

# URBAN CAVE

Using deformation to trigger haptic experience to create an intimate relationship  
between body and space.

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## ABSTRACT

All the spaces people go through while moving from one place to the next inside the city they can do without thinking to much about it. Everything is smooth, even and no surprises or challenges. Perhaps It is so easy and comfortable that people hardly need to look up to navigate, often walking across spaces on their phones not taking any note of the environment around them.

This thesis hopes to challenge that by creating haptic experience through deformation of simple spatial elements. By deforming the normal city space the relationship between the space and body become more intimate (Pallasmaa, 2000). When people actually need to look up and figure how it is best to cross a site, they automatically are more involved. There are a few sites in Gothenburg that lack intimacy and one of them is Brunnsparken. Brunnsparken is almost like a "non" space because people usually go there only to wait for a bus or a tram to take them further to somewhere else. Brunnsparken is a big transport hub, one of the bigger one inside the central of Gothenburg. This function will stay and be used to focus the design investigations performed in this thesis work.

Design investigations focused on recording a physical (haptic) reaction of the body when moving across a sloping surface from the side. The findings recorded from this investigation was furthermore used to deform a rigid framed series of spaces. Creating a sequence of haptic moments used as a filter between the street space and framed space within Brunnsparken.

By defamiliarize every day normal spatial objects the architecture is creating more haptic experience.

The project results in a more focused and intimate urban space. The design is about strengthening the personal subjectivity and for that contrast is made between first perception (visual) and second perception (haptic). Therefor when people enter the structure their visual and haptic perception occur simultaneously and every step is a reaction to the now.

## STUDENT BACKGROUND

### Education:

**Bachelor in Architecture** 2011-14  
The Icelandic Academy of the Arts

**Master's program, Architecture and Urban Design** 2016-18  
Chalmers University of Technology

- Sustainable development and the design professions
- Nordic Architecture
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- Material Turn

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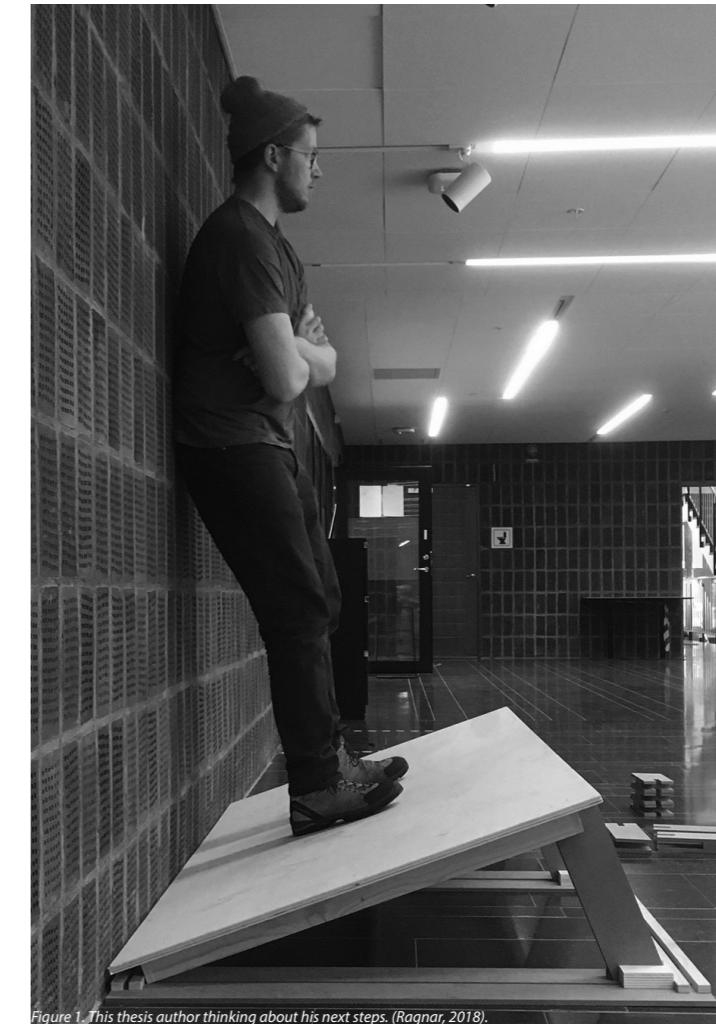


Figure 1. This thesis author thinking about his next steps. (Ragnar, 2018).

## Background

People are becoming more and more closed off from their surroundings when moving around in cities. The city scape is big and out of human proportions therefore, the body does not relate to it, the scale creates a distance and lacks intimacy. People go around with an unspoken space around them that they perceive as "theirs", and in urban situation they often tend to protect that space. In modern days people are often on their phones and making eye contact to the next person has become less and less common. Thus, the possibility of escaping surroundings and possible interactions with strangers has increased (Gehl, 2011).

Most spaces people navigate from day to day are smooth and seamless so people can take a quick look and then walk across without giving it much thought. It creates a distance between people and the place. However, by taking simple spatial agents and changing them a little, results in stronger relationships. When people have to act to each step or each move they make, the space starts to have more impact and bridges such disconnection between people and their surroundings (Sivakumar Thangavelu, 2011).

Vision perceives with memory and former experiences, therefore cannot inform people solely about what is in front of them. Only when the body experiences the space does the mind grasp the correct understanding. That is why space designed to be experienced, has stronger connection to people than space that is immediately understood through vision (KunstSpektrum, 2014.; Pallasmaa, 2007).

## Purpose & Aim

Walking through central Gothenburg there are very few spaces that relate to the scale of human beings. The buildings are tall, the streets are wide and long and there is a traffic rawring all around. The public transportation takes a lot of space in the city and there are few spaces in the city where people only go to wait. These spaces lack attraction in many cases. Central of Gothenburg has a few spaces that are "between" spaces, as people travel through them yet do not interact with them. What a waste of space in the middle of the city. What can be done for one of those spaces so they become something more than a "between" space?

Most spaces people come across in their every day are smooth and simple and every angle is 90°, but what if that is challenged? Take every day spatial elements like street or wall surfaces and altar them so that the eyes cannot tell the whole story but only with physical experience the space can be understood.

By choosing a site and give this project a context the discourse is given a platform to grow from. The aim with this thesis is to use hapticity to enhance people's spatial awareness. Looking for references that feed into that topic and abstract haptic qualities.

## Method

To start with, finding good relative references is the key to place myself in the discourse. From that I hope to gain understanding and tools that will be investigated through design. Choose a site and gain a context that can focus my investigations. Look for contextual agents that can help decide function needed for the site. By having a function in mind for the site in mind, the project has a focused attention for the design investigations.

The design investigations will touch upon how the body reacts to certain haptic changes and how using deformation of simple spatial elements can create a difference between visual and physical perception, in hope to create more intimacy with the space itself.

## Question

How can deformation of normal spatial elements create a haptic and more intimate urban space?



Figure 2. Central Gothenburg. (Google, n.d.-d).

## **SITE ANALYSIS / 01**

Brunnsparken, Central Gothenburg



Figure 3. Site drawing of Brunnsparcken. (Ragnar, 2018).

## BRUNNSPARKEN



Figure 4. Brunnsparcken. (Ragnar, 2018).



Figure 5. Brunnsparcken, waiting. (Ragnar, 2018).



Figure 6. Brunnsparcken, the canal. (Ragnar, 2018).



Figure 7. Brunnsparcken, bridge over the canal to Nordstan. (Ragnar, 2018).

### Brunnsparcken (1)

What is quickly noted when in Brunnsparcken is the big open area on the edges of central Gothenburg. A lot of people come through this site daily since it is one of the biggest transport hub in the city. It is very open to the elements and people have no shelter from wind or rain while crossing. The bus/tram stops only accommodate few compare to the amount of people going through every day. The buildings around Brunnsparcken are not in human scale and have little connection to the square. While people are there waiting for a bus or walking across the site they are very often on their phone and are sometimes close to bumping into one another.

### Waiting and then leaving (2)

Almost everyone that stops and stays at Brunnsparcken are waiting for a tram or a bus. The public transport network is very dominant at the site and are at the south, west and north edge of Brunnsparcken. This disconnects the square from the buildings and makes the site appear almost as an island or just an in between space. People do not interact with the environment or other people, they are rather on their phones or talking to a friend.

### The canal (3)

The canal is a historic element in the central of Gothenburg and is used for boat rides over certain part of the year. However, at Brunnsparcken, the only interaction that people have with the canal is through the boat rides. Going across the north edge of Brunnsparcken it only divides the square further apart from the surrounding environment. Moreover, it is also limiting how people can cross through, and more often making the walking distances for people longer. Very few people walk through Brunnsparcken to cross the bridge in the middle of it. Partly because it is far away where people enter the site and also because there are tram stops on both sides of it.

### Attractions (4)

At the north edge of the Brunnsparcken there is Nordstan, the biggest shopping mall in Gothenburg. A lot of people go there for both work and shopping, however, it has no connection to Brunnsparcken. When the weather is good, people should want a space to stop and stay and enjoy, but at Brunnsparcken there no such attraction. As a space in the middle of the city that is a lost opportunity.

## CONTEXTUAL AGENTS

### Tram & bus traffic

Public transportation is the main theme of Brunnsparken. The trams and buses role around the edges from three sites and are therefore Brunnsparken's main attraction. The reason people come to Brunnsparken and stay there for a moment is to wait for the next tram or the bus. Perhaps that is the reason this site is so neglected and the square is not thought of as a destination. People are only there to go somewhere else. As one of the bigger transportation hubs of the central area it deserves more.

### People

It is either standing or crossing when it comes to Brunnsparken. People either enter the square from a tram or a bus, or come walking. Some people stop and wait statically until the transportation takes them elsewhere. When people stand and wait by the bus stops they usually do not stand close to each other, two or three stand in the stop and the rest somewhere around it. People try not to cross each other's personal space.

### The canal

The canal has no function that interacts with people waiting in Brunnsparken. It works as a boundary that directs walking people away from the square. Some parts of the year boat trips for tourists navigate through the canal but not the whole year around. The water level is far below the walking surface and it is fenced off for most parts. In most parts of the world urban design involves water because people like being close to water.

### Scale

Brunnsparken and its surroundings are very much out of human scale. The building masses are tall and long and walking across the square is a long distance. It is increased, in many cases, by the bus stops and the canal.



Figure 8. Brunnsparken, traffic. (Ragnar, 2018).



Figure 9. Brunnsparken, people. (Ragnar, 2018).



Figure 10. Brunnsparken, people 02. (Ragnar, 2018).



Figure 11. Brunnsparken, Fredsgatan. (Ragnar, 2018).

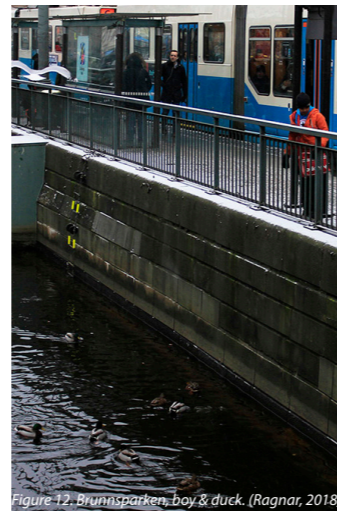


Figure 12. Brunnsparken, boy & duck. (Ragnar, 2018).



Figure 13. Brunnsparken, at night. (Ragnar, 2018).

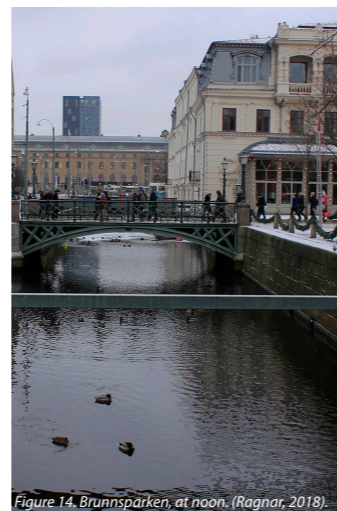


Figure 14. Brunnsparken, at noon. (Ragnar, 2018).



Figure 15. Brunnsparken, personal space. (Ragnar, 2018).



Figure 16. Brunnsparken, personal space 02. (Ragnar, 2018).



Figure 17. Brunnsparken, stängeri passing each other. (Ragnar, 2018).



Figure 18. Brunnsparken, the canal in no connection to its surroundings. (Ragnar, 2018).

## DESIGN FOCUS

### The body

People in Brunnsparken are either waiting or crossing the site then the design investigations must focus around that. Using simple deformations off ordinary spatial elements to create haptic perception in the space. How can sloping walking surface affect where people stand and wait or walk across. Since that is the main function of Brunnsparken there is remarkable little effort put into servicing that function. By designing space that is scaled and focused on the body can create intimate relationship with the site.

### Surfaces

What surfaces are people in relationship with in Brunnsparken? Everyone walk across so there is a haptic connection that can be investigated. While waiting, people tend to stand inside or close to the tram/bus stops or by the facades of the houses circulating the site.

### Scale

The size of spaces or haptic design will be focused on the human scale to strengthen the personal subjectivity. Each person has its own understanding on what is good or bad and will choose from their own subjectivity what path they will walk or where it is best to stand or sit while waiting.

Personal space is important for people at Brunnsparken, most notably seen in the tram/bus stops where there are usually not more than 3-5 people each time no matter how many people are waiting.

### The canal

People are fond of water and when there is a nice spot open close to a river, canal or pond people like to be there. The canal as it is today has no relationship with Brunnsparken and works only as a divider. Part of the design focus will be to create a relationship with the water and the people waiting or crossing Brunnsparken.



### Conclusion

This thesis work is taking something very urban as Brunnsparken and using references and design investigations to unlock an intimate relationship with the space. As Brunnsparken is a very large area with a very limited relationship to people, the goal was to find a way to create stronger relationship to the site by finding ways of limiting what people would see at Brunnsparken.

The goal was not only to refocus on how people stay and get around the site, but also to create a relationship with the space that is already at Brunnsparken. The function of waiting is kept, as well as some of the trees on site and the fountain as these are pleasant when people stop and wait. The canal is something that is in no connection to people that go across or past the site. The design wanted to change that and look for ways to include it and in a way that people on site might interact with in a new way.

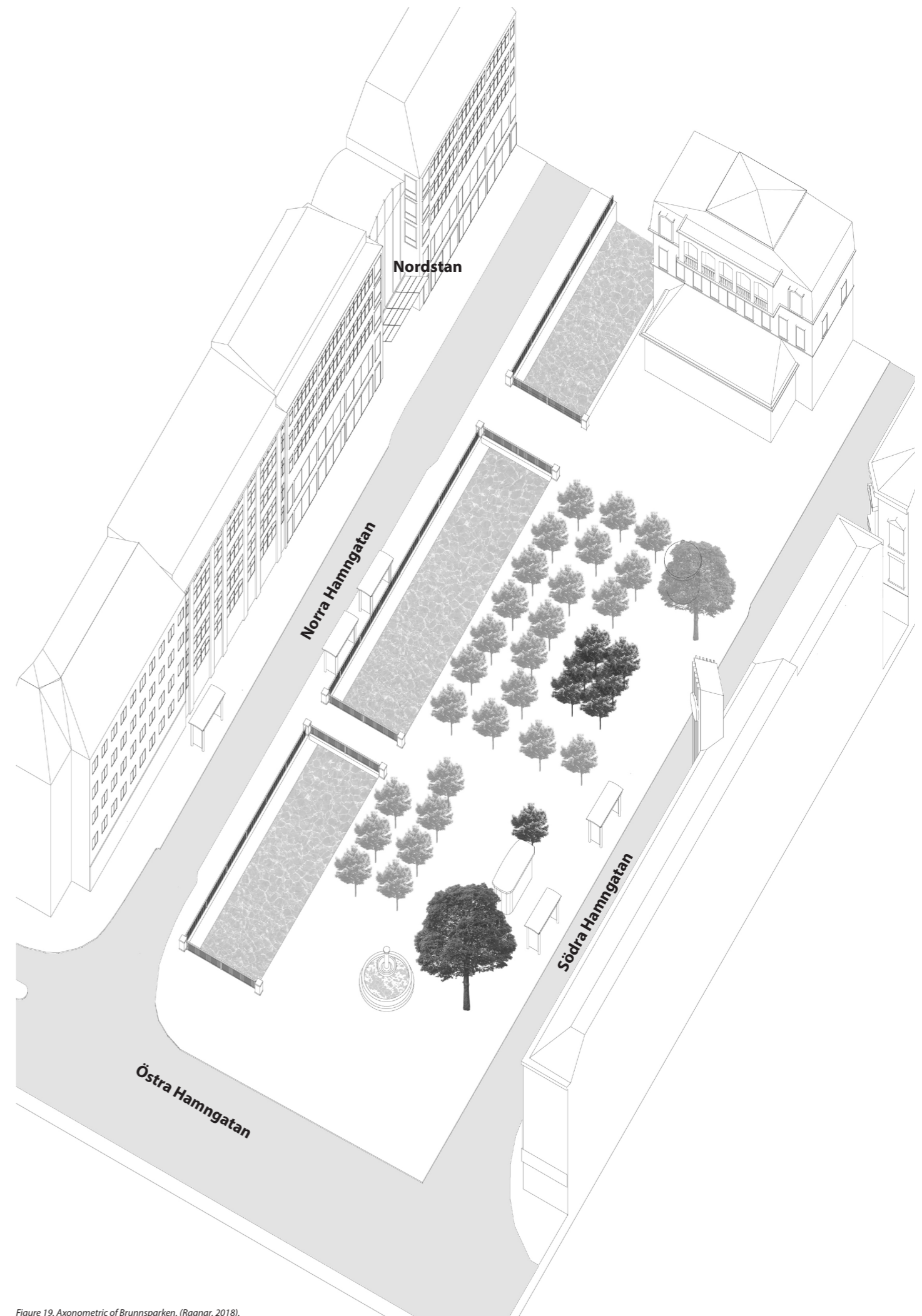


Figure 19. Axonometric of Brunnsparken. (Ragnar, 2018).



Figure 20. The Hedgehog and the Fox. (Princeton Uni. art gallery, 2013).

**THE HEDGEHOG AND THE FOX, RICHARD SERRA**

Princeton University, U.S.A

The sculpture consists of three serpentine sheets of steel standing 28 meters long and 4.5 meter high, each comprising two identical conical/elliptical sections, inverted relative to each other overall (Mcshine, Cooke and Rajchman, 2007).

Serra, when talking about his work in general, is reluctant to say what people should feel or look for in his work. He wants people's experience to be their own, he does not want to lead people in to certain experiences. Meaning that what each person takes out of its walk through his work is up to each person to feel, it might be something meaningful or it might be nothing. The purpose of an art, and in this example space, is to provide different experience. Doing so gives people the opportunity to have a real experiences based on their own subjectivity. The metateriality or the flow of the space might relate to people for different reasons and that is an architectural experience (KunstSpektrum, 2014).

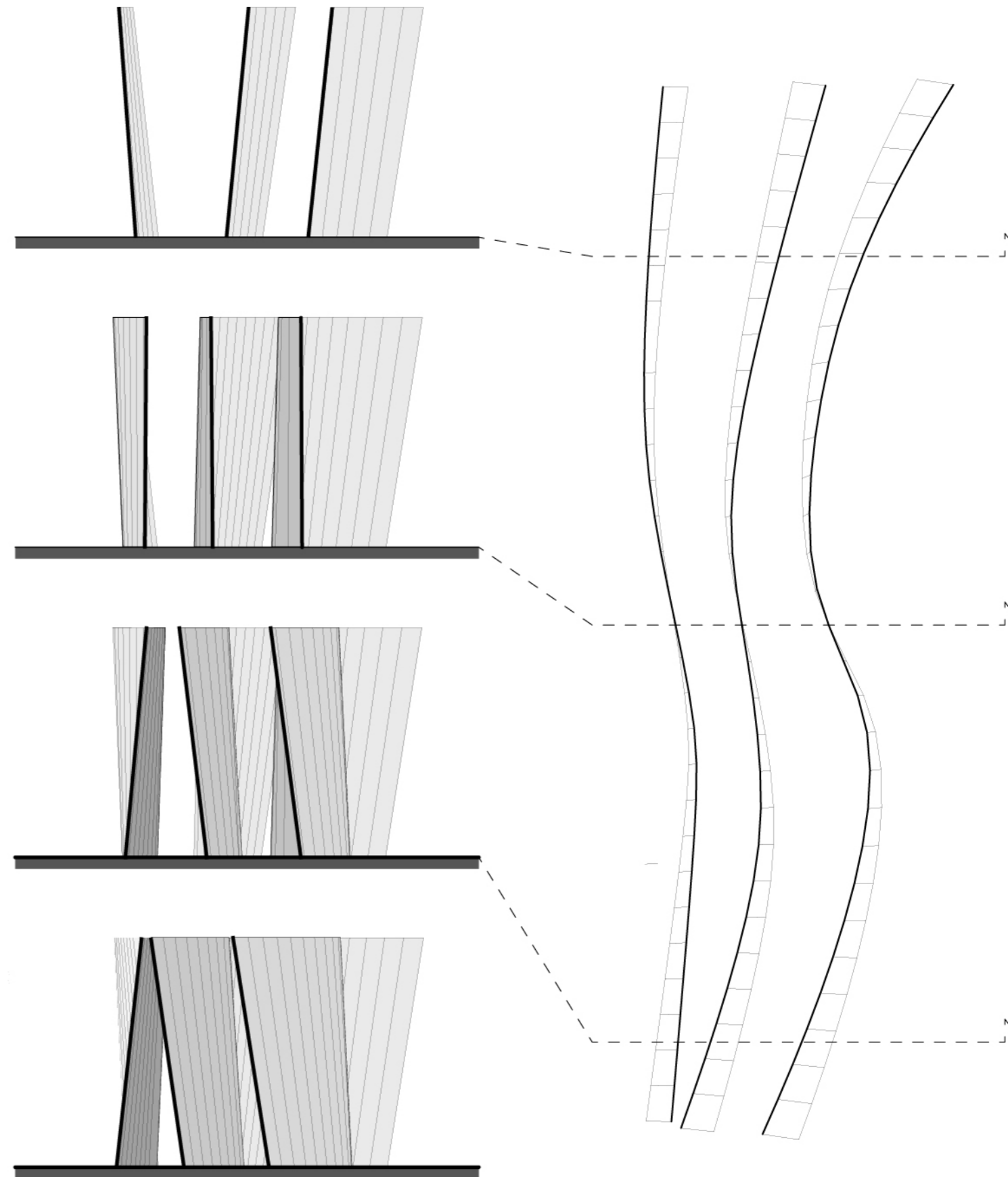


Figure 21. Plan and section drawings of The Hedgehog and the Fox. (Ragnar, 2018).



Figure 22. The Garden of Exile. (Jogloran, 2008).

**THE GARDEN OF EXILE, DANIEL LIEBESKIND**

Berlin, Germany

As Liebeskind Jewish Museum has many distorted and perceptually challenging spaces, the garden of exile is the only space composed on a grid system of right angles. The space uses columns equal in height and all fitted perfectly into a grid leaving space only big enough for one person to pass through each time. In this installation the visual perception is tricked and people most often have difficult first steps.

The whole thing is tipped down at the one corner so the columns are all inclining towards people as if the columns are falling. Not only that, but when people walk up the slope the columns are not facing the slope straight so the visual perception is again challenged and proven wrong by physical exploration of the structure.

In this space Liebeskind tricks yet again peoples visual perception by altering well known spatial elements. First of all, people see the spatial repetition with the columns, then when they start walking up, the tipped surface straight up the columns are turned (Sivakurnar Thangavelu, 2011).

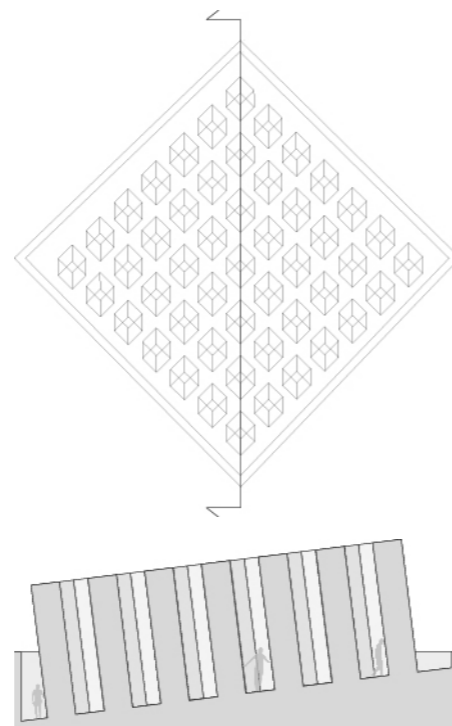
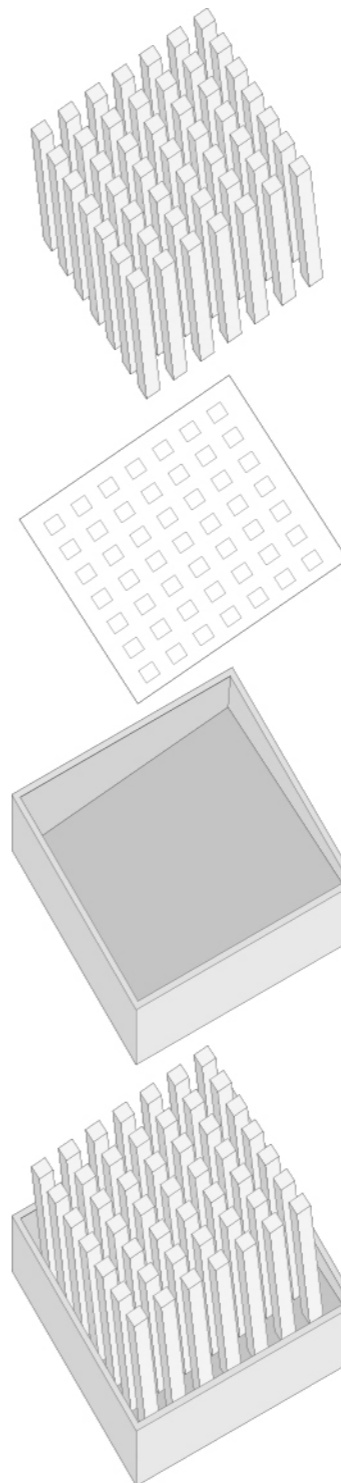


Figure 23. Plan and section drawings of The Garden of Exile. (Ragnar, 2018).



**Columns**

The columns are an object that people relate to stability or something that carries load. They are tall objects and when Liebeskind tilts them as he does in the Garden of Exile he takes the fundamental perception of them out of balance. They loom over people like they are about to fall.

**Grid**

Another agent of stability that is used is the grid system, which people are usually exposed to so that they quickly read what is coming if they travel further. However, together with the looming massive pillars and the fact that there is only space for one person between them, the grid adds to the personal perception and reflection in the garden.

**Surface**

Another element used is the walking surface, tilted in the direction of one of it's corner. Since the columns and the grid have it's faces in the same direction as the plane, everything is tilted to one corner. That corner is facing people when they arrive into the garden.

**Visual vs bodily experience**

People's vision and memory tells the brain that this is a stable structure, but as soon as they come closer to the structure and start to experience the twisted element their experience starts to contradict the visual perception. People get very present and active with the exploration while walking up the sloping surface between the tall tilting columns.

Figure 24. Axonometric diagram of The Garden of Exile. (Ragnar, 2018).



Figure 25. The Holocaust Memorial, Berlin. (Maria Carmen, 2012).

**THE HOLOCAUST MEMORIAL, PETER EISENMAN**

Berlin, Germany

This memorial of murdered Jews in Berlin has many split views of its success as a memorial and many think it is a very failed one. Whether that is true or not, it is not the purpose of this thesis discourse. The purpose is to look at it as a pure urban space where different qualities are abstracted. This project uses two agents to create spatial differences and they are uneven ground and different uneven concrete slabs. When spreaded across a big area, like this one, it makes for a very unique experience. To be inside a big city like Berlin and going from the edge of the monument where you have all the surrounding city affecting your senses, to the middle of the monument and have all the surrounding stripped away, evokes a strange emotion, but strange in a good way. This is a place where people can either choose open space with view everywhere or a very closed of private space. The fact that people can come to this monument and always walk a different path through it is also appealing. This monument in a way works like a filter on the city, how much of a filter is for each visitor to decide with each step they take.



Figure 26. The Holocaust Memorial, Berlin. (Joern Langhorst, 2017).



Figure 27. Inside the Holocaust Memorial, Berlin. (Adam Barrell, 2015).

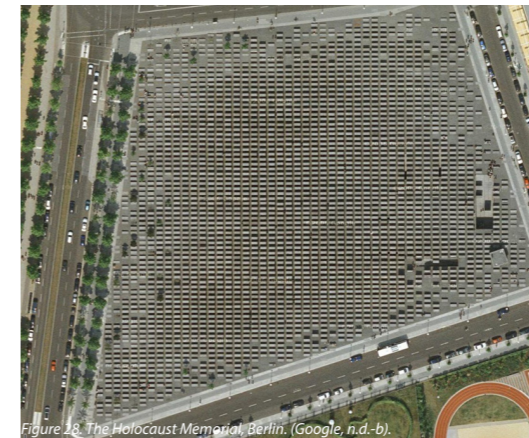


Figure 28. The Holocaust Memorial, Berlin. (Google, n.d.-b).

**Visual perception**

At the edges the concrete pillars are irregular in some parts and there are left gaps. People also experience the site with all its surroundings and traffic. There is almost a complete view of the monument from here. Visually it might look nice and people understand that these are rows of concrete pillars. The pillars are low and can surf as a seat or something to stand on.

**Hightened sense of interiority**

As people tend to wonder further into the monument, their senses are limited and most notable the sight of the surroundings. The space between the pillars is 95cm so it only fits one person. Thus, becomes very private spatially. The sound from the neighbourhood dies out a bit and your own footsteps take over. By walking into the monument the perception and the experience affects what may have been the perception while standing at the edge of the monument.

**Space understood through the experience**

What is urbanly appealing about this monument is how people can enter it and exit it where ever they want. There is no constructed path that they need to follow and very few boundaries. Thus, each person walking through the monument can take their own path. The monument is composed on a grid so the circulation is easy to understand and navigate through. What changes the perception of each space is the sloping surface going up and down like a wave and the unevenly high smooth concrete columns.

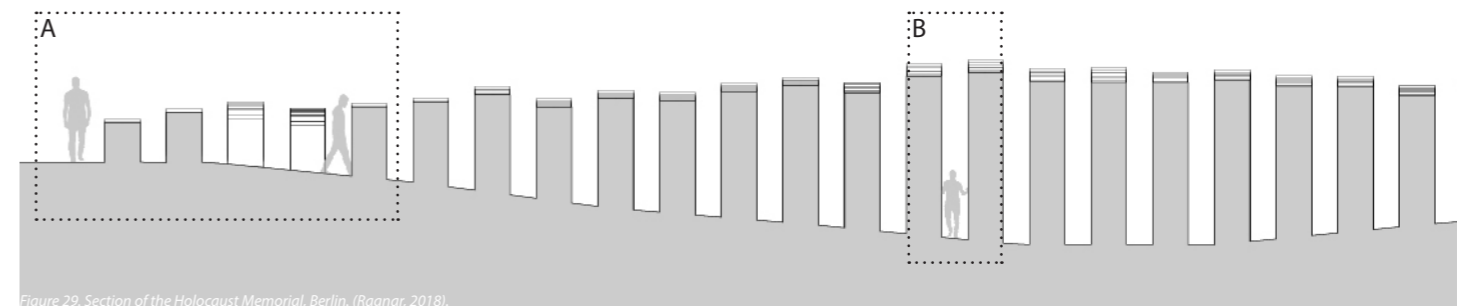


Figure 29. Section of the Holocaust Memorial, Berlin. (Ragnar, 2018).

### **Theory**

Constructing spatial experience focused on the scale of the human body creates a more personal subjectivity for each person. By taking what people are used to and deform it demands that people take more care where and how they navigate that space. Architecture has for a long time been designed for visual sensing though there are cases of that being challenged as seen from the references talked about in the previous pages.

Deformation triggers haptic experience that makes the relationship between space and body more intimate. Still simplicity is vital and essential so that the experience does not become overwhelming.

Using the tools abstracted from these references gave a good and strong foundation to focus design investigations relative to the discourse (Pallasmaa, 2000; Pallasmaa, 2007; Zumthor, 2006).

## **DESIGN INVESTIGATION / 03**

## BODY PERCEPTION STEP 1

### First investigation / Walking in a slope

In the first step some simple image studies were used to capture haptic reactions in slopes. This test was performed to get a feeling for the subject and if indeed the body felt drastic difference when tested with different degree of slopes.

Ranging between 5°-20° sloping the investigation was about experiencing the differences with the body.

#### 5°

This is not much different to what people are used to when walking in the center of Gothenburg. If the focus is not on the slope of the surface it does not change anything about posture, stride length or width.

#### 10°

When walking straight up or down the slope, it is nothing new. Moreover, there are many ramps around the city center that have a similar degree of slopes. Still you detect a slightly more focused pressure from the load of the body.

When walking sideways through, the difference is very drastic and each step is measured. Also the side lower in the slope becomes under far more pressure and the walk cycle is strange and unusual.

#### 15-20°

When the slope has become this drastic the load bearing points are very focused and affect the side of the legs and hip area that is lower in the slope. The steps become short and measured, and people start to lean into the slope to secure the balance.

This is a very awkward movement when walking sideways. Movement of each leg is short and measured as each stress point pushes the weight of the body down the slope. The hands reach out for support almost automatically. It is very tempting to turn and walk straight down the slope in this case where the load is hitting the legs and hip evenly.

#### Relevant criteria

- Shift in balance
  - what happens when the body reacts to the slope
- Focused stress points
  - points where the load of the body is felt
- Body movement
  - length and width of steps
  - hand movement

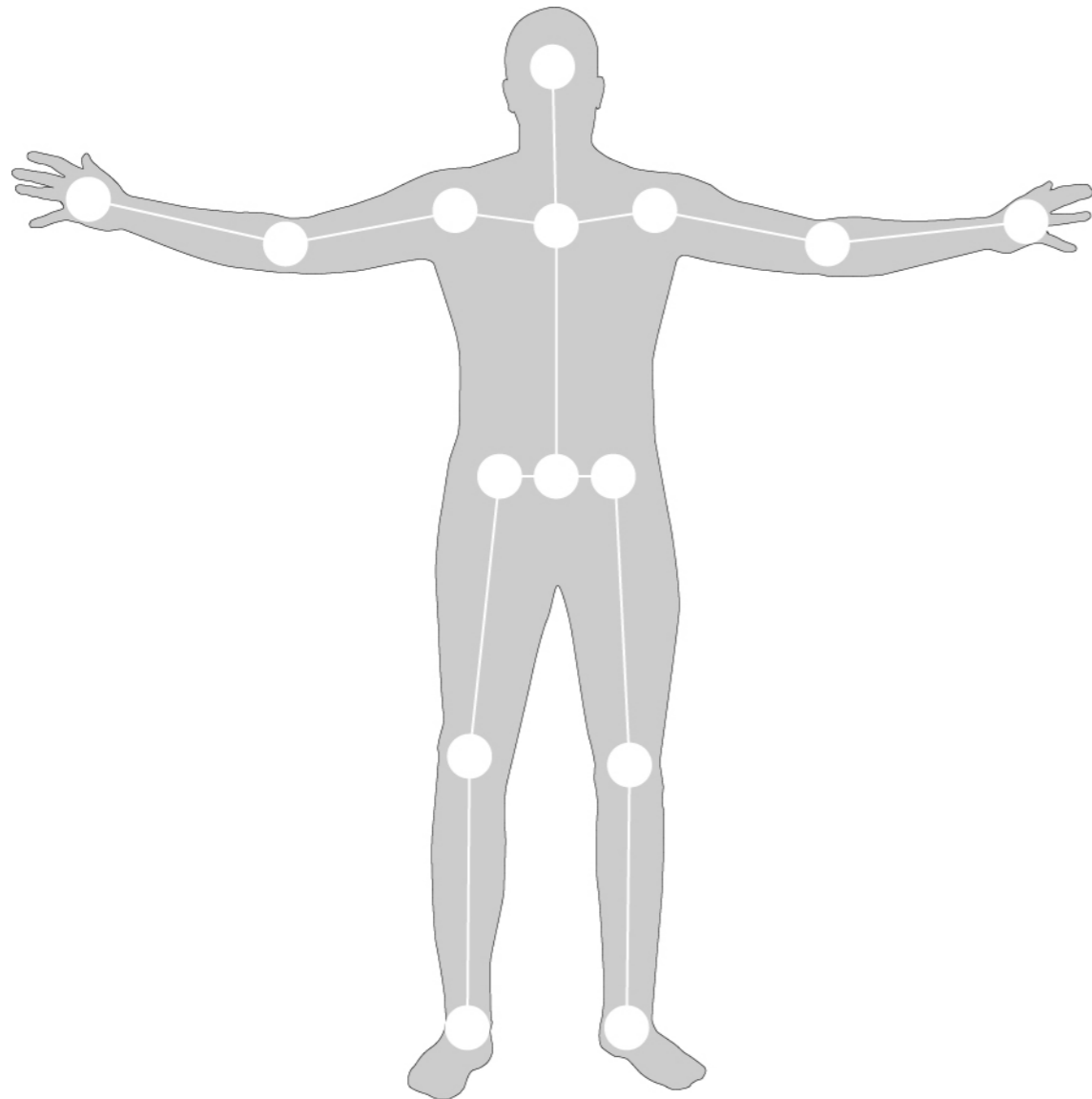


Figure 30. Body diagram, points of stress. (Ragnar, 2018).

## BODY PERCEPTION STEP 1 / DIAGRAM

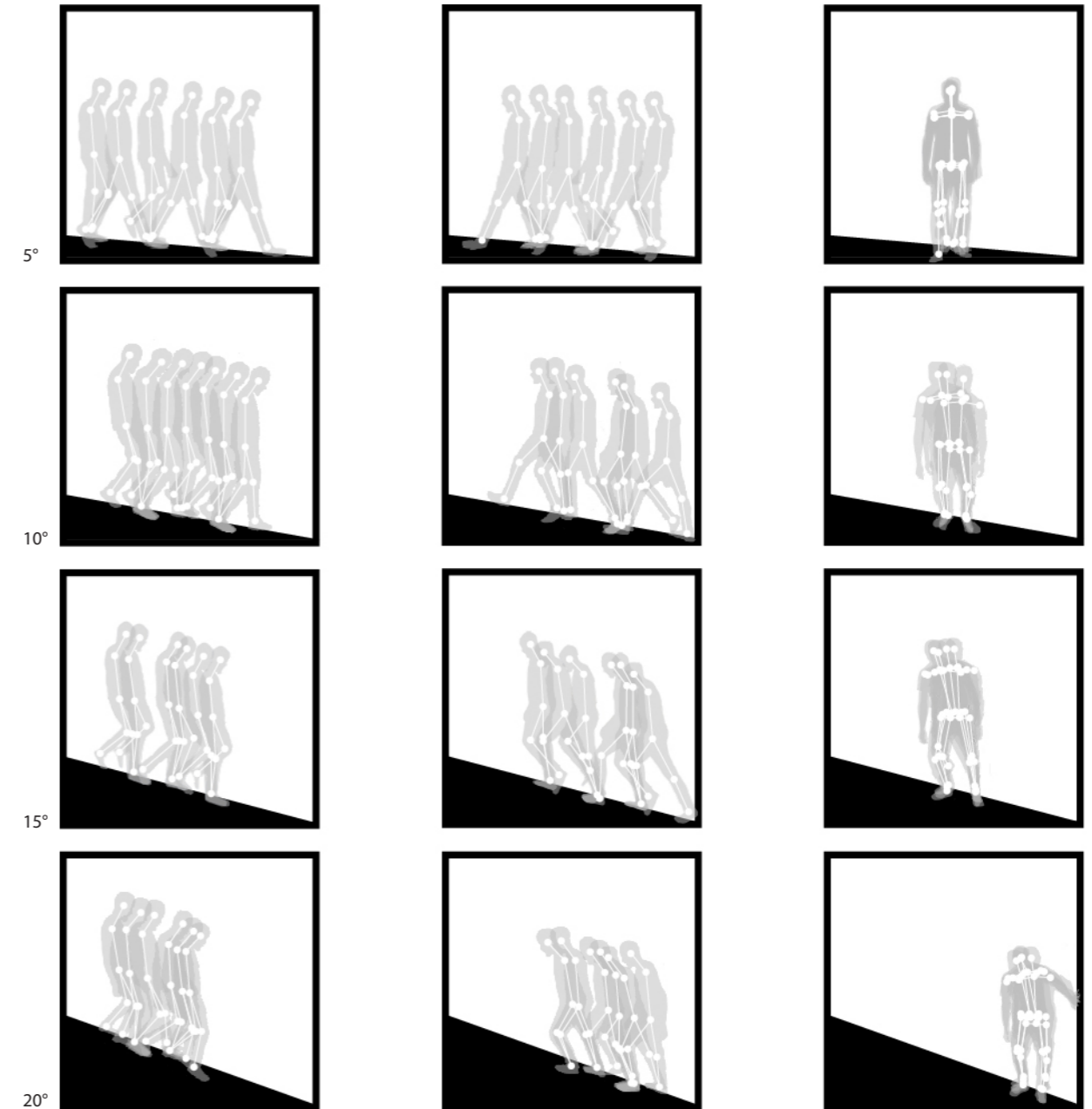


Figure 31. Walk cycle diagrams, Haptic reactions. (Ragnar, 2018).

## BODY PERCEPTION STEP 2 / MODEL CONSTRUCTION

### Why a 1:1 model?

Building a model in 1:1 scale was about getting a design investigation tool. Since hapticity is the focus then having a configurable haptic testing mode is the key. Step 1 showed how clearly the body detects degree changes in a sloping surface so this model should assist in investigate that further.

### The model

The model has a 1000mm x 2000mm plywood surface. Its surface is put on top of a model base. On that model base there will be put adjusters that give then the plywood surface an accurate degrees which, will be from 0°-15°. The last step is then to place the camera in a fixed position and photograph the walk cycle for each degree.

### Relative criteria

#### Shift in balance:

The body detects when the walking surface starts to slope and it adjusts itself to counteract against the loss of balance. The process that was used with this model should help visualice how the body reacts. From there it is possible to react with design, and then record what it changes.

#### Focused stress points:

What is very clear when a person focuses on their body, when walking in a slope like this model creates, are the obvious stress points. When a person walks in a slope that hits hem sideways these points are even more obvious. Higher degree of sloping means that these stress points become more focused

#### Body movement:

When a person's body is faced by this haptic experiment, the mind tells the body to be carefull. Therefore, the steps are shorter and wider and the hands are ready to reach out to grab something steady.

- width of steps
- hand movements

### Diagrams

By photographing the walk cycles through the model the results will be studied carefully to look for differences. That will then be highlighted with diagrams, highlighting the three relative criterias listed above. The next step from there is to use the findings and use them to create a space that reacts to the reactions of the body.

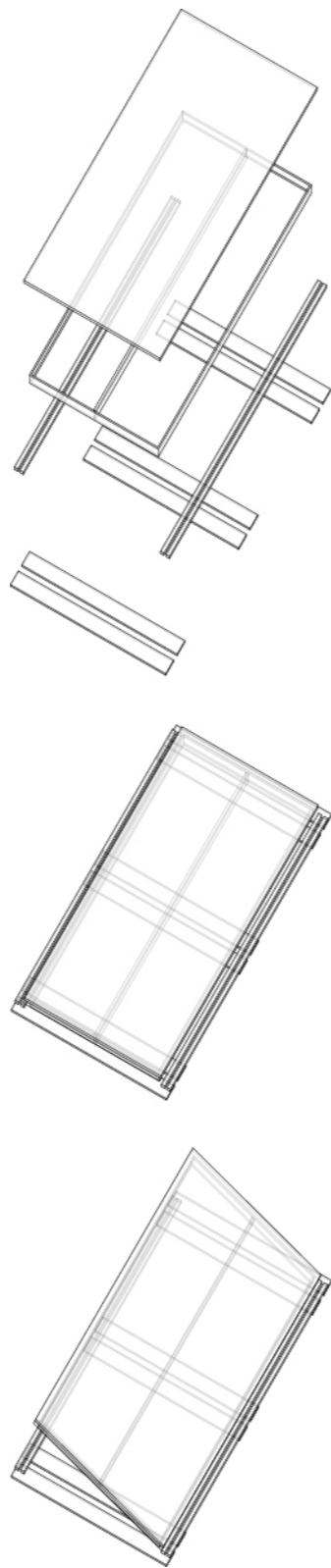


Figure 32. Axonometric, model construction. (Ragnar, 2018).



Figure 33. Process images, model construction. (Ragnar, 2018).

## BODY PERCEPTION STEP 2 / CAPTURE THE WALK CYCLE

### Walk cycle

The camera is placed in the height of the hip and is straight behind the person. It is done so all the movements of the body can be seen and documented into the diagrams. In each test there are photographed two whole steps. In that way the shift of weight is photographed, length and width of steps, shoulder and hip placement and head placement.

### Points location

There are points placed on the body as the base to draw out differences in the movement. These points are placed on the back of the head, shoulder blades, hips, elbows, hands, knees and then finally the heels. All of these points are relevant to how the stress is felt through the body. These stress points then perceive the space so that the mind can understand how to react.

### Diagram 01

With this diagram the point is showing the size of the body and then look for the difference between degrees. This diagram will also in a later stage help with forming the mass around it. It is supposed to create a space responding to the haptic reactions.

### Diagram 02

With diagram 01 the goal is to show movement and reaction of the shoulders compared with the hips. How different slopes create different reactions to keep balance.

A line is drawn from the center of the head because the head is almost always straight above the weight point and that helps showing where the stress of the load is hitting the body. The stress is then shown with red circles around the points.

Line is drawn from the elbows and down to monitor the hand movements. If the hand is located outside the line from the elbow people are ready to use their hands and it means they are not to sure about their footing.

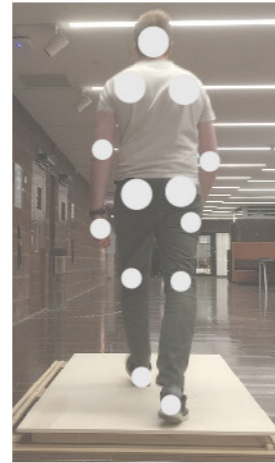
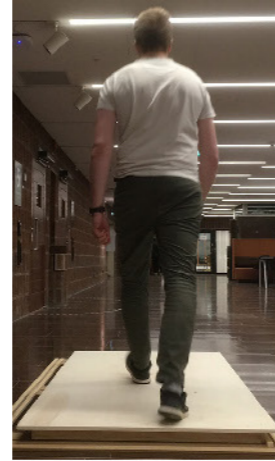


Figure 34. Image study, making of the diagrams. (Ragnar, 2018).

## BODY PERCEPTION STEP 2 / 0° DEGREE

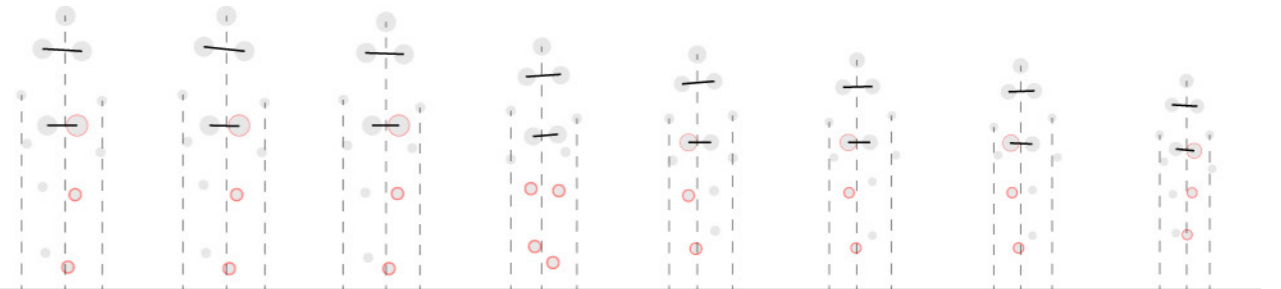
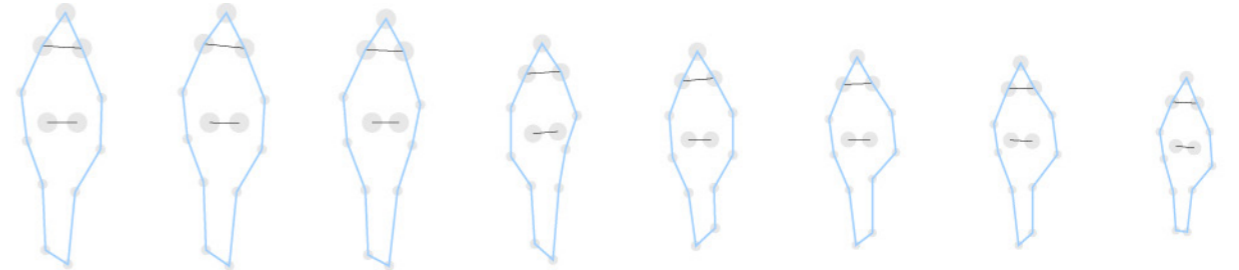
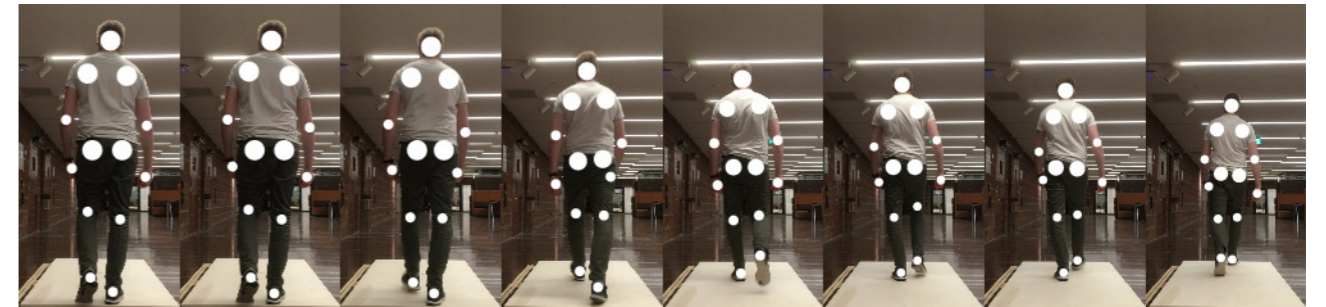
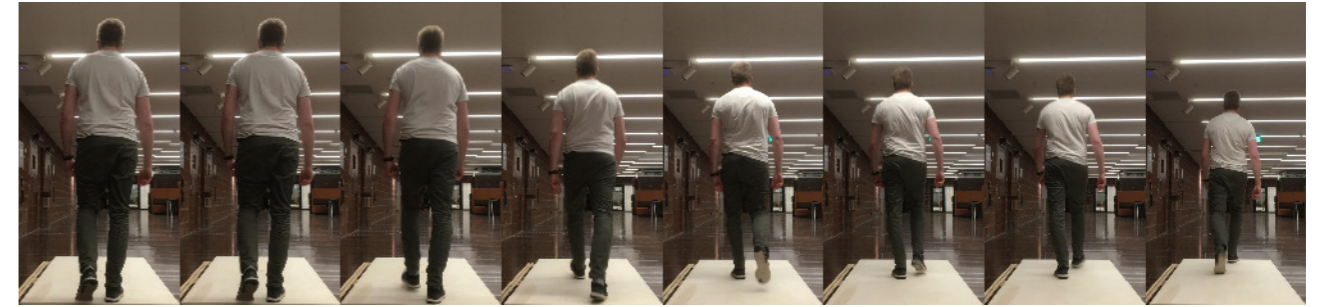


Figure 35. Walk cycle study, 0°. (Ragnar, 2018).



BODY PERCEPTION STEP 2 / 10° DEGREE

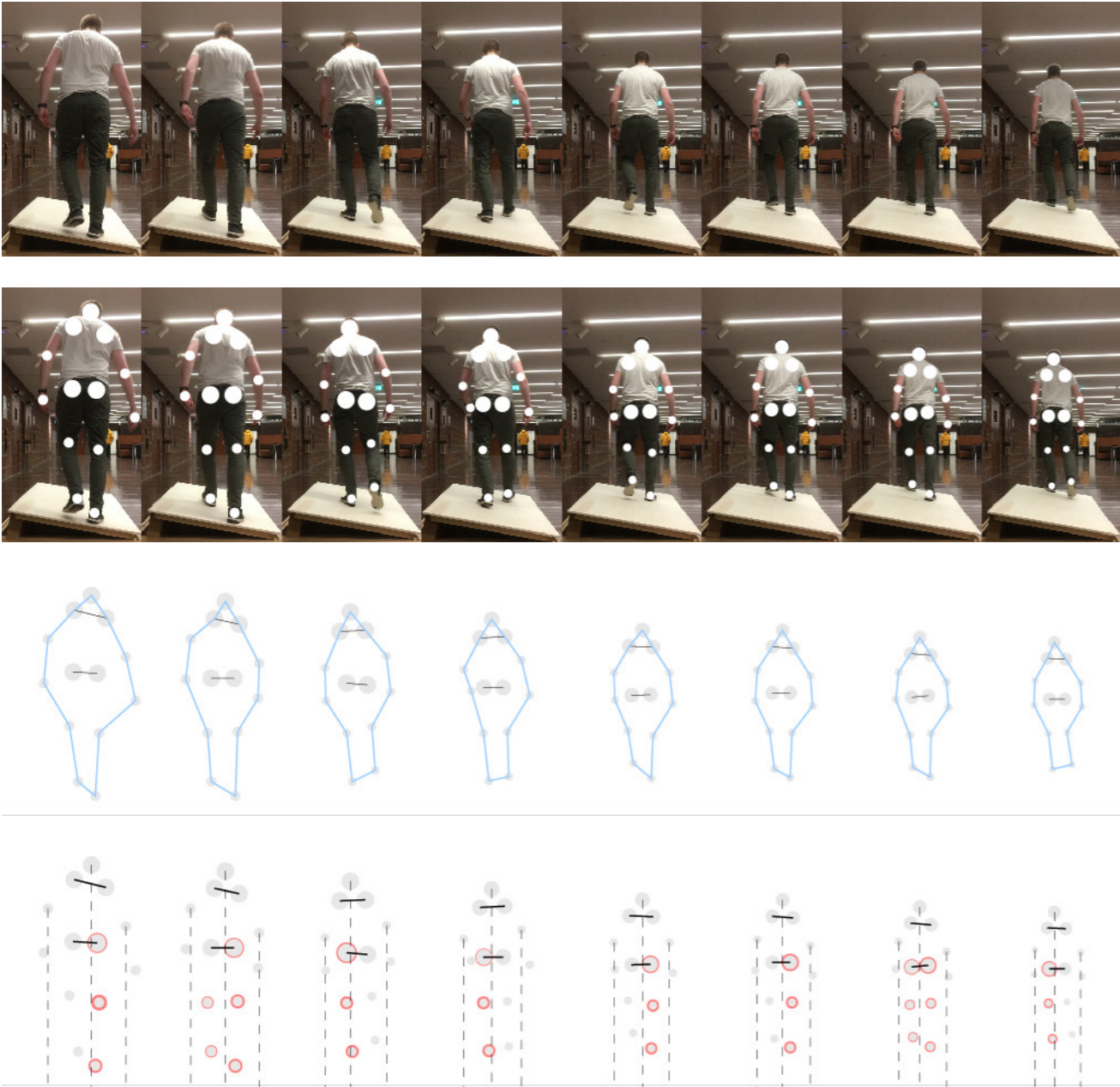


Figure 36. Walk cycle study, 10°. (Ragnar, 2018).

BODY PERCEPTION STEP 2 / 15° DEGREE

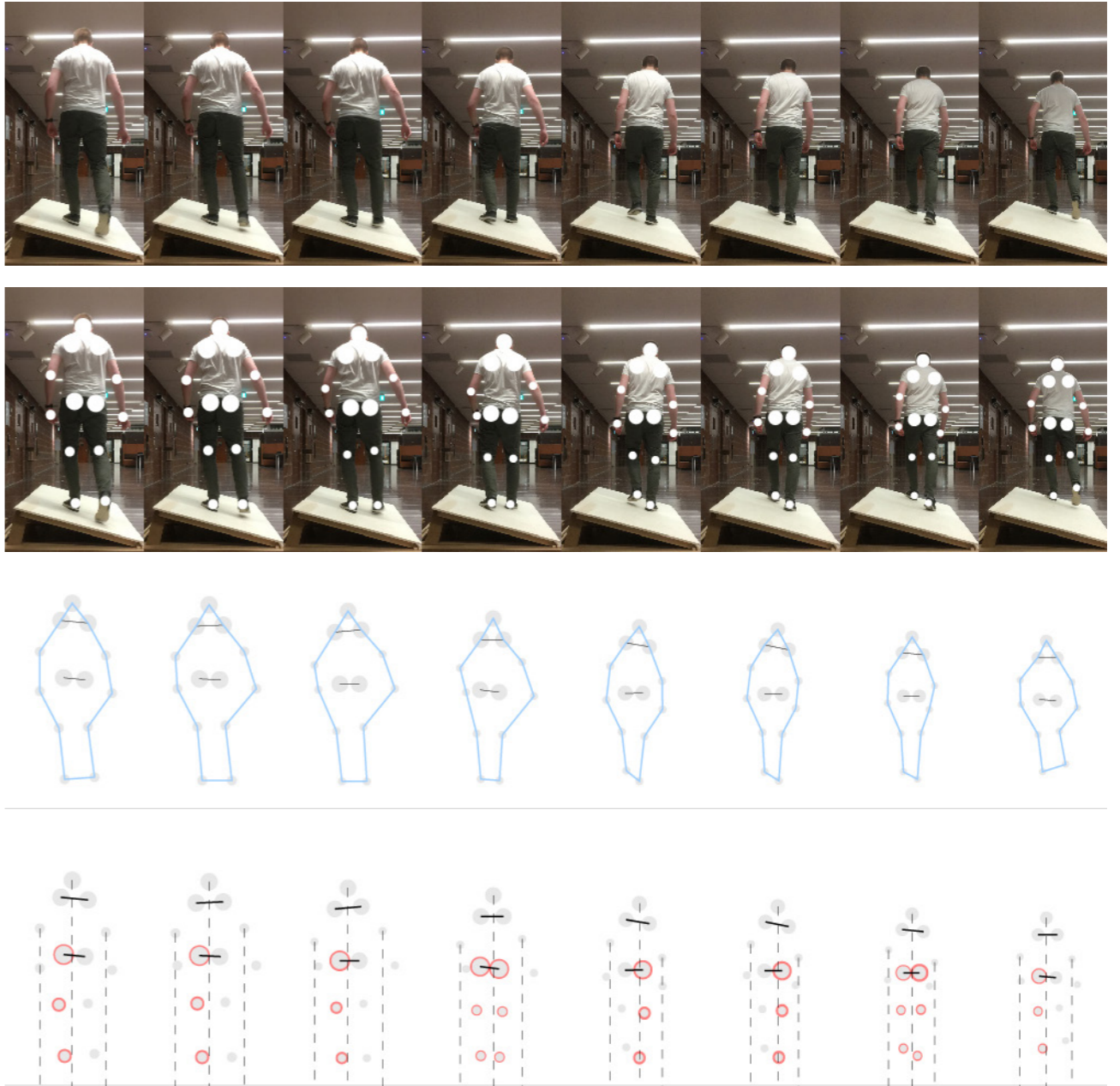


Figure 37. Walk cycle study, 15°. (Ragnar, 2018).

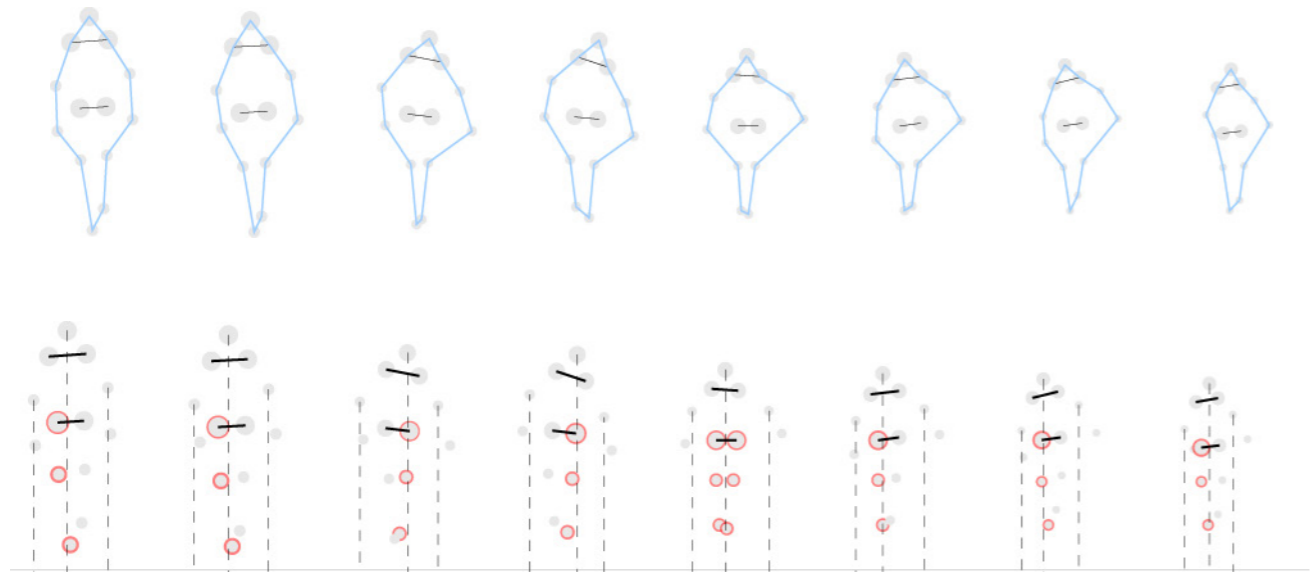
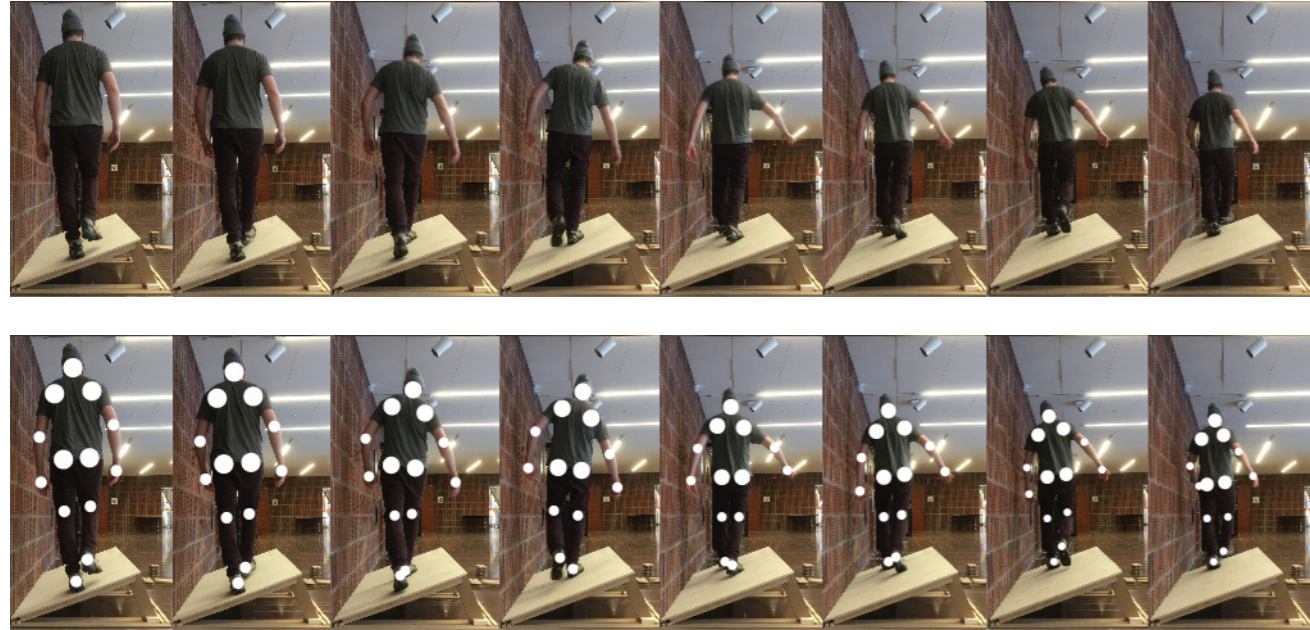


Figure 38. Walk cycle study, 20°. (Ragnar, 2018).



Figure 39. Walk cycle study, Chains. (Ragnar, 2018).

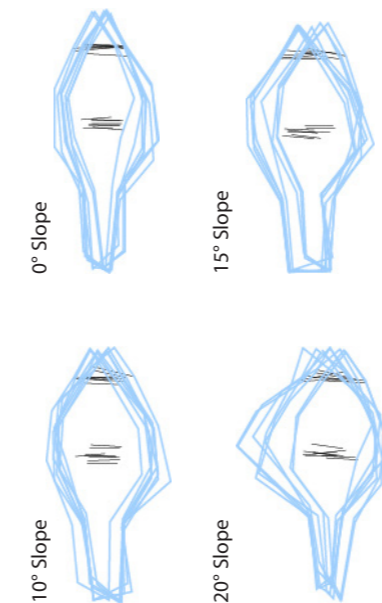


Figure 40. Walk cycle study, Chains. (Ragnar, 2018).

**0° Slope**

When there is no slope and just even surface there is not much change from step to step in the walk cycle. The hands stay close to the body and the feet move almost nothing to the sides.

**10° Slope**

When walking in 10° slope there are more changes in the walk cycle and sometimes the hand reaches out a bit. The balance shift is more apparent and the steps get wider and more calculated so that the balance is kept.

**15° Slope**

When the the surface is sloping that much, people are less secured with their footing and their hands start move more to the sides, as do their steps. They look for support by reaching out, but also to help keep the balance.

**20° Slope**

In this 20° the balance has become unstable and walking is a very measured movement. It is easier to try to walk as if people were walking after a straight line and therefore, people's hands start to spread out to try and keep balance. Gravity still pushes people down the slope

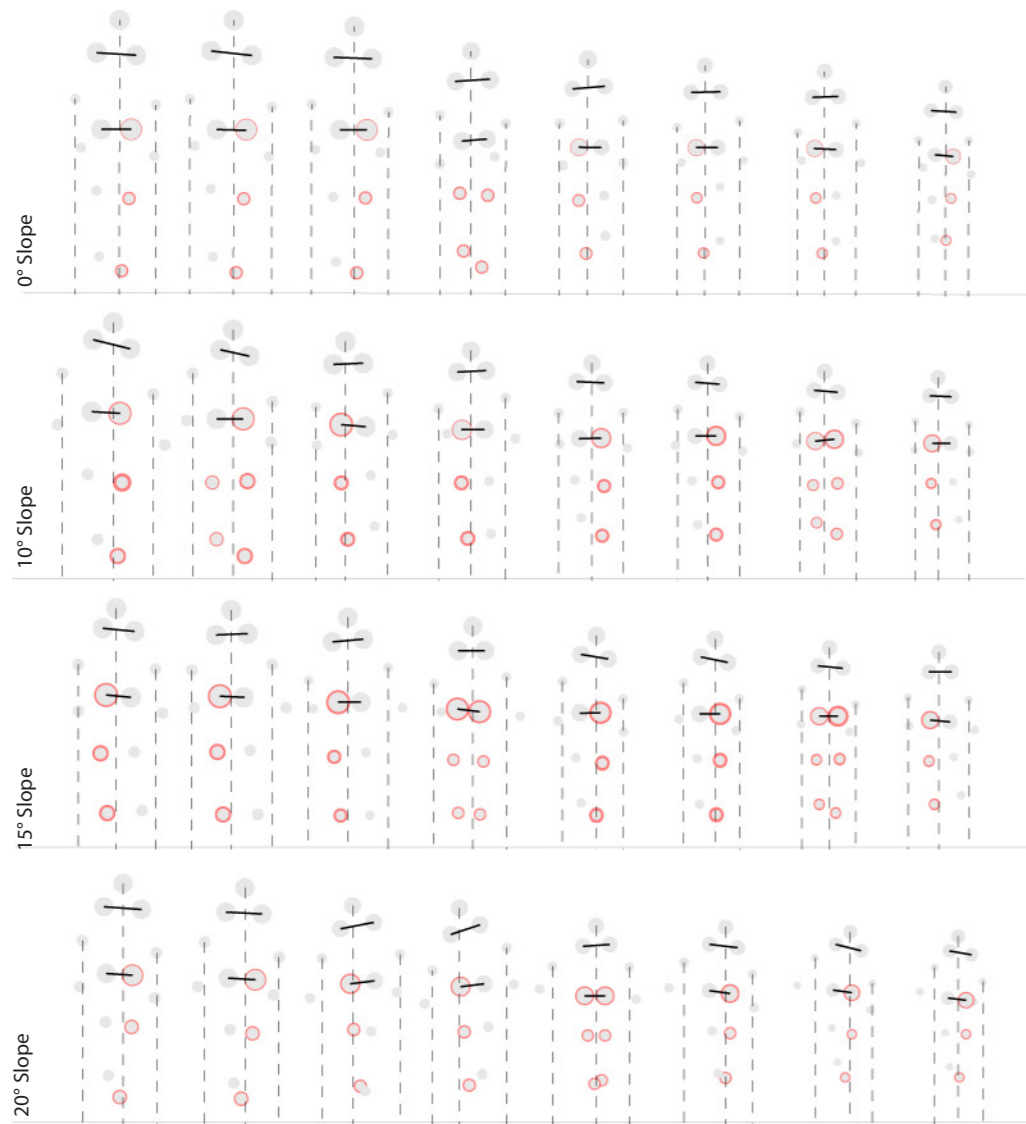


Figure 41. Walk cycle study, Points of stress chains. (Ragnar, 2018).

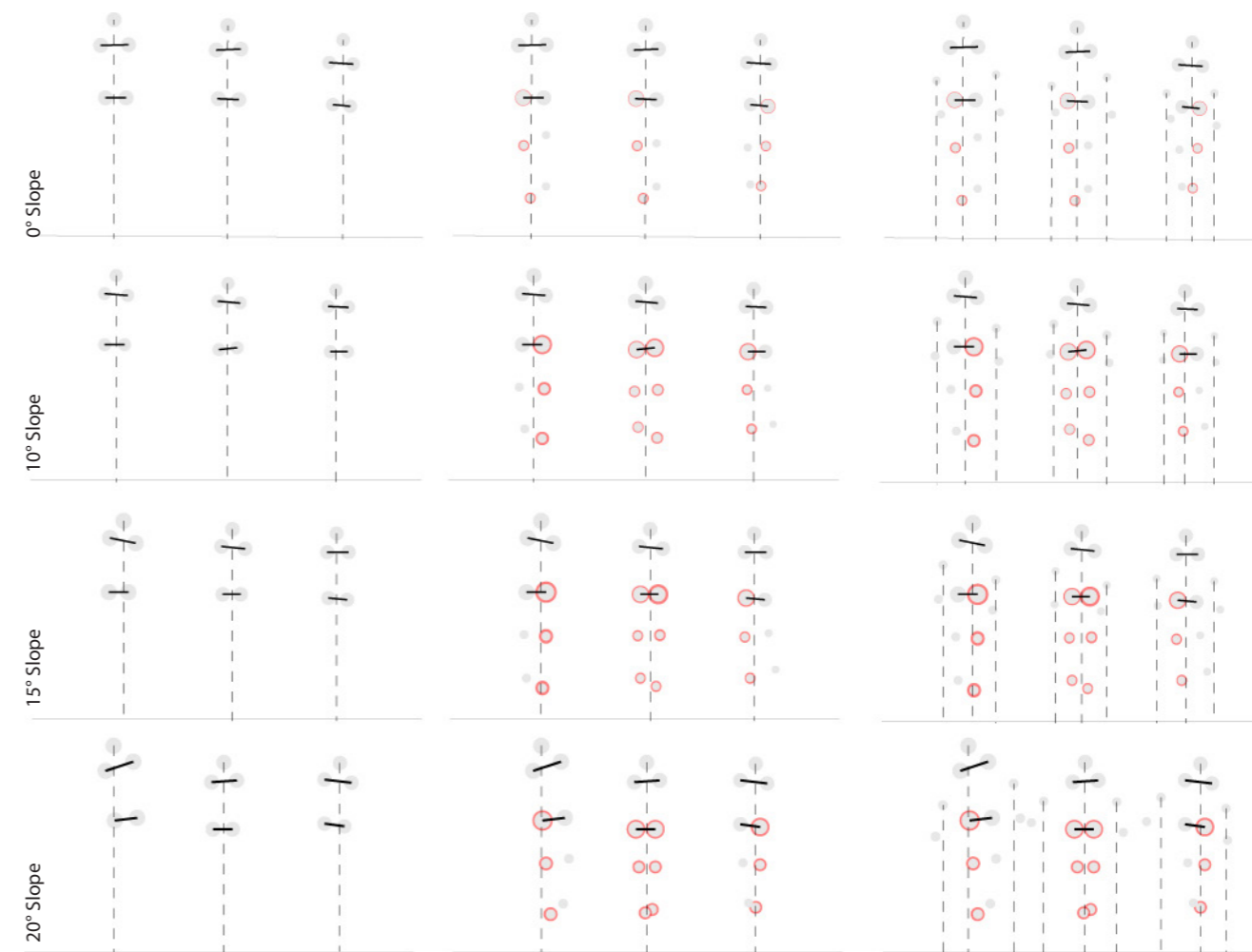


Figure 42. Walk cycle study, Points of stress weight shift. (Ragnar, 2018).

### Balancing

There is a line drawn from the center of the head and straight down. The position of the head normally has the point of balance straight below it. As shown in the 0° diagram step 1 the line is between the shoulder and the hip points. The heel of the standing foot is almost straight below the head. That is not as straightforward when a person is in a 10°–15° slope. That is where people's steps get wider, because if the line down from the head passes the heel that the person is standing on, they tip over and lose their balance.

### Stress points

The red circles around the points is to signal where the stress is felt by the body. If the circle is slim it is normal, however, as the red circle gets broader it signifies more stress. As the slope gets steeper the stress from the body weight gets more focused. The side, lower in the slope, carries more weight since the gravity pulls both downwards and sideways. Therefore the movement becomes awkward.

### Limbs movement

Steps: When the footing is unsure, as it often is when people walk in a slope, their walk cycle gets wider. Still when the slope is from the side that puts the leg lower in the slope under more pressure. By narrowing the walk cycle the load spreads more evenly but that makes the balance more fragile.

Hands: As the slope gets steeper the more people are alert and therefore, their hands reach out. Specially if the walk cycle is narrow, then the hands are vital for keeping balance.

## BODY PERCEPTION STEP 2 / FROM DIAGRAM TO SPACE

### Space based on movement

The results recorded from the investigations on body perception from sloping surfaces is used here to generate space. These spaces shown are showing how the sloping surface causes a physical reaction. The reaction is used to design the space parameters. Each space is representing walk cycles documented in the 1:1 model. Each slope generated different reactions and that is clearly visible between the spaces generated. The space used to generate the parameters in this first step is a space that only fits one person. The difference in shape and size for each degree visualizes a very drastic spatial difference.

### Space perception

When a person is in a small space it measures it by using their own visual and physical perception. In the diagrams here to the sides there are two circles showing the reach of the hands. The distance within that area is a personal space, a space where people tend to want to keep to themselves if possible. Where these two circles overlap we have a area of intimate space that each person is very protective over. If a person enters that space of another person then people react and protect their intimate space. They same can be said about people and physical space. When this intimate area is pressed by a physical spatial elements the body reacts to keep that intimate space unbreached.

### Haptic deformation

On the facing page we have diagrams showing spaces created from the haptic reaction to the different degree of slopes. At the bottom of the page there are two 0° spaces, one where the movement does not deform the wall surface and another where the walk cycle affects the wall surface. Where the wall surface is not deformed by the walk cycle the space is none haptic, but in the space where the walk cycle does affect the wall surface there is a very haptic space. The haptic space is drawn around the intimate area of the person, since people walking on a smooth surface do not have to react physically to the surface. However, when the surface starts to slope more, there is a more physical adjustment made as a reaction to the slope. People tend to reach out and adjust themselves to keep balance secure. It is captured in the deformation as the wall surfaces becomes more uneven. The spaces created in the diagram on the facing page for 10°-20° sloping surfaces are drawn around the personal area of the body.

### Conclusions

Since the space is based on a design investigation where one person is photographed in each slope, these spatial deformations visualized in this first step become very personal for that one person. In the step that will follow, these deformations will be generalized, abstracting elements from this first step that might give a more generalized shapes.

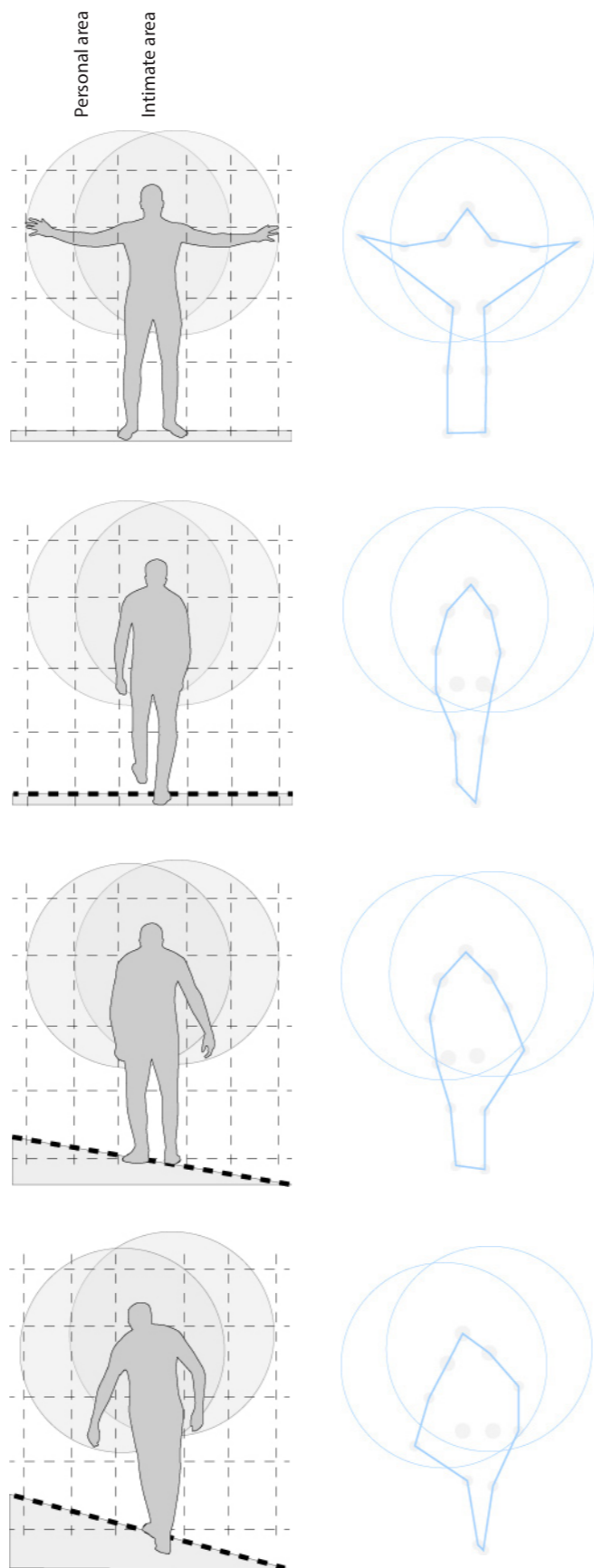


Figure 43. Walk cycle study, from diagram to space. (Ragnar, 2018).

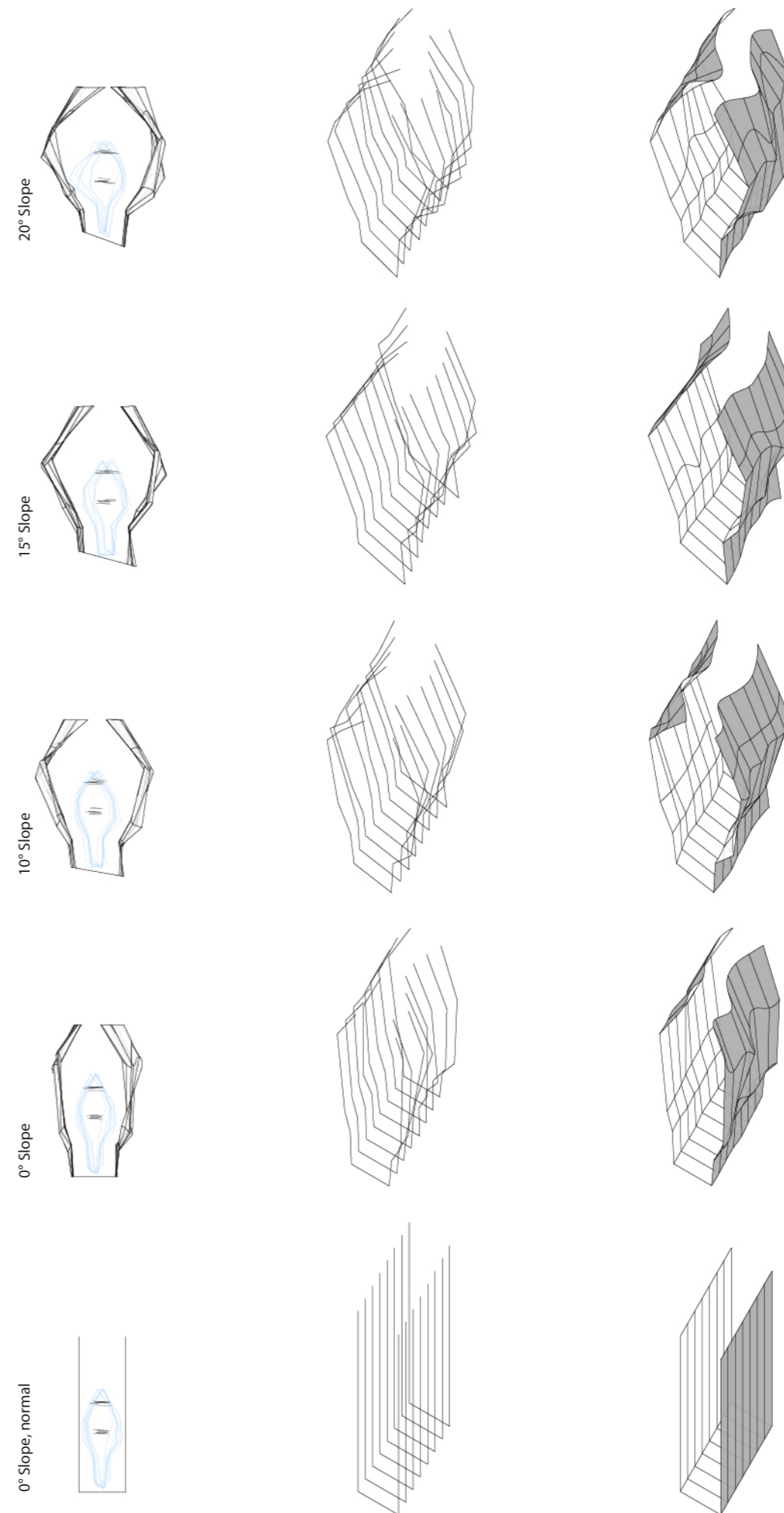


Figure 44. Walk cycle study, First spatial creations. (Ragnar, 2018).

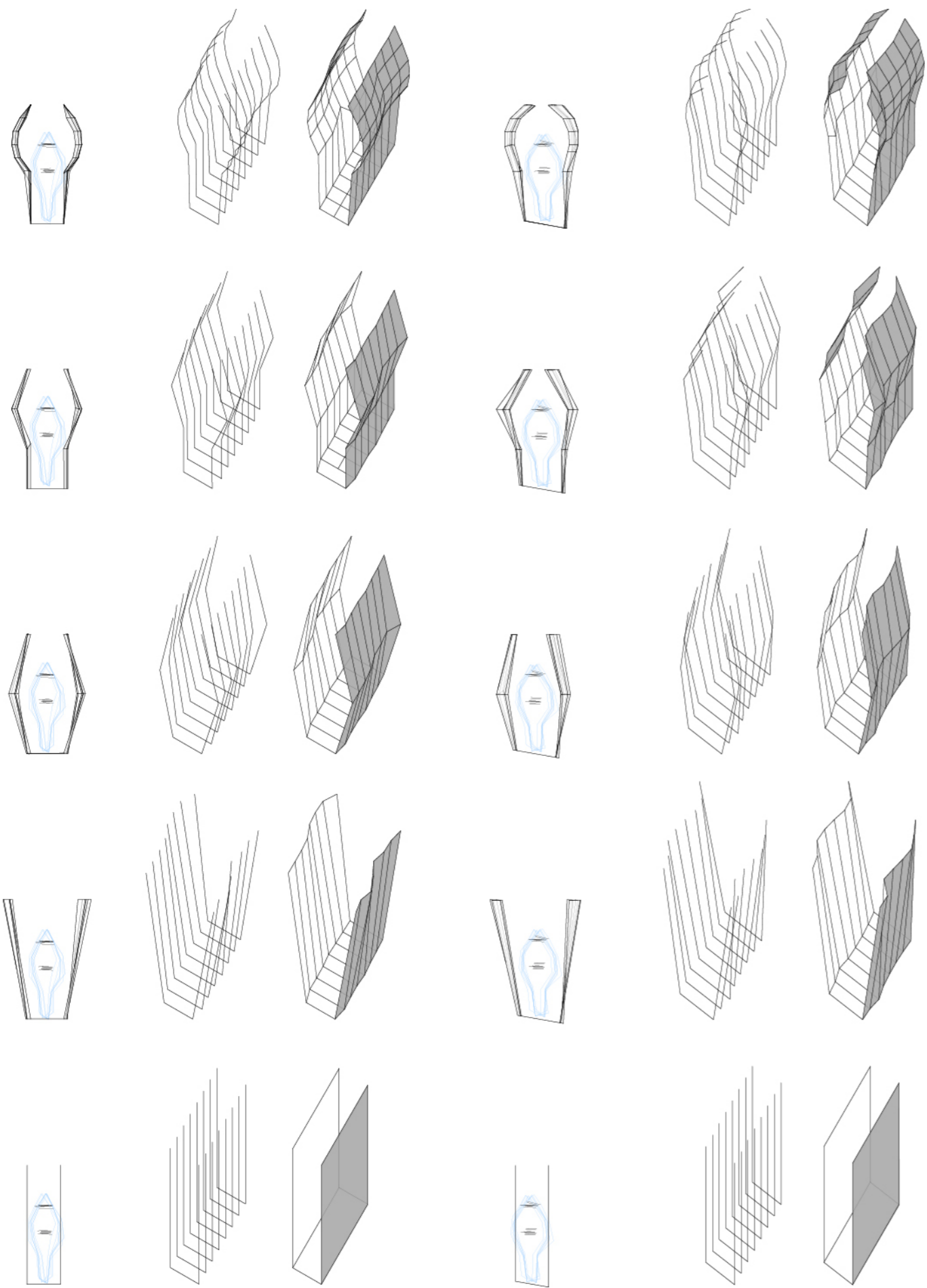


Figure 45. Spatial creations, Creating tight spaces with different amount of points and degree's. (Ragnar, 2018).

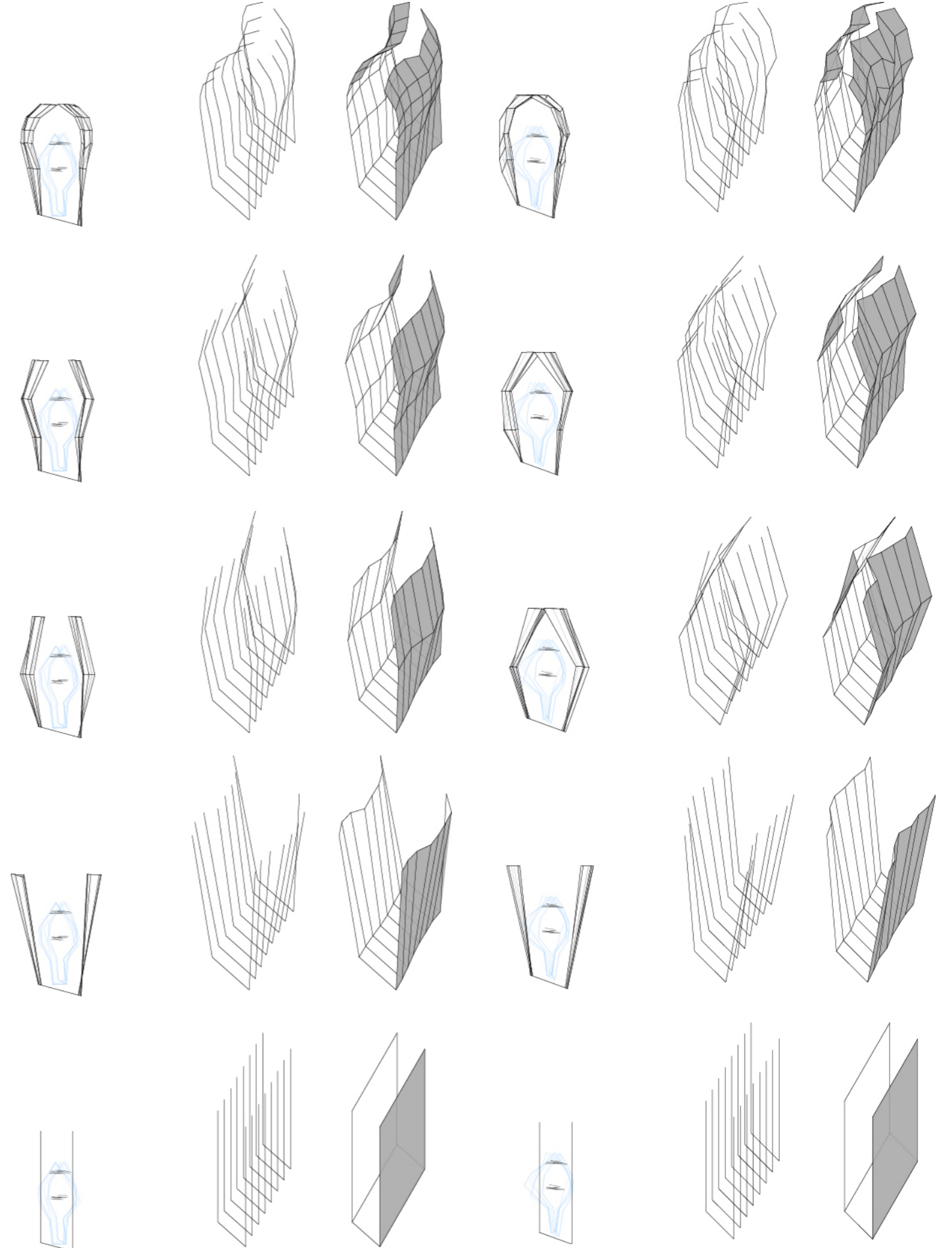


Figure 46. Spatial creations, Creating tight spaces with different amount of points and degree's. (Ragnar, 2018).

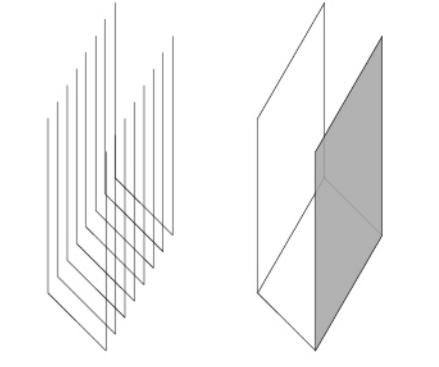
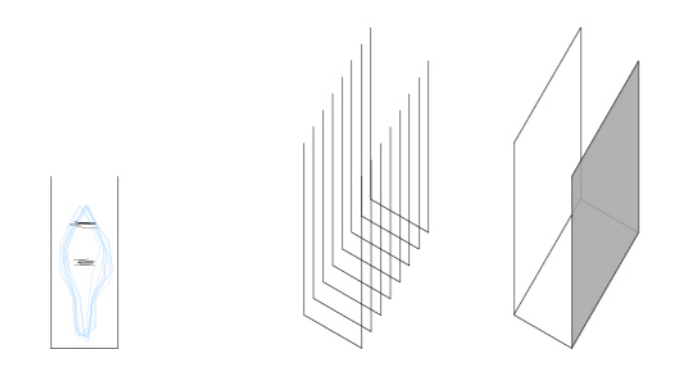
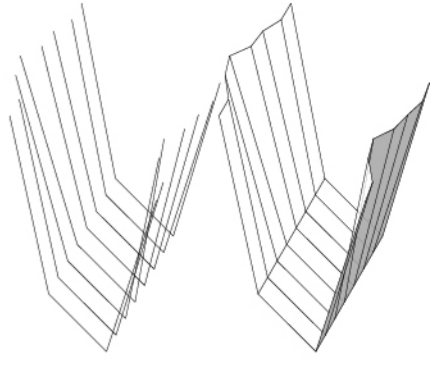
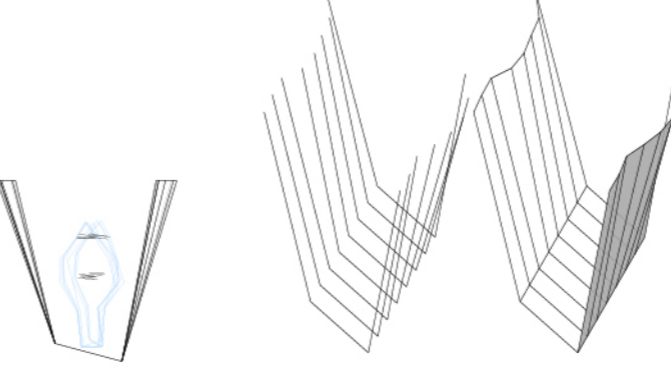
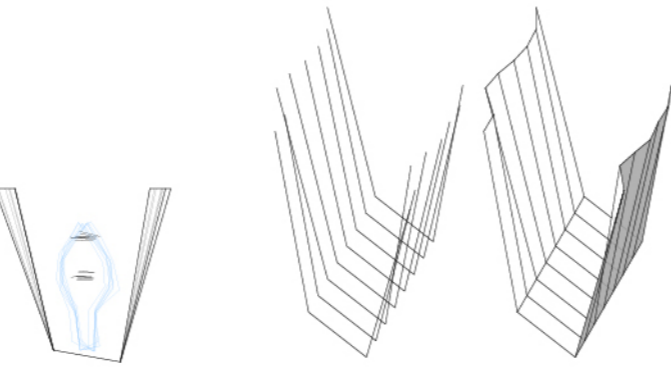
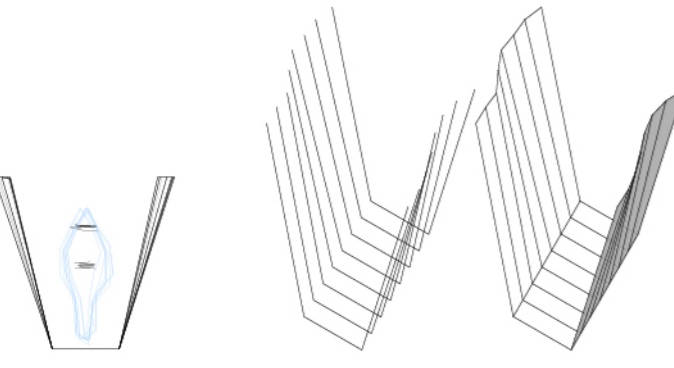
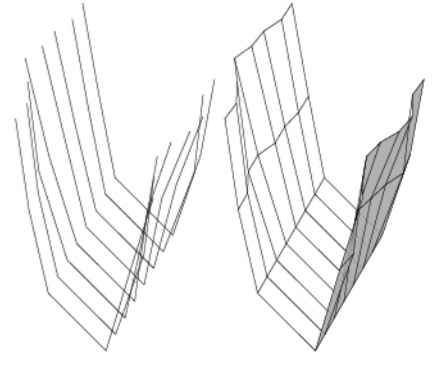
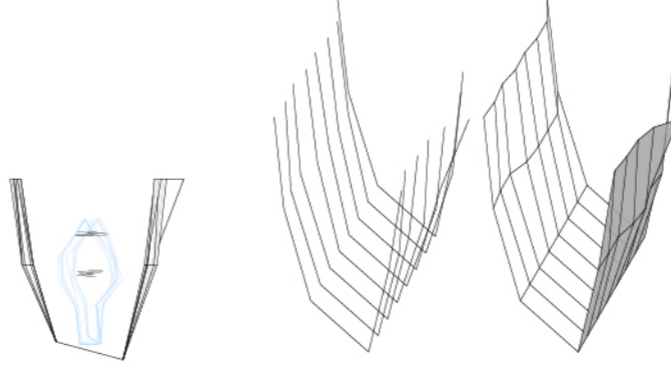
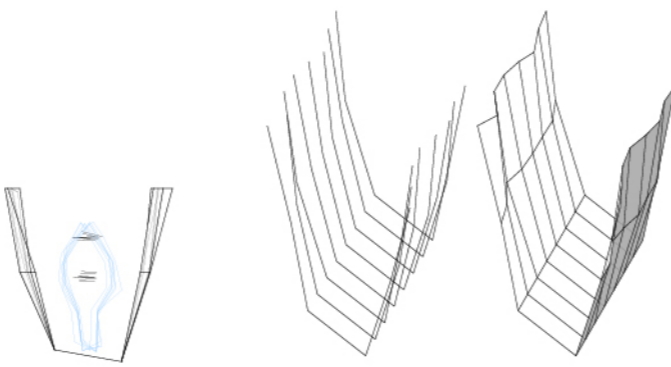
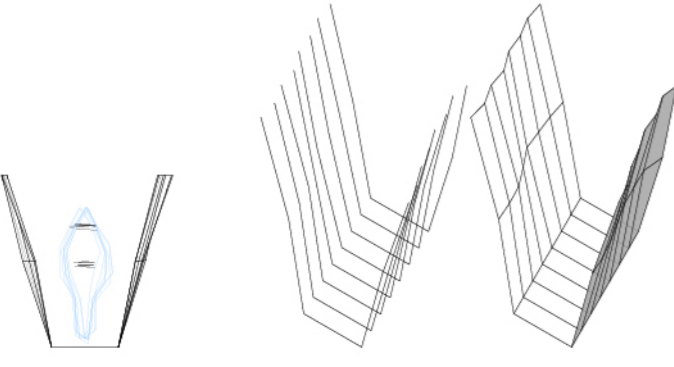
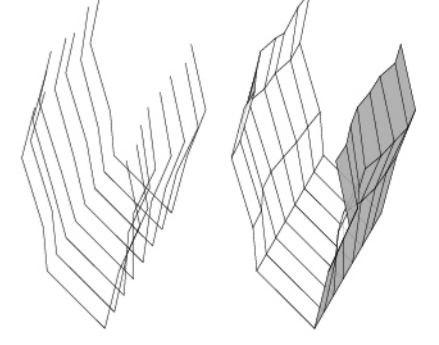
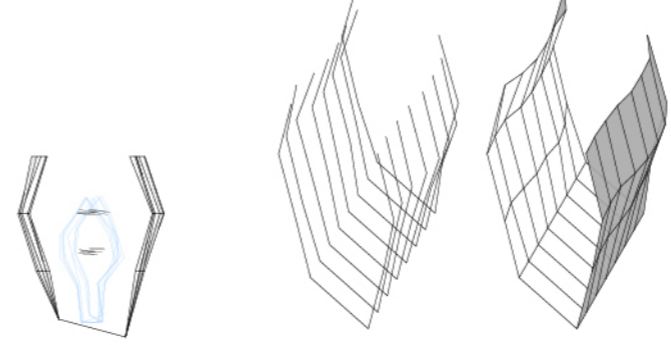
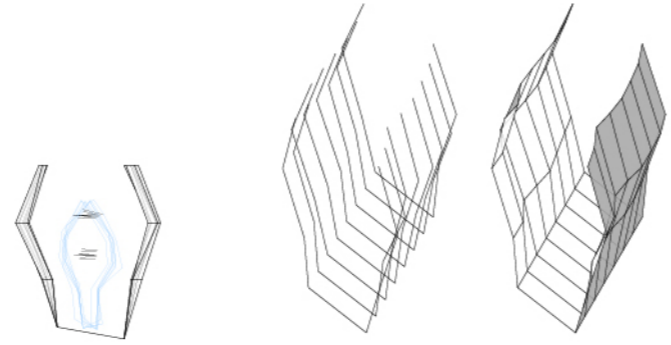
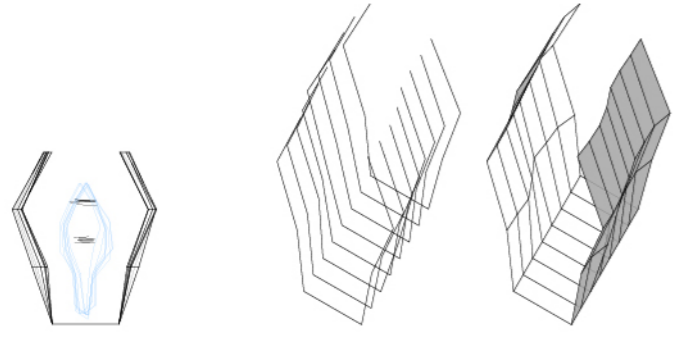
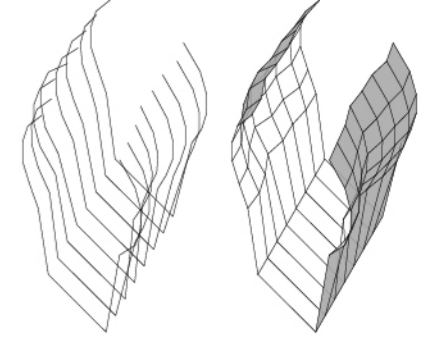
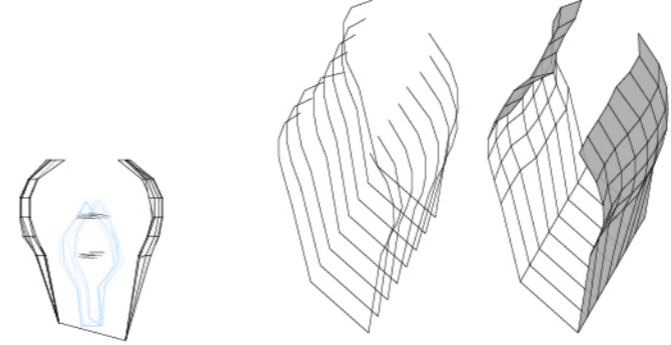
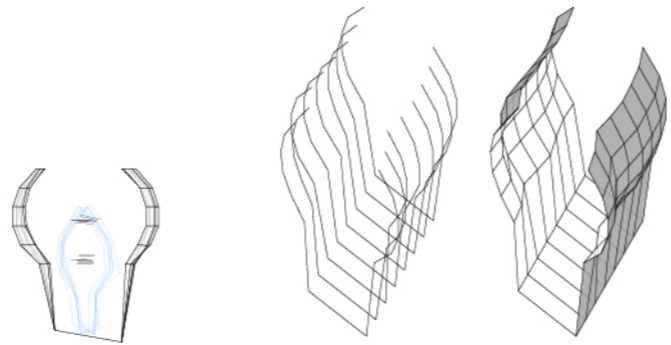
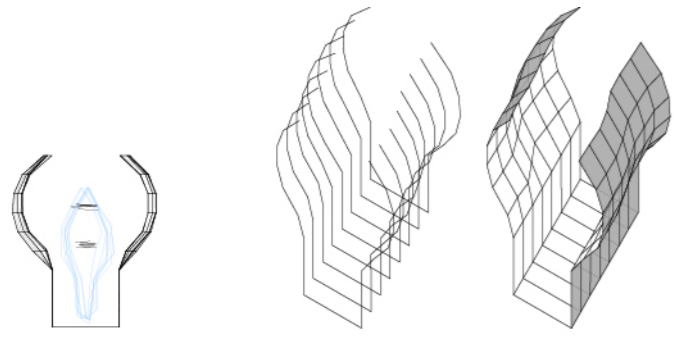




Figure 47. Spatial creations, Creating tight spaces with different amount of points and degree's. (Ragnar, 2018).



Figure 48. Spatial creations, Creating tight spaces with different amount of points and degree's. (Ragnar, 2018).

## BODY PERCEPTION STEP 2 / FROM SPACE TO MASS

### Perception

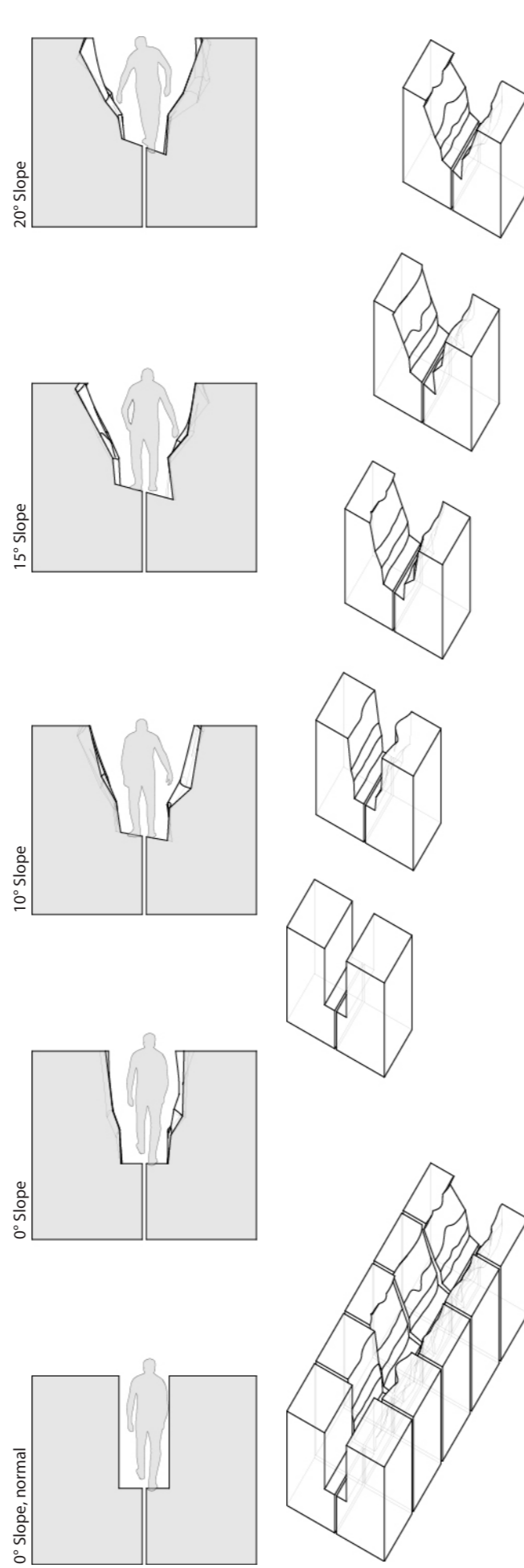
The first perception is always through the visual sense, followed by physical sense and that is an important factor for the structure. The structure should not be realized through sight alone, rather with experiencing the space by going through it. It strengthens the experience and people become more aware

### The slope and the mass

Working with a slope creates the opportunity of having different heights within the structure. Lifting people up above the surrounding city and also take the below street level where each experiences give a very different perception of space and intimacy.

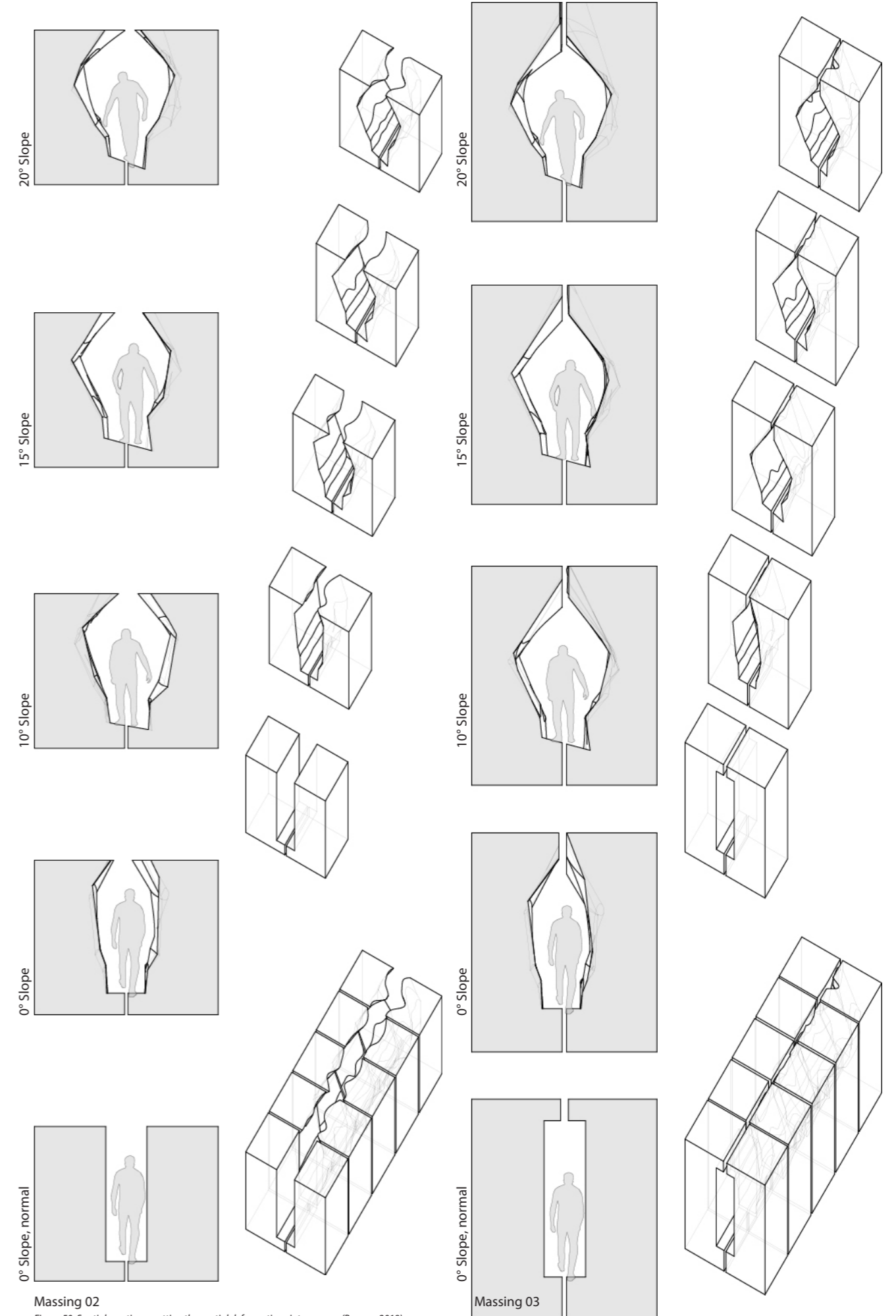
### Spaces

The structure will mostly be about personal perception and therefore use small intimate spaces that fit only one person. The mass can be used to close people completely off from the surroundings, as well as just partly, as shown in the diagrams on this spread.



Massing 01

Figure 49. Spatial creations, putting the spatial deformations into a mass. (Ragnar, 2018).



Massing 02

Figure 50. Spatial creations, putting the spatial deformations into a mass. (Ragnar, 2018).

Massing 03



### **Conclusions from the design investigation**

The investigation helped develop an understanding for hapticity of the human body. As people move across a sloping surface their body needs to adjust and that demands people to take note of their walk cycle. How they step down, where their hip is in comparison to their shoulders and when people are unsure of their footing they reach out with their hands.

Using the deformations extracted from diagram 1 shows how space can be created out from haptical reactions. Still as the shown results are done based on a person that is 190 cm tall, should a person that is 170 cm walk through that space it would not relate the same way.

So if people would walk through spaces created in this way, their choice could be governed by their height and reach.

## **THE GRID / 03**

## PEOPLE AND SPACE

### Body measurements

The human body uses its own measurements to understand space. A person that is 175 cm tall with similar reach has usually smaller personal space than a person that is 190 cm tall. Yet proportionally they should be similar. Thus, people have a very subjective perception on what is personal and what is not.

### Spatial sizes

People show very clearly with the amount of space they have between themselves and others, how intimate they are with that specific person next to them. Therefore, when organizing spatial sizes there are surely spatial comfort. When people wait by bus and tram stops there is usually space roaming between 1.2 m to 3.0 m (social space) that they keep between themselves and others.

### Walking space

When people are walking past each other, it is a very short amount of time that people are physically close to each other. Therefore, they do not become as protective about their personal space. Thus, when walking spatial width close to 2 m, it is considered a comfortable width.

### Static space

When people are standing and waiting, the gap between themselves and others becomes much longer. It has to do with the fact that people stay still at the same spot, and therefore, the time spent in the proximity of other people is longer. It is almost as if there is more space, there are longer distances between people. Still when there is a mass separating people's visual connection, they become less concerned.

### The conclusion

The measurements and observations used to explain how people use and perceive their own space in the social urban city space are drawn from the work and studies found in Neufert's book *Architectural Data*, as well as, Jan Gehl's book, *Life between buildings*. Having them as a foundation for the site investigation in Brunnsparcken, on how people use the site, strengthens these conclusions. It will be used alongside design investigations on how the human body reacts to different haptic testing (Neufert and Neufert, n.d.; Gehl, 2011).

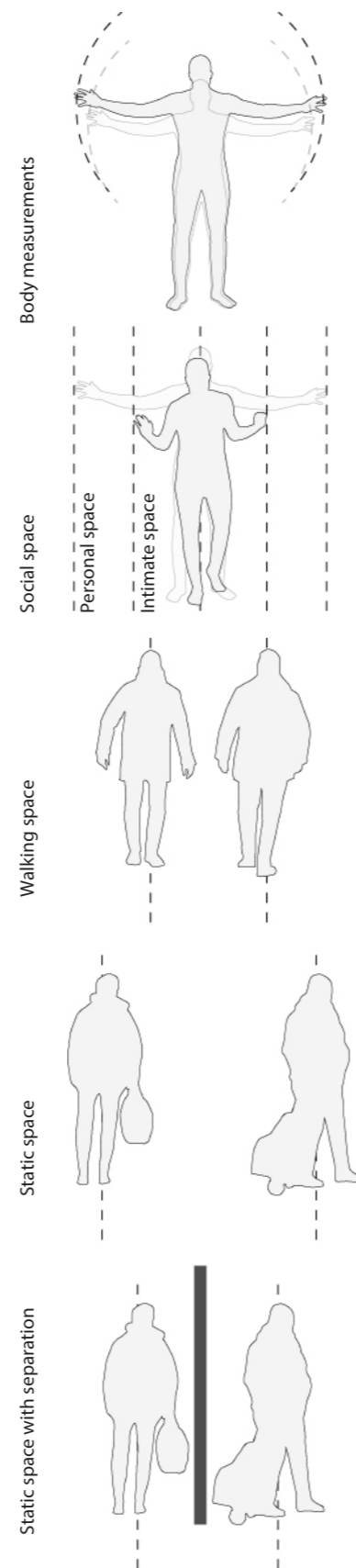


Figure 51. People and space. (Ragnar, 2018).

## PEOPLE IN A CLOSED OFF SPACE

### Intimate space

When people are in a space where their vision is blocked, their relationship to the space is more intimate. For a free and comfortable movement while walking a space that is 800 - 1000 mm, is sufficient. If there is no problem with walking, the body does not use more space (Gehl, 2011).

### Personal space

Space that has the width of 1000 - 1200 mm is intimate, even more so if people cannot look outwards. People that are walking towards one another and do not have any relationship, change their movement when meeting and spend a moment in each others personal space. Between friends this would not be uncomfortable.

### Social space

Here people have a enough space so that they do not need to change their walk cycle. Therefore, the time spent close to the person coming is very short. People do not need to look at the other person. This is a space with the width from 1200 to 3000 mm.

### Larger spaces

When the width of spaces becomes wider than 3000 mm they can fit more people. Also people do not need to think about their surroundings as much and therefore, the intimacy becomes less and less.

### The conclusion

These abstractions from references and every day observations help forming these conclusions. The references from Richard Serra's, *The Hedgehog and the Fox*, Peter Eisenman's, *Holocaust Monument* and Daniel Liebeskind's, *Garden of Exile* use the personal space to enhance each person's perception and subjectivity to the space around them. What they also do is to deform the spatial elements to create even more intimacy to the space. The design focus is to do the same and let the haptic reactions have a factor on how the spaces are formed.

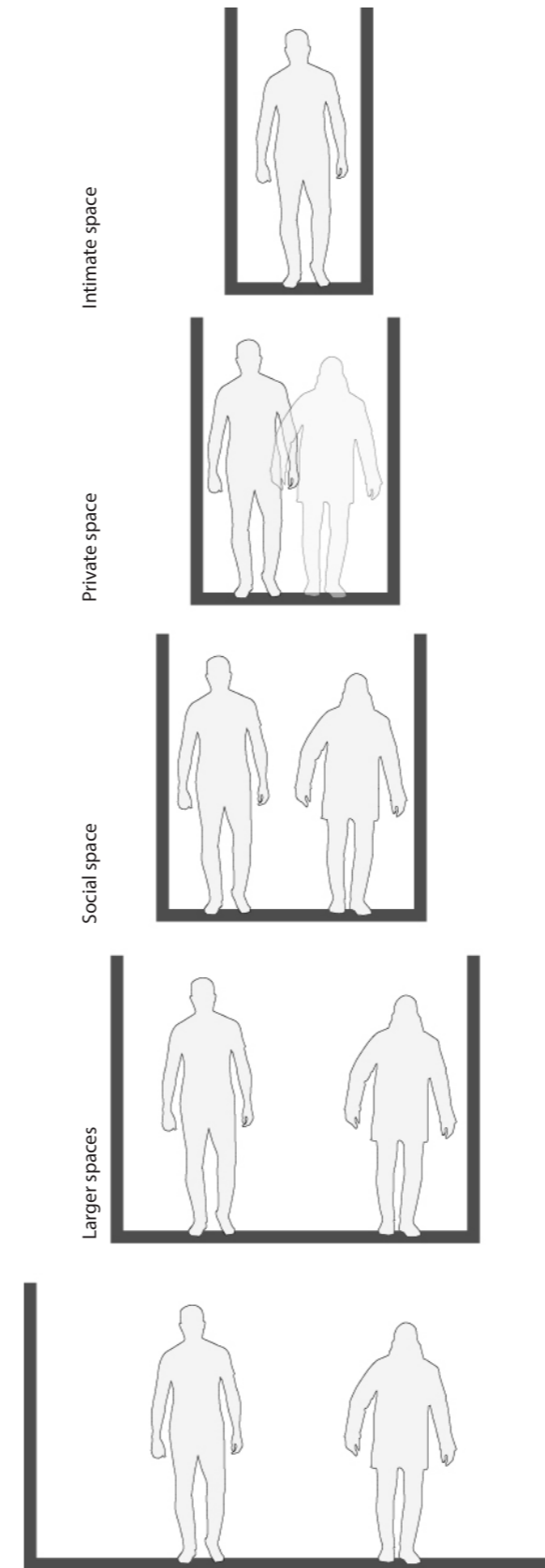


Figure 52. People and closed off space. (Ragnar, 2018).

## Movement on Site

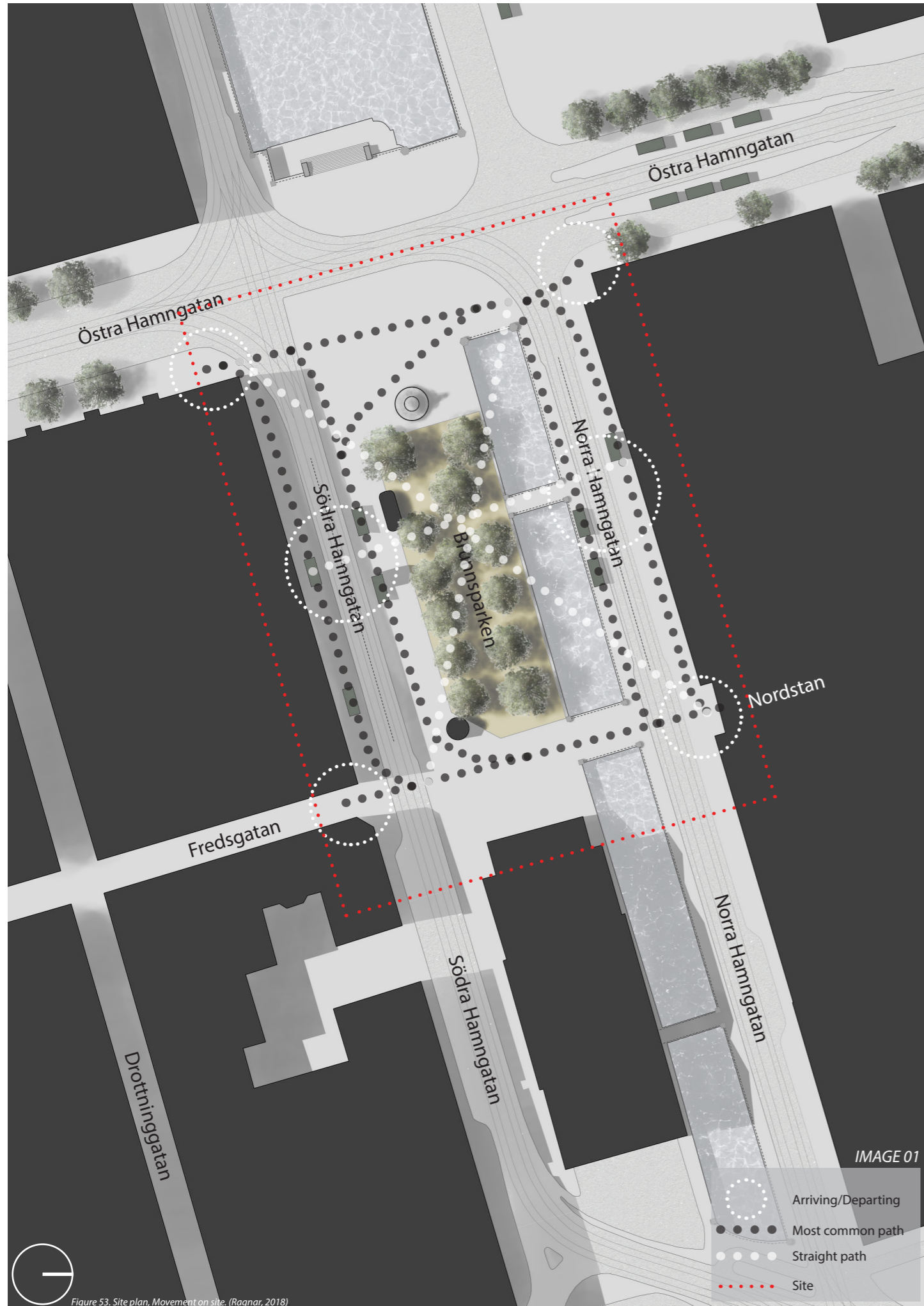


Figure 53. Site plan, Movement on site. (Ragnar, 2018)

## PLACING THE GRID

### Moving around Brunnsparcken (Image 01)

People walk around Brunnsparcken today, and still though there is a bridge across the canal in the middle of Brunnsparcken, people hardly use it. People walk around the edges even though they are going to the opposite end of the square. Still it is natural for people to take the shortest route to their destination. And if straight lines are drawn between where people come in and out to Brunnsparcken, the area takes a drastically different look (Gehl, 2011).

### Relevant contextual agents (Image 02)

01: The site considered for this project at this point is the whole of Brunnsparcken.

02: The canal as it is today has almost no relationship with Brunnsparcken. All fenced away and the water level almost 2 m below the surface. People are used to enjoy water in public areas and therefore, it will be used as an agent for the design.

03: The stops are not scaled to how people wait and their personal space. More often than not, there are only 3-5 people that stand inside each one at a time. Their function will be integrated into the project.

### Shortest paths and the grid (Image 03)

Shortest paths: When the shortest paths are taken across Brunnsparcken, and as shown below, the changes are drastic. If people have a designed path in front of them, they will walk it. Thus, by implementing such designed paths immediately, it will help with the earlier stages of the design.

The Grid: The grid proportions (2000x2000 mm) are obtained from references and observations from the site. Having placed the grid, the project gets a platform to visualize acquired findings from the design investigation (Neufert and Neufert, n.d.; Gehl, 2011).

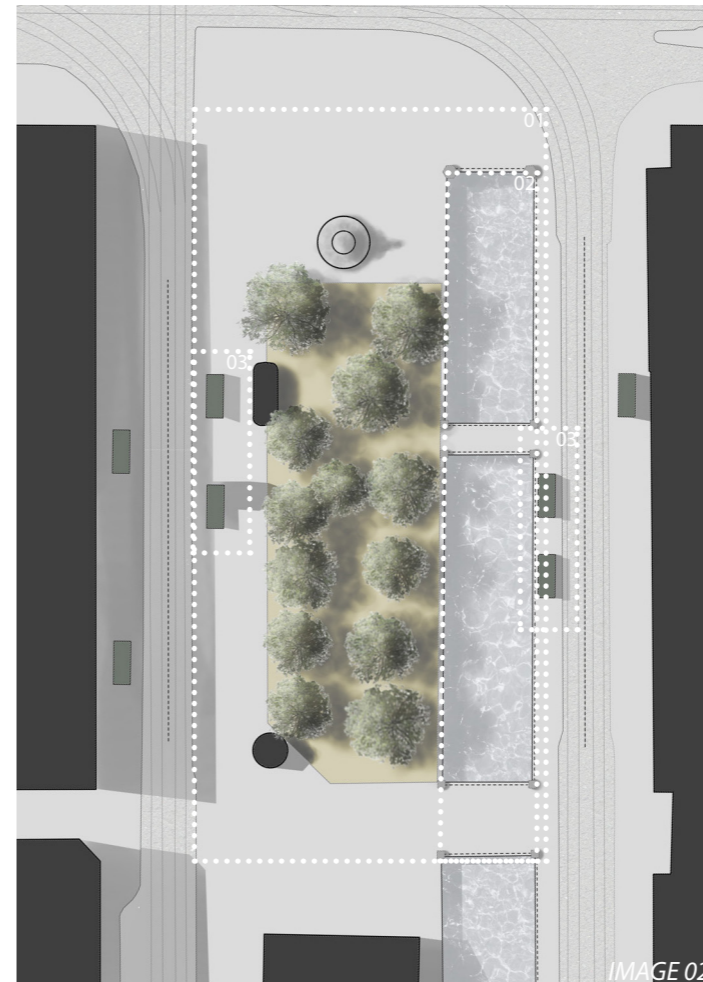


Figure 54. Site plan, Affected area. (Ragnar, 2018).

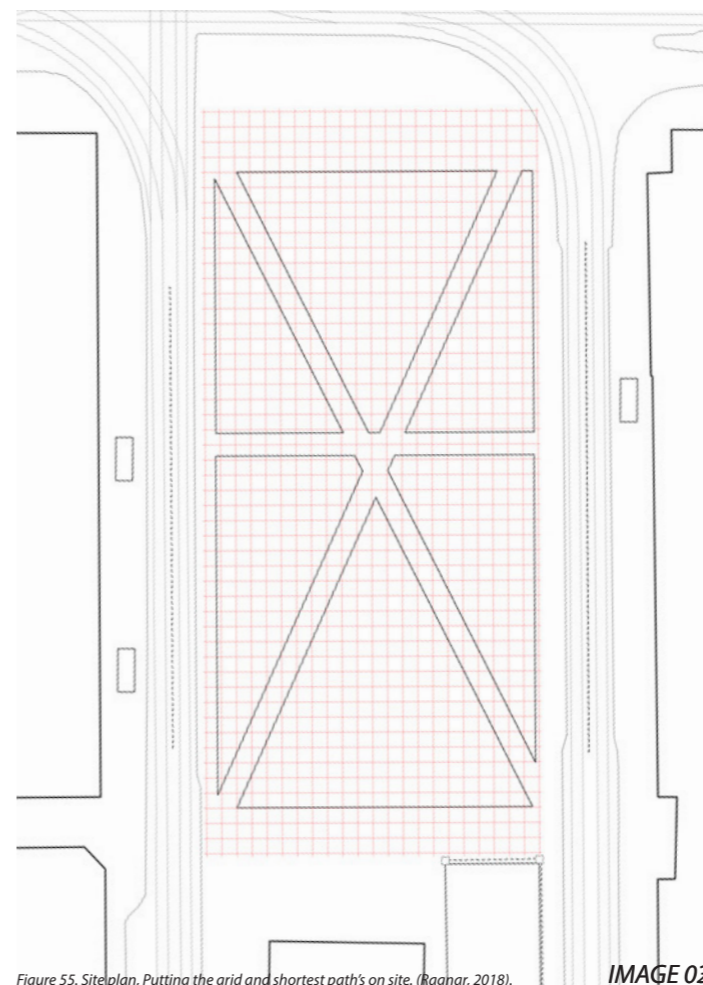


Figure 55. Site plan, Putting the grid and shortest paths on site. (Ragnar, 2018).

## INVESTIGATIONS AFFECTING THE SURFACE

### Walking surface

Normal: Surfaces in central Gothenburg are usually even and do not test movement or balance much. People have a clear view through the whole area and can predict their movement many steps ahead. This surface does not get people engaged in the space.

A: In step A there have been added a few irregular 5° slopes. They should not affect movements too much, but still enough so that people do have to be aware of how they move across. A slope of 5° that stretches 2 m, lifts the surface up 175mm from the ground plane. It is nothing that people are unused to, since many staircases have such high in their steps. Also as tested with the design investigation, people are not affected very much by 5° slopes anyway, they move across it.

B: In step B, the degree of all the slopes have been increased up to 15° and that incline does affect people's movement. The height difference between the ground plane and the elevated plane also increases to 536 mm.

C: In step C, the number of elevation levels have been raised from 1 to 2, and the height difference between ground plane to highest point is now 1072 mm. Also, the level ground surface is strengthened, as a main path to move by because the elevated levels are more broken up. Therefore, the path to move across them is less straightforward.

D: In step D the degree of the slopes have been increased, now they are 20°. That kind of sloping is not comfortable and people feel unsure about their footing. This also highlights very clearly what path is easiest and quickest to walk across. The height difference from lowest to highest point is 2184 mm so now most people are being visually constrained by the surface.

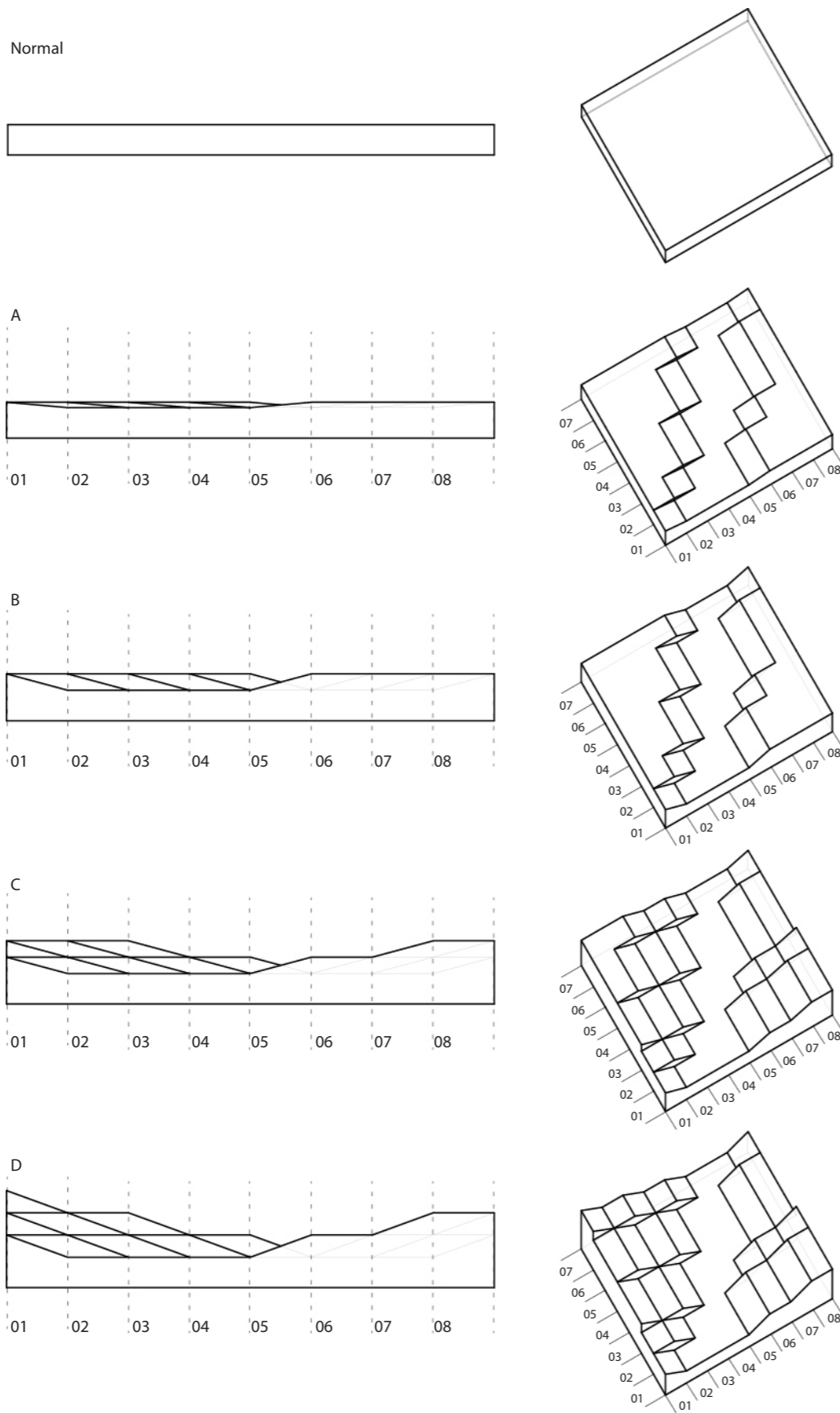


Figure 56. Slopes, Going down. (Ragnar, 2018).

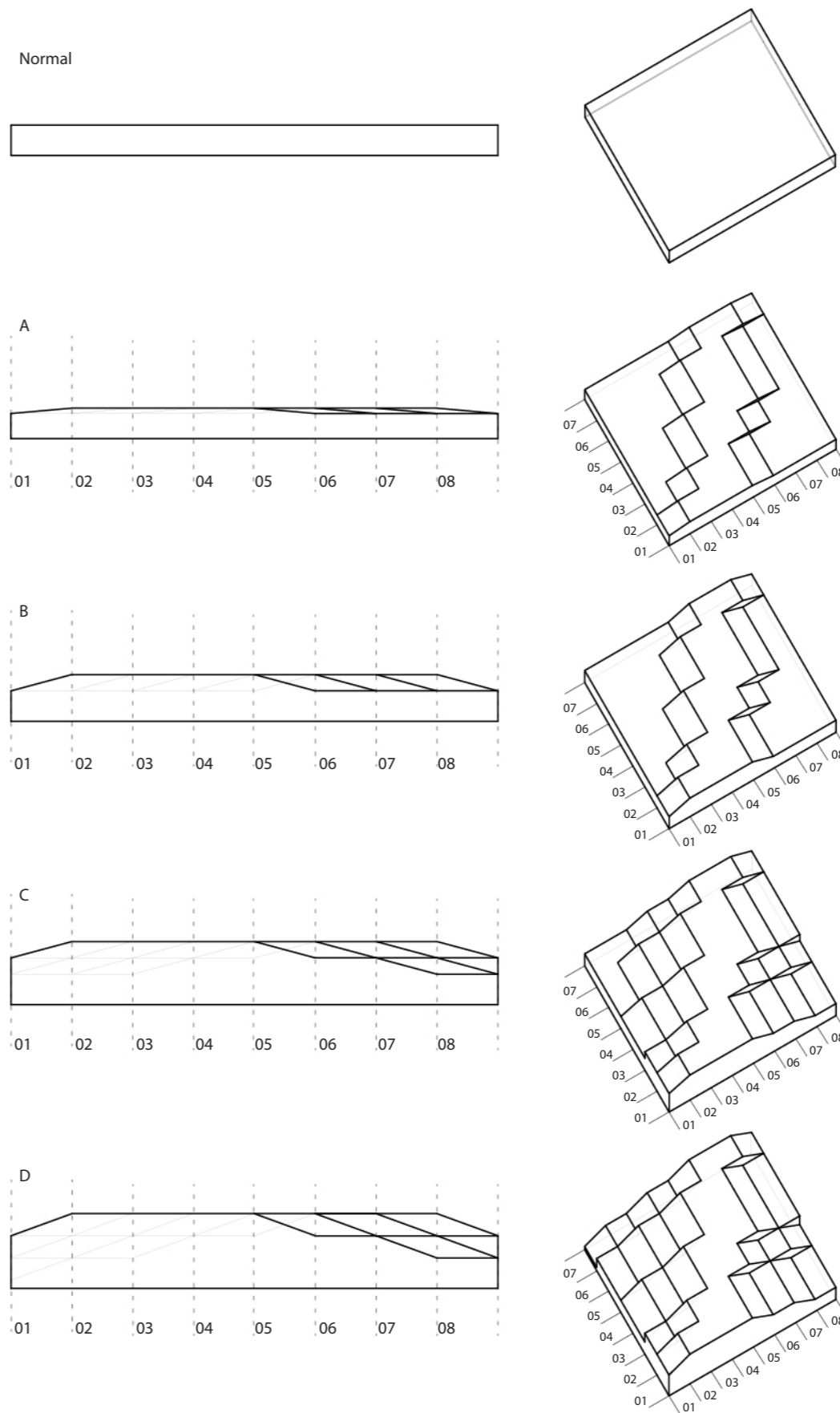


Figure 57. Slopes, Going up. (Ragnar, 2018).

### Walking surface

A: Here again as in step A, on the previous page, the degree of the slopes is only 5°. However, the main difference here is that the slopes move people below the ground plane. Still in this step people should move about it rather easily.

B: In step B, the degree of all the slopes is 15° and that incline does affect people's movement. Also the difference here is that since the slopes are going below the ground plane, people's weight is pulling them away from the path in the middle, instead of pushing them towards it.

C: In step C, the number of elevation levels are again raised from 1 to 2 and the height difference between ground plane to lowest point is 1072 mm. Also, the level ground plane is strengthened as a main path to move by because the elevated levels are more broken up so the path to move across them is less straightforward.

D: In step D, the degree of the slopes have been increased to 20°. The lowest point is 2184 mm below ground plane and therefore, in this case the path running through the middle is the highest point. Thus, the site is all visually accessible.

## INVESTIGATIONS AFFECTING THE SURFACE

### Walking surface randomised

By randomly putting slopes on a plane is to make the visual clarity on how and where to cross the site, less clear. That pushes people to think about every step and re-evaluate the best path to take with each step as well.

A: In step A, there have been added a few irregular 5° and 10° slopes. They should not affect movement to much but still enough so that people do have to be aware of how they move across. A slope of 5° that stretches 2 m moves the surface above or below 175 mm from the ground plane, a slope that is 10° 353 mm. That is an edge that not everyone trust themselves to cross. What changes in this step though, is the fact that the surfaces are being elevated either up or down. Thus, there are cases where the height difference is more than 353 mm. For example between x 04,05 and y 01,02 the height difference becomes 528 mm.

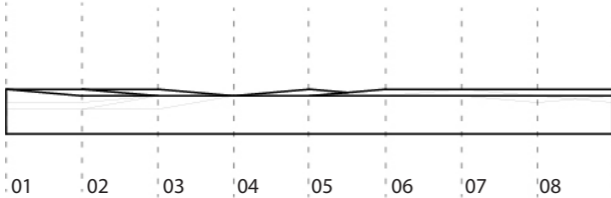
B: In step B, 15° slopes are added to even further randomize the surface. Again the area x 04,05 and y 01,02 height difference has increased to 889 mm so most people would not move across that height difference. Also, x 04,05 and y 07,08, there is a height difference of 714 mm so accessible paths through the site is getting more limited by the surface.

C and D: In these steps there is no even path accessible so people have to use their own subjectivity to the surfaces to resolve which path is best to take. These surfaces are very haptic and engage people in a more challenging way. Peoples movements are more based on their own subjectivity to the surfaces and space.

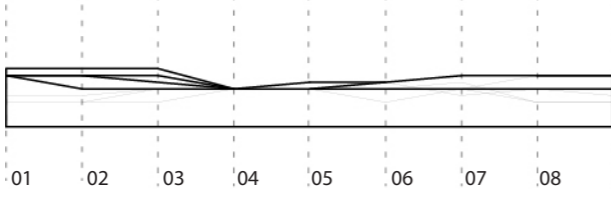
Normal



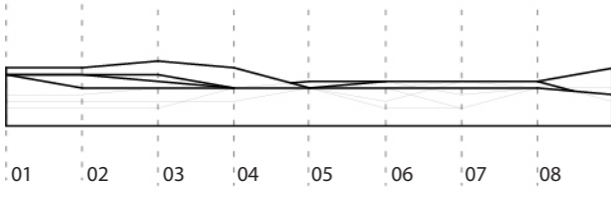
A



B



C



D

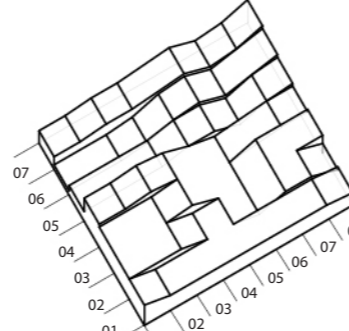
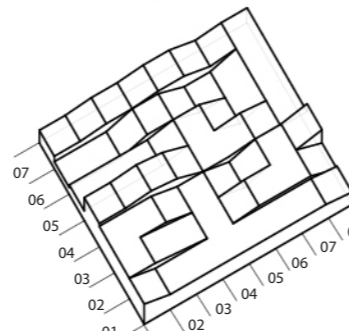
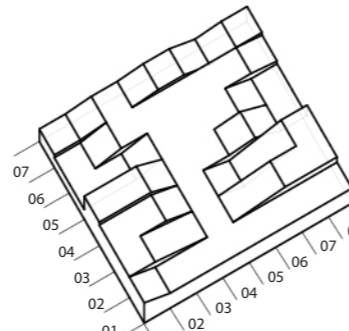
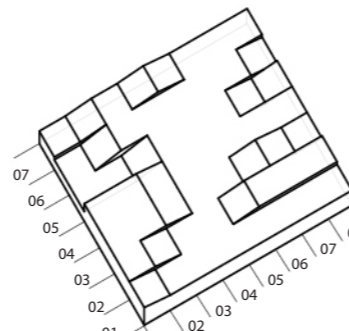
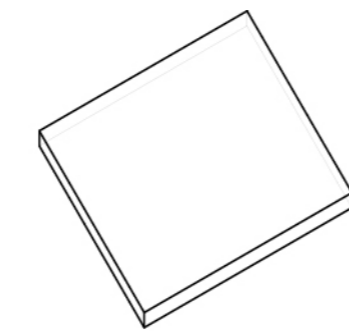
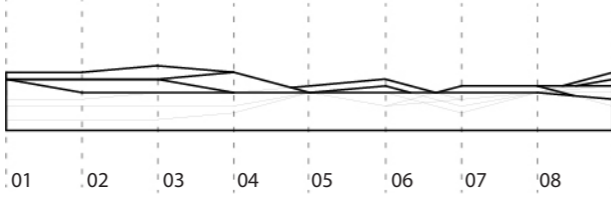
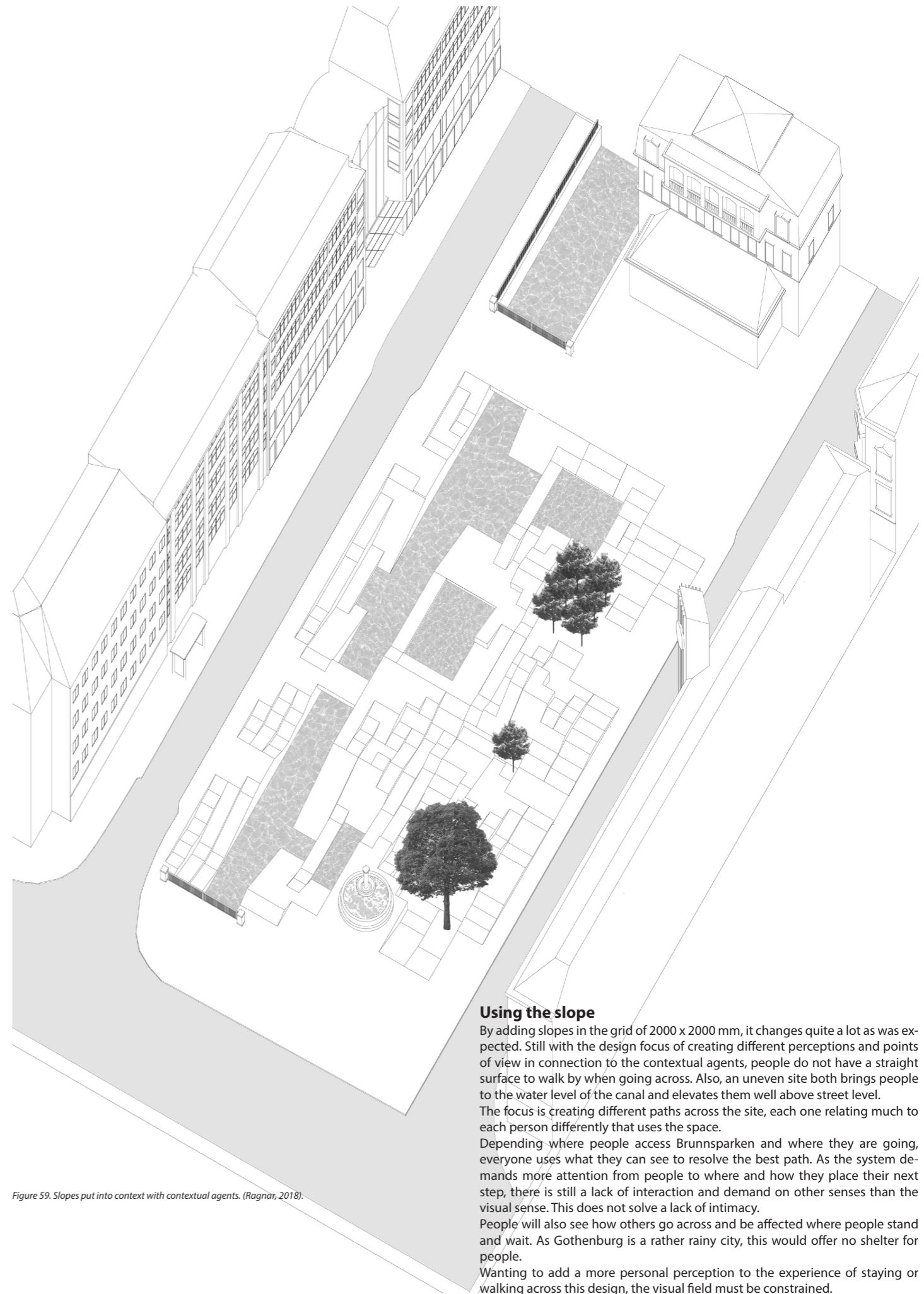


Figure 58. Slopes, Randomized. (Ragnar, 2018).



### Using the slope

By adding slopes in the grid of 2000 x 2000 mm, it changes quite a lot as was expected. Still with the design focus of creating different perceptions and points of view in connection to the contextual agents, people do not have a straight surface to walk by when going across. Also, an uneven site both brings people to the water level of the canal and elevates them well above street level.

The focus is creating different paths across the site, each one relating much to each person differently that uses the space.

Depending where people access Brunnsparken and where they are going, everyone uses what they can see to resolve the best path. As the system demands more attention from people to where and how they place their next step, there is still a lack of interaction and demand on other senses than the visual sense. This does not solve a lack of intimacy.

People will also see how others go across and be affected where people stand and wait. As Gothenburg is a rather rainy city, this would offer no shelter for people.

Wanting to add a more personal perception to the experience of staying or walking across this design, the visual field must be constrained.

Figure 59. Slopes put into context with contextual agents. (Ragnar, 2018).

## INVESTIGATIONS AFFECTING THE GRID

### The Grid

The grid is 2000 x 2000 mm reaching over the whole of Brunnsparken. In this step the design investigations will be put into the grid to give an idea of how it could affect the spatial perception within the boundaries given by the grid.

### Walking surface

During the investigation, using slopes that go from 0° to 20° and placing them into the grid give few different outcomes. The slopes will go from East to West so when people walk across the site from East to West they are being faced with the slopes as they are used to where the weight is evenly spread across the body. When people move from North to South, they cross the slopes from the side and therefore, people have to adjust their posture to the deformation.

### Adding mass

(01) The first image shows the mass or pillars where the space between them is 1500mm. It is a good width for people to walk past each other, and people keep a rather good overview for the space. The eyes inform the mind what it is about to go through so people are able to think many steps ahead.

(02) Each column is 1000 x 1000 mm and the width of the space between them is 1000 mm as well. This space is a personal space so people tend to feel uncomfortable except, if it is a close friend their walking or waiting with. This is also where the spaces between each column starts to feel more as many little spaces.

(03) Each column is 1500 x 1500 mm and the width of the space between them is 500mm. That is a very intimate and tight space. People almost have their shoulders from mass to mass. Visually people do not see far and at each turn they are faced with something that their body and vision perceives at the same time.

(04) Each column is 1875 x 1875 mm and the width of the space between them is only 250mm. People cannot fit through that so it is blocking people to move through the structure. In the mass examples 03 and 04 the use of the haptic deformation from the design investigation would be needed, to be able to pass through.

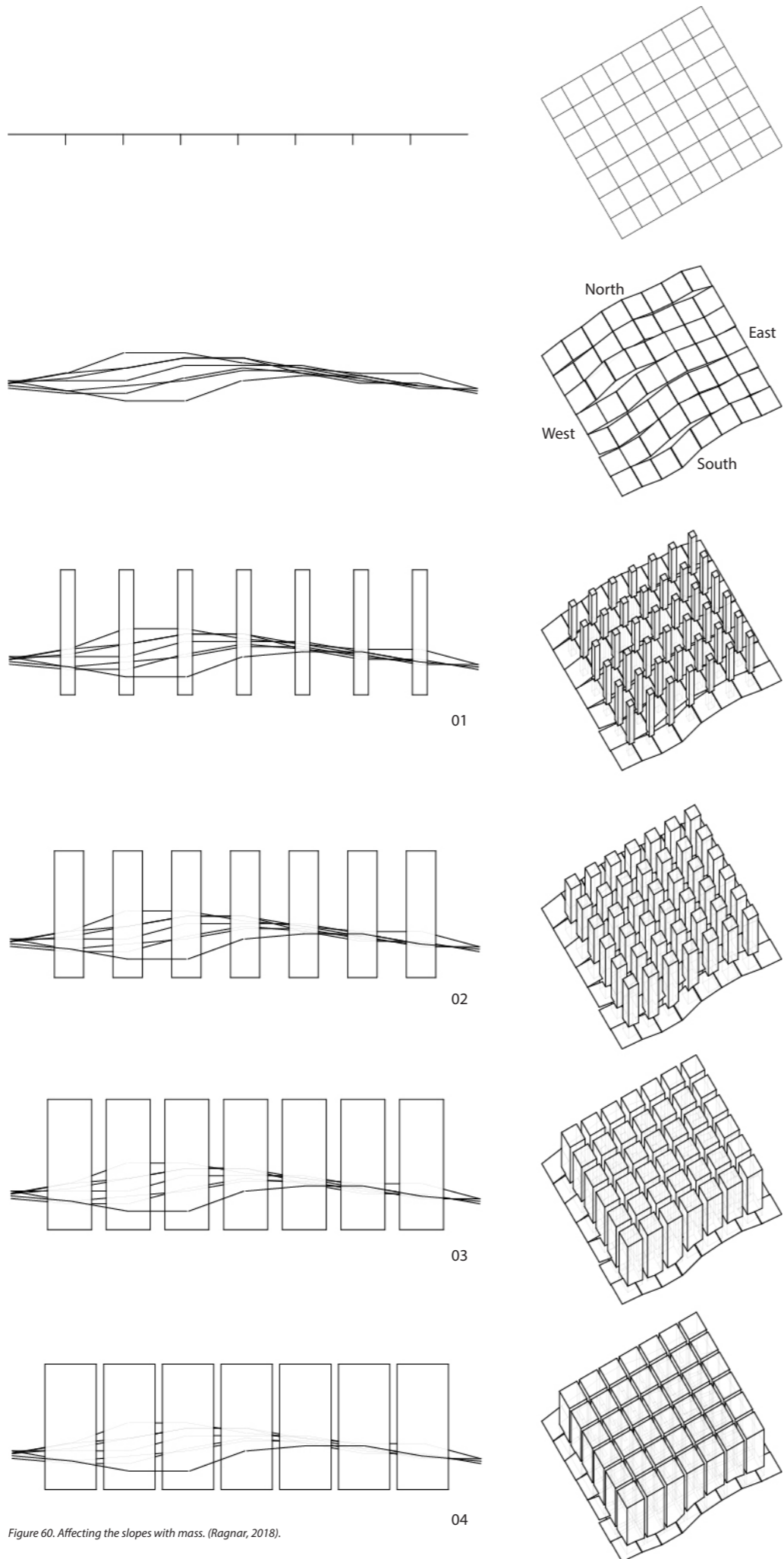


Figure 60. Affecting the slopes with mass. (Ragnar, 2018).

01

02

03

04



01 Figure 61. Affecting the slopes with mass. (Ragnar, 2018).



02 Figure 62. Affecting the slopes with mass. (Ragnar, 2018).



03 Figure 63. Affecting the slopes with mass. (Ragnar, 2018).



04 Figure 64. Affecting the slopes with mass. (Ragnar, 2018).

## PLACING MASS ON THE SURFACE

### Using mass to create tool to frame perceptions

By adding mass, the project will have stronger control of spatial creations wanted for the project. Mass is a tool to filter view over the site and creating spaces in different sizes. The smaller the space the more intimate the space becomes and personal subjectivity strengthens.

01: When people are walking across in a hurry they should be able to cross the site fast. No mass will be put in these paths so that people can see many steps ahead.

02: In step 02 some mass will be used so that the visual perception is blocked a little. The space between the masses is 1500 mm so the visual barrier is minimal so people are not affected very much.

03: The space in between is getting smaller and people are visually more constrained. Still the space between the masses is 1200 mm so the space is still large enough for more than one person.

04: Now people are entering a space that is 875 mm between masses so this space is a personal space and only one person can fit in there comfortable. The surrounding elements are becoming less and less of a factor.

05: This space is very intimate or 625 mm so people can only navigate through there on their own. People don't see far ahead so visual and physical reactions should be happening at the same time.

06: Here people can't go through because the space between the masses is 250 mm so this is a barrier or a stop to the path.

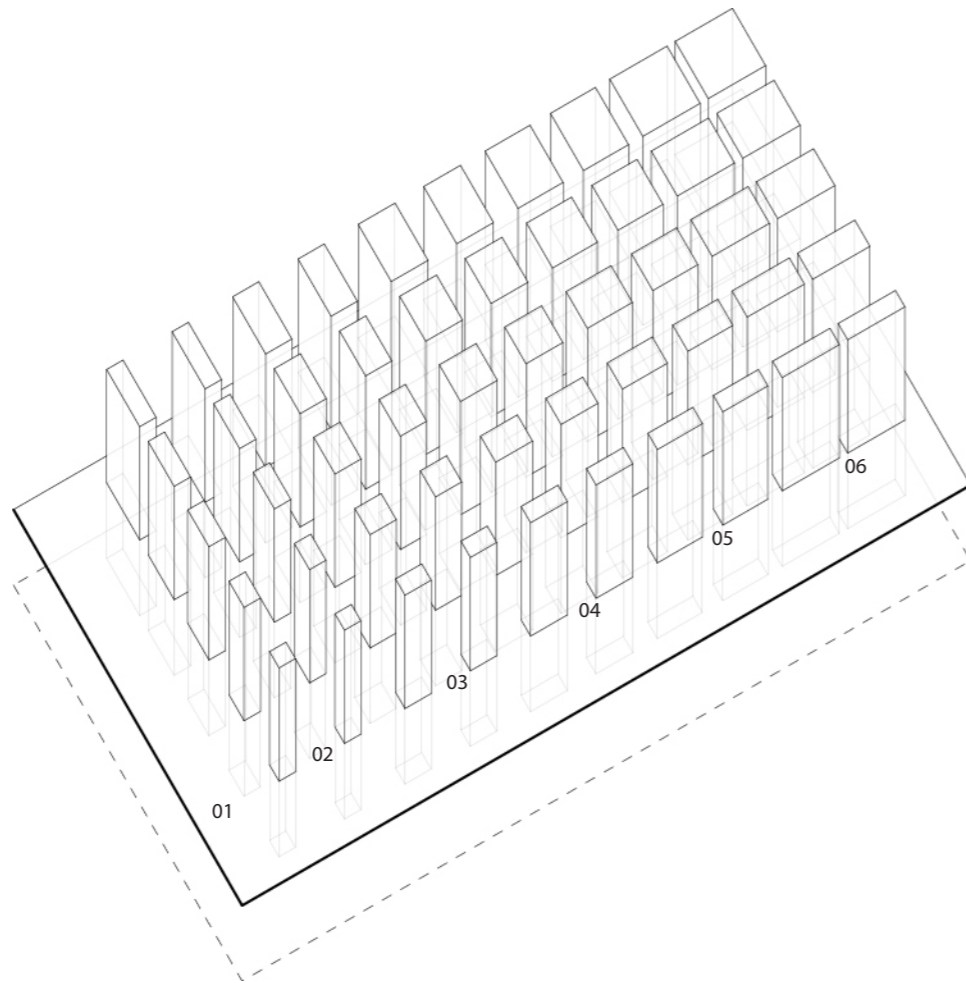


Figure 65. Axonometric, plan and section, Visual constraints and framed perception . (Ragnar, 2018).

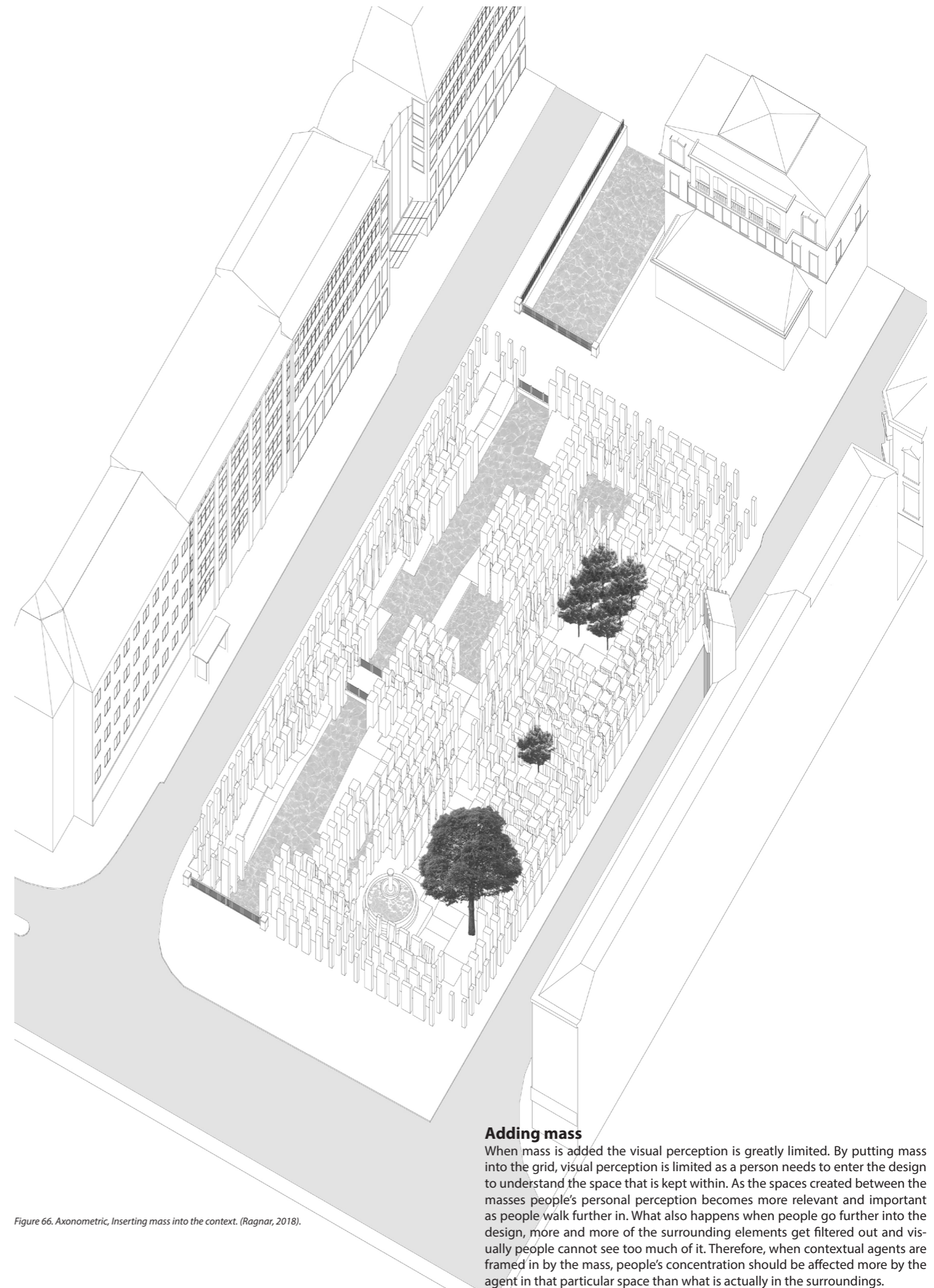


Figure 66. Axonometric, Inserting mass into the context. (Ragnar, 2018).

### Adding mass

When mass is added the visual perception is greatly limited. By putting mass into the grid, visual perception is limited as a person needs to enter the design to understand the space that is kept within. As the spaces created between the masses people's personal perception becomes more relevant and important as people walk further in. What also happens when people go further into the design, more and more of the surrounding elements get filtered out and visually people cannot see too much of it. Therefore, when contextual agents are framed in by the mass, people's concentration should be affected more by the agent in that particular space than what is actually in the surroundings.

## **The Design / 05**



### Creating a relationship with Brunnsparken

As shown in the work done up to this point, there is a clear way of how hapticity with deforming normal spatial agents so they become unfamiliar, and moving through would demand more attention from people moving inside the design.

Since all this work is meant to create more and stronger relationship with the contextual agents, that exist in Brunnsparken, it must be demonstrated with an example.

The agents that were used in the design are all agents that are already in Brunnsparken. However, as this work talks about, they are very unfocused or not connected to people that cross there daily. As the mass is used to create a visual barrier, it focuses the visual perceptions deliberately into certain directions or paths. Therefore, the small amount of Brunnsparken people see each time, is more focused and a bigger influence on what people feel and perceive. When the forest of concrete is broken up, and creates a small space within the design, that particular space is what influences the senses beyond whatever else might be close by.

There are spaces that contain focus on water, the canal and then the three pools in different height from the canal water surface. Then there are spaces that are about creating different visual focuses on Brunnsparken.

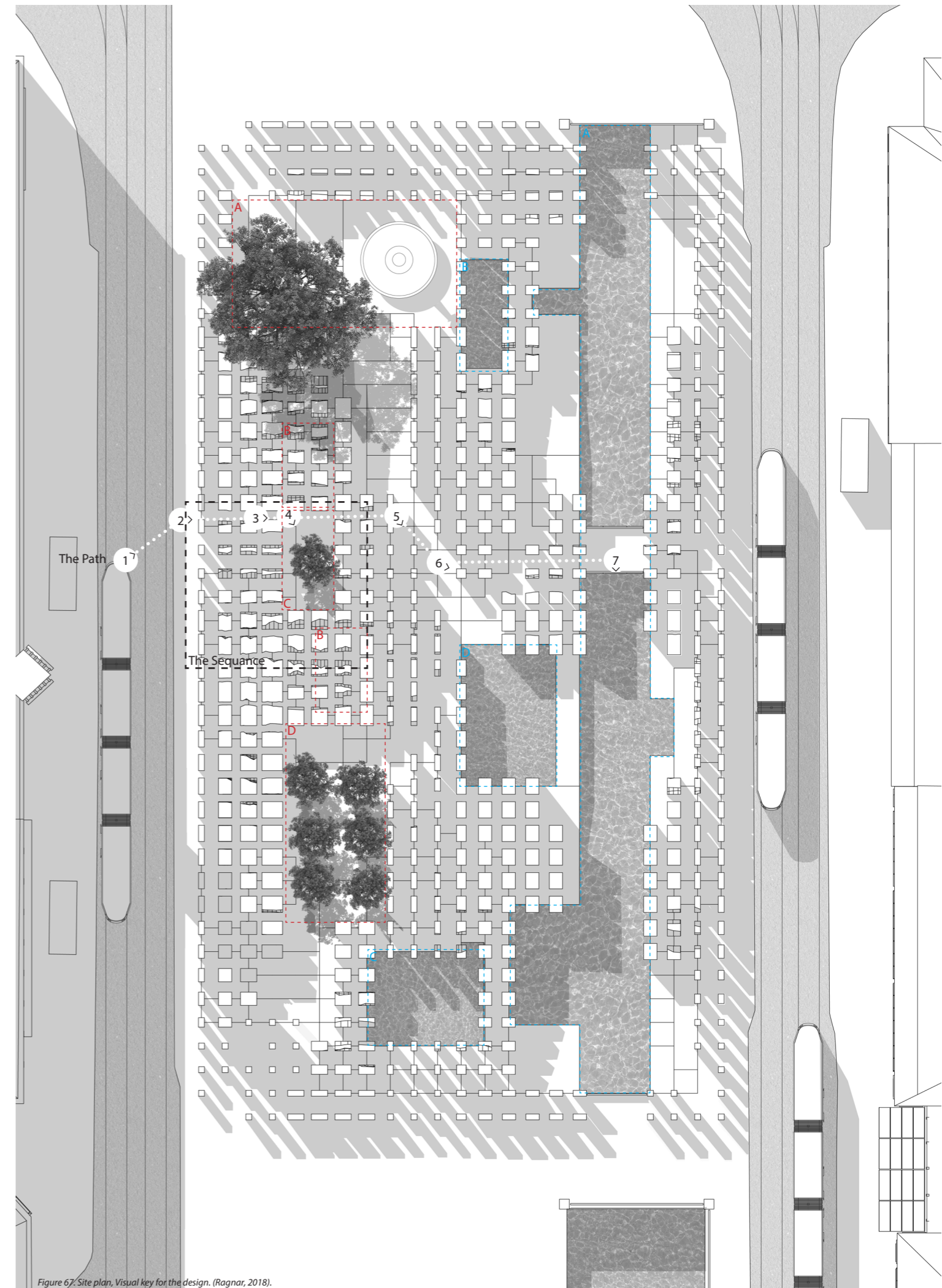


Figure 67 Site plan, Visual key for the design. (Ragnar, 2018).

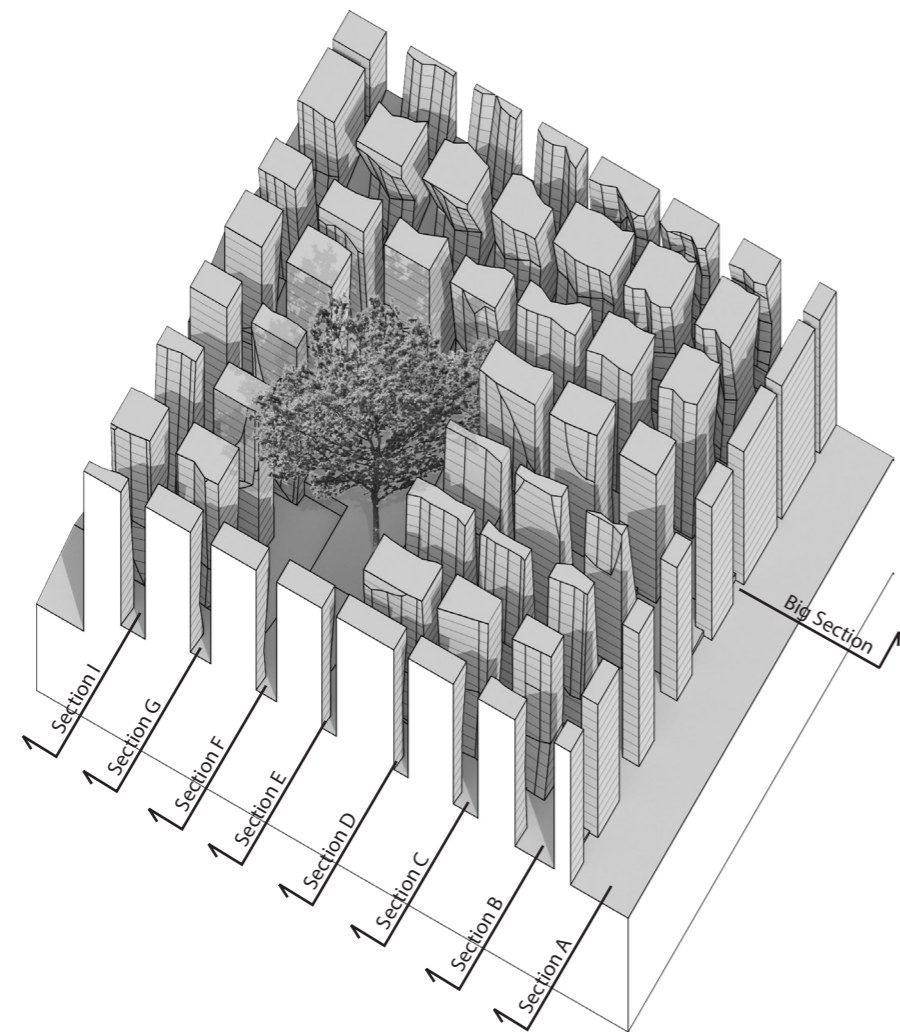


Figure 68. Axonometric, diagram to explain the sequence. (Ragnar, 2018).

### The Sequence

What the design is about is creating a sequence of moments, moments that differ to the one before and the one that comes next. As the design for the whole area is so that people may enter from any direction, each path is different to the next.

The sequence is therefore important and is where people come from a busy street space where everything is happening at once. As soon as people enter, they get more and more filtered away from the street and the surrounding agents of Brunnsparcken.

If the design was an endless row of different tunnels, it would lack a pull that the framed bigger spaces provide, since they give people the assurance that this work is designed for entering and perceiving for themselves. Each path taken can have a very different outcomes and relationship with the agents of Brunnsparcken. As shown in the sections on the opposite page the path chosen might lead people to see over the design or lead people to a tight and very haptic experience. Still the framed agents from Brunnsparcken should open up a space that gives people a bit of rest of the haptic walk.

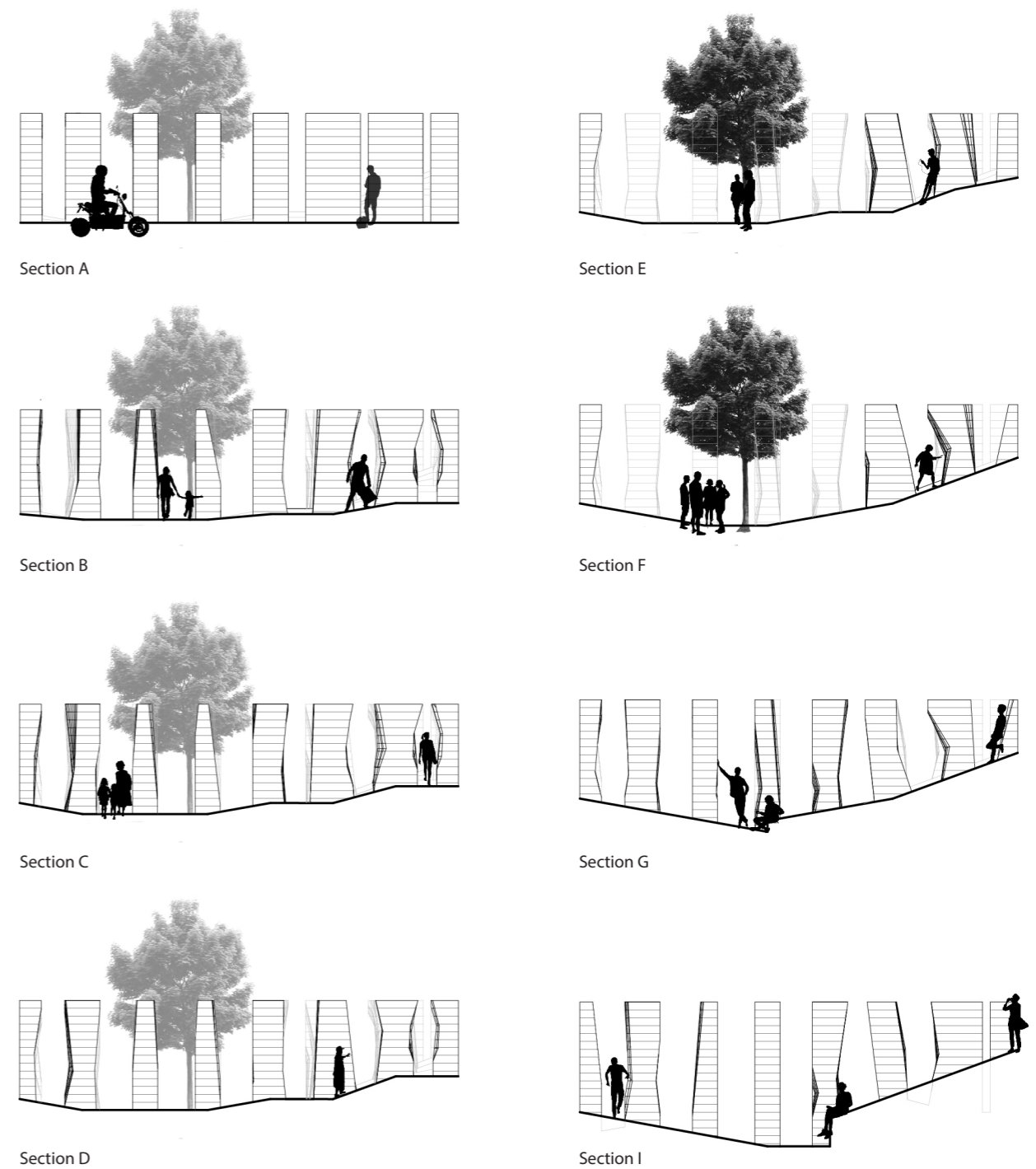
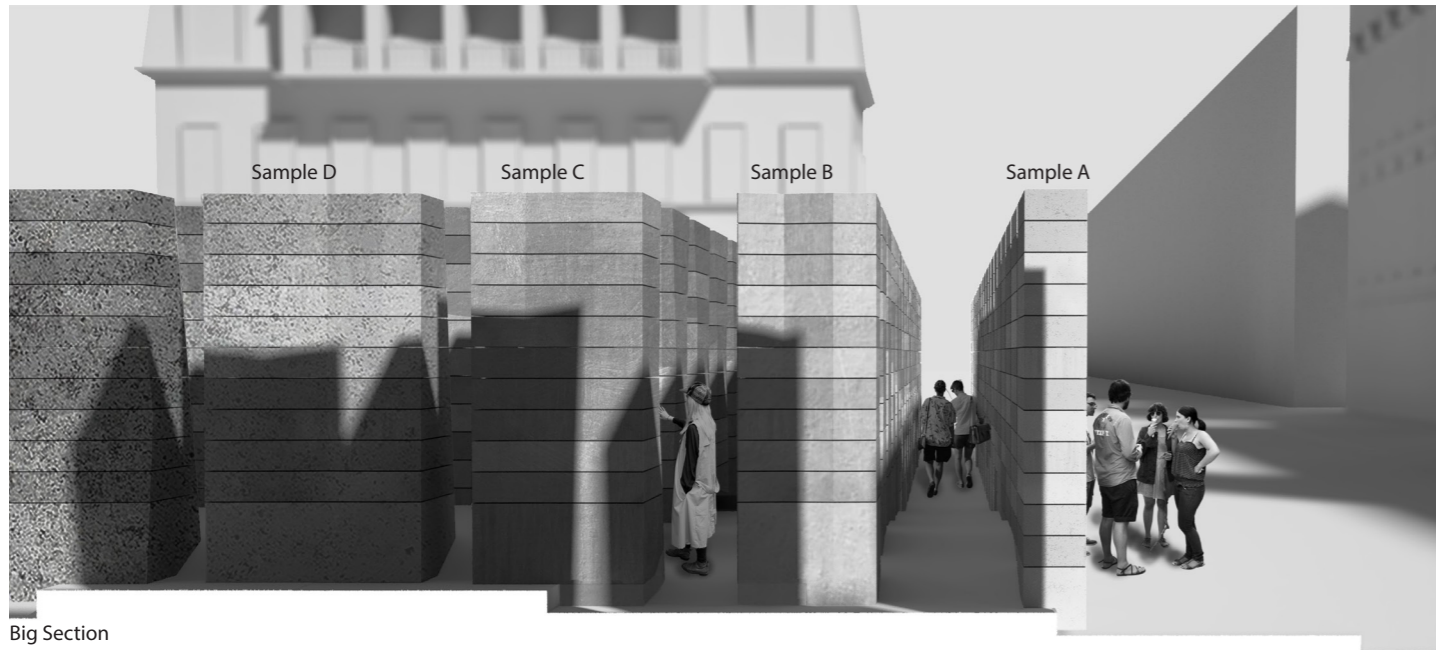


Figure 69. Sections, diagram to explain the sequence. (Ragnar, 2018).



Big Section

Figure 70. Perspective section, Showing how tactility and coarseness in the design. (Ragnar, 2018).

### The Texture

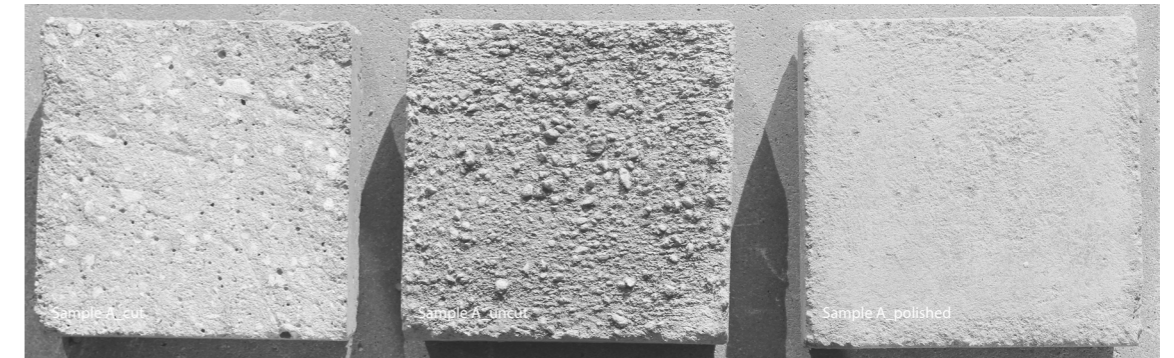
To enhance the contrast between outside and inside the design and increasing personal perception when entering and walking through these spaces texture was always going to be taken into the final design.

Concrete is a very universally known material and therefore everyone has a memory or experience with concrete in some shape or form. The goal in this work was to integrate the material in a way that could add to the sensual experience as well as using physical experience and perception in contrast with what people's eyes would tell them. By using different coarseness in the mixtures different visual and haptic experience could be felt when experiencing the spaces (Forty, 2012).

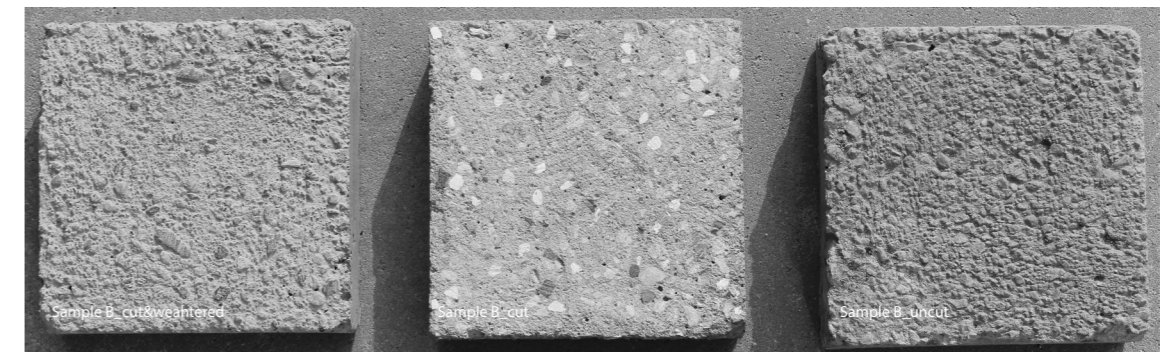
As people first see the concrete masses the facade is smooth and polished, using fine mix makes the surface and edges smooth and sharp. Then as people would wonder further into the design the concrete mix used would get coarser and coarser, the surface rougher and edges more broken. And using masses where there are 250 mm blocks stacked on top of each other the flaws will be more clear for people to witness as they would see the contrast between smooth surface and edges and then the cracked and rough surface and edges.

And then as people put their hands onto each surface their hands would tell them the difference between surface where cut had been made and where not.

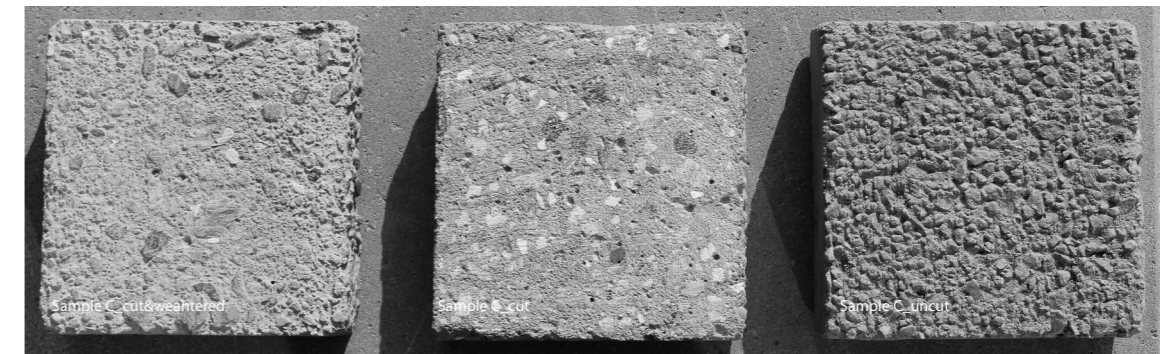
As the cuts are worked surface of the concrete and the blade creates an even surface and in these cuts the coarseness of each mass is shown and felt through touch and vision. Where there are no cuts the rough and cracked surfaces are also felt and seen and that is likely to affect certain people's movement through the sequence of spaces. So the usage of the material and its finishes are fine subtle tools of the architecture to guide people when going through, but of course it is mostly guided by personal perception and experience that each person might have (Zumthor, 2006).



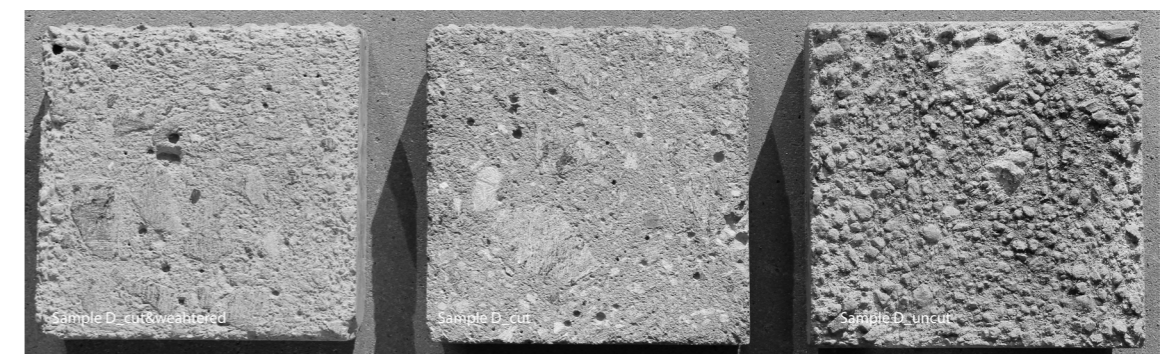
Sample A



Sample B



Sample C



Sample D

Figure 71. Concrete samples, Showing how tactility and coarseness of the material. (Ragnar, 2018).



1  
Figure 72. Rendering showing how experience changes perception. (Ragnar, 2018).

### The Experience

As people come from the surrounding city spaces what they see firstly a forest of concrete masses and looking at it from the outside it does not give away to much of what is to expect. In the street space around the design people will have a perception drawn from their own memory and experience as well as being able to see how other pedestrians act and behave.

The cuts are not seen or any other design agents that are within the sequence of spaces. This is important as it makes the contrast of perception before and after people enter the design more drastic.

Still as people come closer they will take note of that there are people moving within the design.



2  
Figure 73. Rendering showing how experience changes perception. (Ragnar, 2018).

When people come closer their vision and perception will be focused on a smaller portion of the structure and design agents will reveal their existence to people. Still only seeing can't tell people what the experience is really like, only physical experience will inform what the spaces are.



3  
Figure 74. Rendering showing how experience changes perception. (Ragnar, 2018).

When inside no space is the same and people will experience through haptic reactions when walking through the distorted spaces. As the spatial agent are unlike other city spaces and more intimate in size the experience becomes more private and personal. These spaces create a sequence of haptic experiences that filter other surrounding agents from Brunnsparcken.



Figure 75. Rendering showing how experience changes perception. (Ragnar, 2018).

Inside people will find bigger spaces that frame agents of Brunnsparcken like trees as shown on this image above. Then other parts of Brunnsparcken have been filtered out and the focus will be on the agent that is in each space framed. The rustle of leaves take over the noise of cars and trams and the shadow play of the dancing leaves in the wind will take peoples attention



Figure 76. Rendering showing how experience changes perception. (Ragnar, 2018).

Within the design there are spaces big enough to give a visual connection to buildings in the surrounding of Brunnsparcken. Also by breaking up the concrete massing in the design are people given a social size space within where much of the external agents are blocked away from sight.



Figure 77. Rendering showing how experience changes perception. (Ragnar, 2018).

The cuts that are taken and extracted haptic reactions relate differently to each person and therefor will be used differently by people. So where there are path that use cuts extracted from a person that is around 170 cm will face one person that is that height differently that it will face a person that is 190 cm tall.

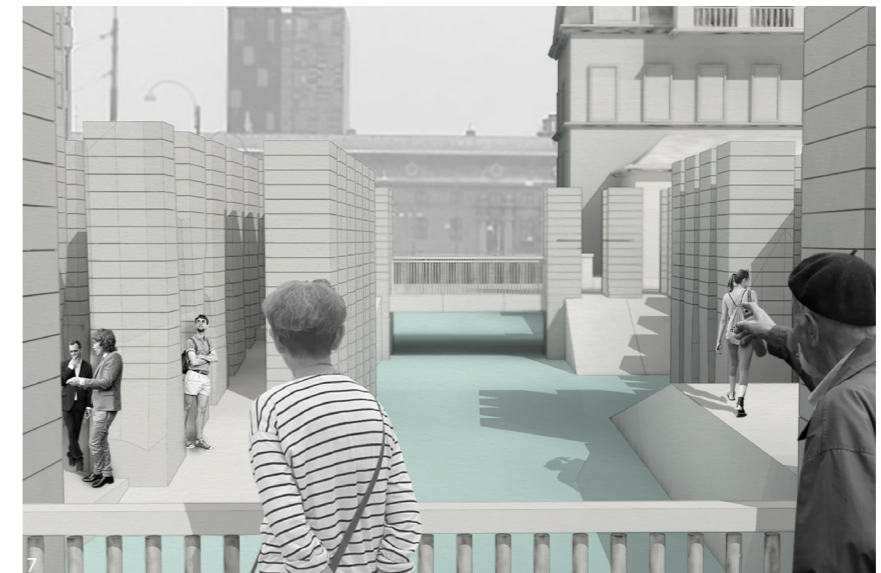


Figure 78. Rendering showing how experience changes perception. (Ragnar, 2018).

And as people will grove more used to the presence of the design people may start to pick their own favourite spots to wait at or paths they like the most when going through. This is where the personal subjectivity for being in a space shows difference in how people relate to space differently.



Figure 79. Rendering showing framed space within the masses. (Ragnar, 2018).

### The Framed Moments

**D:** These moments that are framed within the design highlight contextual agents of Brunnsparken. As the image above shows the agents framed, are trees and their crown of leaves. People might wonder into this space and take a moment to experience what the design frames in for them. Since the concrete masses filter out the surrounding city, a gust of wind will fill people's ears of the sounds of leaves, the shadow cast from the leaves will dance and surfaces come alive with their shadow play. The richness of these trees that people might otherwise have missed before, are framed into a beautiful moment with the design.

**B East:** Someone else enters the forest of concrete masses from somewhere else. This person goes through tight spaces with steep slopes, as he/she goes further the in the masses start to get thinner, one or two moments later he/she can see the whole of Brunnsparken. As he/she now stand at the highest spot in the whole design. Still as this moments is located some distance into the forest of concrete people can't see the traffic happening on street level, it is as if they have the whole of Brunnsparken for themselves.



B\_East  
Figure 81. Rendering showing how the masses filter out the surrounding traffic as two men look around. (Ragnar, 2018).



Figure 80. Section showing framed spaces within the masses. (Ragnar, 2018).



Figure 82. Rendering showing pool D at the bank of the canal below. (Ragnar, 2018).



Figure 84. Rendering showing framed pool C within the masses. (Ragnar, 2018).

Brunnsparken has a canal running from East to West at the northern edge of the site, and as designed it creates a border of two area's. For this design proposal it was vital to create a relationship between people and the canal. Thus, designing it in a way that might attract people to the site rather than pushing them to take a detour in the walk.

The sloping surface slowly brings people down to the water surface of the canal in few places of each side. It creates a focused visual connection between people across the water. If people give it a thought, they will notice that there are pools inside the design and all in different height from the canal surface.

The concrete masses have cuts every 25 cm so they look like stacked, and this goes through the whole site. This repetition gives people a visual measurement. Therefore, when they are in a closed off space within the design, they understand by counting the cuts if they are far up or down in the design. As people start to come more often, they can visually and haptically place themselves within the structure by using their visual and haptic sensing of the masses. Physical measurements in the design requires people to have a haptic perception in the design. By experiencing it they understand what it is for. The perception of what people might have had before is informed by their haptic experience.

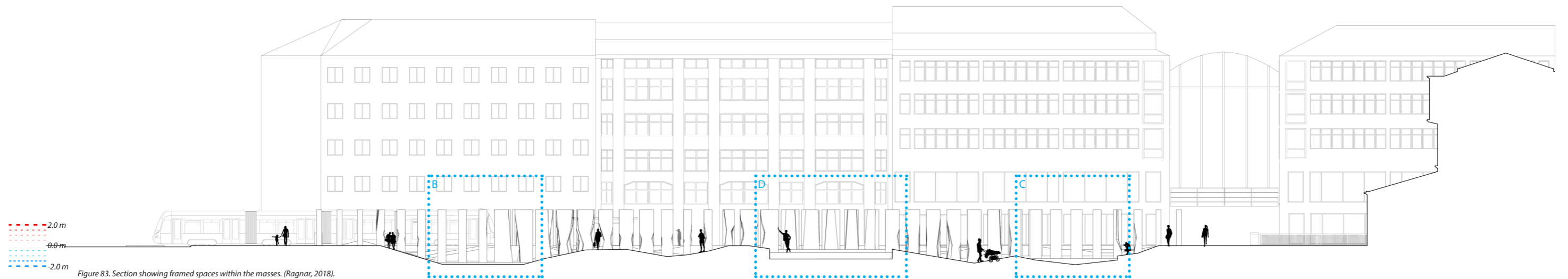


Figure 83. Section showing framed spaces within the masses. (Ragnar, 2018).

## The Water

**B:** Three pools were located along the southern edge of the canal and each one was placed at a certain height above the canal's water level. Pool B, the one furthest to the West is only 500 mm above the canal's water level. Thus, when there are floods due to heavy rains or storm floods by the coast line, this pool will be flooded and becomes a part of the canal.

**C:** Pool C, is the one located farthest to the East of all three, and is 1000 mm above the canal's water level. Storm floods from the coast line have been known to lift the water levels to 1000 mm and even little above that. Therefore, this pool will be filled up and becomes part of the canal when those kind of floods occur.

**D:** This pool is above recorded flood heights. These three pools are one of few spatial agents within the design proposal, and placed there to give people a tool of measurement and deeper connection to the site.

Adding these pools are therefore not only meant for pleasure, but also to add understanding and thought of the outside world. The pools are meant to change the effect of the design as it floods up and above the banks of the canal.

Still if there is no flood these pools are there to give the fuel for thought about something outside people's lives (Gelin, 2015).

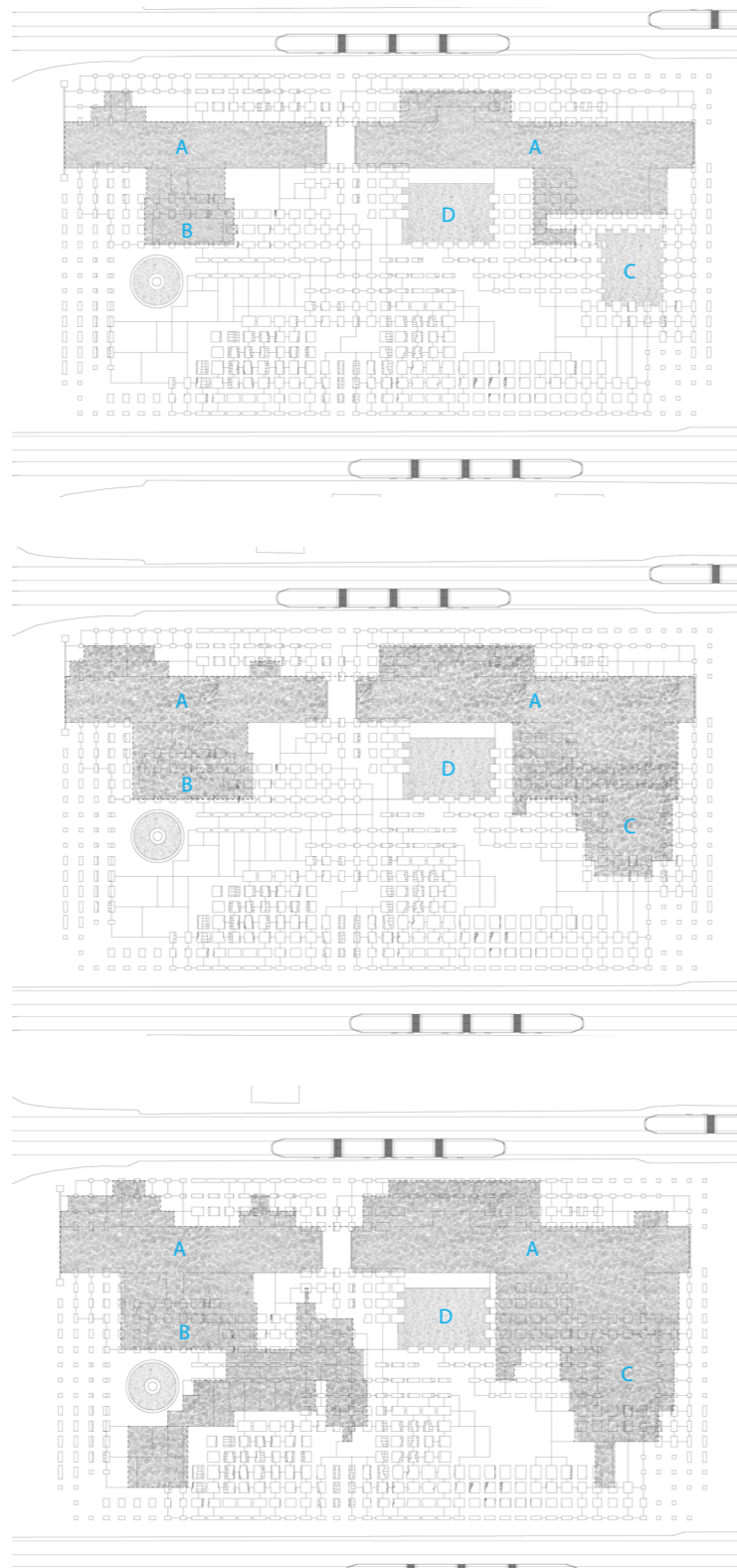


Figure 84. Site plans showing how storm floods affect the design. (Ragnar, 2018).



Figure 85. Site plan with contours. (Ragnar, 2018).



### Design conclusion

It is clear that when people go through a physically different space they take note, they must take a closer look at what they are going across. And being put into spaces that are formed around the human body, that experience is giving people a very personal perception. They don't see other people and how they move across, they must use their own perception to understand and move across that space.

Also this design being based on a grid of different degrees of slopes demands people to use their hands to help them figure themselves through the spaces. Creating a touch of both feet and hands of the surfaces, therefore the perception will be equally felt through physical haptic perception as through visual perception.

What experience this design does create is both through walking (The sequence) and also by viewing (The moments). Simulare idea as the gardens in Suzhou in China where their design was meant to use both visual experiences as well as physical once (Henderson, 2014).

This design focuses on the individual experience, creating a city space that focuses on the one instead of the many. Filters people away from the street space and gives them a framed moment with a natural agents like a tree or many, pools of water or even the canal itself.

Everyone will pick and choose their paths and places within the design based on their own perceptions and that was the goal of this work.



Figure 86. Rendering, Showing a man looking across the canal over to pool B at the other bank. (Ragnar, 2018).

## VIDEO

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