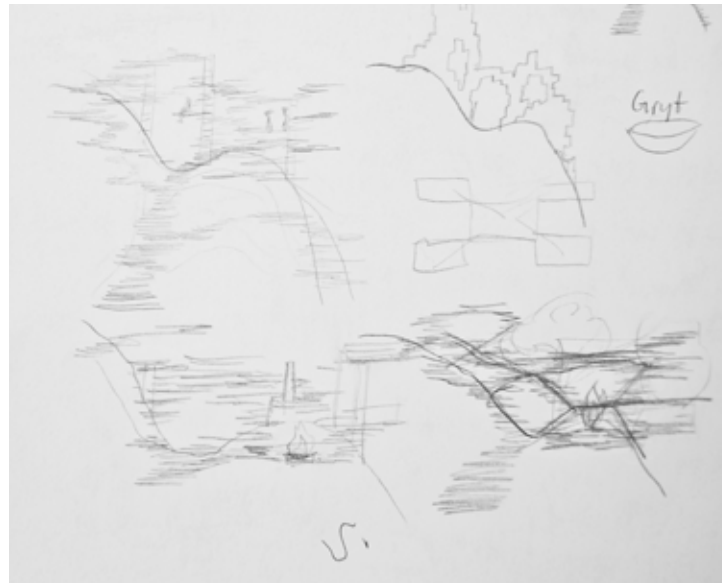
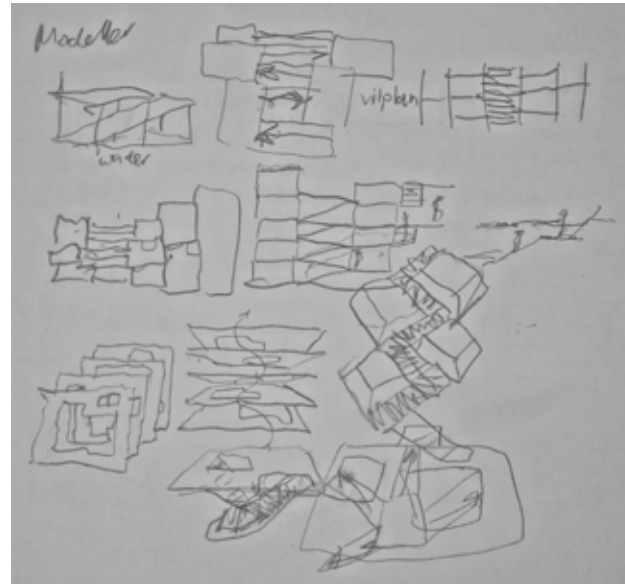
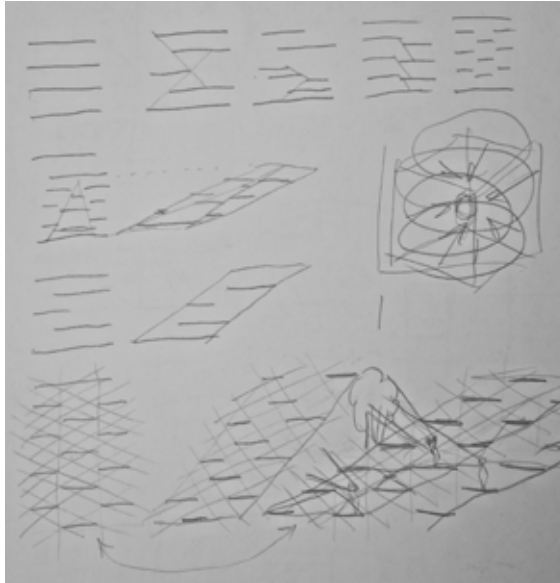
However, to create space that are completely free to interact with leaves me confused, questioning our role as architects that create and plan spaces with situations in mind. I believe that we can be more creative and free within frames.

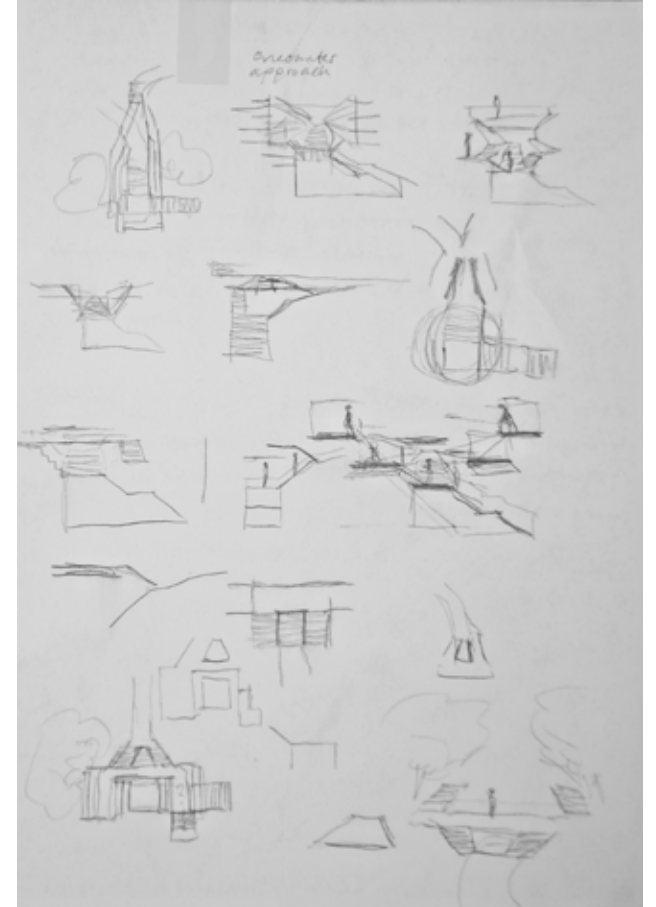
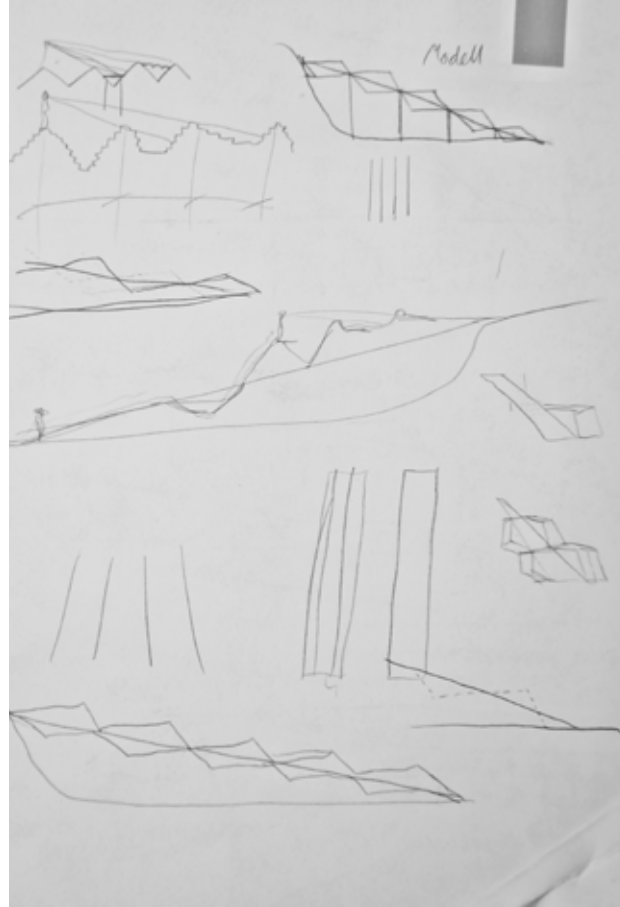
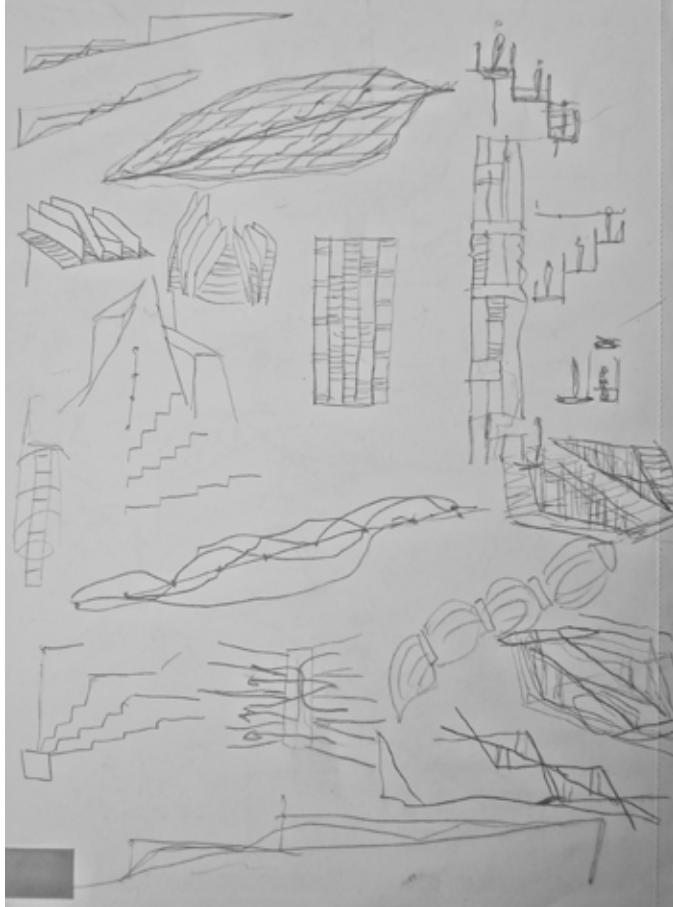
PROCESS

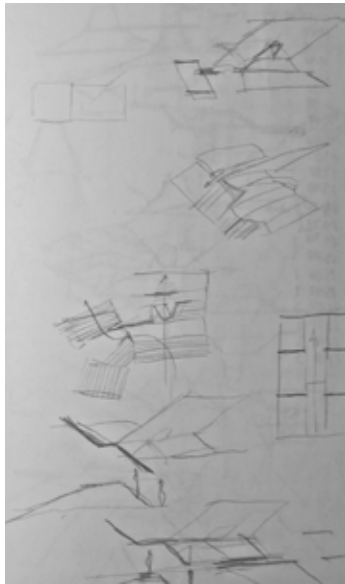
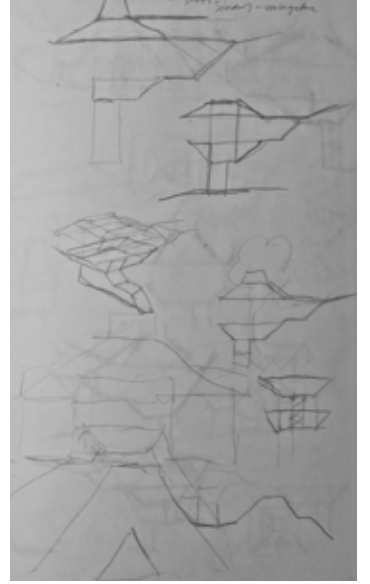
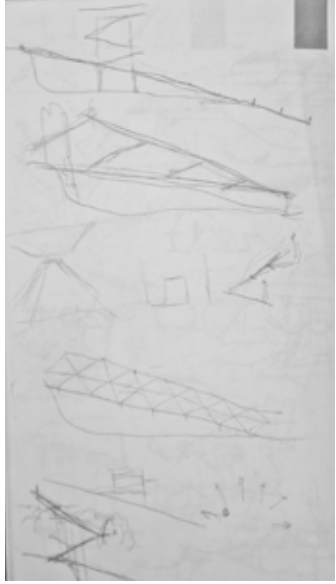
SITE EXPLORATION

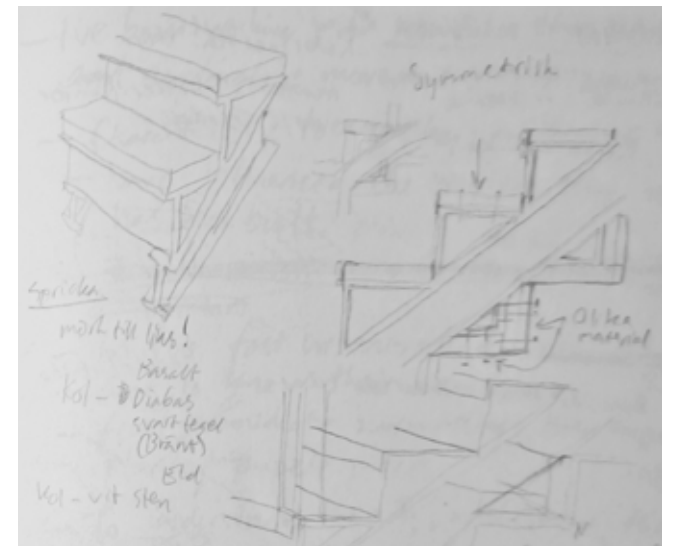
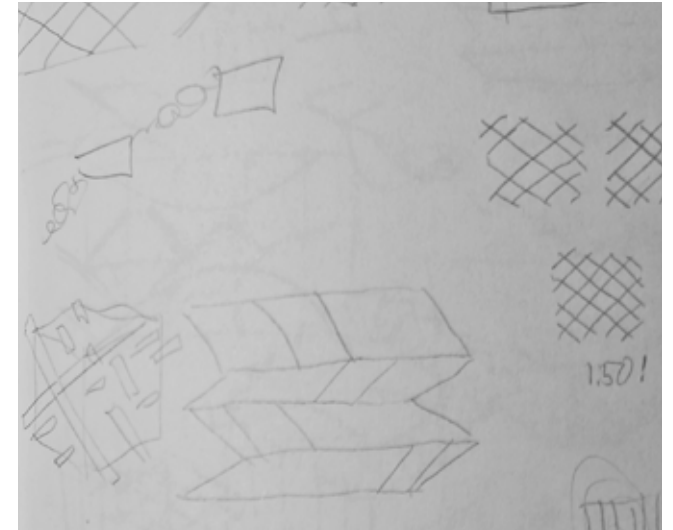
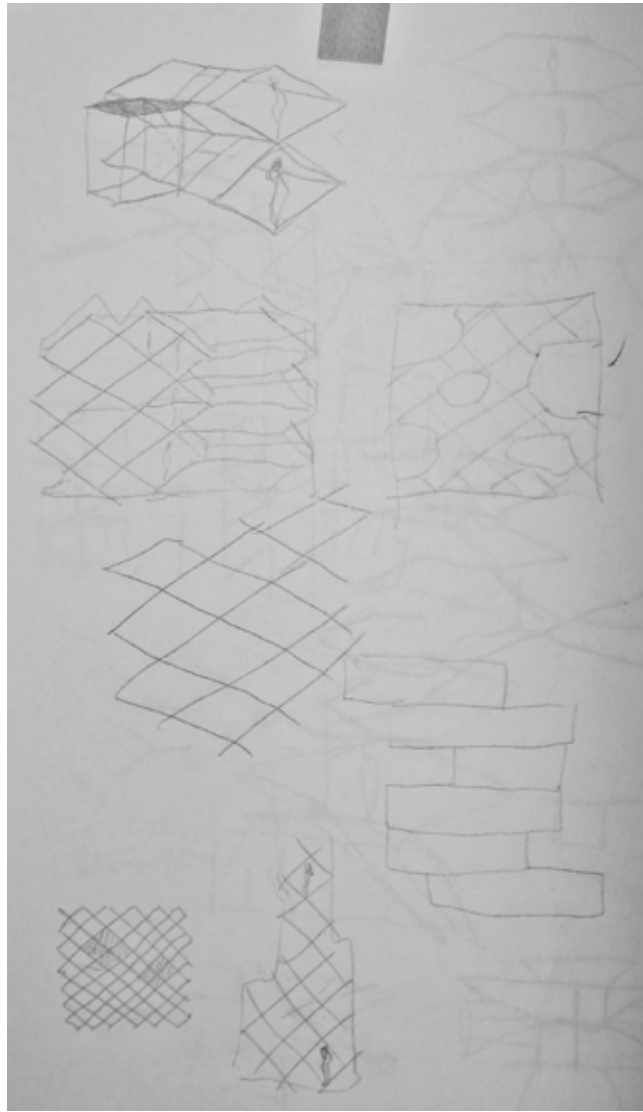
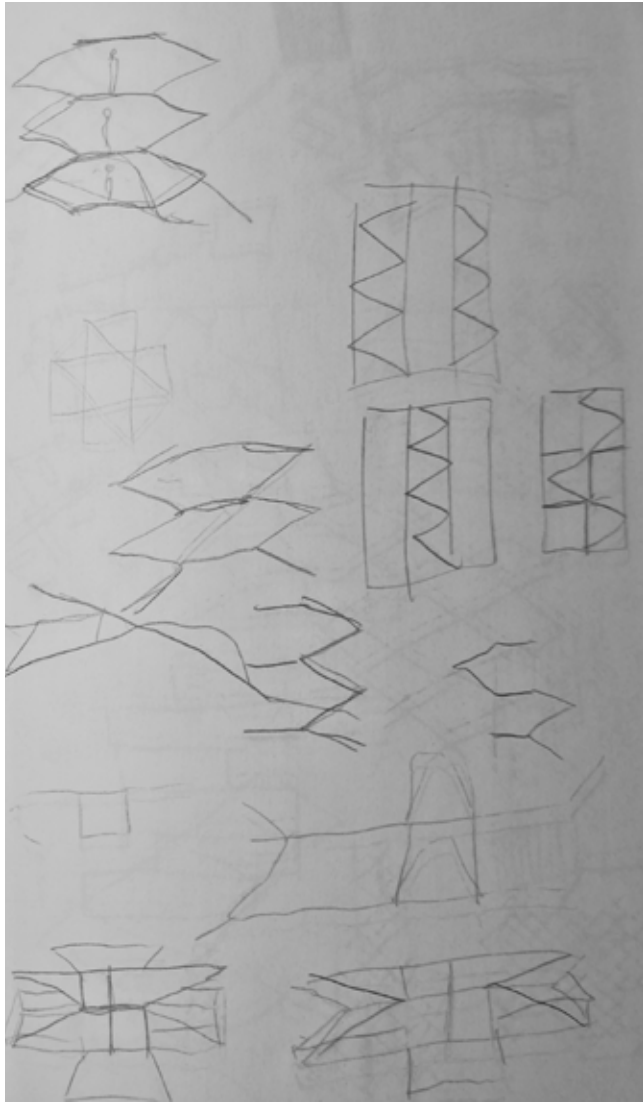


SKETCHES



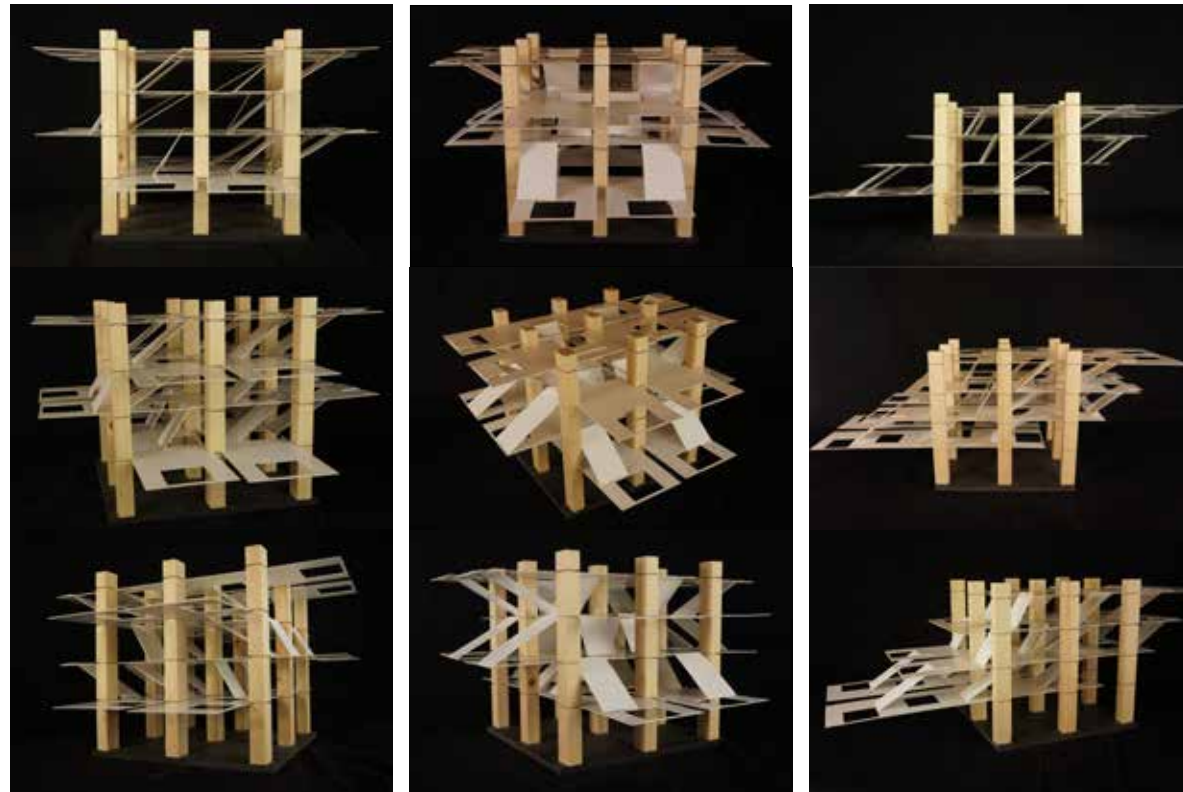




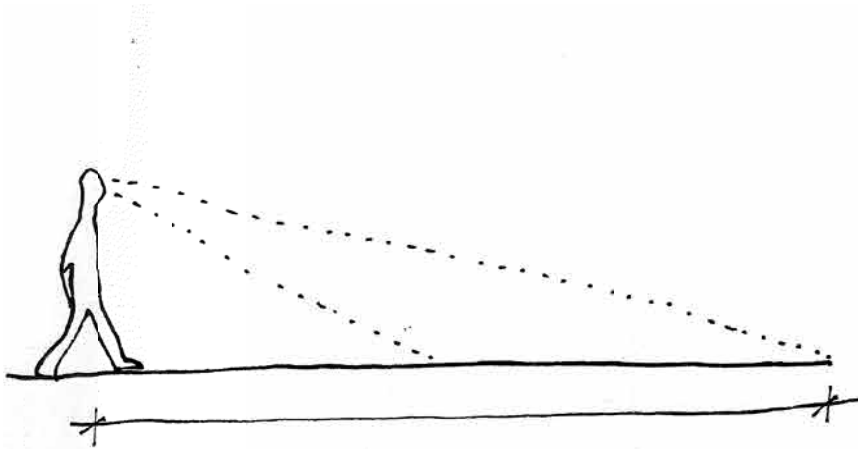


CONNECTING LEVELS

The model is built to examine connections between levels. Floors are made movable to be able to slide them in different ways to test layouts.



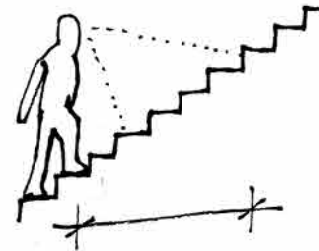
FOCUS DISTANCE



1: Far-away focus

When walking a flat surface, movement become more or less automatic and relaxed, allowing focus to be far-away from the body or out-of-body without risking tripping and falling.

- Orientating, understanding and planning movement in larger area
- Idling, daydreaming, thinking, focusing on other things than the movement of the body
- Fragmented, unexact information from far-away focus give rise to interpretation, forecast attempts or fantasy of future movement possibilities



2: Close focus

The staircase implies increased effort and risk in the movement, so the focus is closer to the body. But the rhythmical properties of the steps also makes movement somewhat automatic, allowing for some focus to be far-away.

- Activating the body, more active interaction with the ground
- Focus becoming a mix of horizontal and vertical, three-dimensional
- Balance is activated, gravity is not perpendicular to the inclination of the ground



3: Body focus

When climbing in natural mountain terrain without paths or similar built environments, automatic movement becomes more difficult. The interaction with the ground requires an active, creative interpretation. Far-away focus is hard and dangerous.

- Creative, explorative movement, freedom in finding paths forward instead of pre-determined movement. Searching for patterns or signs of orientation
- Awareness of the body and its possibilities
- Focus on small things touching or close to the body, making orientation of larger area harder, risk of getting lost

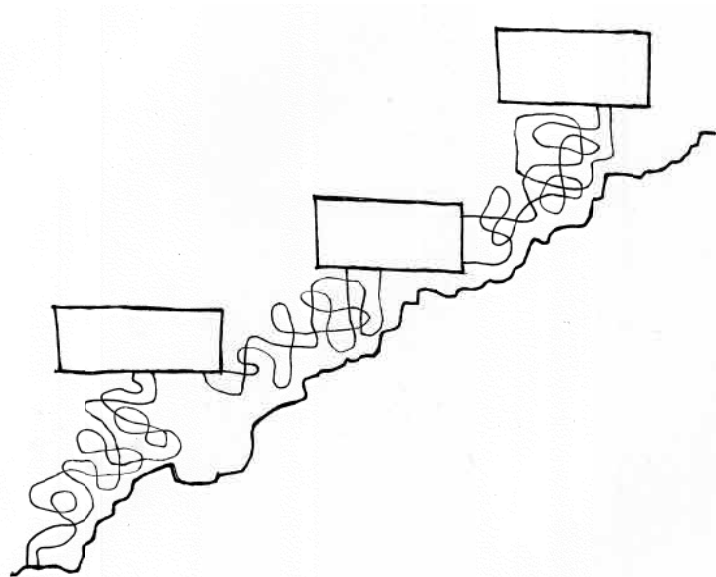
CLIMB AND LANDING

By connecting zones of different focus distances, they can strengthen each other and create new qualities and reduce unwanted effects.

-Far-away focus spaces acting as milestones, providing orientation and physical rest.

-Body focus spaces providing body activation and exploration

Different meanings and opposites can be derived from these two areas



Climb Landing

Effort
Manual
Creative
Body
Search
Active

Rest
Auto
Planned
Brain
Find
Passive

Disorder
Assymetry
Sloping
Vertical

Order
Symmetry
Flat
Horizontal

Cave
Natural
Untreated
Animal

Nest
Built
Treated
Human

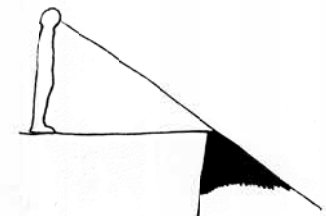
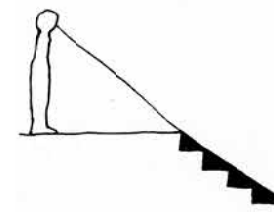
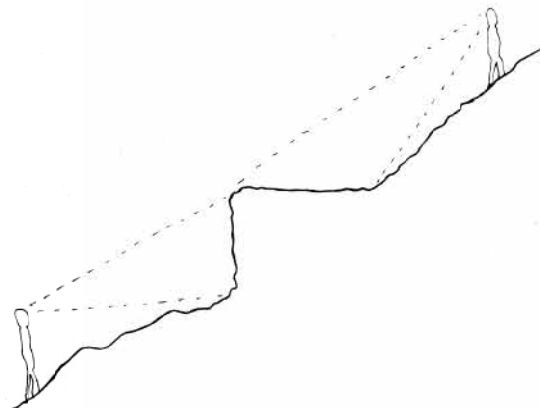
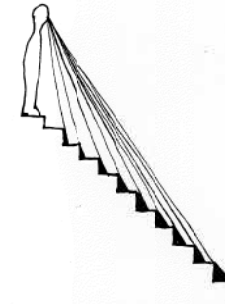
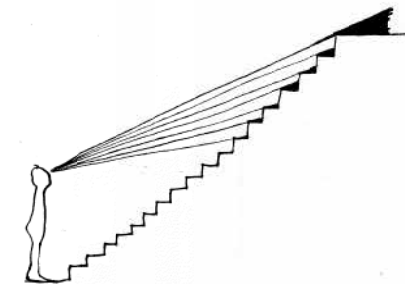
ASCENT AND DESCENT

Ascent

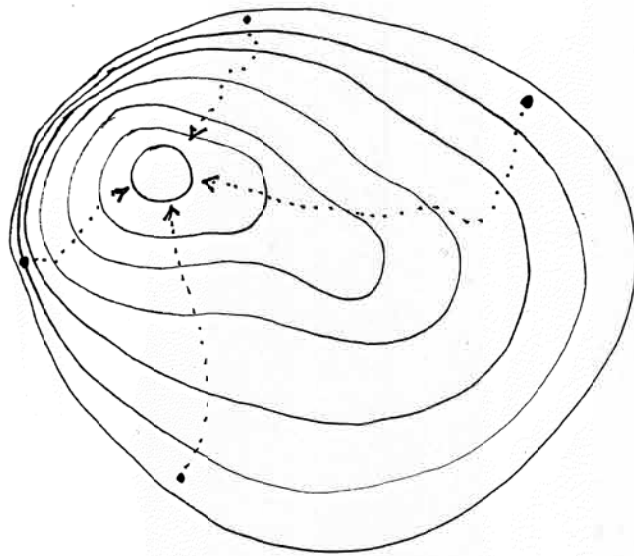
- The visual impressions are dominated by vertical elements
- More immediate area is visible compared to descending
- Less far-away area is visible compared to descending, depending on forest or other visual obstacles.
- The angle of the neck and eye are more natural than when descending, facing the ground, making the ground closer to the climber and more easily read. This control results in an automatic movement which creates an alternating focus between body and far-away path with a big angle. The feet are “behind” the eye, making movement less visually controlled.
- More muscle effort required compared to descent
- More natural steps due to the anatomy of the foot and legs.
- The body is “pressed up” by muscles, making the movement more controlled and gentle to the body than the descent where the body is “dropped down” to the ground.
- More safe when tripping than descent due to anatomy of the body. When falling forwards, eyes see the ground, hands, arms and knees rescue the fall earlier due to their orientation forwards.

Descent

- The visual impressions are dominated by horizontal elements
- Less immediate area is visible compared to ascending
- More far-away area visible compared to ascending, depending on forest or other visual obstacles.
- Angle of neck and eye are pointing down following the inclination of the ground, which makes the far-away focus and body focus closer in angle. The feet are “in front of” the eye, making movement more visually controlled.
- Less muscle effort required compared to ascent

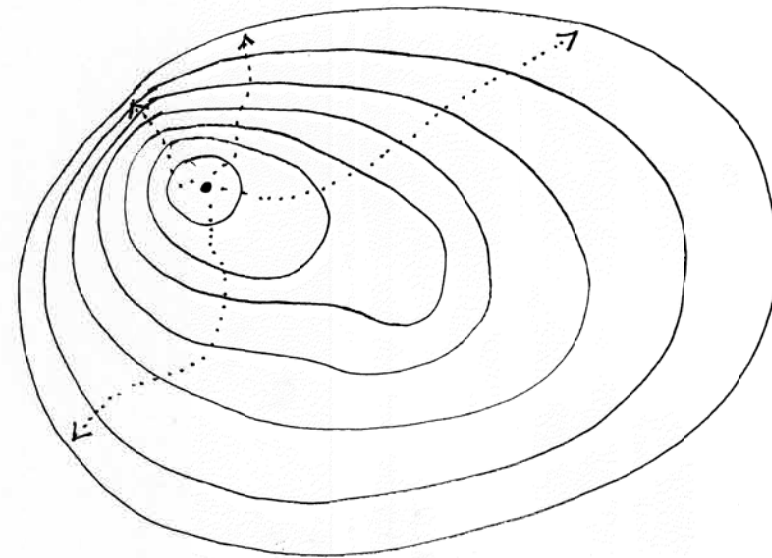


ASCENT AND DESCENT: LANDSCAPE ORIENTATION



Ascent

When orientating in a landscape without paths from the lowest point, no matter where we start we can always find the highest point by simply moving against the inclination of the topography. The peak we thought was the highest point however may turn out to be only half way to the actual top.



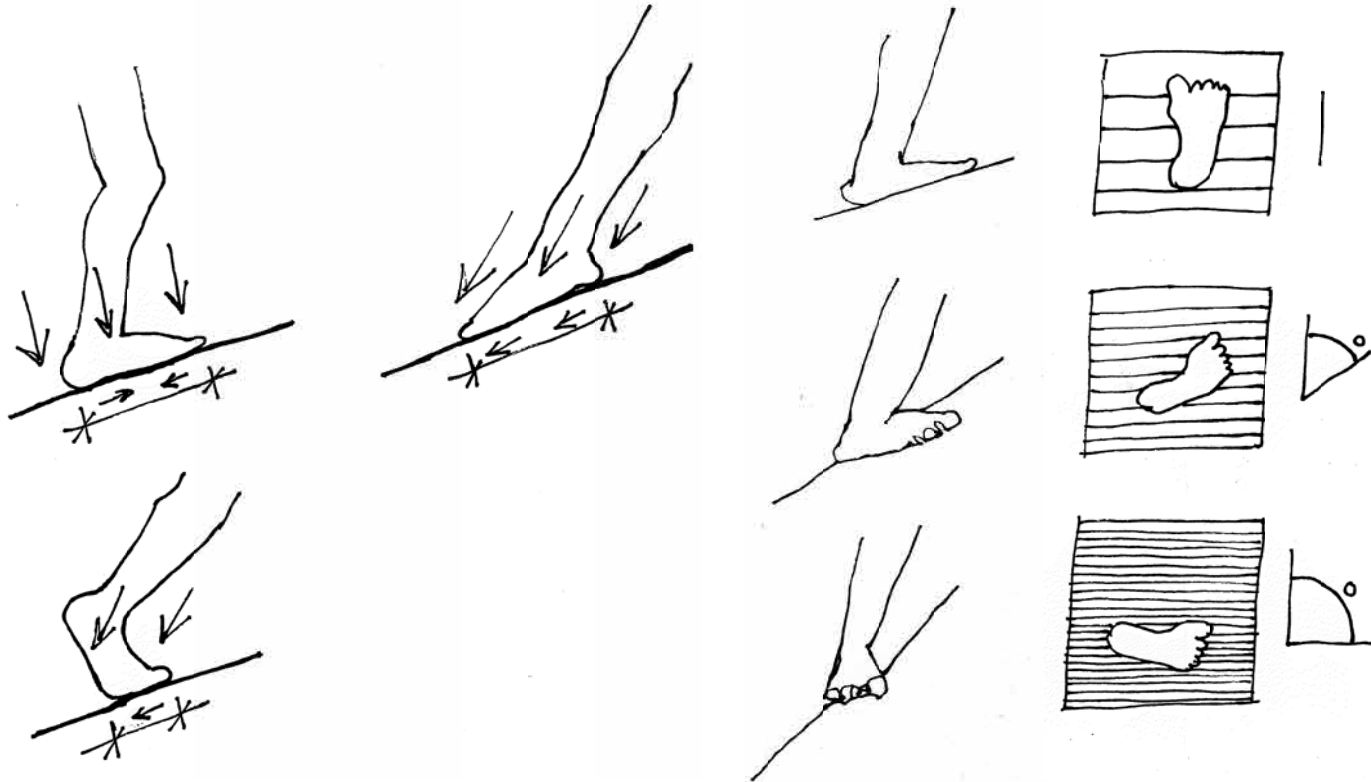
Descent

When starting from the top, our only advantage to move in the right direction comes from views of far-away landmarks, but we can always come down by simply moving down the inclination of the topography.

ASCENT AND DESCENT: CONCLUSIONS

	Ascent	Descent
Immediate visual area	Good	Bad
Far-away visual area	Bad	Good
Foot anatomy	Good	Bad
Tripping rescue	Good	Bad
Topographic orientation	Good	Bad
Landmark orientation	Bad	Good
Body movement control	Good	Bad
Far away - body focus angle	Bad	Good
Body overview	Bad	Good
Psychological aspects	Good	Bad
Symbolic meaning	Good	Bad

THE FOOT IN TERRAIN

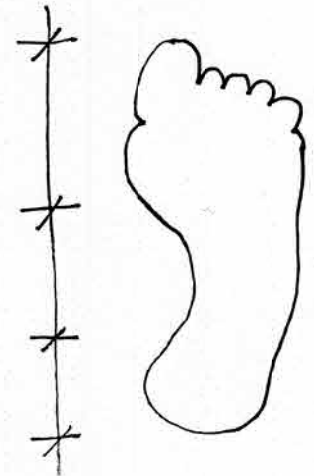


The difference when ascending or descending terrain is linked to the area of contact surface, the friction and grip of the foot or shoe and the weight distribution of the body.

To remain grip in increasingly inclinating terrain, the foot is rotated against the inclination. This to remain an even weight-distribution on the contact surface, but also due to the anatomical limitations of the foot and ankle.

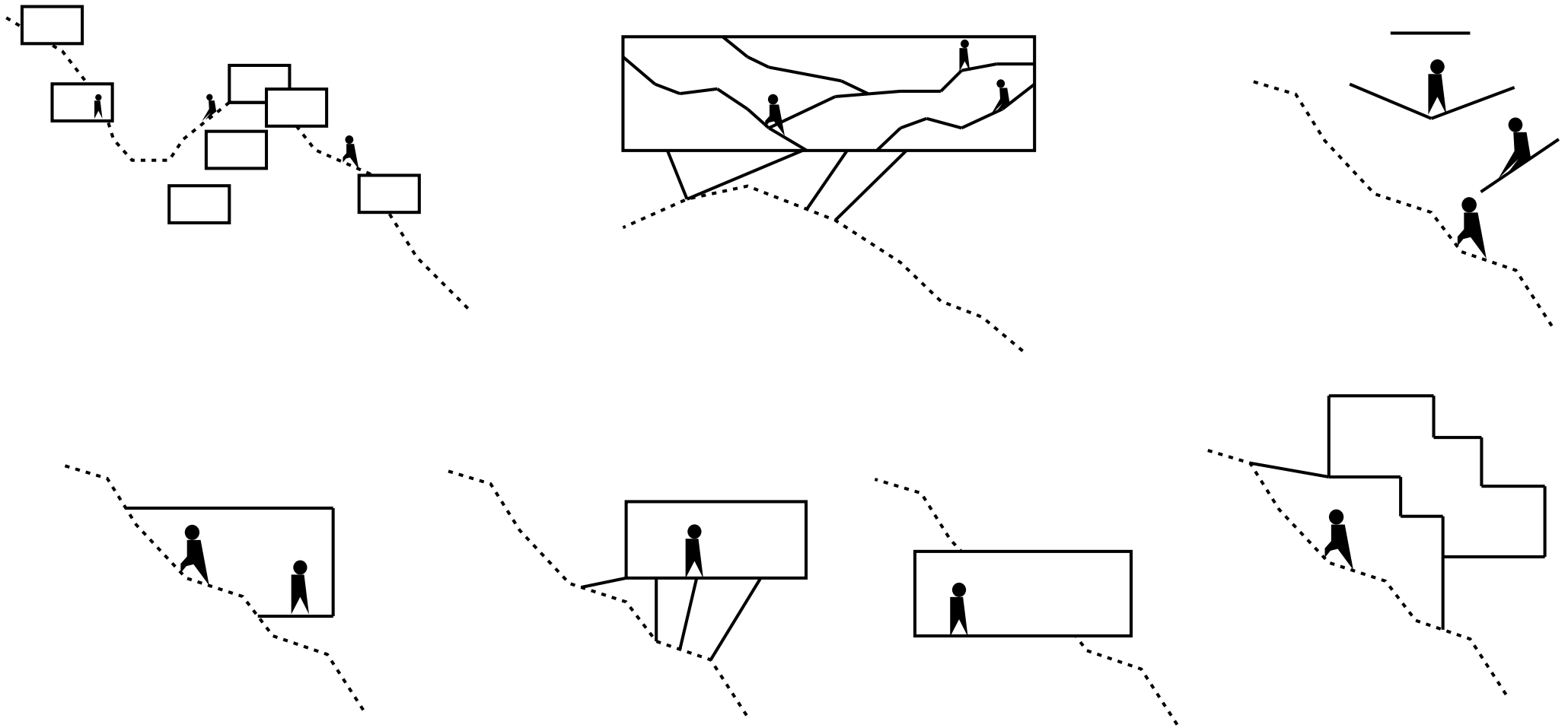
- Fine motor skills
- Balance
- Grip
- Mobile
- Muscle

- Support
- Power
- Immobile
- Skeleton



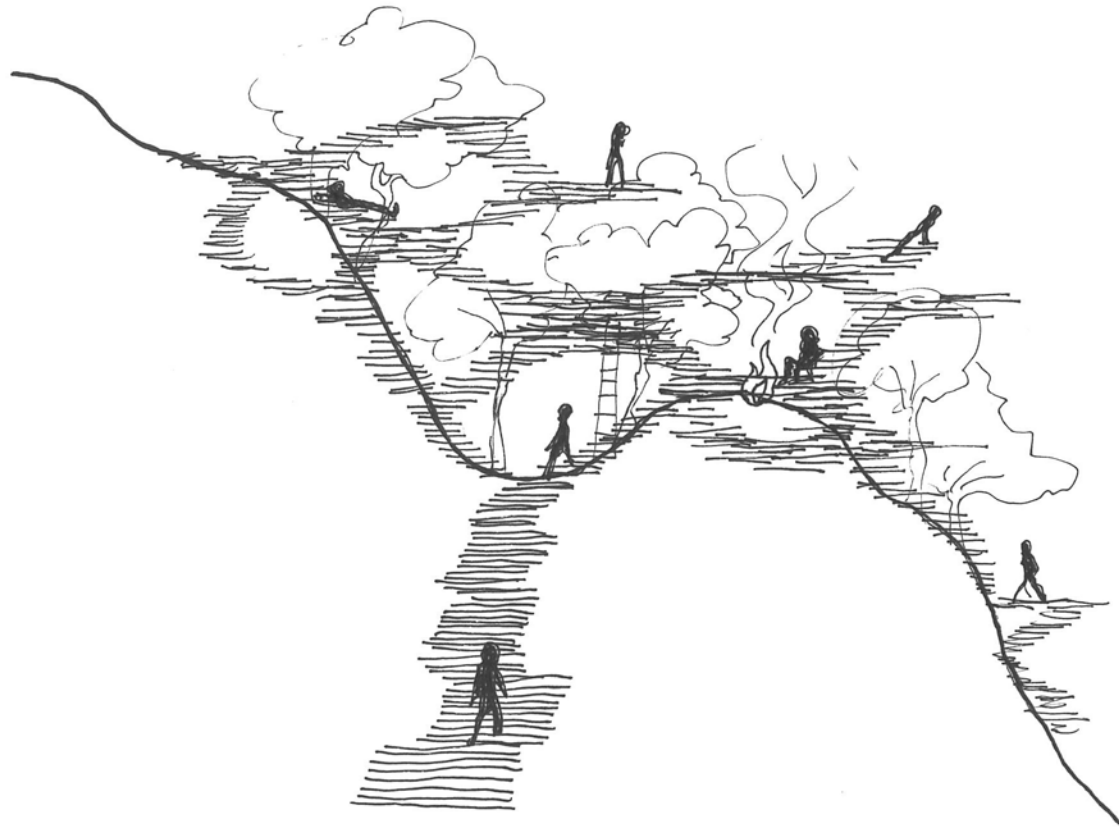
The foot can be divided into two areas of different properties. Ascending is more controlled due to the benefits of the more mobile front zone.

TERRAIN STRATEGIES



Sketches showing different strategies of relating to terrain

CLIMB SPACE/GLADE

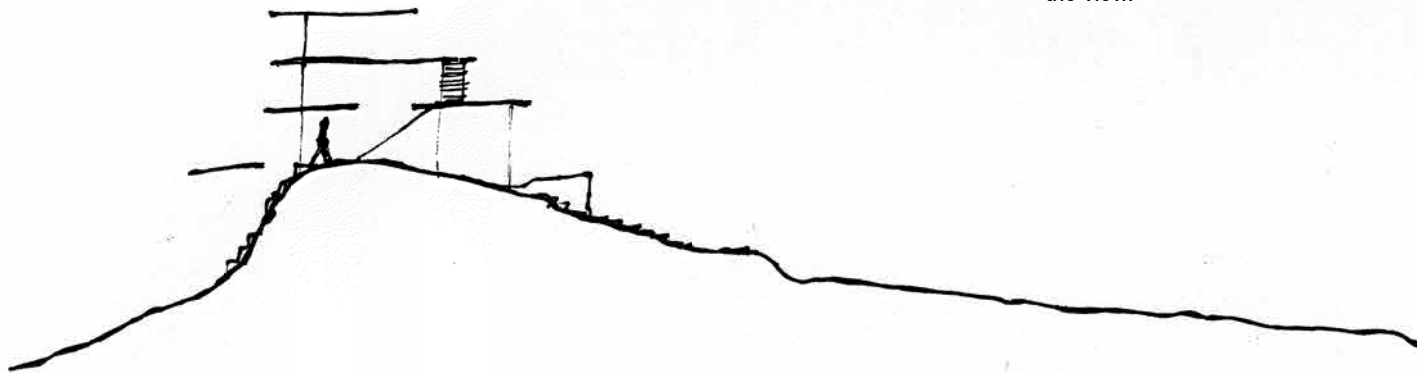


In the climb space, the stair evolves into a place where small spaces are found and explored in the movement through it. Steps become floor, wall and roof, framing small spaces for sitting, laying down and socializing while enjoying the surrounding views and nature.

CLIMB SPACE/GLADE MODEL

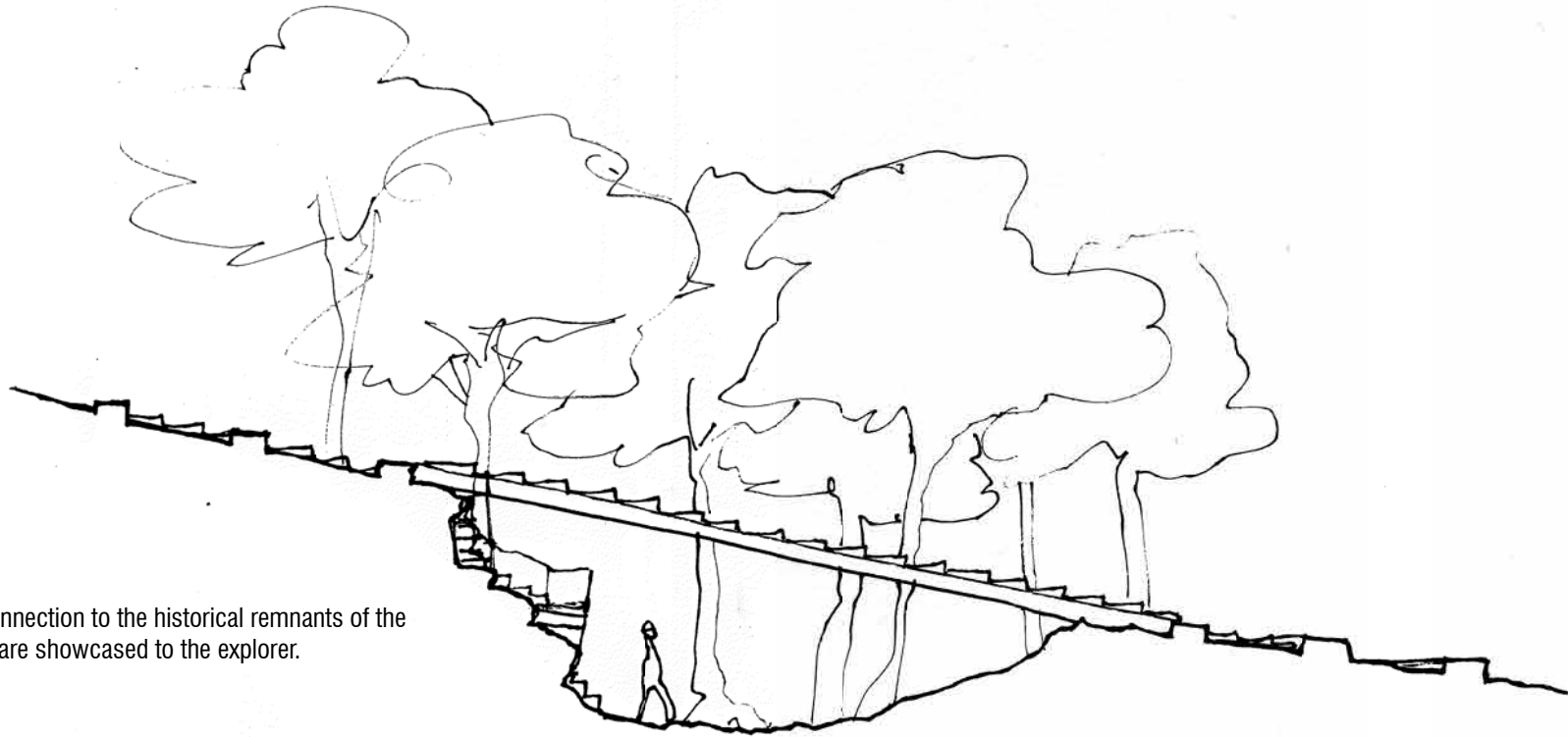


WEST VIEW/EXPLORATIVE TOWER



The west view (Explorative tower) also functions as an entrance point. When walking over the crest of the top, the view is revealed. There is a sequence of seeing the building from afar, approaching it in an inclining walk and then getting the view.

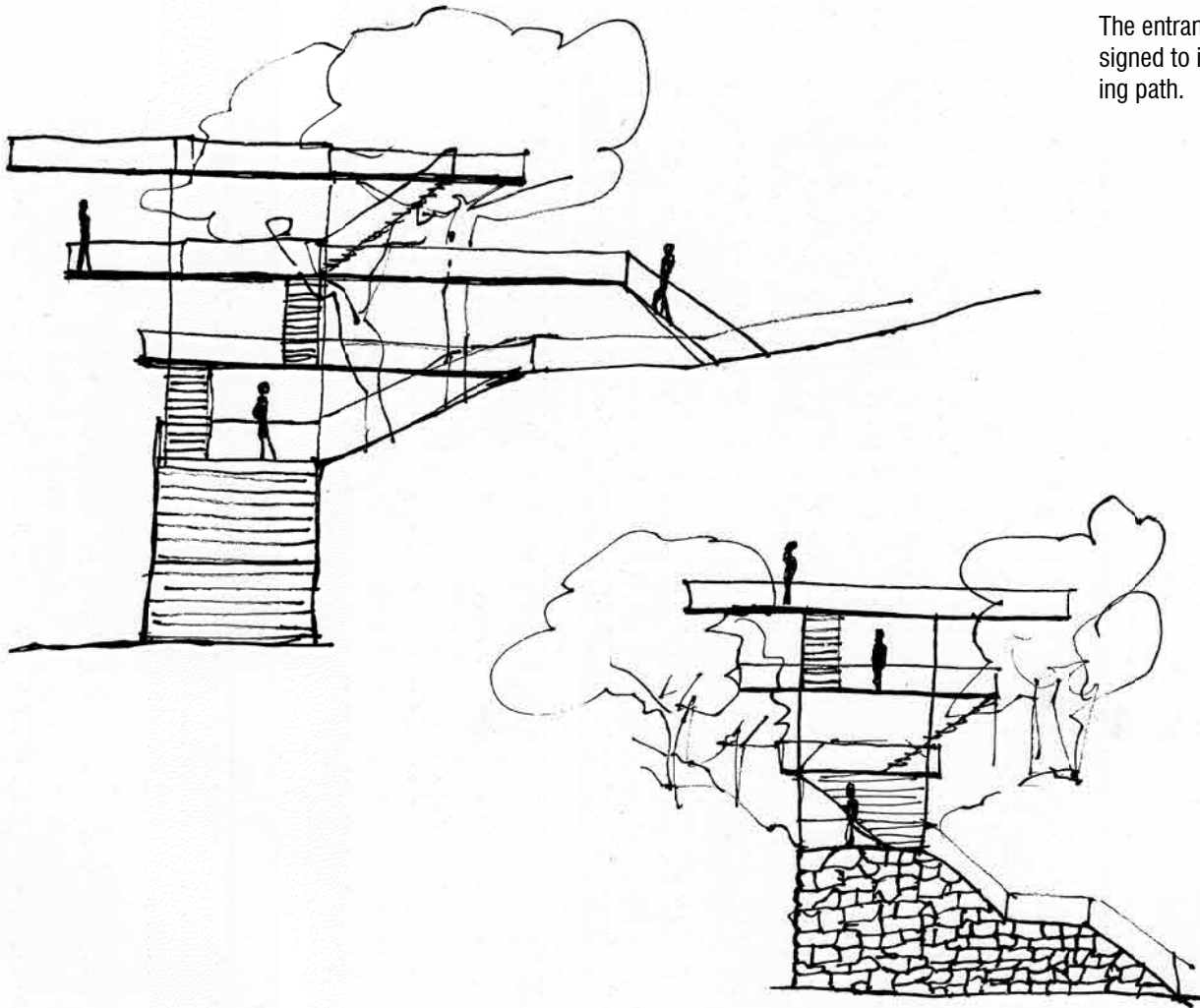
CONNECTING BRIDGE



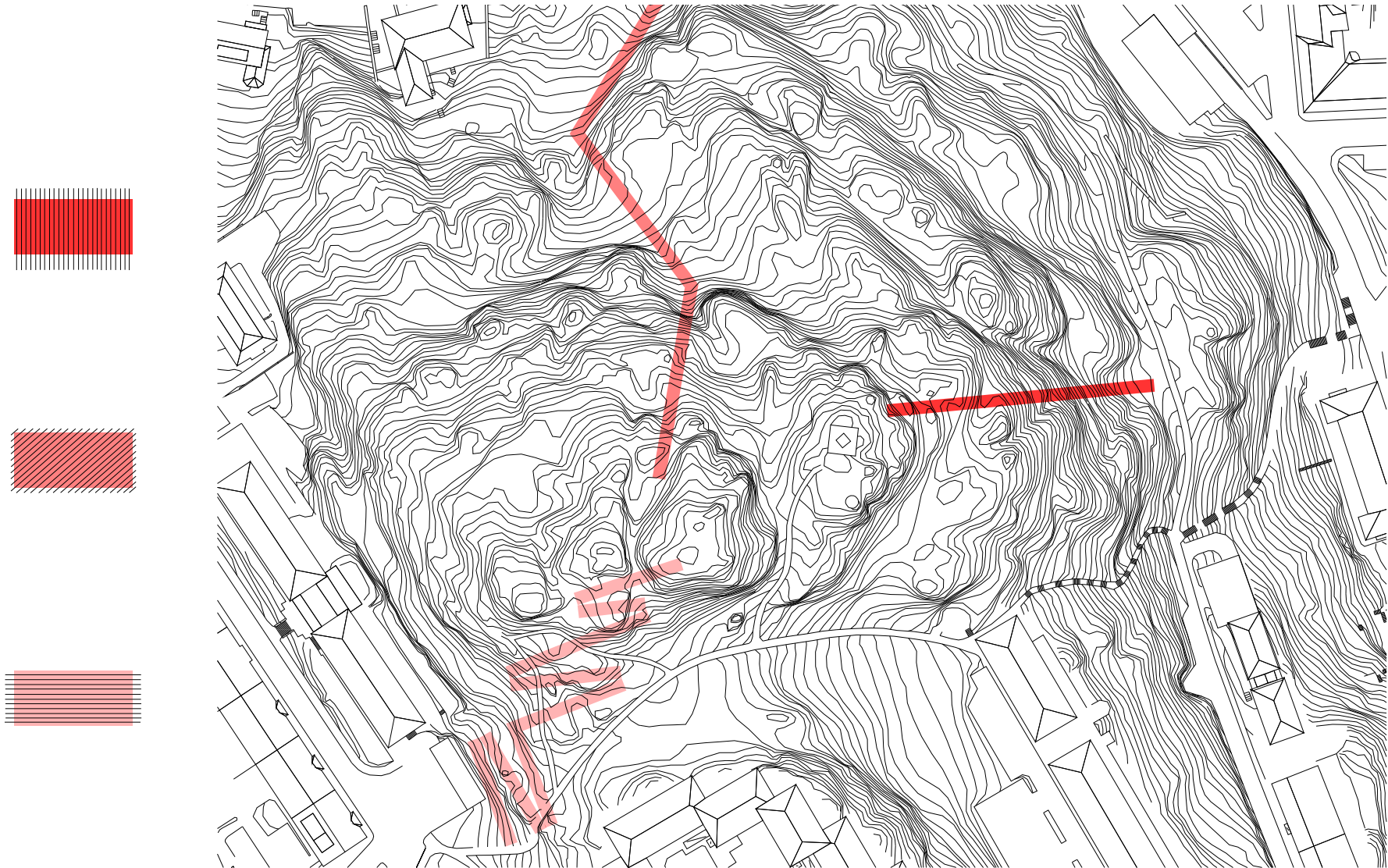
By building in connection to the historical remnants of the site, its heritage are showcased to the explorer.

ENTRANCE BUILDING/MOUNTAIN ATTRACTOR

The entrance building (Mountain attractor) should be designed to invite and give a hint of the character of the following path.

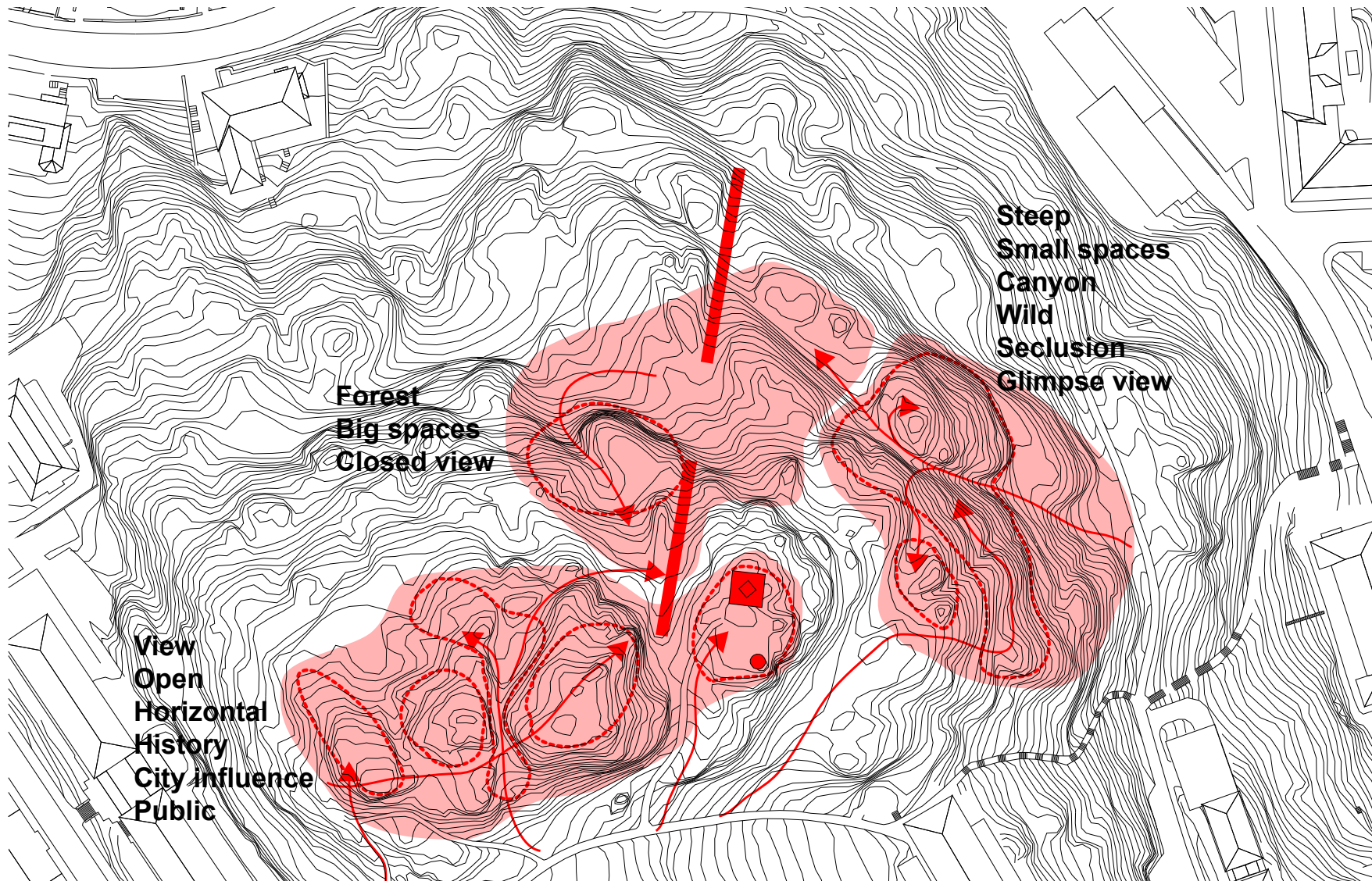


THREE INCLINATIONS



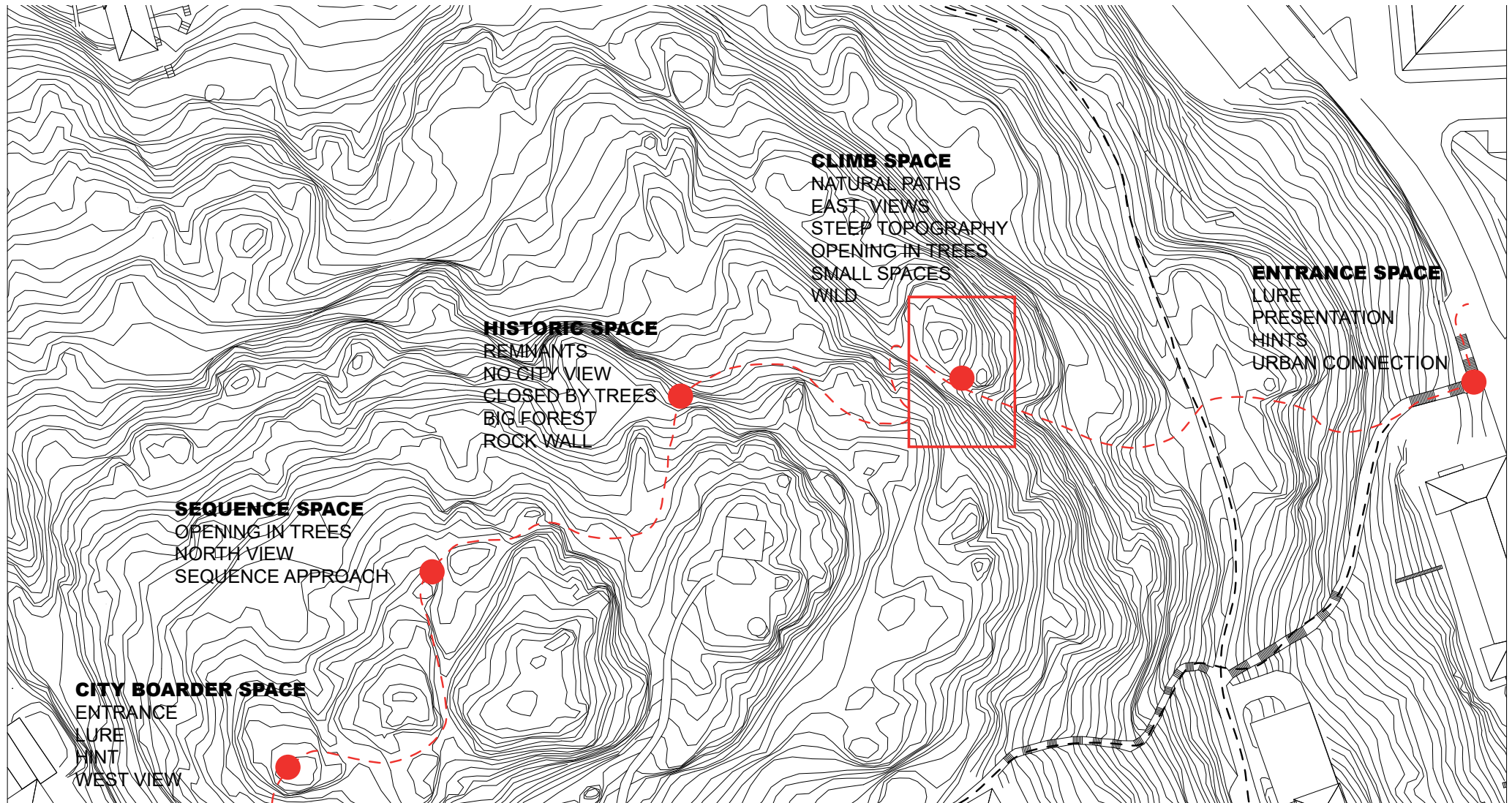
Process diagram showing three paths up to the top with three different inclinations

THREE AMBIENCES



Process diagram showing different areas of the mountain and their ambience and movements through them

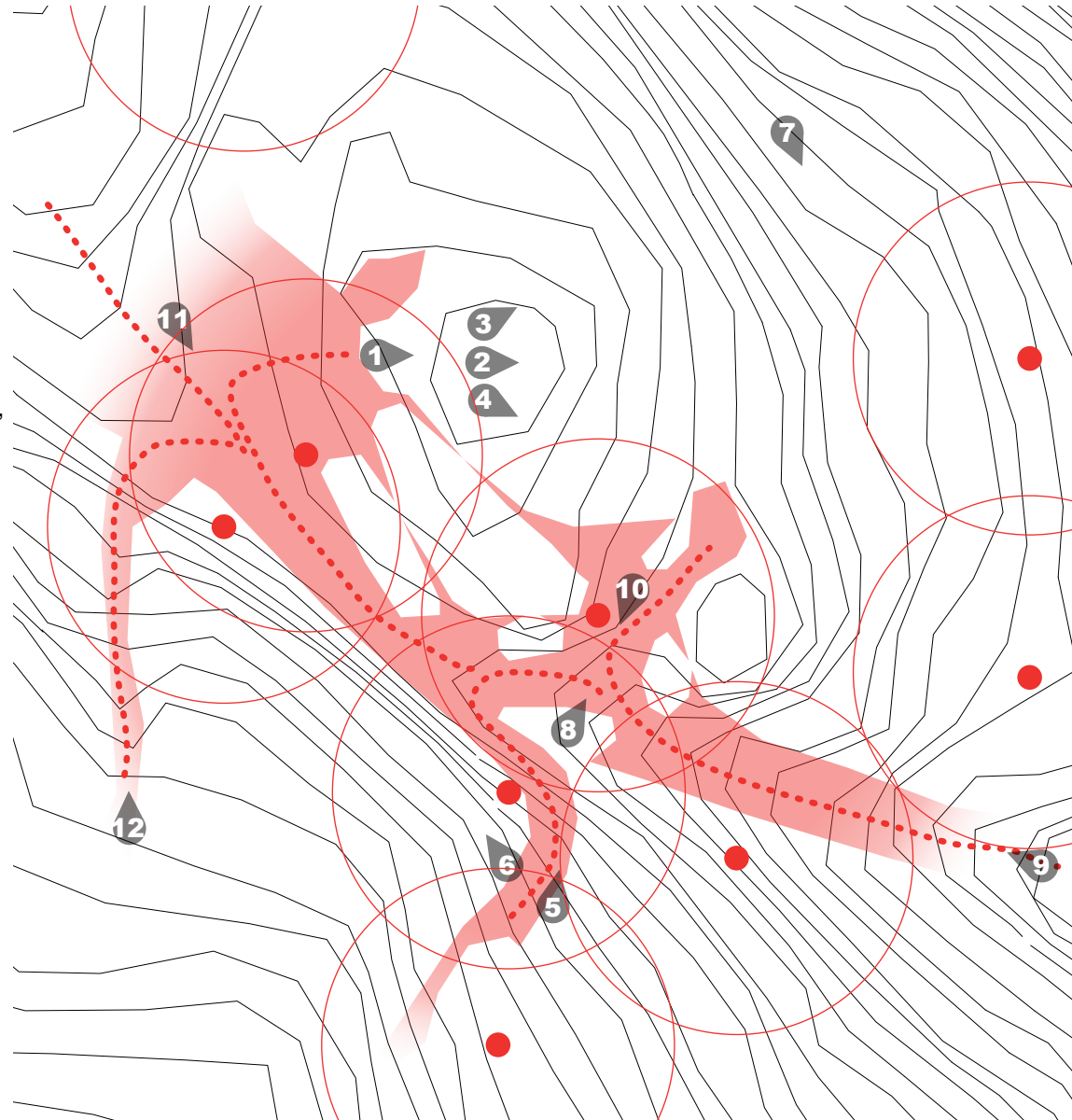
FIVE CHARACTERISTIC SITES



Characterization of sites along the path

GLADE SITE ANALYSIS

Analysis of the Glade, showing trees, rocks, paths, topographic character and views.



East views



Topography



Paths

9



10



11



12



GLADE ENCOUNTER

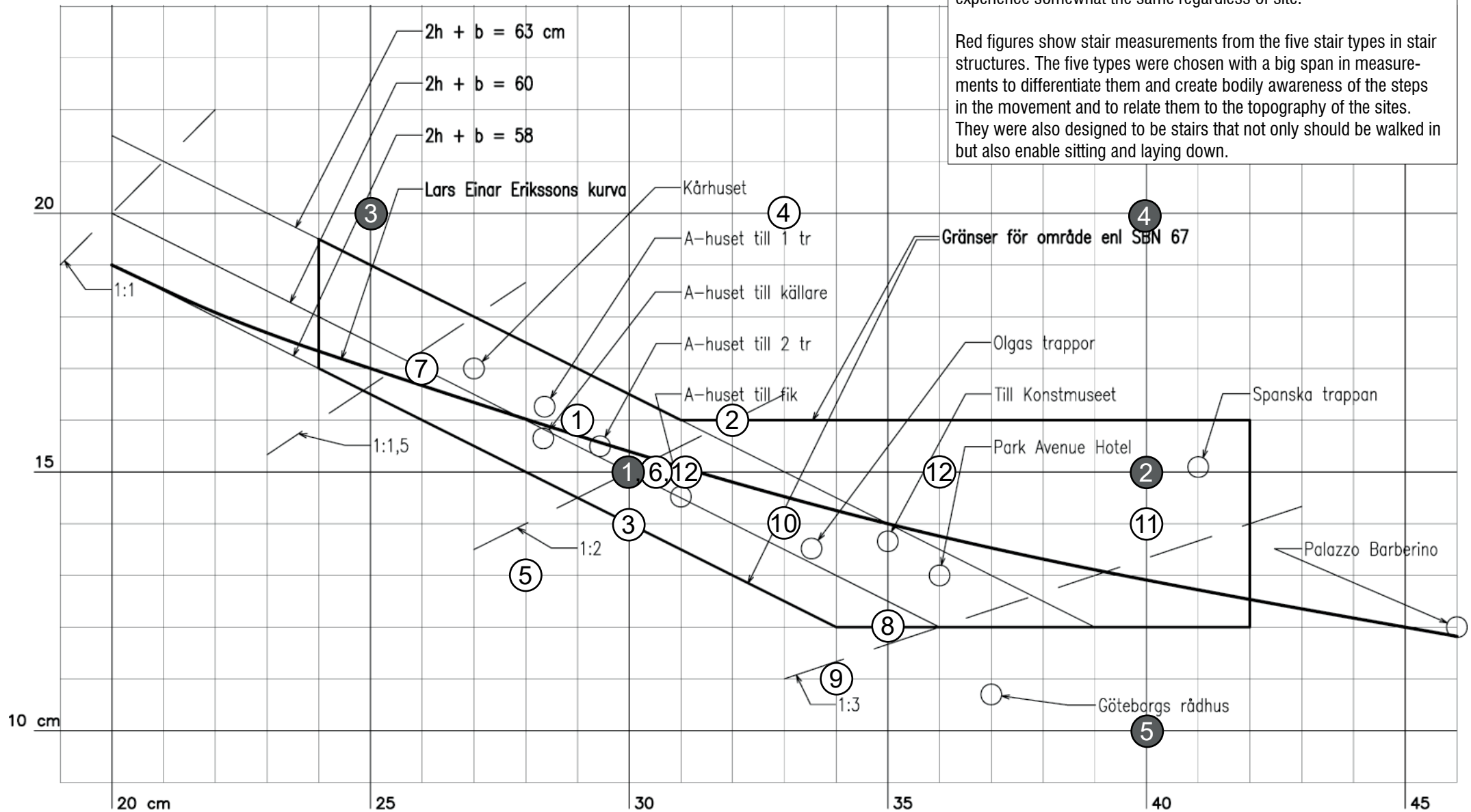


Early sketch of glade, climb from east

STAIR MEASUREING

Public stair field-research in Gothenburg, adding to Janssons(2013) previous work. The research mostly covered stairs over mountains in the city. Most of the stairs had similar measurements, making the experience somewhat the same regardless of site.

Red figures show stair measurements from the five stair types in stair structures. The five types were chosen with a big span in measurements to differentiate them and create bodily awareness of the steps in the movement and to relate them to the topography of the sites. They were also designed to be stairs that not only should be walked in but also enable sitting and laying down.



- ① Otterhällan
Landings: 6
Steps: 127
- ② Kungsgatan
Landings: 8
Steps: 74
- ③ Luntantugatan
Landings: 1
Steps: 43
- ④ Bastionen
Landings: 0
Steps: 30
- ⑤ Kaponjärtrappan
Landings: 3
Steps: 189
- ⑥ Nilssonsberg
Landings: 10
Steps: 125
- ⑦ Fogelbergsparken
Landings: 3
Steps: 96
- ⑧ Koncerthuset
Landings: 0
Steps: 11
- ⑨ Stadsteatern
Landings: 0
Steps: 6
- ⑩ Chalmersplatsen
Landings: 8
Steps: 107
- ⑪ Gibraltargatan
Landings: 1
Steps: 14
- ⑫ Johannebergshöjden
Landings: 20
Steps: 185





10



5

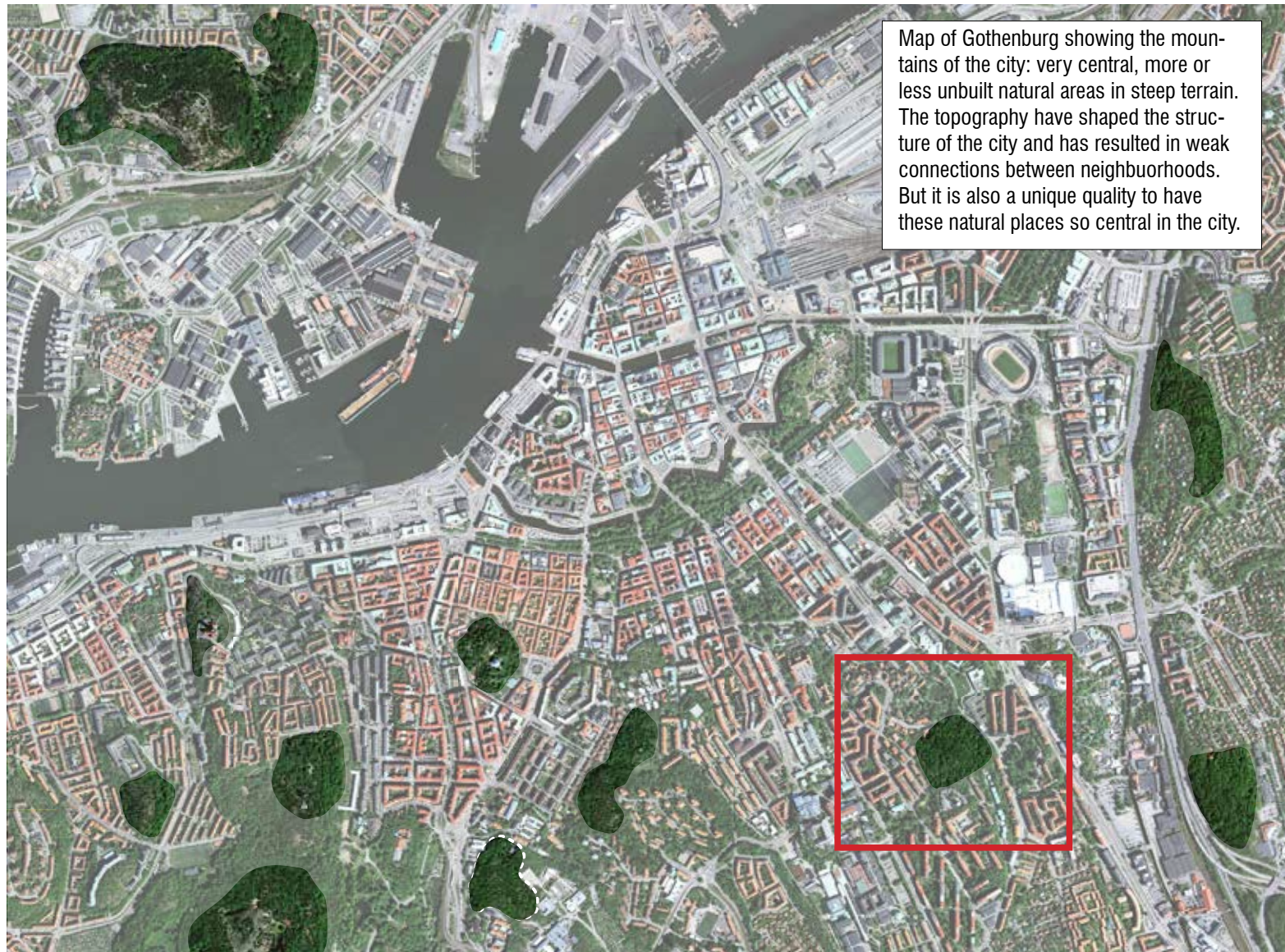


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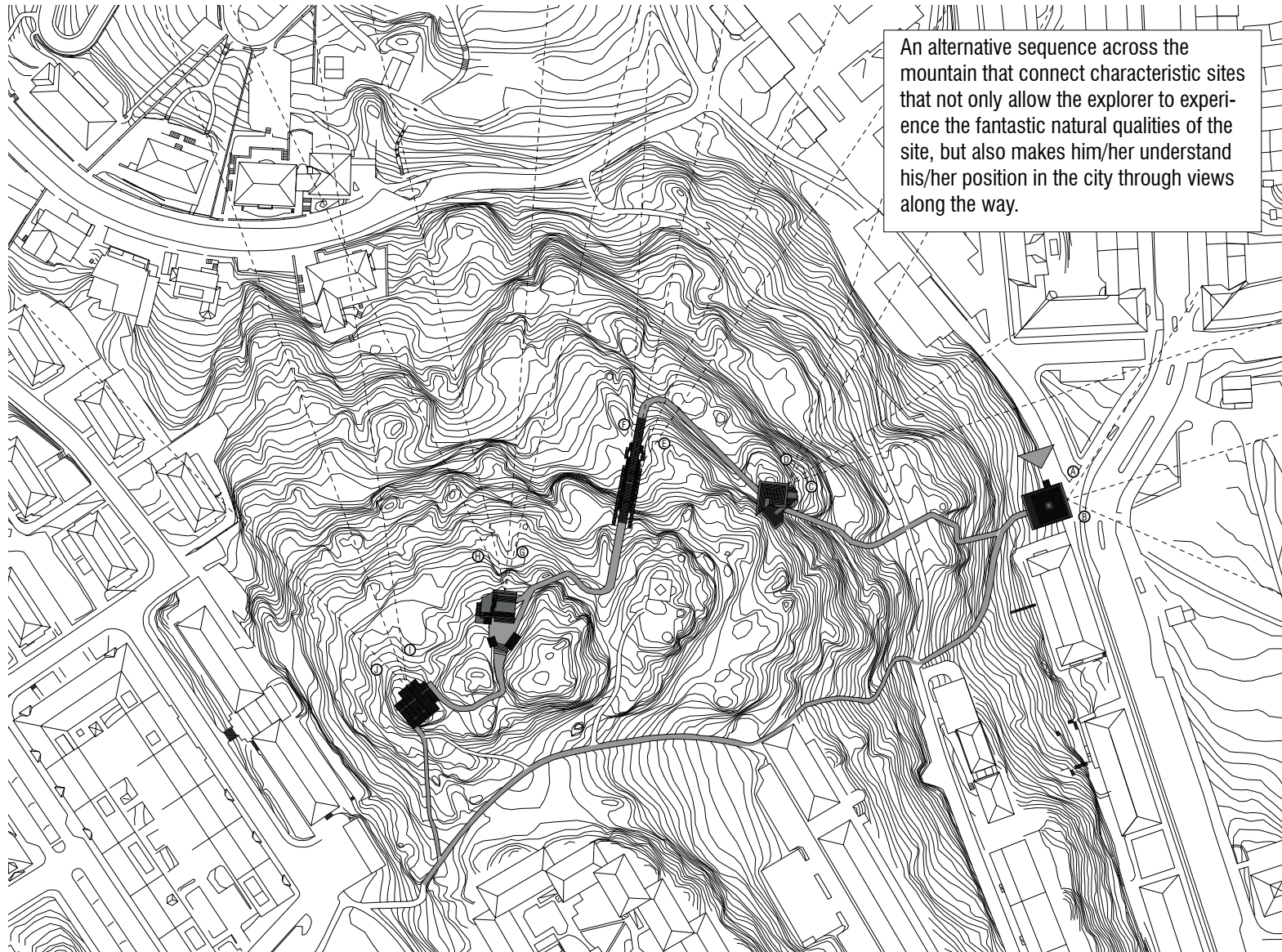


PROJECT.

MOUNTAINS OF GOTHENBURG

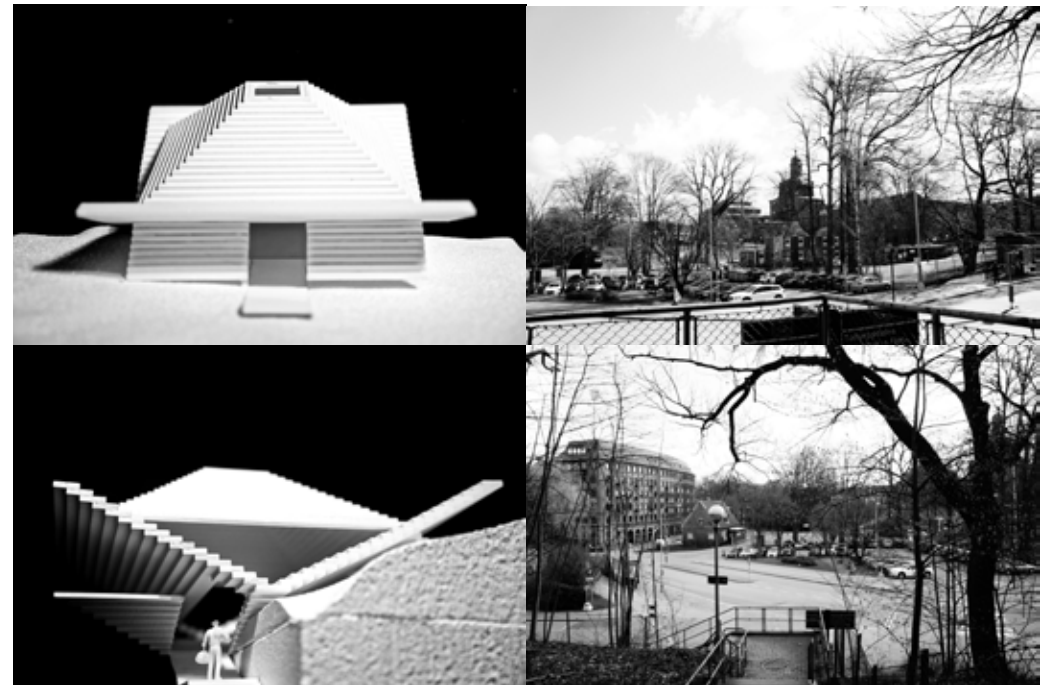


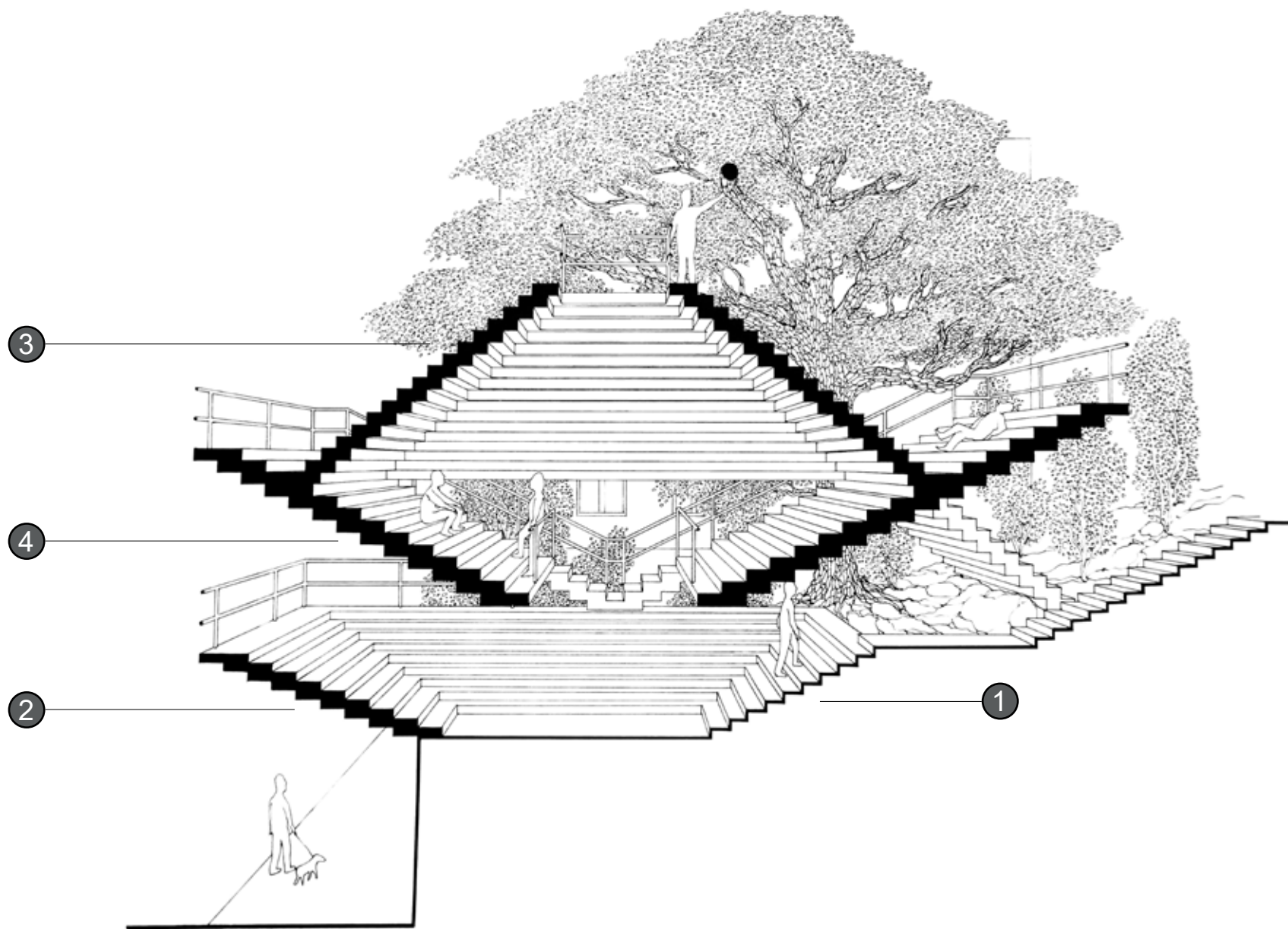
JOHANNEBERGSHÖJDEN - EXPLORATIVE SEQUENCE



MOUNTAIN ATTRACTOR

- Attracting and creating curiosity in further exploration of the mountain
 - Peak calling for climb
- Providing possibility to climb close to tree, to vertically transcend into calm and nature
 - Shielding from nearby traffic noise inside

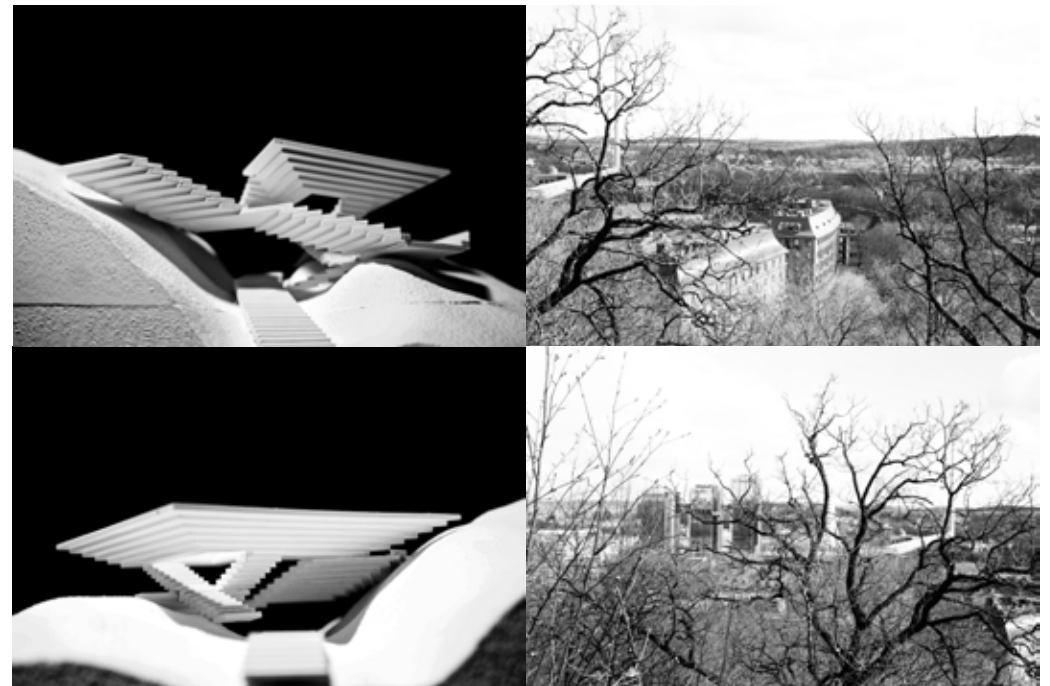


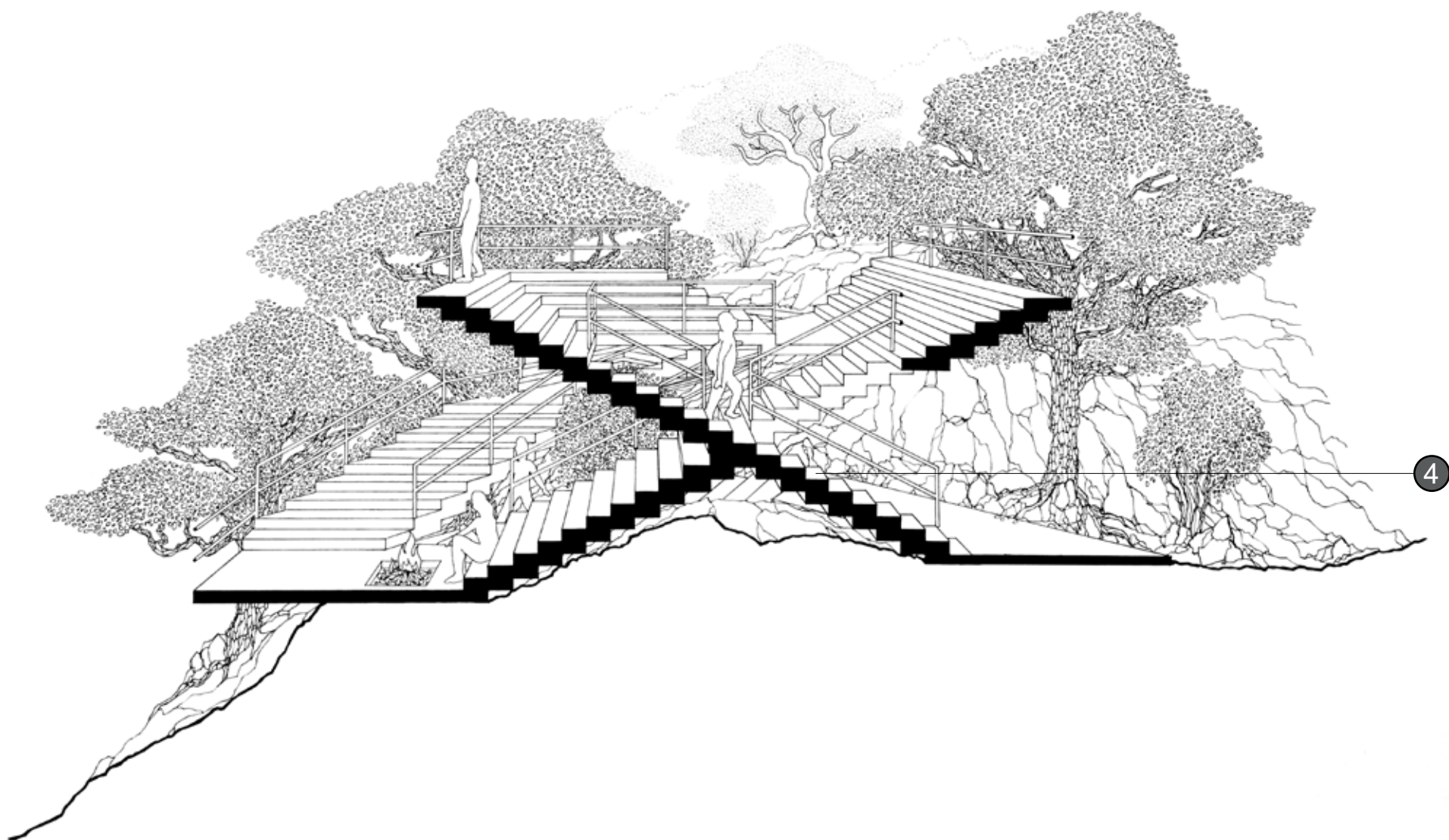


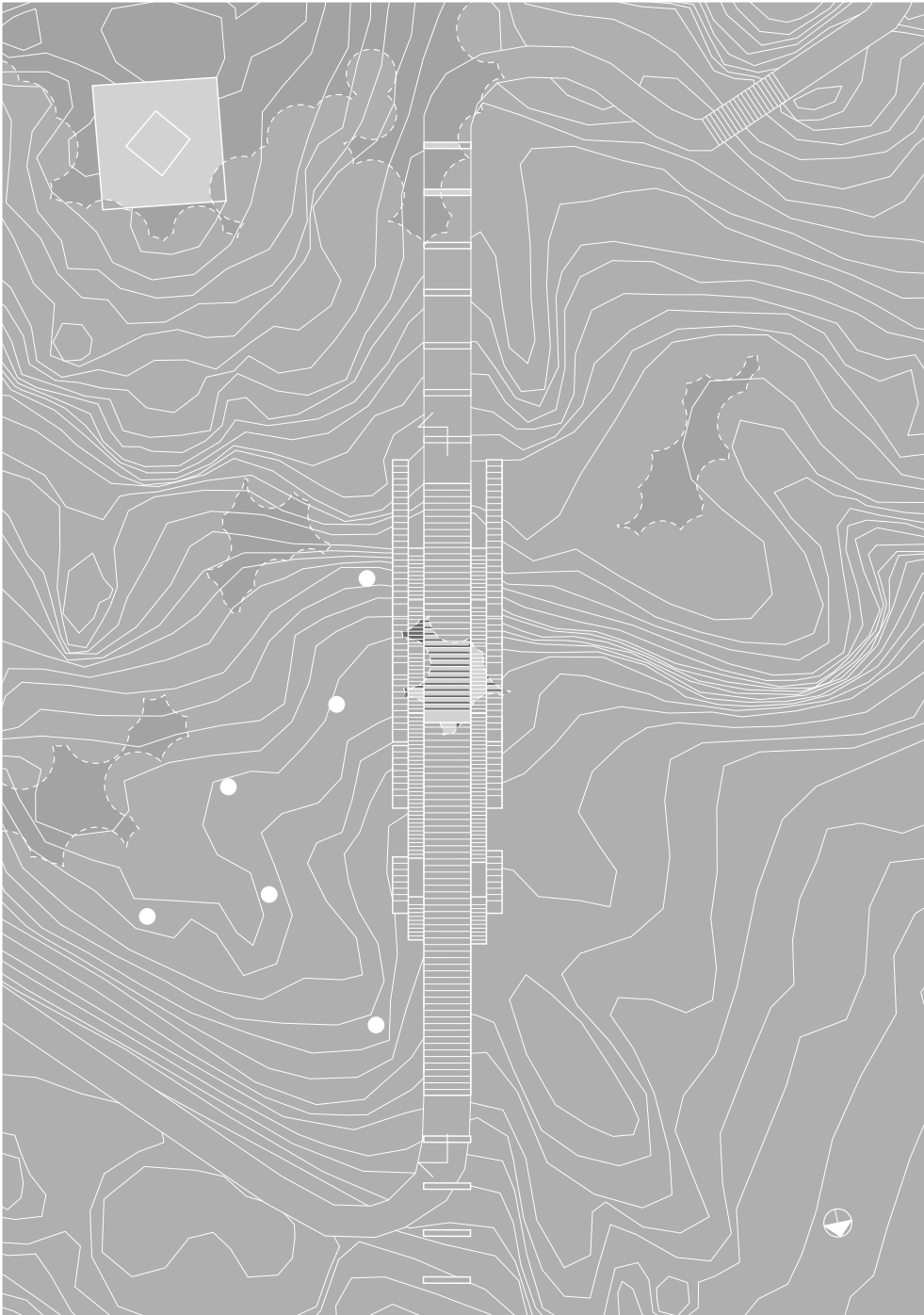


GLADE

- Strengthening site sequence: from steep, narrow and dark to open and light; from under to over
- Strengthening transition from close body focus to far away focus
- Possibility to make fire
- Providing seclusion in small semi-private social spaces, hideaway

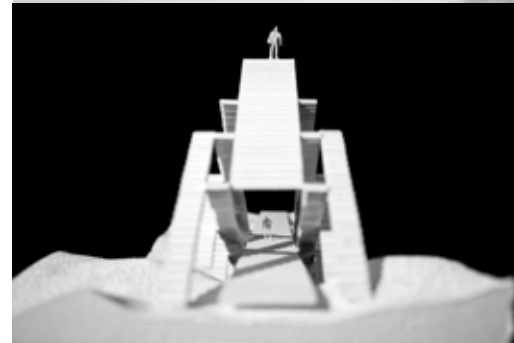
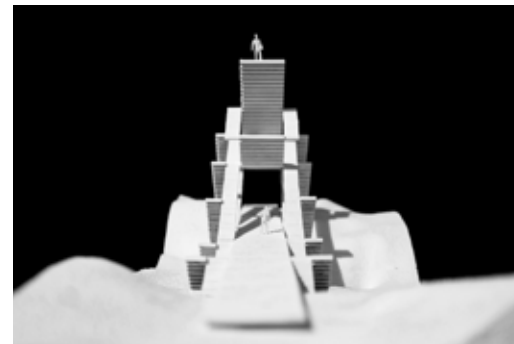


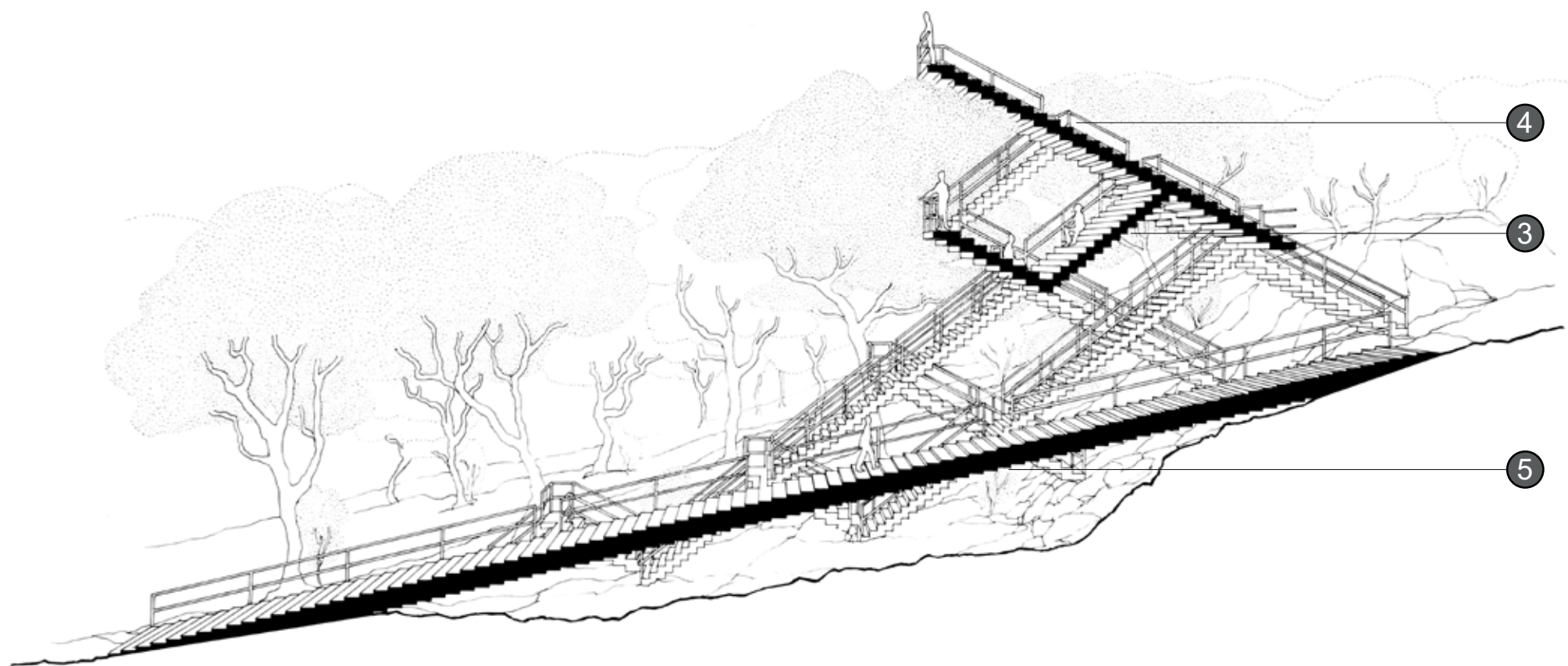




CONNECTING BRIDGE

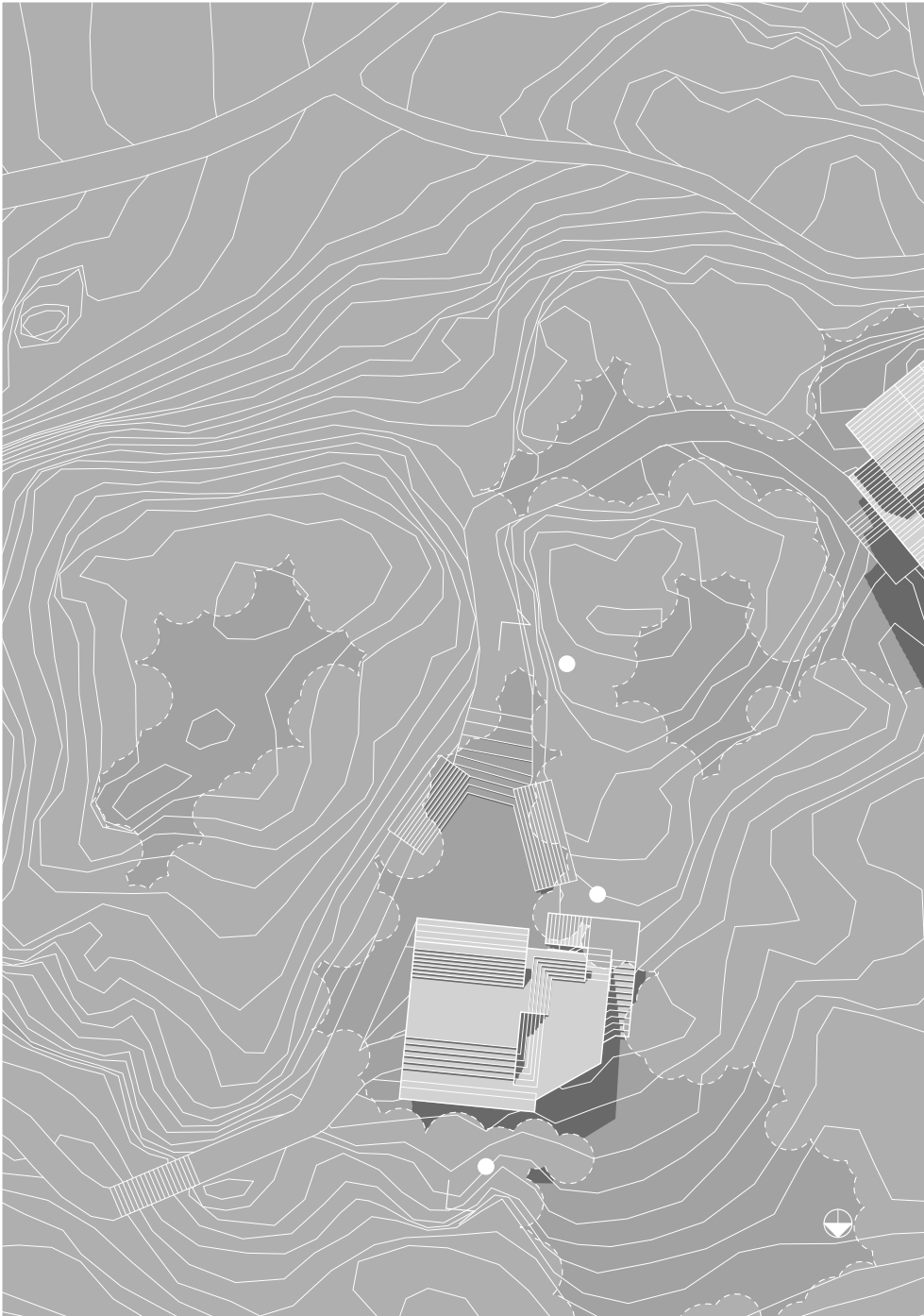
- Showcasing site history, reconnecting remnants
- Allowing movement above closed tree roof
- Sheltering rest inside treetops
- Providing variety of movement possibilities to explore

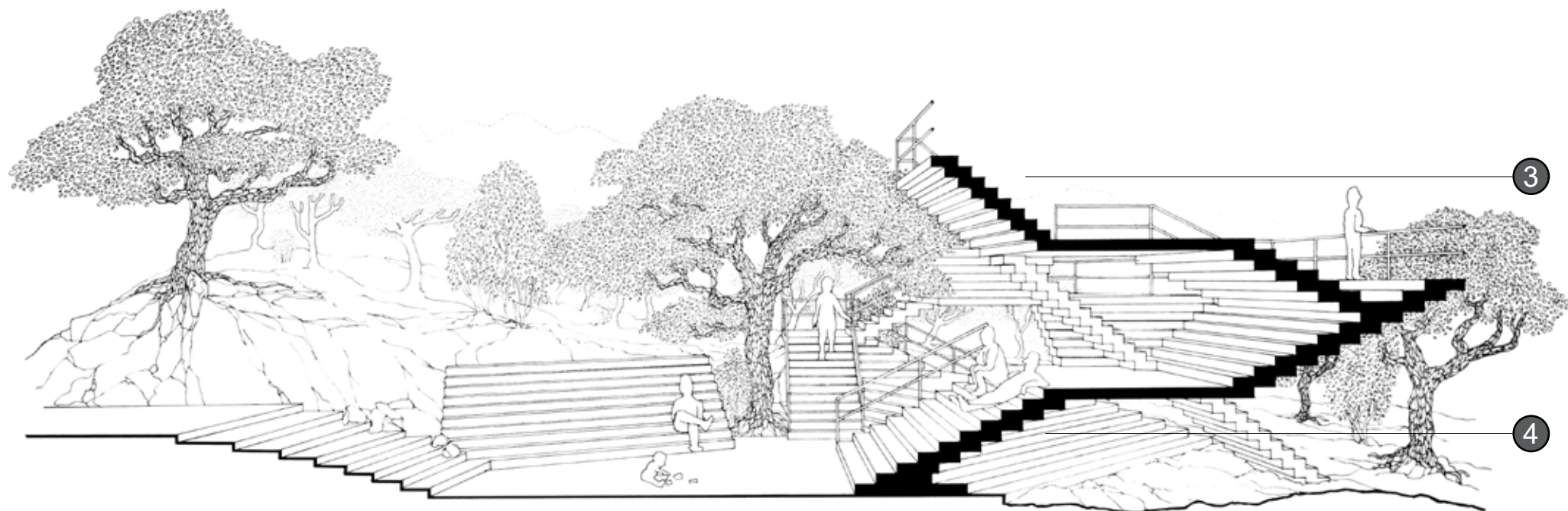




MOUNTAIN SQUARE

- Topographic square with stage suitable for events and activities such as concerts, meetings, sports and play
- Two-sided design allowing relaxed back side with view and shelter
 - Opening topographic sequence from south attracting movement by gradually revealing view
- Variety of secluded spaces allowing smaller social meetings

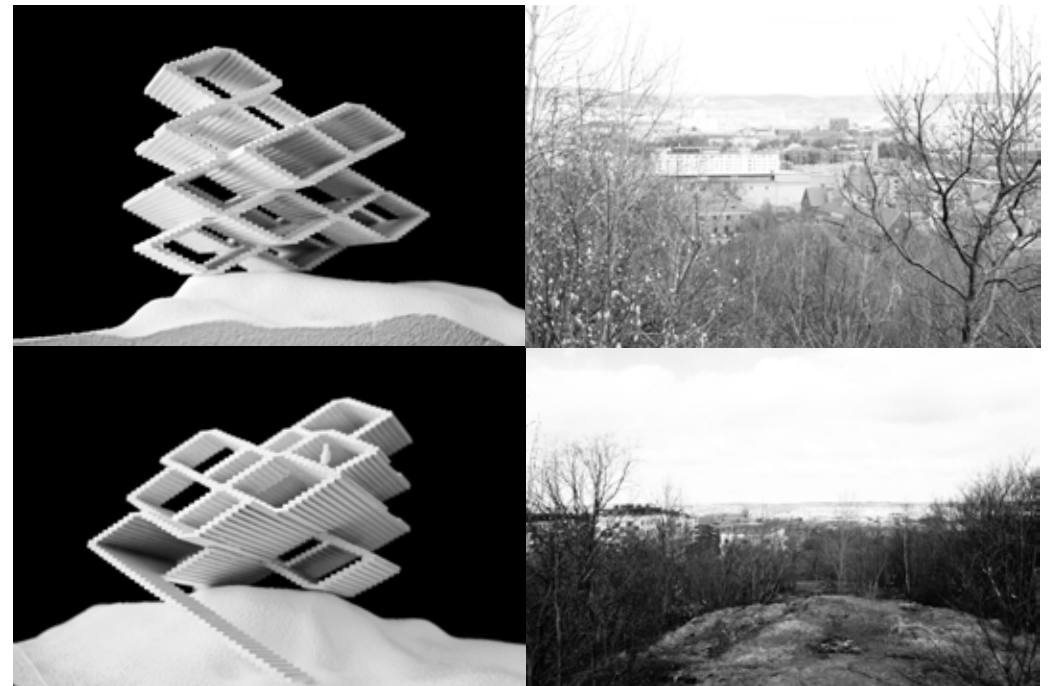


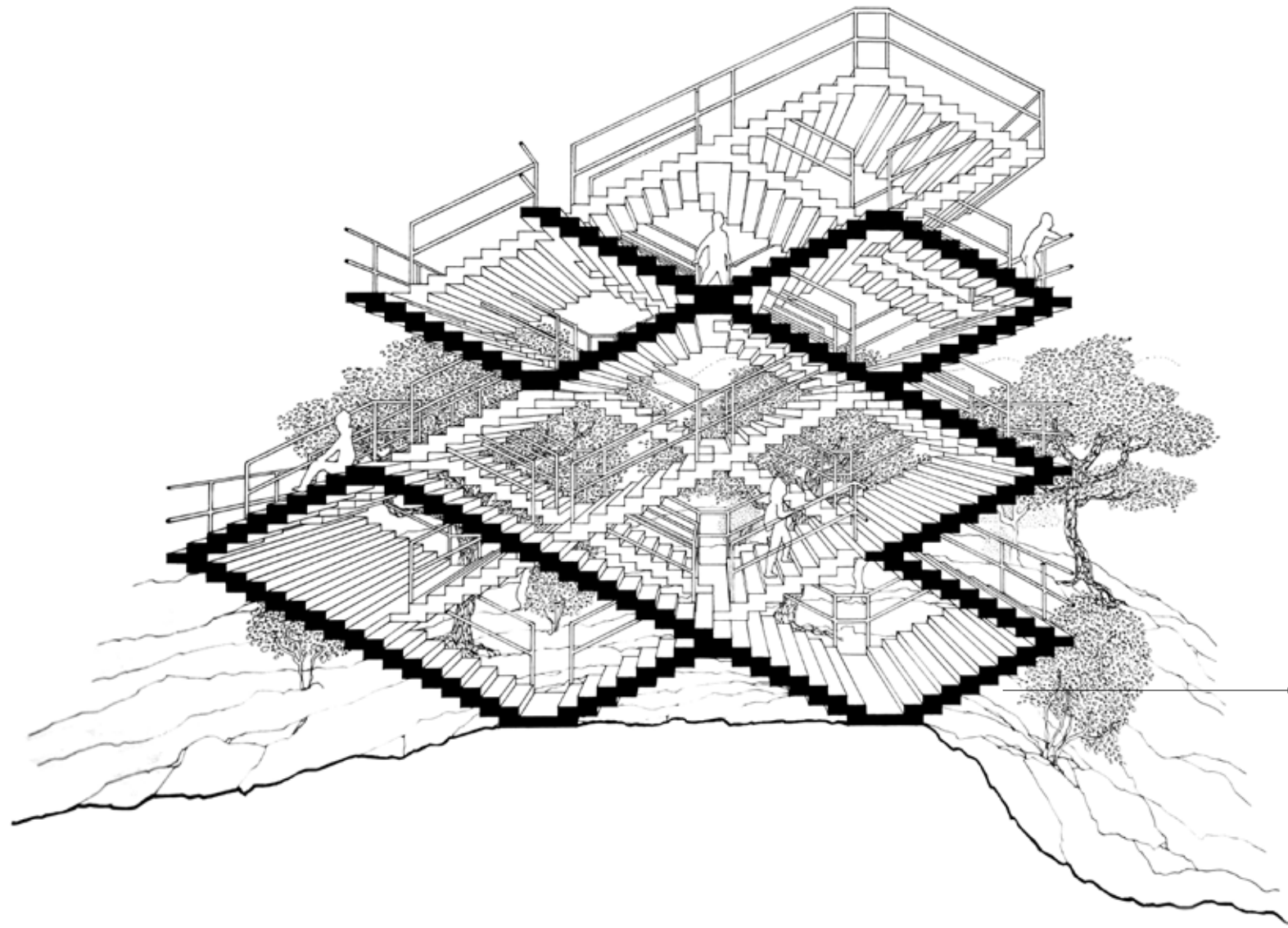




EXPLORATIVE TOWER

- Highest viewpoint situated close to city border providing urban connection and expansive views over rooftops
- Modular maze of stairs allowing creative movement and playful exploration
- Open structure allowing views in all directions
- Richness of inside and outside social spaces to find





1

REFERENCE LIST.

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CONCLUSION.

I have answered my questions by providing stair structures that together with the qualities of the site creates an explorative sequence across the mountain. By applying the ability of the staircase to give rise to acts and bodily interaction, the stair structures become architecture of exploration. The architecture of the stair is not about the visual appearance but the movement possibility it communicates, but the act it facilitates. By applying an architecture of the stair in a sequence through characteristic and strategic places on the mountain that captures the view points and natural qualities of the mountain, the alternative path enables exploration of the architecture, the mountain and the city.

A problem with strengthening natural qualities by adding structures is that you inevitably change the natural qualities that you tried to strengthen by introducing something new. My approach to this problem have in my work became to look at the site not as a fragile image of untouched nature where architecture just pollutes, but to look at what it is that the specific site *does*, to create an architecture of *acts* that develops and highlights the interactive experiences of the sites.

THANK YOU!

Johanna and Axel

All my friends in the MSS studio

Simon Hasselblom

Martin Löfqvist

Kajsa Falkman

Ulf Jansson

Mölnåls Stencilcenter