

this is not a representation of architecture, this is a representation of experience

Public Building: MUSIC MARVEL (Music & Popular Culture Re-Wired)
AR3AP100 MSC3/4 2021-22

Graduation project by Dimitrije Milić

Responsible instructor: Prof. Ir. Nathalie de Vries
Course coordinator: Ir. Paul Kuitenbrouwer
Tutors: Ir. Henk Bultstra
Ir. Florian Eckardt
Dr. Nicola Marzot

THE MUSIC MARVEL

Making the invisible visible.



public
building

A

A.1. Graduation plan

B

B.1. Theory research
B.2. Design manifesto
B.3. Case studies
B.4. Location analysis

C

C.1. Design
C.2. Context & Approach

D

D.1. Design Journal

E

E.1. Building technology
E.2. Sustainability

F

F.1. Final reflection

GRADUATION PLAN

A

GRADUATION PLAN

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Dimitrije Milić
Student number	5109507
Studio	
Name / Theme	Public Building - "Music Marvel"
Main mentor	ir. Henk Bultstra Architecture
Second mentor	Ir. Florian Eckardt Building Technologies
Argumentation of choice of the studio	By making this choice I was encouraged to merge the two fields that I work and study in and pursue appropriate architectural solutions that answer to my fascinations in both architecture and music. Furtherly, I have found my experience in music production, music venue organization and my experience in architectural design of music building of potential value in contribution to this studio.
Graduation project	
Title of the graduation project	Music Marvel – A Temple of Experiences
Goal	
Location:	The Binckhorst, Den Haag, The Netherlands
The posed problem,	The Binckhorst, a former industrial area of The Hague, is being readapted into the mix-use development defined in an urban plan adopted in 2009. According to this plan, the area will attempt to appropriate a new character that would benefit the new high-density, luxurious residential architecture. The plan however does not cover any new cultural content and is thus threatening the previously settled, 'street' and urban culture responsible for the prevailing vibrant energy.

	The ambition of this project is to provide a solution to this threat by presenting a cultural beacon, a MUSIC MARVEL, that will neutralize the predominant image of mass-capitalist ambitions in the area.
research questions and	<p>1) What does 'monumentality' stand for today? 2) Who does monumentality serve? 3) Can monumentality serve everyone?</p> <p>Almost the entirety of architectural profession seeks some sort of timelessness. A lasting individual accomplishment that would change, not necessarily just the profession, but even more confidently, the habits of contemporary living, overpopulation or some other similarly pressing and monstrous social issue. If not, then it seeks beauty, acceptance in the world of art and recognition as future heritage. In both ways, architecture craves the status of monumentality.</p> <p>The famished regime of the modern world that inspires daily technological breakthroughs for the sake of expanding capitalism almost completely neglects encouragement of societal values and creates global confusion about ultimate beliefs. During this process of 'disenchantment of the world' (Weber, 1917) it is harder than ever to imagine one asset valuable to all people, and therefore, harder than ever to create a monument cherished by the entire population. Monumentality does not speak to the individuals in the society.</p>
design assignment in which these result.	<p>To create a collective space for a modern society we must understand each individual thoroughly and separately. Even if all this information could be assimilated in whole, it would soon be outdated due to the changing human nature and all attempts of creating a worthy space would be ill-fated.</p> <p>Today's world leaves no time for philosophical decoding of personalities in the design process, yet urges for a mechanism that would, as envisioned by Toyo Ito, "build fictional and ephemeral architecture as a permanent entity" (Ito, 1992). Such entity that communicates with the passer-by and, in the same time, creates an analogy</p>

of their wavering experience. A personification through a function that corresponds to all ambitions of the MUSIC MARVEL.

All of the perceived world is reflected somewhere within the observer's brain as a pattern of brain activity. Using electroencephalographic technology this activity can be measured and used as input data for algorithms that change the surrounding architecture in the adequate time frame.

In this way it would be possible to create the ephemeral effect in architecture that only correlates to the coexisting brain activities of the observers and stops existing as soon as the activities change. A new technique that would help exclusion of subjective architectural trends imagined by individuals and implementation of 'living' and reacting mechanisms that shape the space only with a goal to suit every user.

This new technique could shape a specific movement in architecture that challenges idolatry of architects based on their recognizable but rigid designs and create new form of monuments that are constantly appropriating and unpredictable.

Reflection

Neurological architecture is a real time interpretation of the surrounding world perceived by humans. The specific idea behind the MUSIC MARVEL is revolving around sound inputs and outputs but it also inspires imagination that questions limits until which neurological decoding may affect the world around us. A predictable next step would be further influence on the interior as well as the exterior of the building. This could later indicate possibilities of affecting the buildings surroundings and communication between buildings through the language of telepathy between their users. Consequently, it could even inspire a new form of digitalization through such communication and a creation of not only living entities within the cityscape, but also a city-organism consisted of interdependent parts that, actually, presents its citizens. In another direction, neurological architecture might affect the way we see other forms of design. The introduction of EEG equipment to our everyday lives, that permits us to reserve relevance in the world of neurological architecture, could cause revolutionary tendencies in fashion design. Or influence other industries that would adapt their products and markets towards the new collective habits. The creation of this mechanism that enables living architecture could influence a formation of a different world.

Literature and general practical preference

Literature

Solà-Morales, M. d. (1992). *Public Spaces, Collective spaces*. Barcelona: La Vanguardia.

Gehry, F. personal communication

Weber, M. (1917). *Science as a Vocation*. Munich: Munich University.

Gebauer, L., Krinzelbach, M. L., & Vuust, P. (2012). Ever-changing cycles of musical pleasure: The role of dopamine and anticipation. *Washington D.C.: American Psychological Association*

Ito, T. (1992). *Architecture in a Simulated City*. London: New Prairie Press.

Boulanger, R. (2015). personal communication, Berklee College of Music

Novak, M. (2005). *AlloBrain@AlloSphere*.

Roussel, M. (2016). *The Brain Without The Body? Virtual Reality, Neuroscience and the Living Flesh*, Societe des Anqlicistes de l'Enseignement Superieur

Hauptmann, D., Neidich, W. (2010), *Cognitive Architecture, From Biopolitics to Noopolitics*. *Architecture & Mind in the Age of Communication and Information*, Delft School of Design

Hosale, M-D., Murrani, S., De Campo, A. (2018), *Worldmaking as Techné: Participatory Art, Music and Architecture*, Riverside Architectural Press

Process

Method description

This study will include many experimental exercises that would help differentiate brain activity in different actors. This will require cooperation with performers and the audiences and translation of these encounters into data that will be used as input value for algorithms that have a goal of manifesting individual experiences in the surrounding physical space. The project will deal with neurology, brain waves, soundwaves, music production and technical architectural and engineering solutions that would allow these study results to take a physical form.

THEORY RESEARCH

B

THEORY RESEARCH

MUSIC MARVEL - A TRANSFORMABLE SPACE

To understand the maximal potential that the MUSIC MARVEL may achieve, one must first take into consideration the social expectations as well as the physical realm that primarily determine the core purpose of the building. This means, that reflection on social constitution of the Binckhorst presents the first factor in the definition of the venue.

New residential developments that are starting to assume their presence in the area promise a dense population of 'high-class' residents, as is described in multiple advertising presentations. However, that change will hardly affect the previously established lifestyle encouraged by new businesses that have taken over old industrial buildings and turned them into inviting affordable places that encourage gathering of young creatives. This dichotomy, encouraged by the general diversity in the whole city, is the most important factor that emphasizes the demand for a collective space that will welcome people of all social groups and interests.

"The morphological, urban, architectural and civil wealth of a city is that of its collective spaces (...) Public spaces absorbed by particular uses, or private spaces that acquire a collective use." (Solà-Morales, 1992)¹

Furtherly, with the successful opening of the new musical venue in The Hague, Amare, that happened this year, the necessity for large, strictly musical spaces that provide services and rooms for various performances and private sessions at the same time or large pre-organized public events is minimized. There is no need of another such grand venue, especially in the non-central location as is the Binckhorst.

This space needs to be an adaptable, modest-sized marvel that occupies just enough area that can suit every type of performance, one at the time, and no more than that in order to maintain its efficiency and sustainability. One space for at least 100 members of the philharmonic orchestra, an opera theatre, a dance performance, a rock band, a DJ event, a dance class group etc. All of these types of performance have mostly different technical and acoustic demands of the surrounding space. For that reason, this place must transform accordingly and value every performance equally.

Perusing transformability in venue design permits savings both in budget and space, and is a tempting idea that can hardly be considered new. Many venues have included elegant solutions that achieve this type of adaptability and create a moving hybrid building that changes in service of its users. However, such constrained movement, although often highlighted as technically remarkable, plays little part in the architectural expression and monumentality, and does not live conjointly with the attitude or the experience anticipated within the boundaries of musical buildings.

Rather than being just a system of preprogrammed functions and an innovation in engineering, should not every building also try to maintain the conversation with the public in the form of ephemeral monumentality that leaves a fleeting but distinctive experience for each individual?

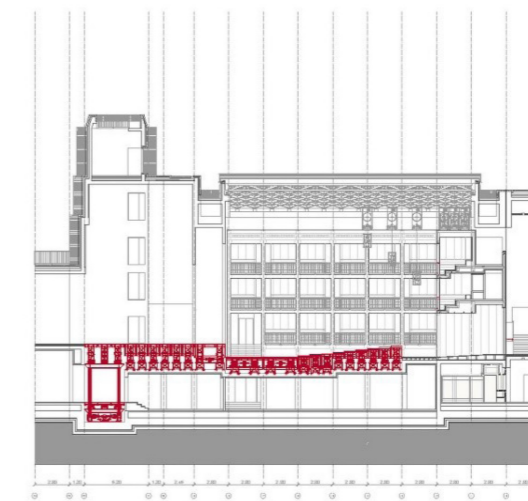
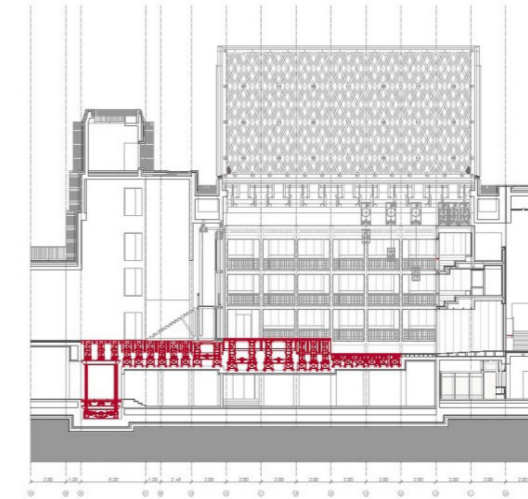


FIGURE 2

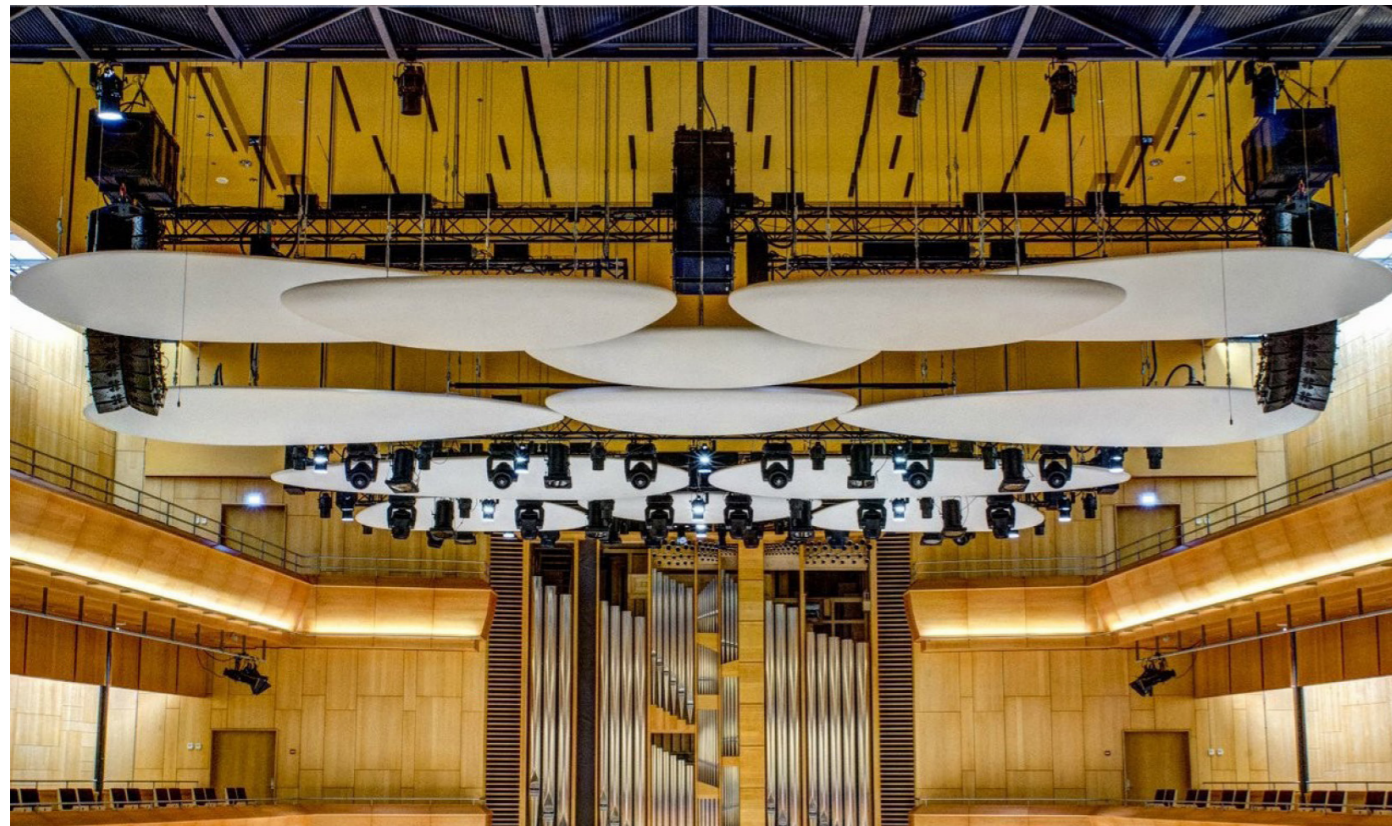


FIGURE 1



FIGURE 3

MONUMENTALITY

"Architecture should speak of its time and place, but yearn for timelessness." - Frank Gehry²

Almost the entirety of architectural profession seeks some sort of timelessness. A lasting individual accomplishment that would change, not necessarily just the profession itself, but even more confidently, the habits of contemporary living, problems caused by ever-growing financial differences, overpopulation or some other similarly pressing and monstrous social issue. If not, then it seeks beauty, acceptance in the world of art and recognition as future heritage. In both ways, architecture craves the status of monumentality.

The only obstacle in this process, that would lead an architect to glory, is that today we are less and less certain of what monumentality stands for. The famished regime of the modern world that inspires daily technological breakthroughs for the sake of expanding capitalism almost completely neglects encouragement of societal values and creates global confusion about ultimate beliefs.

This "disenchantment of the world" (Weber, 1917)³, as described by Max Weber, is one of the reasons why it has become hard to imagine a single architectural piece, that holds value, that is not historic, to all observers. In a time of this much cultural diversity, one space can only be meaningful to all if it somehow simultaneously answers to all individual personalities. Architects have to abandon the habit of designing according their own intuition or according to subjective preferences with ambition of glorifying a part of their ego in the process. Instead, in order to create a place equally important to all bystanders, an architect should generate a technique that includes and depends on all in a way consistent to the values of each individual.



FIGURE 4

PERCEPTION & EXPERIENCE

Everything that we perceive is a target to our reflection and consequently a trigger to our behaviour. The pavement, the birds, other people, colors and movement just as much as architecture that we experience, are the unavoidable stimuli that we experience daily. Most of this stimuli are subject of our posteriori knowledge, as defined by Kant, being just a variation of the previously experienced realities. However, we often find ourselves in anticipation of a priori knowledge, new findings. Axiological cognition of these occurrences allows us to interpret them as pleasurable surprises which explains the human desire of exposing oneself to new music, performance, architecture or overall – new art.

"Music can be experienced as pleasurable both when it fulfils and violates expectations. The more unexpected the events in music, the more surprising is the musical experience." (Gebauer, Kringelbach, & Vuust, 2012)⁴

This sensation, found in exposure to music, will definitely not be absent in a musical building, however, as a result of its program rather than of its architecture. Having in mind the aforementioned ambition of the MUSIC MARVEL towards acquiring the identity of an ever-changing architectural monument, this space must also hold a similar predisposition to provide surprising experiences.

In addition to being adaptable, modest in size, monumental and of lasting value for all, sustainable and efficient, the MUSIC MARVEL must be 'alive'!

CREATING FOR ALL MINDS

Always has architecture been a reflection of the on-going societal condition. We are currently experiencing a society that shifts between reality and virtuality and due to our acclimatization to the dual world the border seems to be fading. Human well-being now depends on the tangible world as much as it does on the simulated unreality which has become an inseparable part of how we experience our surroundings. Perception of the physical plane has become dependent on its concurrent understanding in the virtual environment of social media, augmented reality or new technologies that in any way enhance our experience. This new human ability has made us even more estranged now that every individuals' comprehensions are more tightly associated with preferred virtual trends than with the shared physical environment that we co-exist in. Architecture can no longer account on geo-cultural similarities in human recognition of value and must tend to every human individually.

To create a space for a modern human, we must understand their needs and expectations, system of valorisation, ambitions, fears etc. To create a collective space for a modern society we must understand the same set of traits for each individual separately. Even if all this information could be assimilated in whole, it would soon be out-dated due to the changing human nature and all attempts of creating a worthy space would be ill-fated.

This 'data' world leaves no time for philosophical decoding of personalities, yet urges for a mechanism that would, as envisioned by Toyo Ito, "build fictional and ephemeral architecture as a permanent entity" (Ito, 1992)⁵. Such entity that communicates with the passer-by and, in the same time, creates an analogy of their wavering experience. A personification through a function that corresponds to all aforementioned ambitions of the MUSIC MARVEL

DECODING BRAIN ACTIVITY

The perceived world must be reflected somewhere within the brain as a pattern of brain activity. Different parts of the brain reflect different types of information related to what we are currently experiencing mixed with our biased thoughts and private feelings. Because our brains work as non-linear dynamical systems that rely on firing of interconnected synapses, all activity can be detected in form of brainwaves. Brainwaves that are in direct correspondence with the stimuli in the outside world. That means that our brains in the moment of new experiences produce content that can be described as private and personal duplicate of the outside world.

If, with aid of now widely accessible EEG (electroencephalography) technology, we aim to extract these brain activities we could form a collection of an individual's reactions to a certain stimulus without having to philosophically ponder on its deciphering. Extracted brainwaves could be used as input data in the formation of an algorithm that would create a mechanism that reacts to every (or all) individual(s).

There are five types of brain waves, each linked to different types of brain activity and all of those types would be present within a person that is experiencing a space for the first time.

Imagine that instead of appropriating the space based on the examination of the observer's primary experiences we extract their brain activity and translate it into data that affects the surroundings in real time. In this way we would be able to create the ephemeral effect that only correlates to the coexisting brain activities of the observers and stops existing as soon as the activities change.

All waves are time series that span a range of frequencies, this makes all waves easily comparable and translated. The sincerest way of communication between the MUSIC MARVEL and its attendees is a dialogue in music. People come to musical venues with a goal of reacting to the music that the venues provide. This happens during the time of performer activity. However, when the performers are not active, the venues remain silent. This is where the MUSIC MARVEL differs from other venues. Moments without performer activity shift the spotlight towards the audience that subconsciously creates music through their experience of the building. A primary experience (stimulus 0) affects brain activity of each individual in a way original to their reasoning, that is then extracted in the form of brainwaves and translated into sound-waves that are emitted within the building. This creates a new experience (stimulus 1) that affects everyone in a similar fashion and so the process persists. New experiences (stimulus 2, 3, 4 etc.) are formed and the dialogue between the building and the people inside it is continuous and unpredictable, making the building an ever-changing living entity (Figure 5).

In this manner it will be possible to create **music for a building for music**. A never-ending circle between the architecture and its purpose.

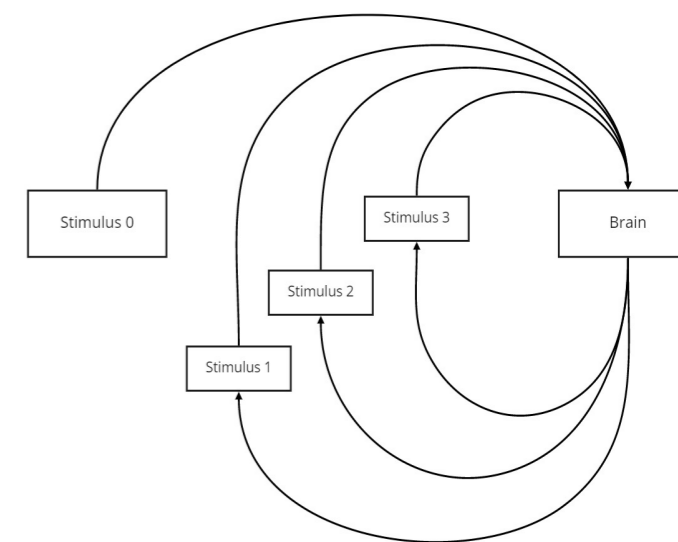


FIGURE 5

"The big question is - when will we be in an age where the thoughts in my mind or the music in my mind translates directly to" - Dr. Richard Boulanger⁶

Current technologies allow us to play recorded brainwaves as audio files. However, those sounds are nothing more than unpredictable noises. If intended for space enriching purposes, these noises should depend greatly on their artistic interpretation and organized combination, perhaps with parallel consideration of musical theory, in order to achieve the desired musical effect.

THE POTENTIAL

Architecture that mutates in response to the neurological feedback depends on the latest advancements of the equipment that is used for brain activity decoding. In order to stay relevant over time, it must account for technological improvements that can be incorporated into the system when available.

Neurological architecture is a real time interpretation of the surrounding world perceived by humans.

This specific idea behind the MUSIC MARVEL is revolving around sound inputs and outputs but it also inspires imagination that questions limits until which neurological decoding may affect the world around us. A predictable next step would be further influence on the interior as well as the exterior of the building (Figure 8 – 11). This could later indicate possibilities of affecting the buildings surroundings and communication between buildings through the language of telepathy between their users. Consequently, it could even inspire a new form of digitalization through such communication and a creation of not only living entities within the cityscape, but also a city-organism consisted of interdependent parts that, actually, presents its citizens.

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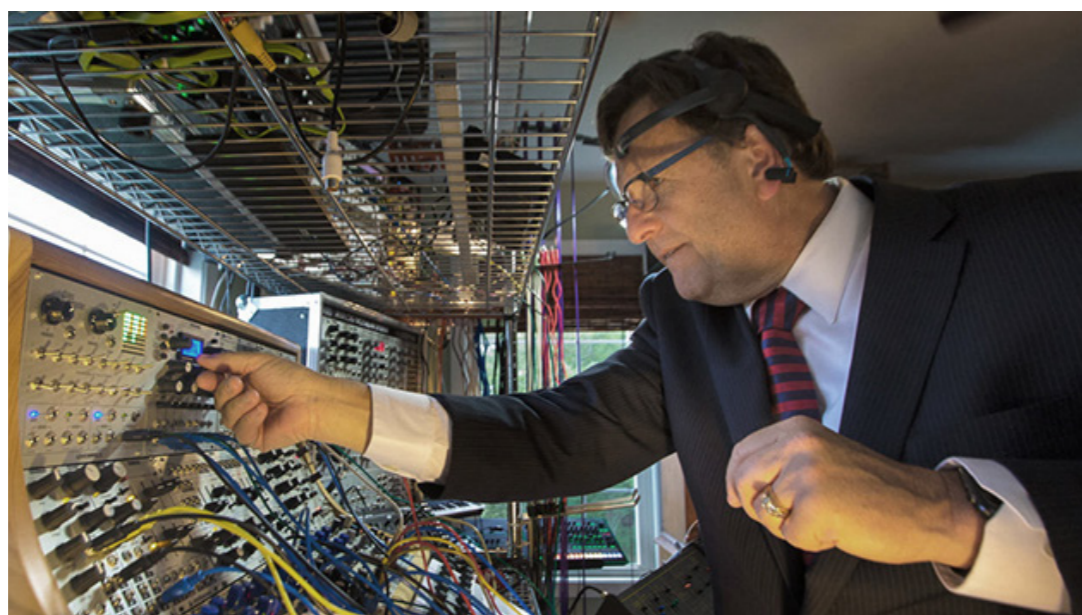


FIGURE 6

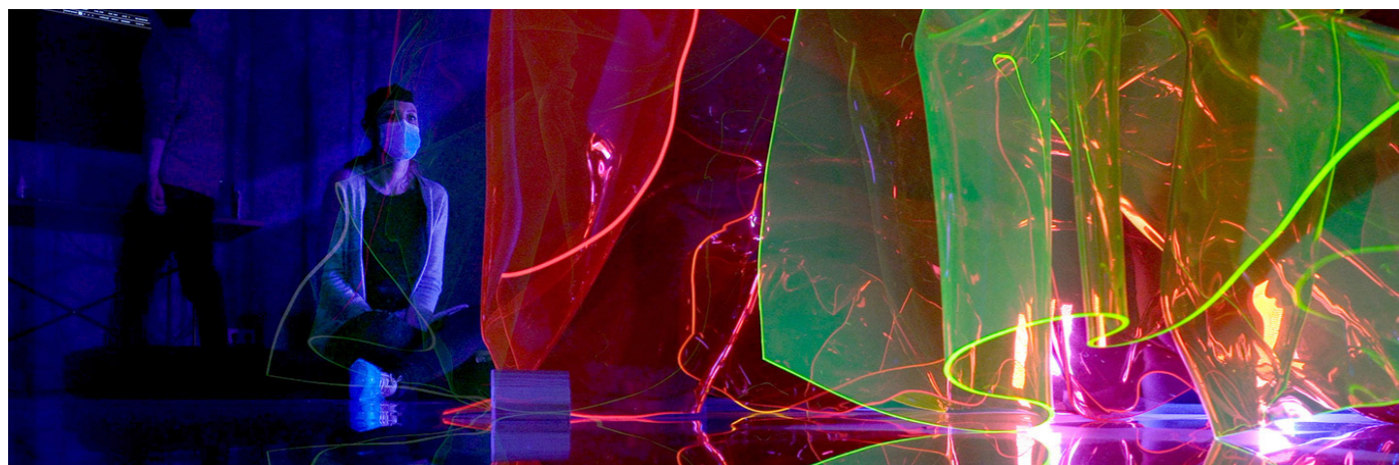


FIGURE 7

FIGURES :

FIGURE 1

Stavanger Concert Hall, Movable acoustic ceiling elements in SOURCE Waagner Biro Stage Systems

FIGURE 2

The Gdask Shakespeare Theatre, the main hall: sections of the Italian configuration (left) and the Elizabethan configuration (right) SOURCE ArchDaily

FIGURE 3

The Gdask Shakespeare Theatre, the main hall: Retractable roof SOURCE BBC

FIGURE 4

WDCH Dreams by Refik Anadol at Walt Disney Concert Hall by Frank Gehry SOURCE Digidigital

FIGURE 5

The loop of simulation in the MUSIC MARVEL - relationship between the stimuli and the brain

FIGURE 6

Dr. Richard Boulanger composing music using soundwaves produced from his own brain activity, Berkeley College of Music SOURCE Boulanger Labs

FIGURE 7

Brainpalace by Christian Losert, artistic installation that reacts to neural feedback SOURCE Christian Losert

SOURCES :

1

Solà-Morales, M. d. (1992). Public Spaces, Collective spaces. Barcelona: La Vanguardia.

2

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DESIGN MANIFESTO

B

DESIGN MANIFESTO

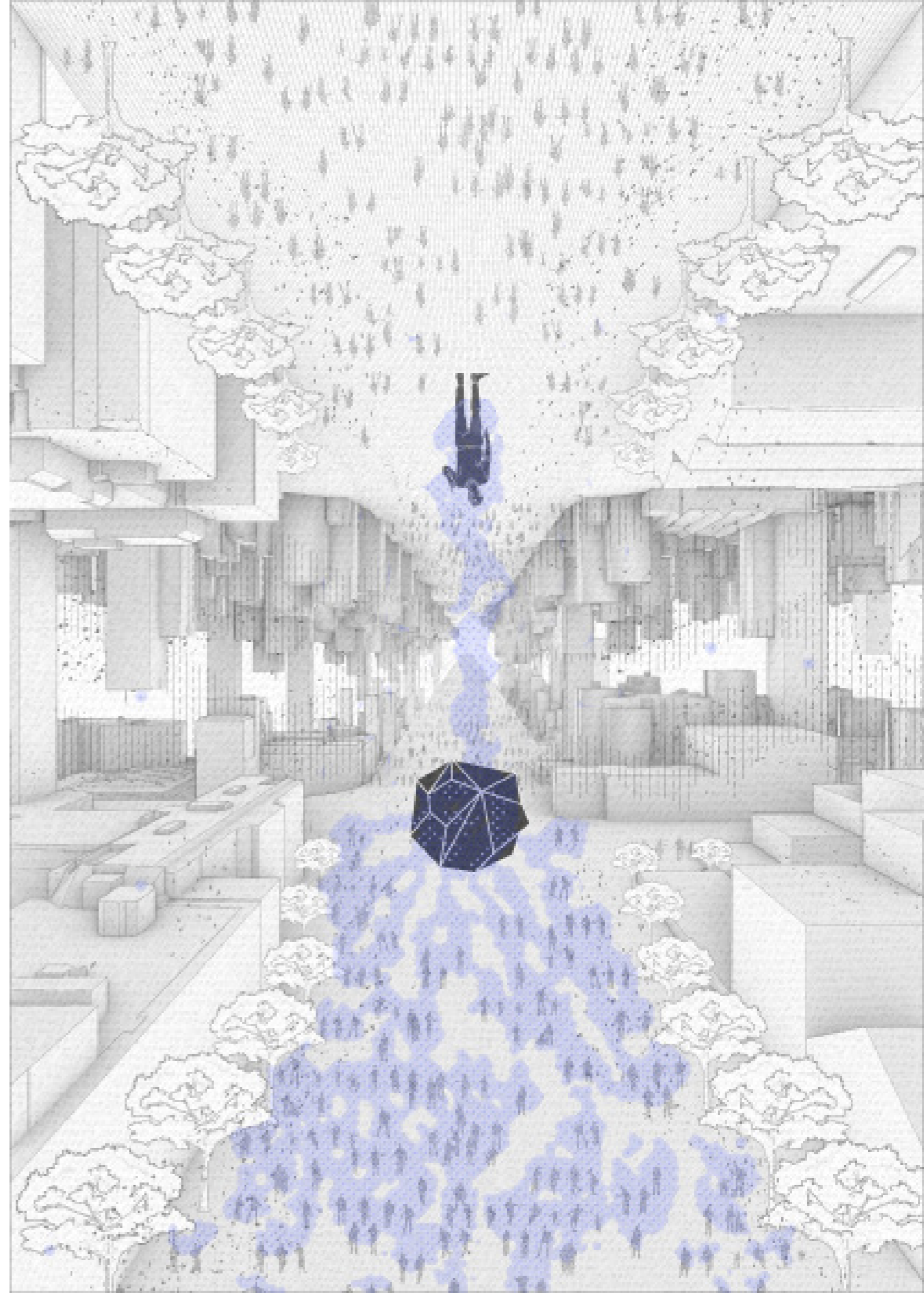
B2.

A music building

that includes the public
in the design process
based on their **experience of music.**

This changes

The building changes



CASE STUDIES

B

CASE STUDY: PARADISO

(Selection of research done as part of Group work with Daphne Vlak, Hakkican Unsur and Bart Schipper)

ABOUT

Paradiso is also located in Amsterdam. It finds itself in the older part of Amsterdam in between the canals. The venue is fits in tightly with the surrounding buildings. The building is enclosed by the roads on the front end and by the back at the back end. Visitors can come via car, public transport, bike and by foot. Coming via the canals is an option, but very unlikely due to time and economical factors. Coming by car is possible, but the venue relies on other parties for parking options. The venue has a tram stop close by and bicycle parking on its property, so those are the most popular options.

The building can be approached from two sides of the same street and visitors can enter the building via the main entrance door at the front of the building, directly located on the curb. Staff and musicians enter via the backside of the building and logistics is carried out outside on the east side of the building.

CIRCUIATION & ACCESS

Paradiso has two spaces for events. The first and main being the big hall. This hall is used for concerts with a standing crowd and the most well known. The second one is the small room and is unfamiliar with most people. It can be used for music, but not simultaneously with the big hall. It is most often used during the day for other types of events.

The basement is also used as an event space, every now and then performances are given there. There is a bar and seating and the space can also be used for the musicians only.

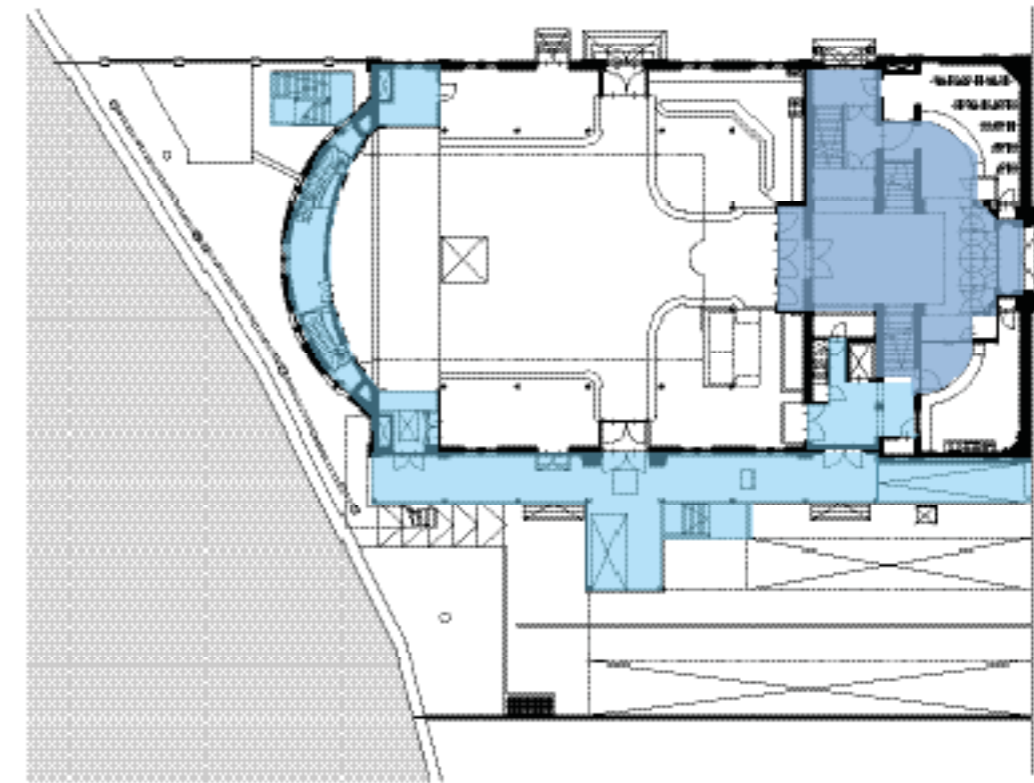
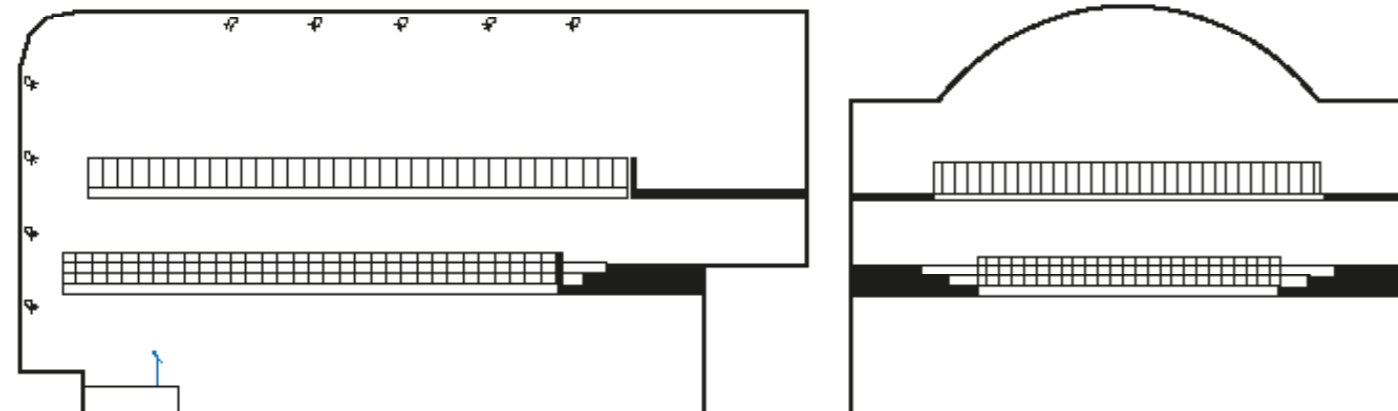
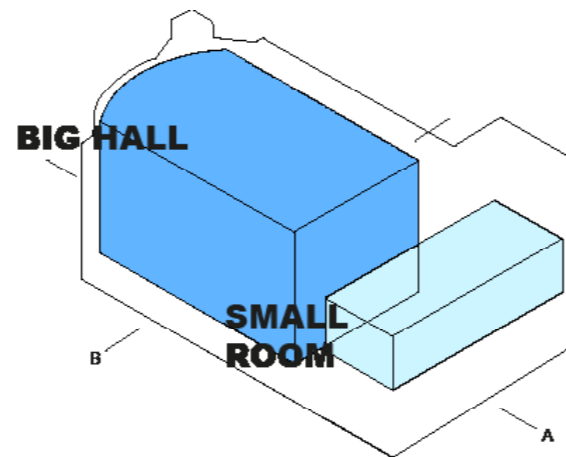
Paradiso is very space efficient. The halls take up 38% of the total volume of the building. The remaining 62% is mostly used for circulation, logistics and storage. Even so, the routes for the visitors of the building are organised very efficient, so that the least amount of space was lost to logistics during the renovation. The circulation for visitors is kept at the front end of the building as much as possible. People can reach the hall directly on ground floor level, or go up via a set of stair to one of the two balconies. The stairs are rather narrow and do not have a defining character.

The figure above shows the accessibility of the building for the public, the musicians and private areas. These spaces are

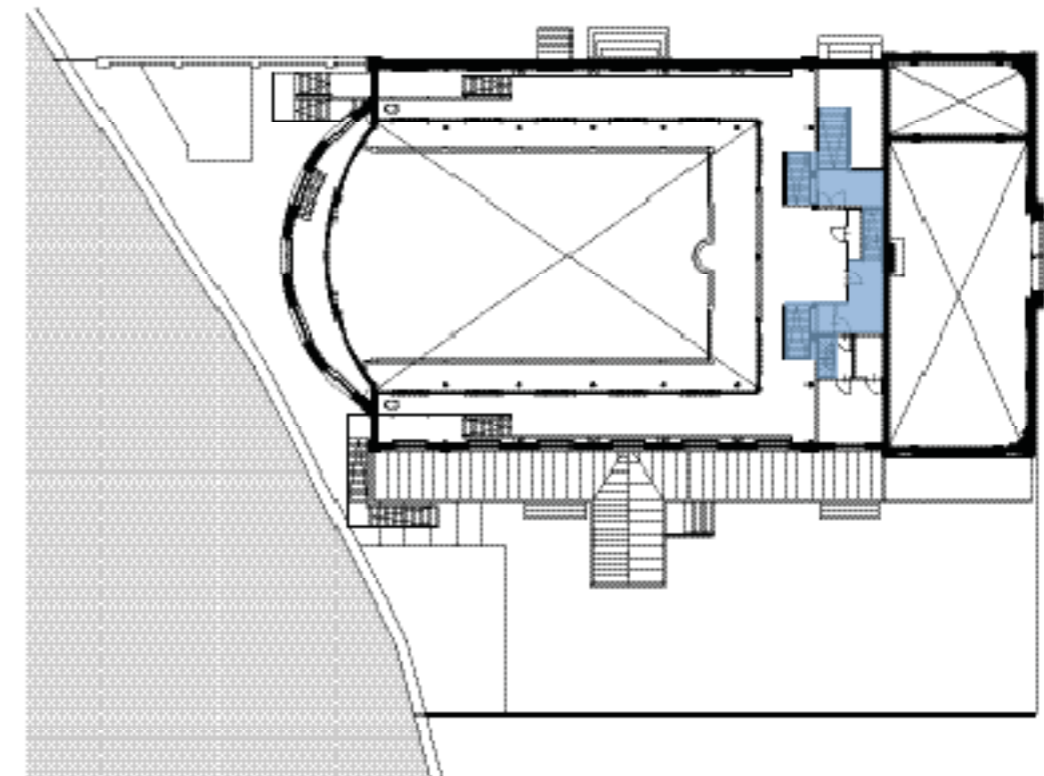
what makes up 62% of the building. The main hall is highlighted here fully, from bottom to the roof, but in the calculation, the structural space above the hall are not accounted for in the volume of the concert hall. For this analysis, it was agreed upon to calculate the volume of the hall according to its acoustic envelope.

The most outstanding feature of Paradiso is the efficiency with which they have packed the programme into the building. Every space has a specific function.

This venue has a very clear division between the front of the house and the back of the house, which can be seen both in the plan and in the section.




Ground floor level



Second floor level

● Publicly accessible ● Private/accessible for musicians

20 m 



D1

CASE STUDY: MUZIEKGEBOUW AAN 'T IJ

(Selection of research done as part of Group work with Daphne Vlak, Hakkican Unsur and Bart Schipper)

ABOUT

Muziekgebouw aan 't IJ is located in the area Amsterdam-East and can be reached via various modes of transport. Visitors of the building can come by car, bike, walking and public transport. Visitors could possibly even come by boat, since the building is located in a harbour area. They could dock on the south side of the building, since the north side is only for bigger transport ships. The image above show the direct connections the building has to its surrounding area for it to be reached. The public can park either their car or bike in the parking garage underneath the concert building for a fee. People coming by foot or public transport can cross the bridge over the water and enter the building at a higher level. Logistics uses the same road as the public, but has their loading dock inside the building. People can enter the building at different points, two of them are shown below in blue. The lower being named the main entrance, but since there are so many ways to enter the building, this is just a title. The smaller one on the higher level is where you enter when having crossed the bridge and enters at the level of the BIM House.

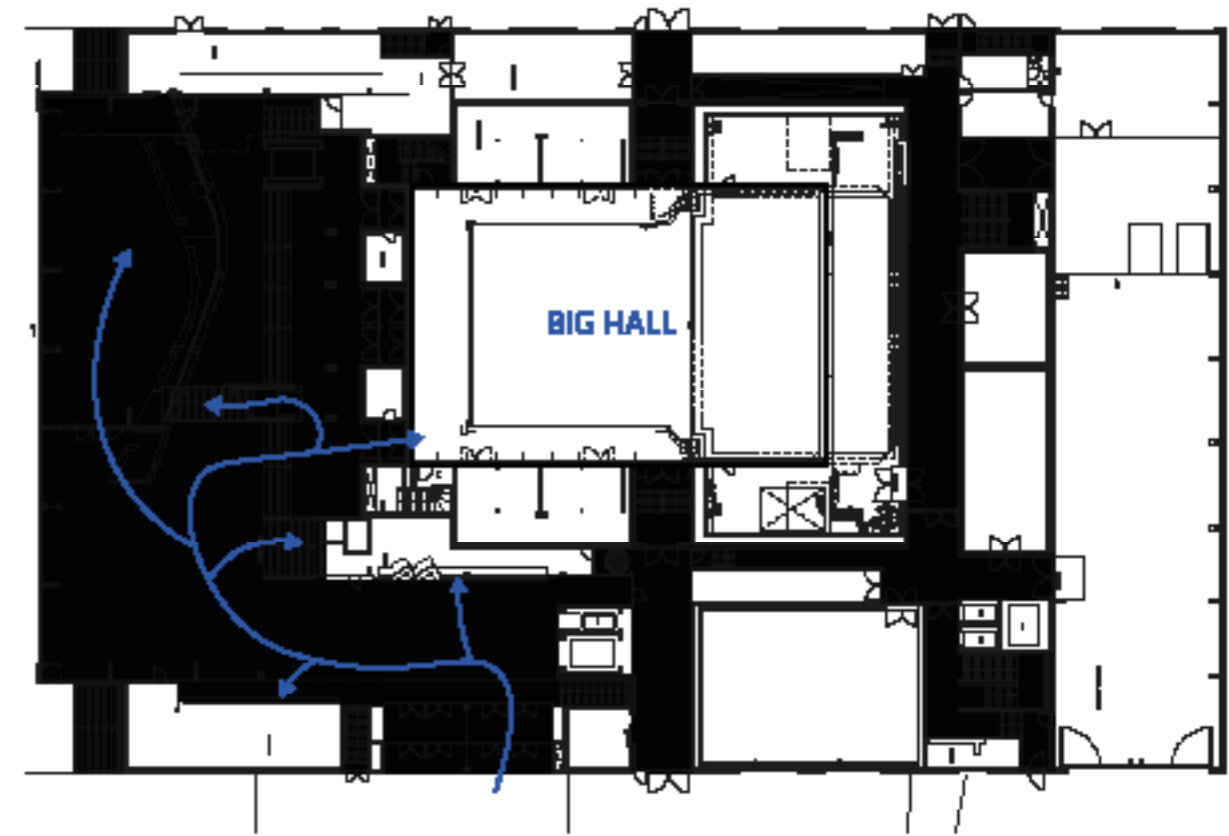
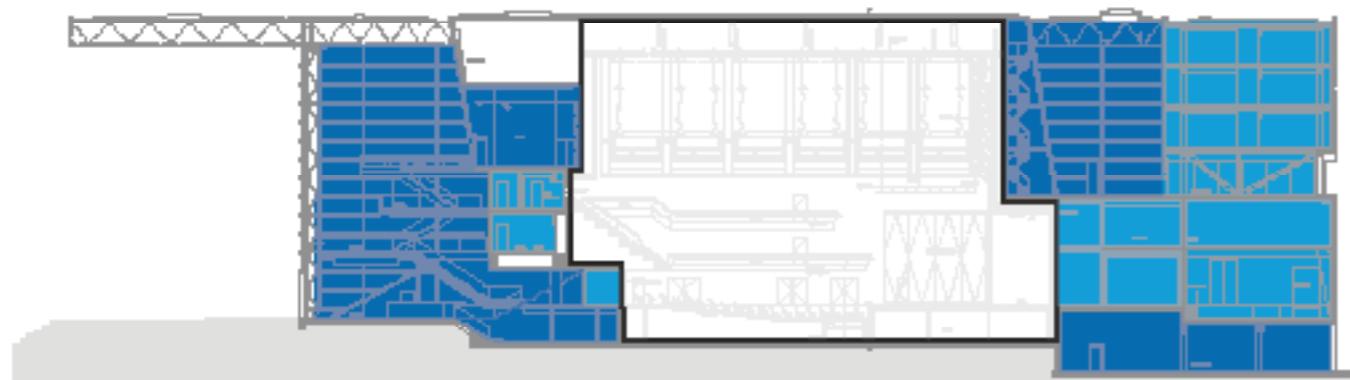
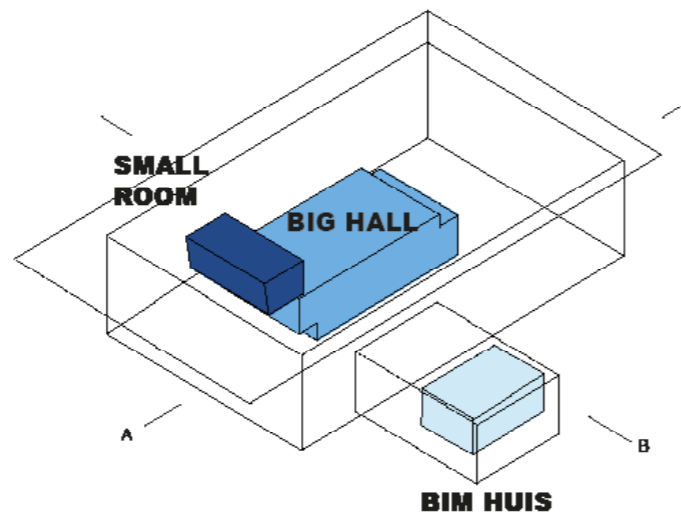
HALLS & CIRCULATION

The building consist of three official dedicated rooms. The main hall and the biggest one being the Big Hall. This is where concerts and other big events take place. The second one is the hall in the BIM Huis. This hall can be used for concerts, but also for lectures or other event types. The last one is called the small room. This event space is mainly used for talks or other corporate events, but can be opened up and joined with the foyer space. Muziekgebouw aan 't IJ has a lot of supporting space. This supporting space consists of functions such as circulation space, foyers, bars/restaurants, technical rooms, offices, logistics and so on. It makes up for 90% of the building.

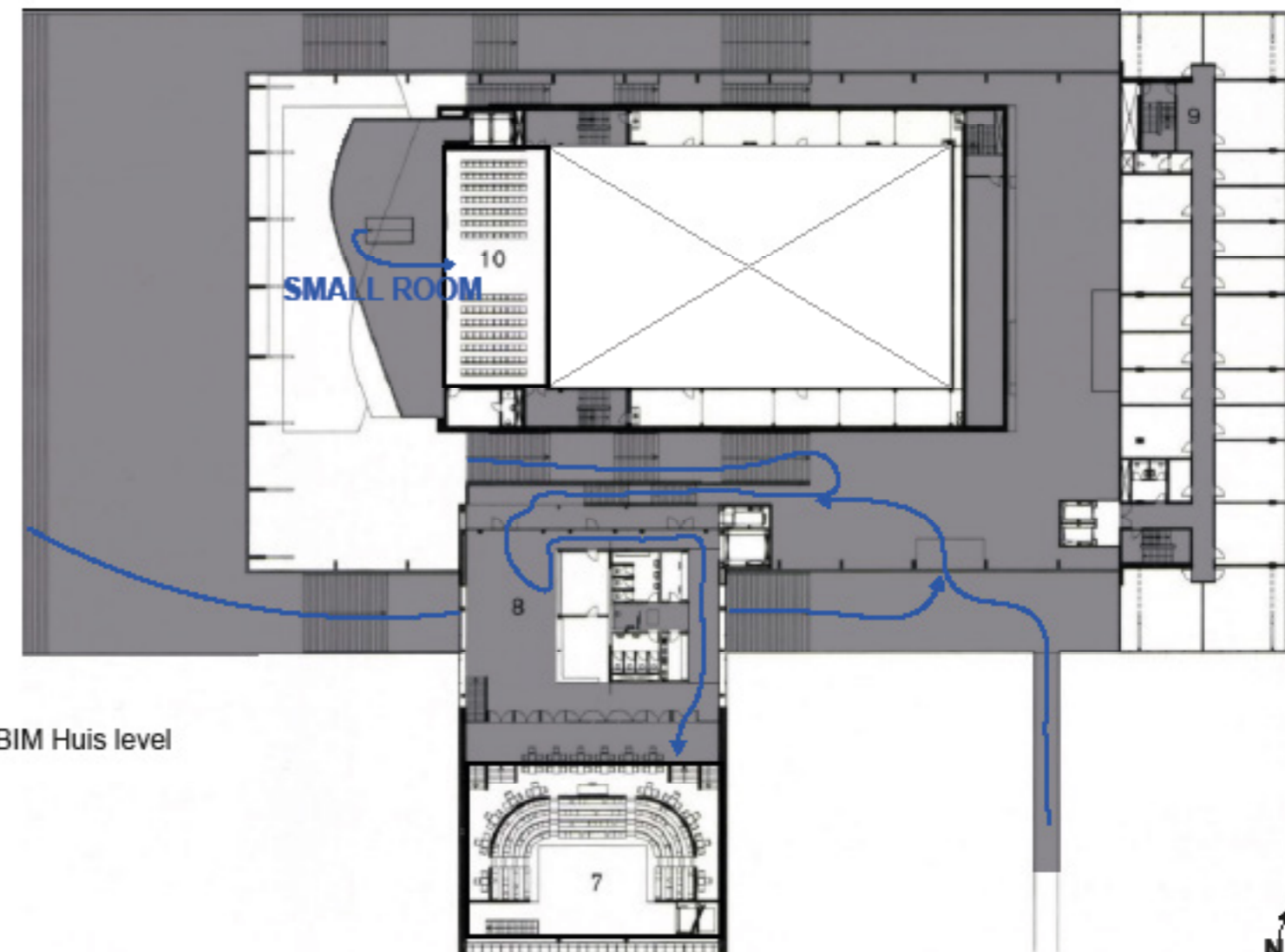
The circulation in the building is defined by the many different routes a user can take through the building. The big staircase next to the main hall is a defining factor in this experience. It takes you from ground level to the second floor level, where you can enter the building from the pedestrian bridge. The three foyer decks can be reached via their own set of stairs, which also

take you to the higher level entries of the main hall, as well as the entrance of the small room on the second floor. Indicated in the dark blue arrows are the several point where you can enter the building and the lighter blue lines show the flow of routes moving through the building.

A majority of the space in the building is thus used for circulation. The spaces around the hall are not officially defined as venues for music, but can be transformed into such spaces. This is why it may seem that the building has a lot of leftover space, but it is just a very flexible, hybrid building. The foyer decks (a total of 3) can be used for dinners or parties, such can the space behind the big hall be used for events.



Ground floor level

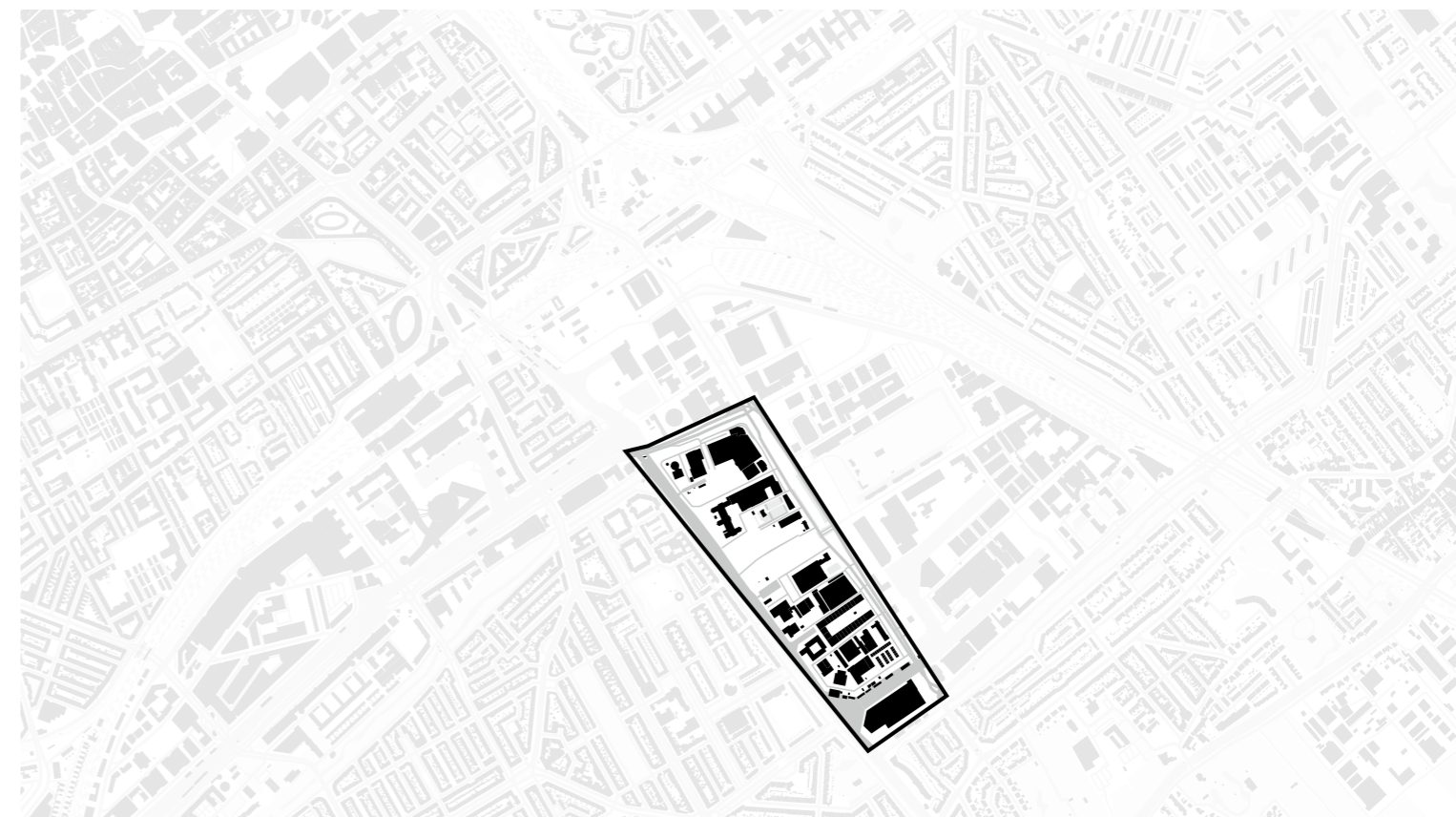
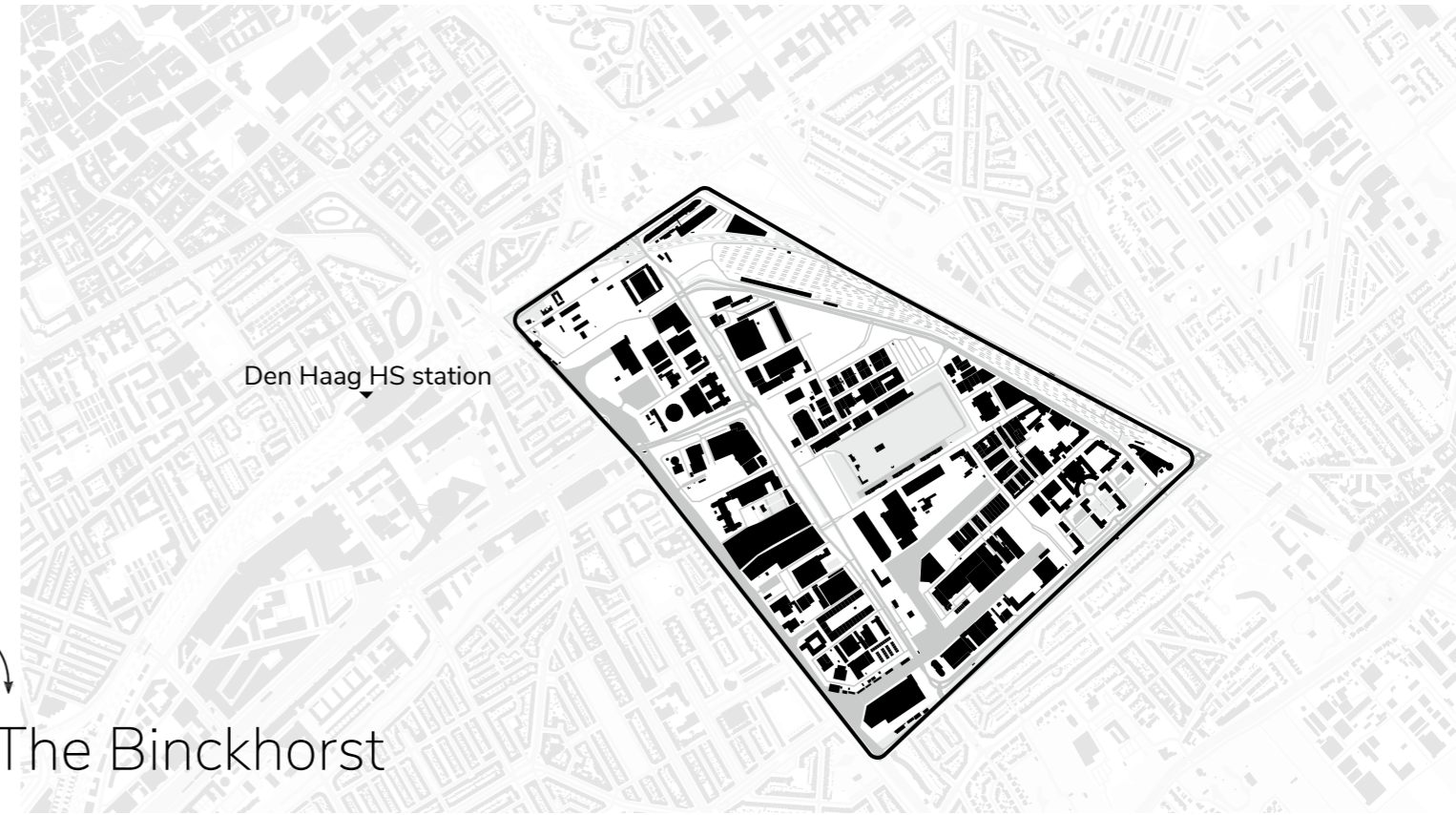
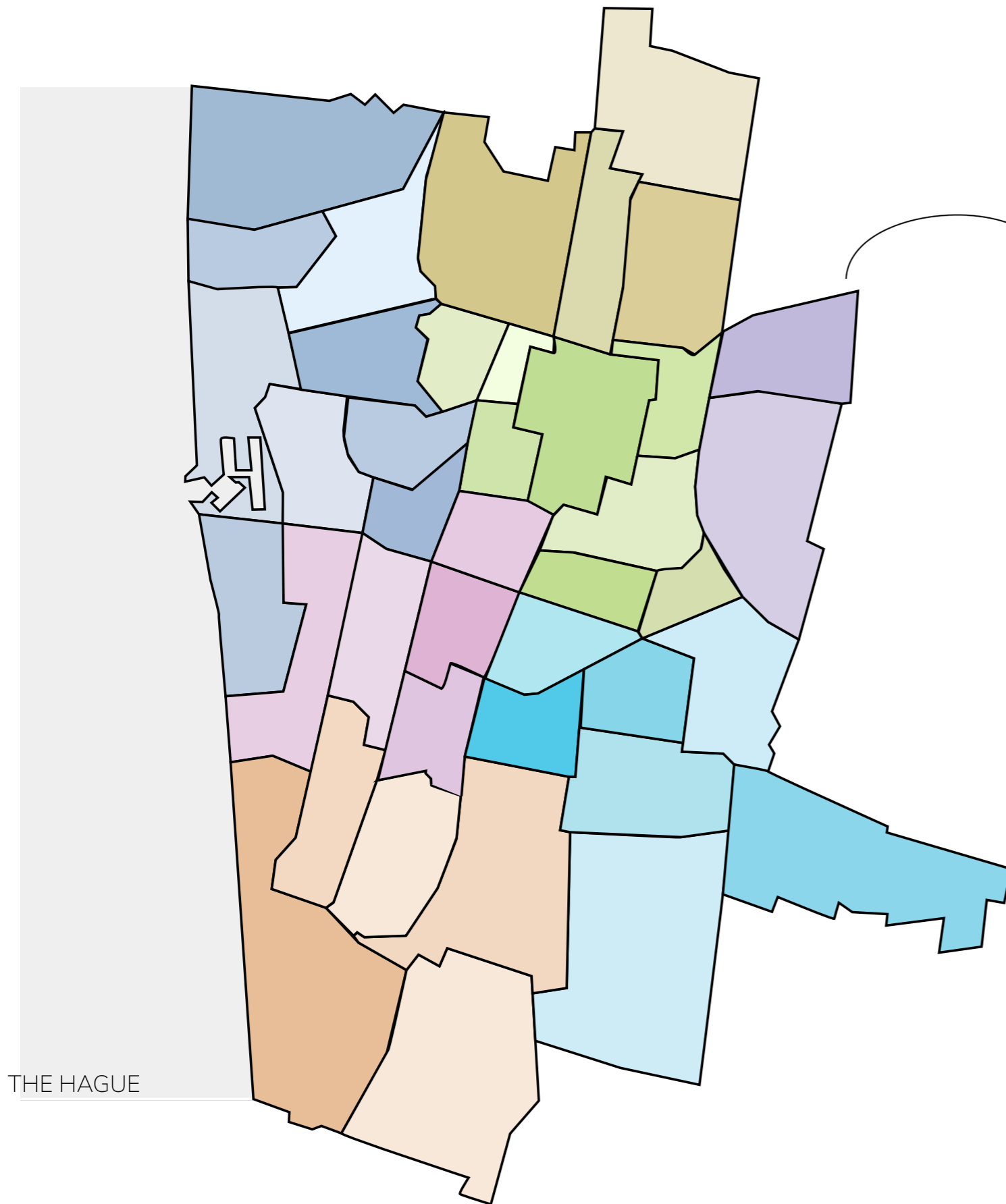


BIM Huis level

LOCATION ANALYSIS

B

LOCATION



THE
TREKVLIEZONE

LOCATION

area promises a continuation of the green area from around the Manor De Binckhorst and 'Long van Laak' all the way to the water in the South-West part of the zone. This waterfront green area could serve as a direct green connection to the landscape around the Music Marvel that is designed to gather people from the dominant residential surroundings around the building that will 'perform' for the passer-by.



MANOR DE BINCKHORST

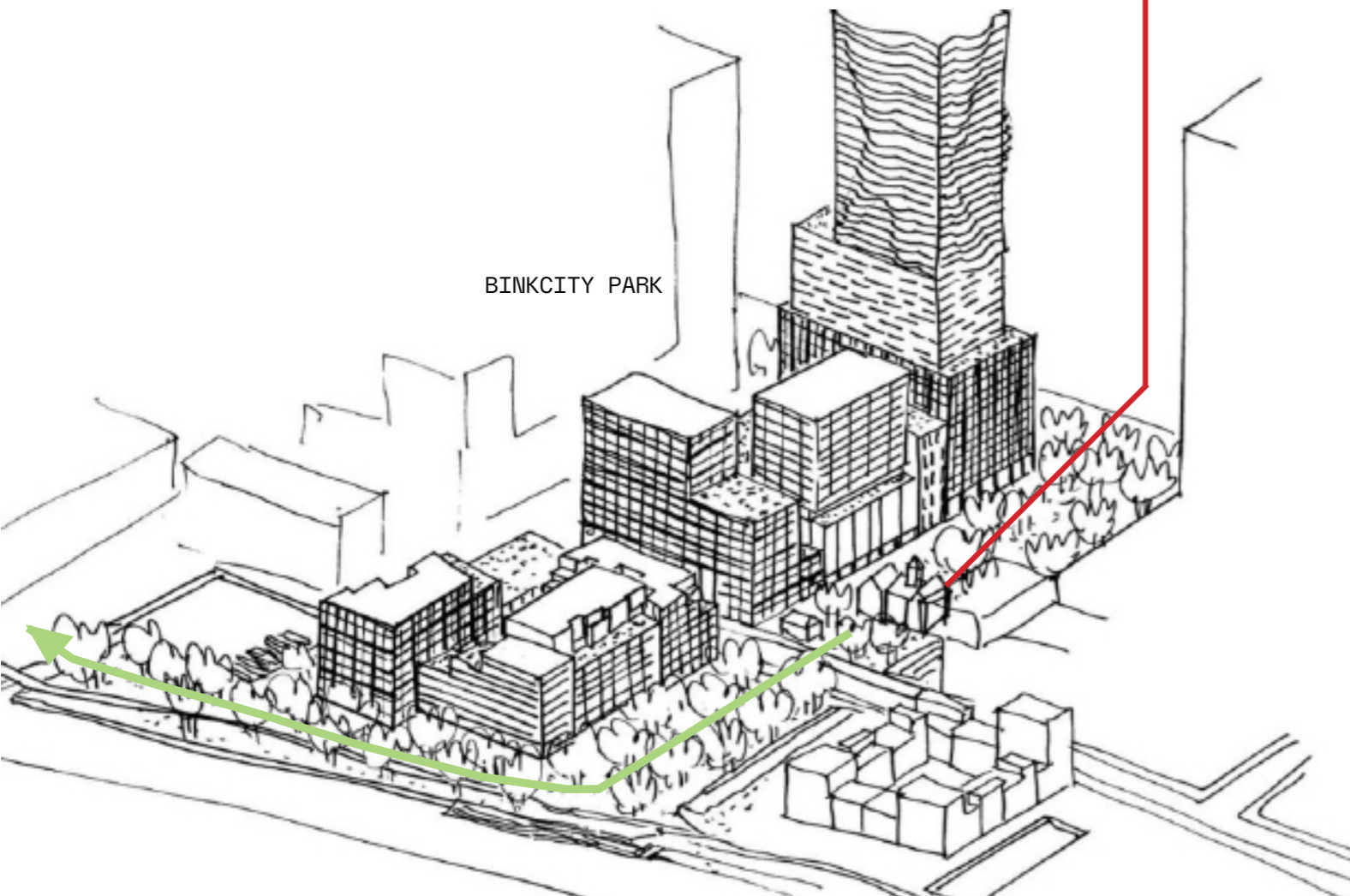
THE MONUMENTS

Although it is known for its industrial character, the Binckhorst also possesses valuable monuments that affect all plans for further development. Among many valuable buildings and abandoned rail infrastructure that both have debatable value and potential in the Nieuw Binckhorst, there are two other monuments that drastically stand out. The Sint Barbara cemetery and the 17th-century Manor De Binckhorst are green areas that will surely persist and influence the new urban plan. Additionally, two restaurants within the Trekvlietzone are currently occupying buildings dating from around 1920s. These undoubtedly hold architectural value that should be cherished.

TREKVLIIET

The Trekvlietzone is currently being transformed from what was formerly an industrial area into what is to be an attractive place to live and work. In the future, the zone will have between 750 and 1000 residential units (apartments, more than houses) that will be built for diverse clients and residents. In the location of the former Dutch Air Force headquarters, a development called The Binck City Park is being designed. This development will have major impact on the environment and specifically on the neighbouring location of the Music Marvel. The plan for this

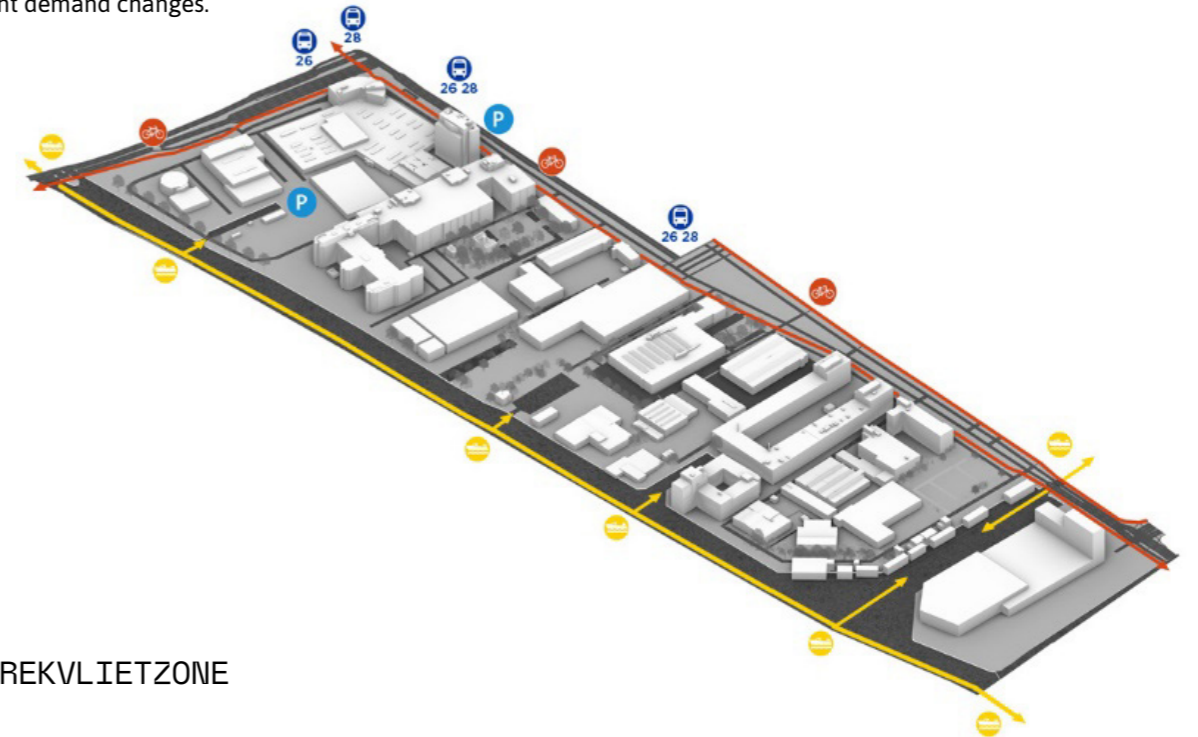
NEARBY FUTURE DEVELOPMENT - BINKCITY PARK



BINKCITY PARK

INFRASTRUCTURE IN THE TREKVLIIETZONE

The Trekvlietzone is connected to the main road of The Binckhorst on its North-East side. It is very easy and fast to travel, by foot or by public transport, through the area thanks to the good and logical existing connection. Such infrastructure is beneficial to the future plans that have an ambition of almost completely eliminating street parking in order to minimize pollution as well as to make the visual more inviting. Currently, little to none improvement is needed in the public transportation system as well as for the bike access to the deeper parts of the area. However, new developments, underground parking and the future residential density of the area might demand changes.



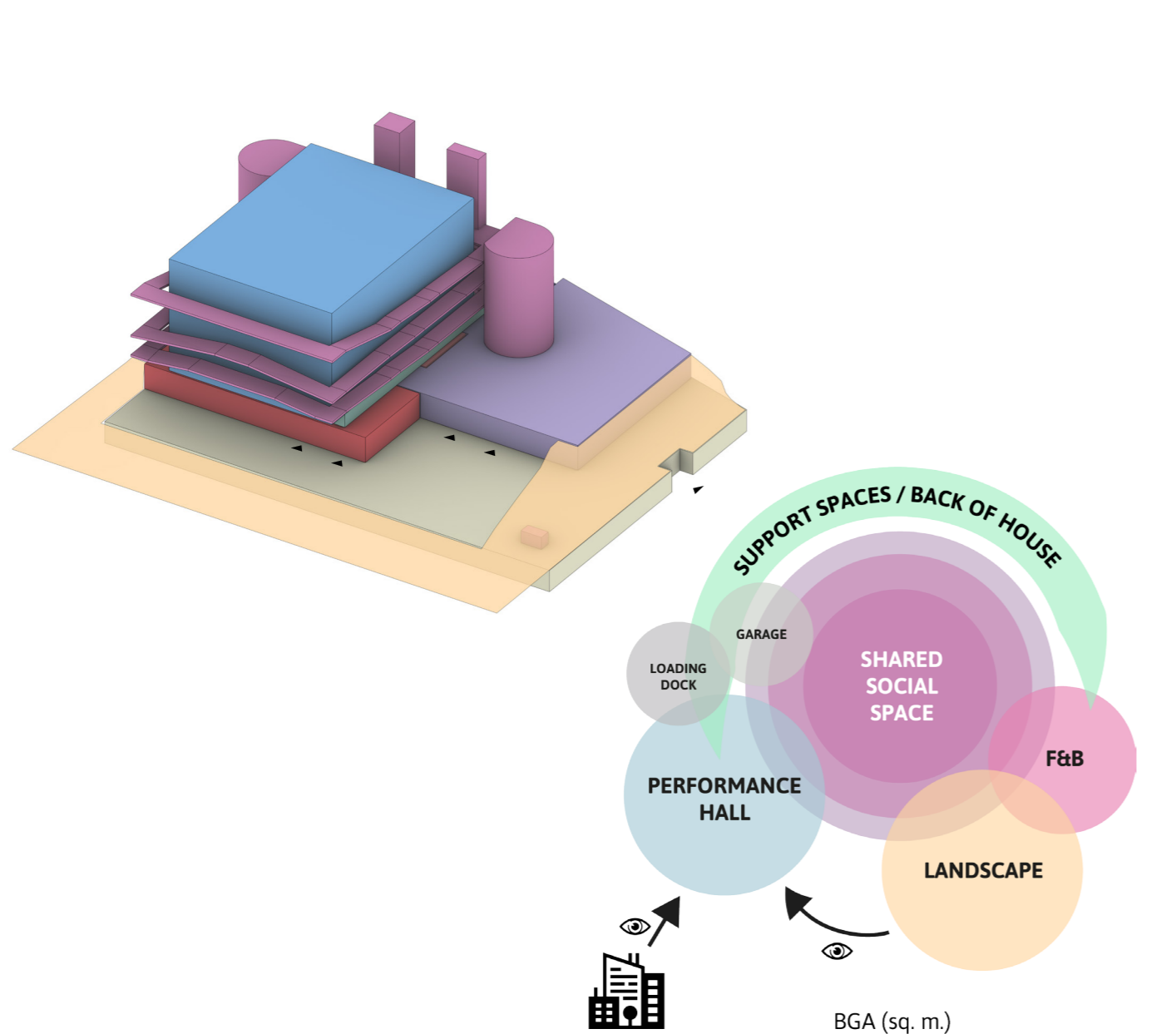
THE TREKVLIIETZONE



DESIGN

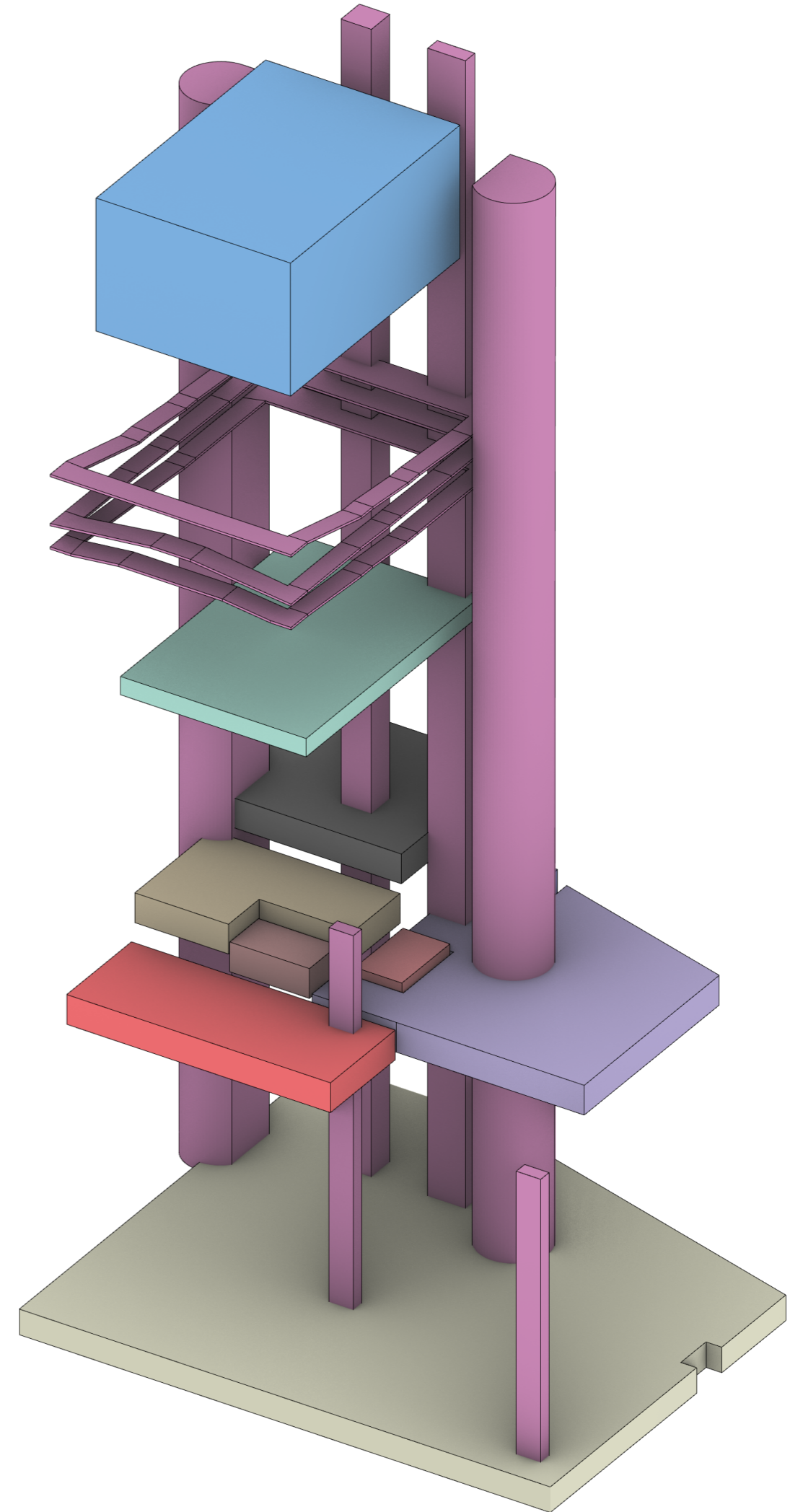
C

PROGRAM



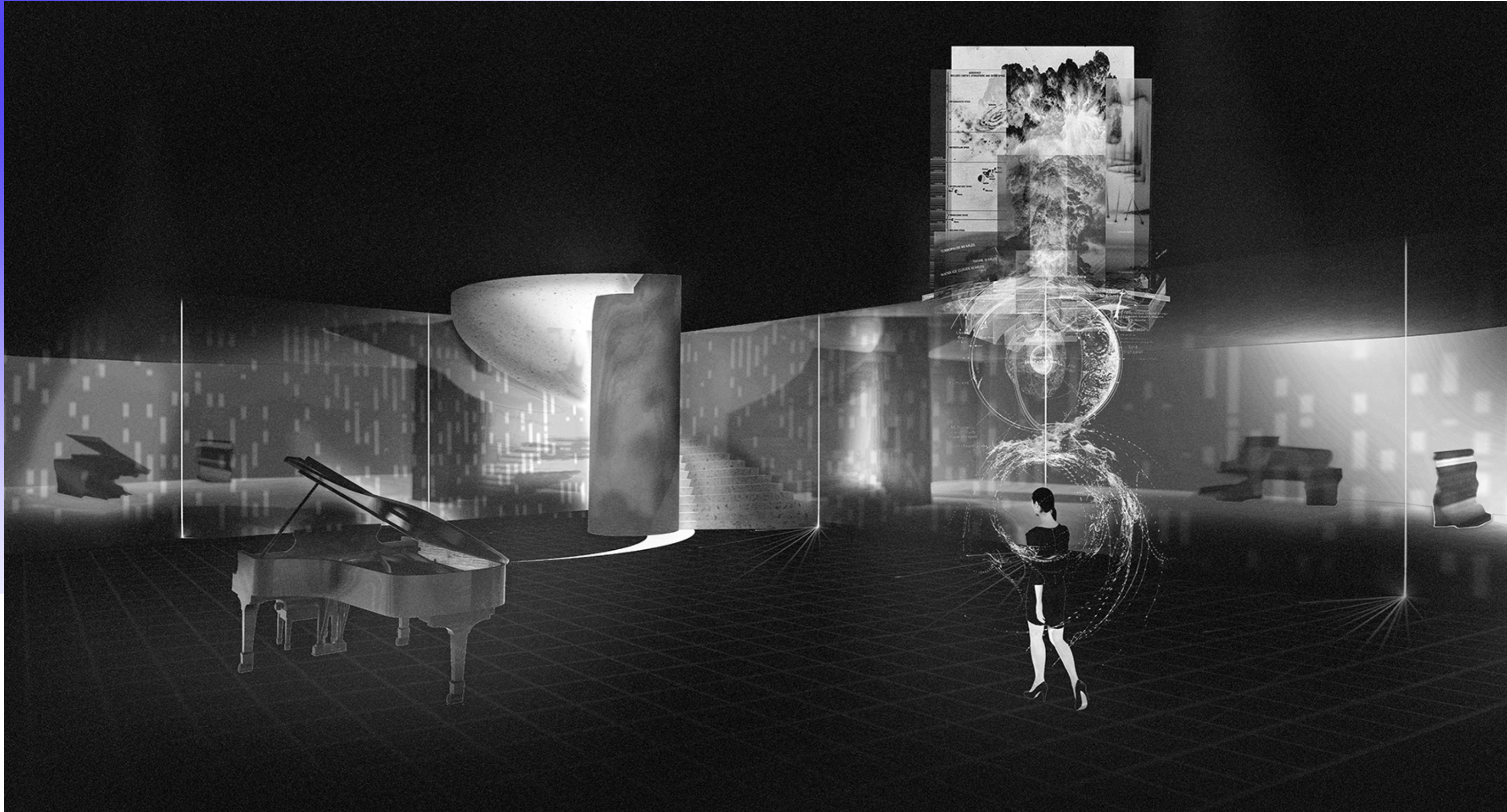
BGA (sq. m.)

1.1. Exterior of the Building		
Outside public spaces	1171	
Landscape		
2.1. Front of House (Public Area)		
Shared Social Space	1120	
VIP / Performer area	500	
2.2. Front of House (Commercial Area)		
F&B (Café / Vegan Restaurant) - with own BoH and Kitchen	785	
3.1. Performance Spaces		Seats
Performance Hall	2500	1380
Back Stage	350	
4.1. Back of House		
Storage	900	
Loading Dock and Receiving (performance and F&B)	650	
Offices / Staff area	900	
Technical spaces	400	
5.1. Circulation		
Circulation	WIP	
6.1. Underground		
Parking	6300	



3 ROOMS

THE ENTRANCE



THE WALK



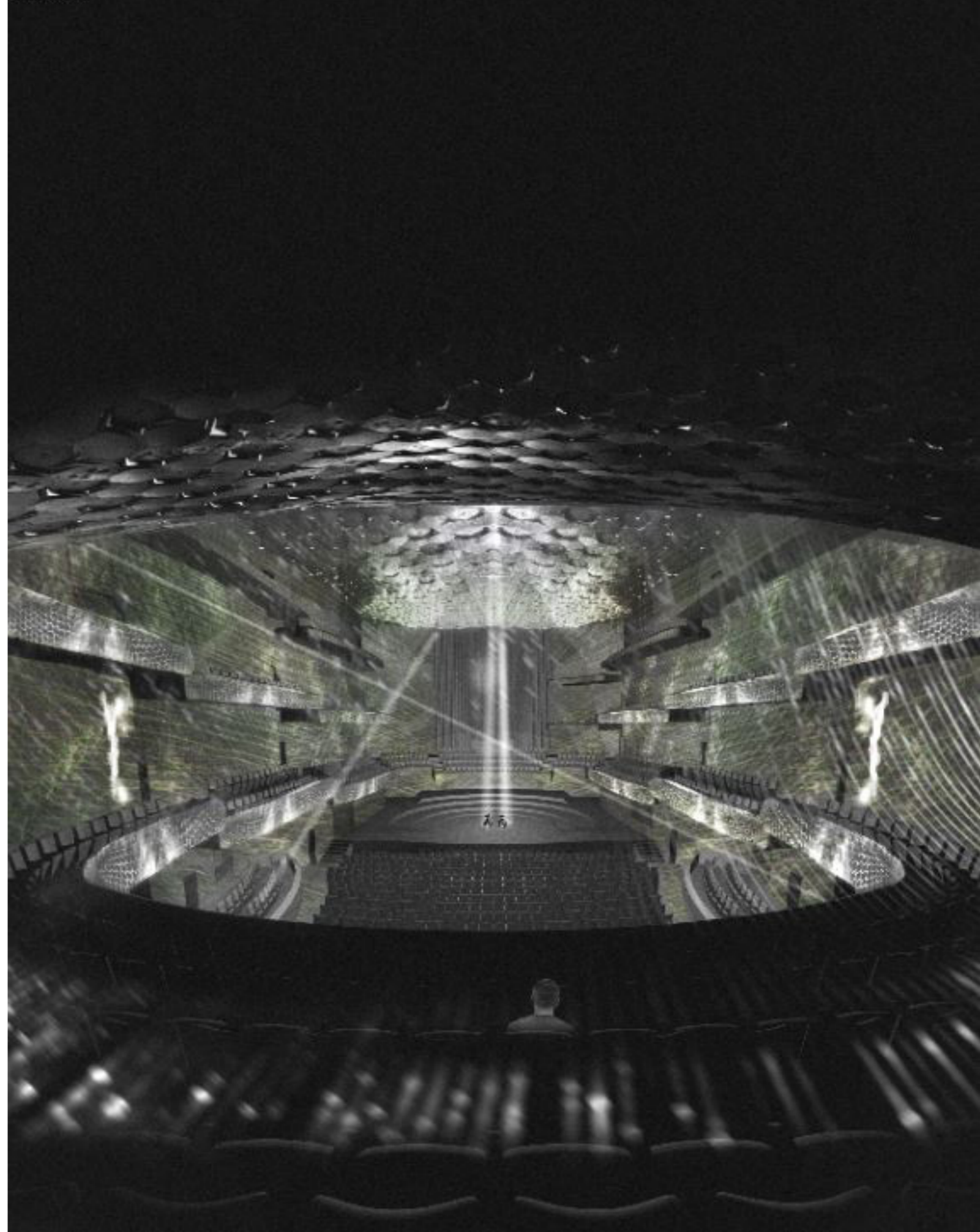
THE PERFORMANCE HALL

this is not a representation of architecture, this is a representation of experience

Public Building: MILITARY, Public & Popular Culture (1999-2001)
Architect: MILITARY

Collaborative project by: MILITARY

Executive Contractor: Prof. Dr. Mustafa K. Yildiz
General Contractor: Dr. Halil Güllüoğlu
Architect: MILITARY
Dr. Mustafa K. Yildiz
Dr. Halil Güllüoğlu

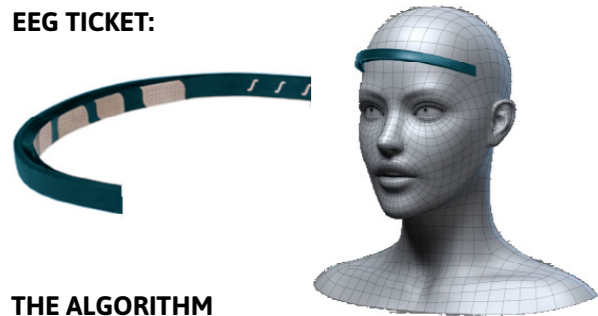


THE MECHANISM

READ MY MIND

This venue, like any other musical building, very effectively generates emotions within the audience through different performances. However, The Music Marvel is the only place that exploits these emotions as data in order to enhance the feelings of the audience and produce a more vivid scenography to follow any type of performance. The building uses the data extracted from the brain activity of each member of the audience to power the algorithm that controls the movement of the inside walls and generates lighting to form a unique atmosphere inside the hall. This brain activity is collected through an EEG (electroencephalography) sticker with 5 reception nodes that wirelessly sends data to the receiver. The EEG sticker is given to every guest as a ticket which they will apply to their forehead during the performance.

EEG TICKET:



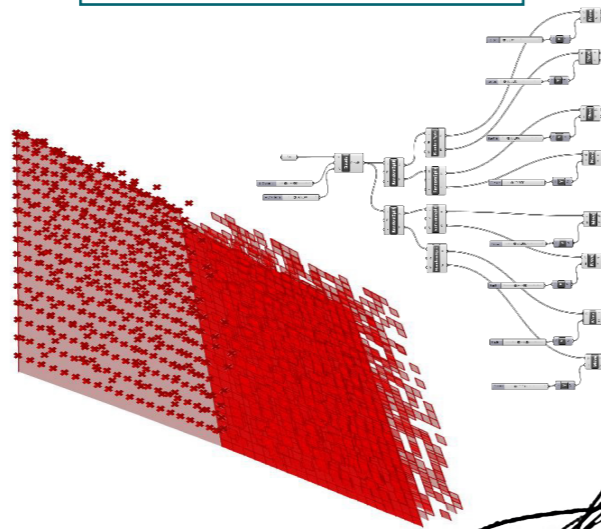
THE ALGORITHM

All emotions are represented in all brain waves. However, only a specific aspect of each emotion is channelled in each of the 5 groups of brain waves. Neuro oscillations from all 5 spectrums occur in our brains at the same time and it is practically impossible to analyse them all in detail. Instead we analyse the changes that occur and so recognize shifts of attention caused by the music that will tell us which type of brain activity is the most dominant. These changes are noticeable in frequency amplitudes. Peak amplitudes that stand out show us that a significant change has happened in a certain moment of time and that it is time to change the scenography in order to emphasise this change and create an enhanced experience for the viewers.

- γ waves** - Deeply focused state (30-100 Hz)
- β waves** - Thinking state (12-30 Hz)
- α waves** - Relaxed awake state (8-12 Hz)
- δ waves** - Daydreaming state (4-8 Hz)
- θ waves** - Deep sleep state (0.5-4 Hz)

Peak thinking state
Peak meditative state
Peak focused state

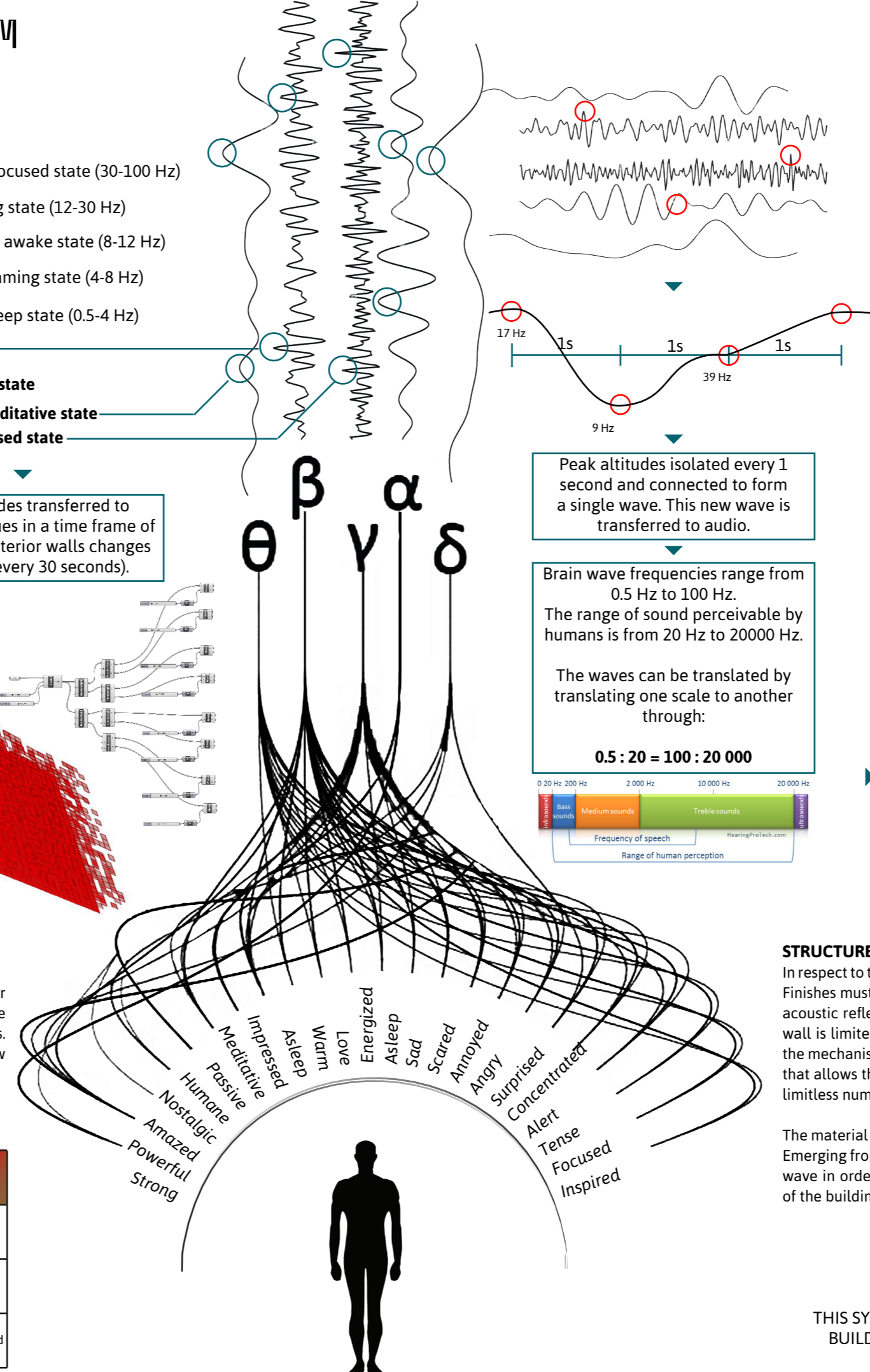
Peak altitudes transferred to numerical values in a time frame of 30 seconds (interior walls changes will occur every 30 seconds).



TELEPATHY

This system allows us to directly influence our surroundings only by thinking. In order not to produce a clash of experiences certain restrains must be active at all times. These restrains allow the space to react only to the most dominant group of brain waves. Depending on the music, the dominant group may change every 30 seconds and allow the space to regain other abilities.

		θ	δ	α	β	γ
LIGHT DESIGN	Colors					
	Motion	very slow (imitating sunlight through trees)	slow (with sudden spikes of fading white light)		medium pace (following the terrain of the walls)	fast (linear light beams)
3D WALLS	Level of protrusion	3	2	1	2	3
	Motion	very slow (large sections imitating big slow waves)	slow (random, small and separate sections)	medium pace (linear ripple imitating loading effect)	medium pace (tetris / mondrian movement)	fast (sudden spiked shapes)

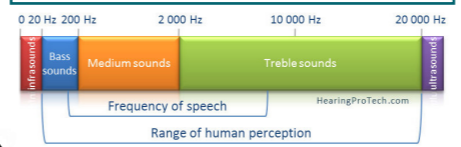


Peak altitudes isolated every 1 second and connected to form a single wave. This new wave is transferred to audio.

Brain wave frequencies range from 0.5 Hz to 100 Hz. The range of sound perceivable by humans is from 20 Hz to 20000 Hz.

The waves can be translated by translating one scale to another through:

$$0.5 : 20 = 100 : 20\,000$$



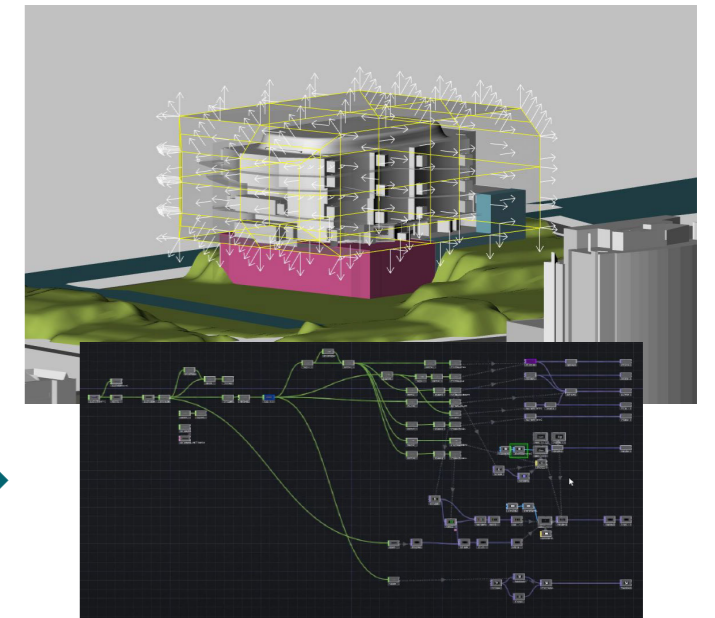
PERFORMING FOR BINCKHORST

The design of the building was made to primarily expose the performing character of the building. While a performance is happening on the inside, and while the interior of the performance hall is changing according to the audience, same brain wave data is being used to change the buildings facade.

In this way a building assumes the character of the performer for its neighbourhood and attracts people to see its unique ephemeral abilities.

THE ALGORITHM (2)

The facade acts independently from the concert hall, but is influenced by the same data source. Brain waves from the audience are deduced to the peak amplitude points in a time frame of 1 seconds that are connected and forming a new, simple brain wave. This brain wave is then translated into a sound wave that causes the audio responsive facade to act to the sound changes.



Source: Audio generative 3D structure script by bileam tschepe (elektronaut)

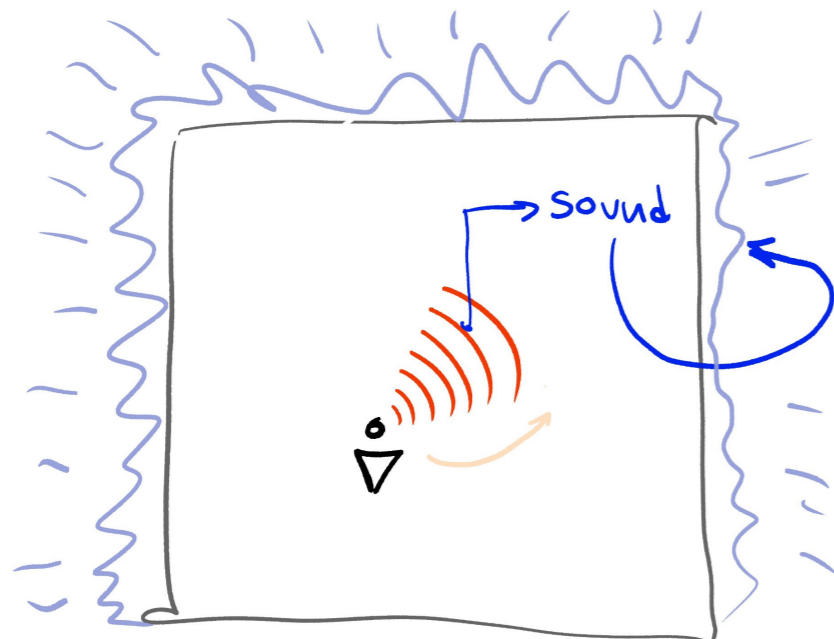
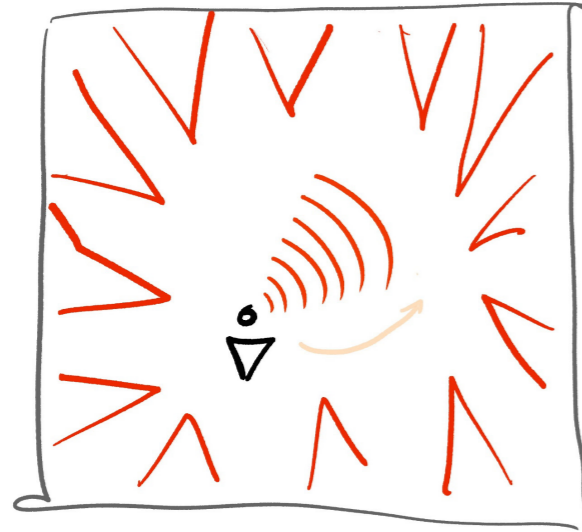
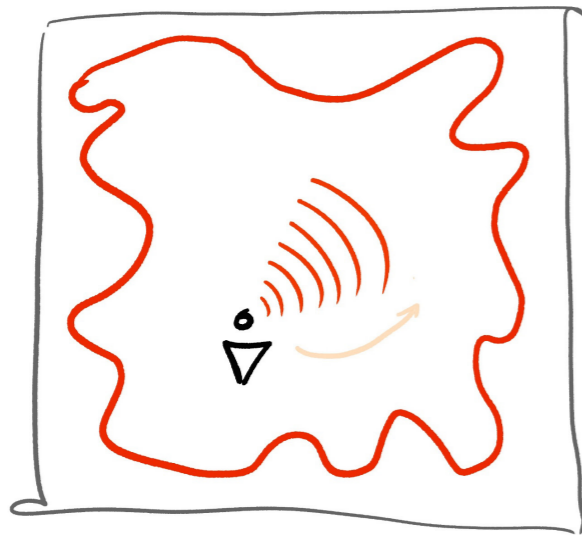
STRUCTURE & MATERIALITY

In respect to the acoustic requirements, all walls must be hard and solid surfaces. Finishes must be made of hardwood timber or similar materials to provide best acoustic reflection. With this in mind, the materialization of the transformable wall is limited. The wall could be made from small wooden tiles connected to the mechanism that pushes them out or pulls them in closer to the wall in a way that allows the effect of the pixelization of the space. This effect allows almost limitless number of combinations for spatial transfiguration.

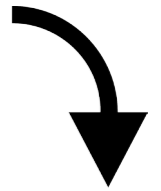
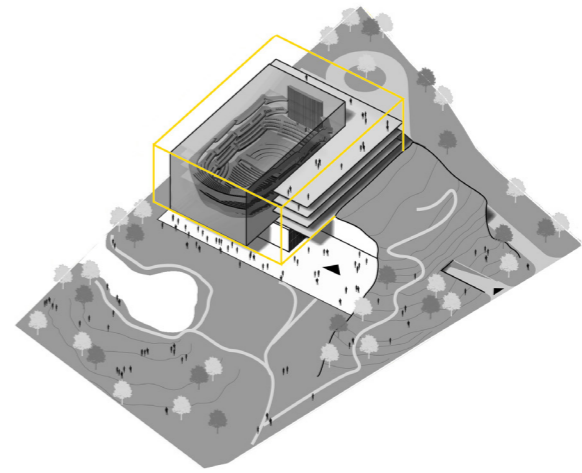
The material of the facade needs to be flexible and stretched over the structure. Emerging from that structure are poles that will respond to the generated sound wave in order to create movement true to the experience of the guests inside of the building.

THIS SYSTEM USES MUSIC TO CREATE DATA FOR DESIGNING A BUILDING THAT CREATES MUSIC TO RECREATE ITS SHAPE.
- MUSIC FOR A BUILDING FOR MUSIC

THE MECHANISM

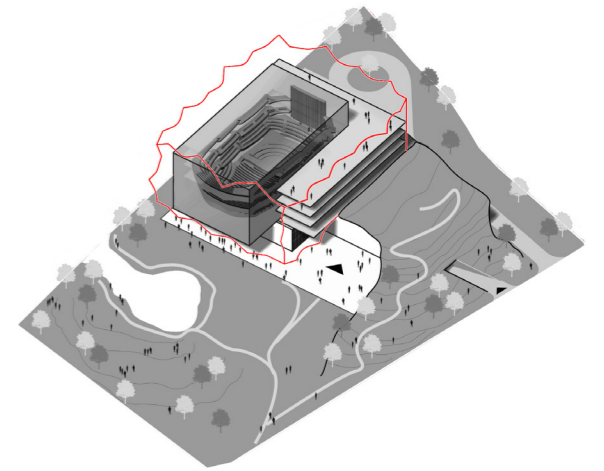
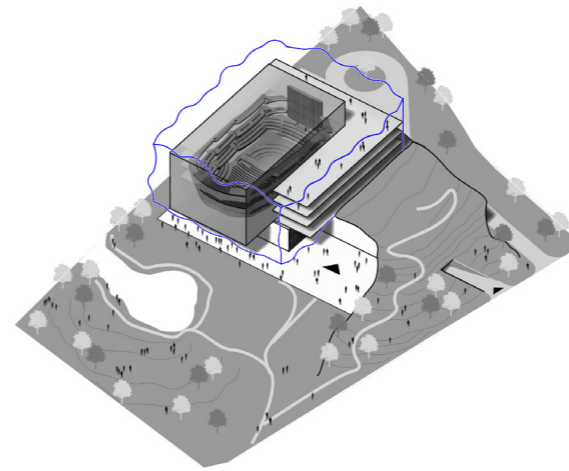


NO PERFORMANCE = MARVEL IS DORMANT

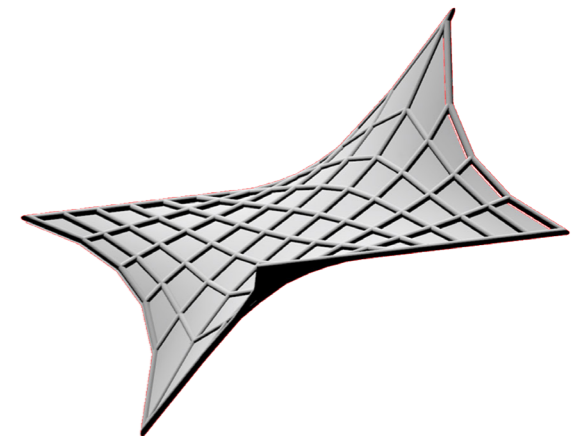
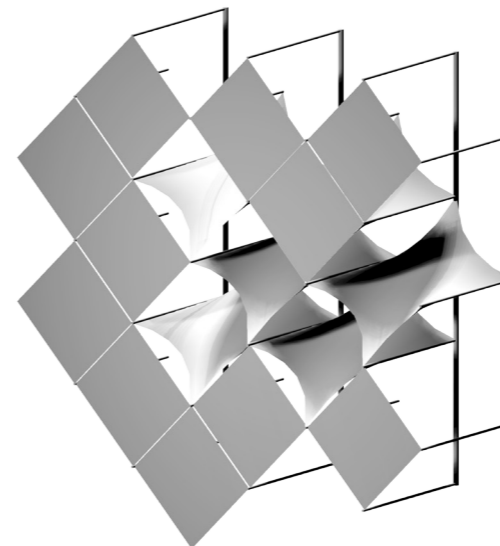


CLASSICAL MUSIC = REACTION 1

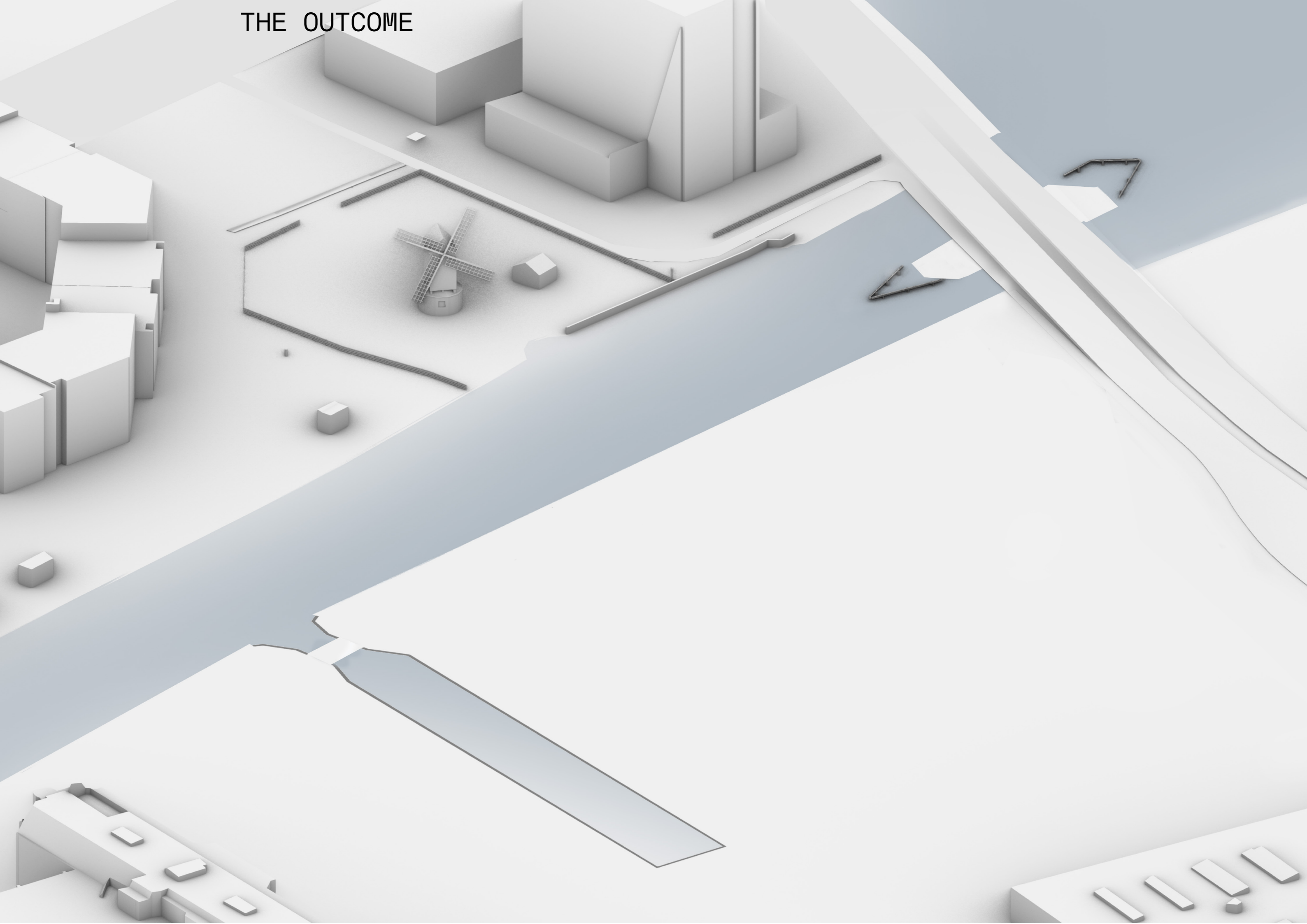
ROCK MUSIC = REACTION 2



FACADE:



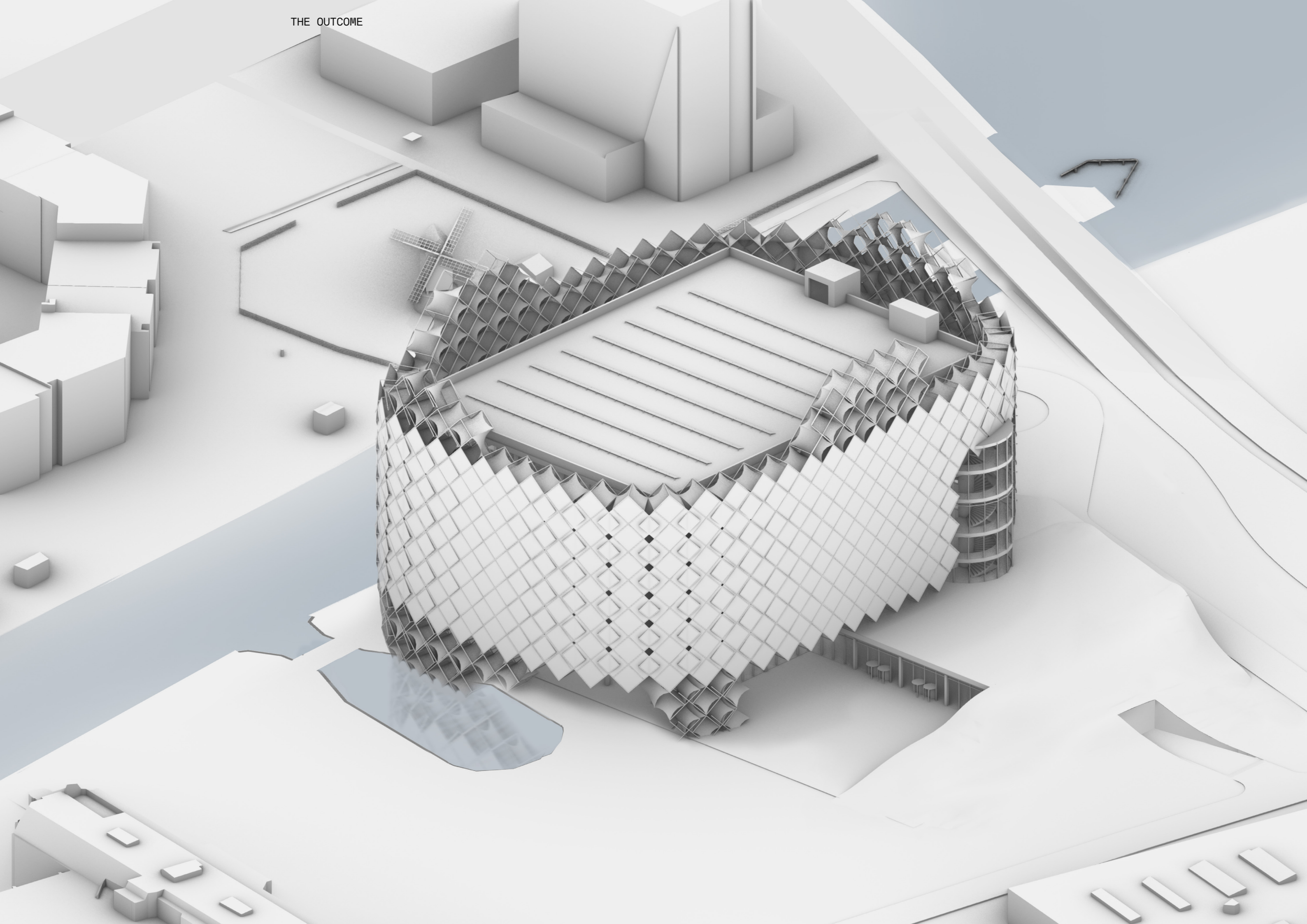
THE OUTCOME



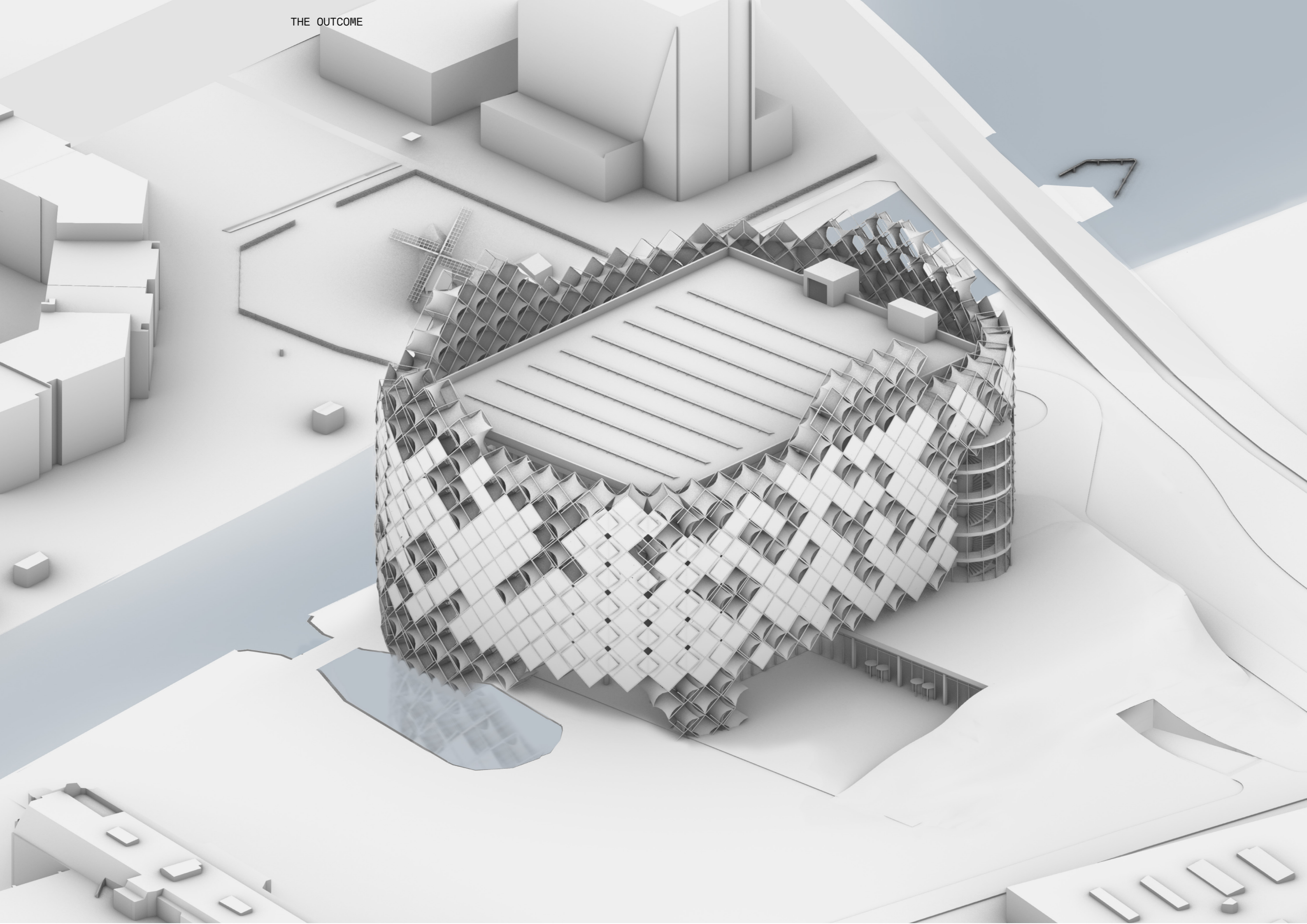
THE OUTCOME



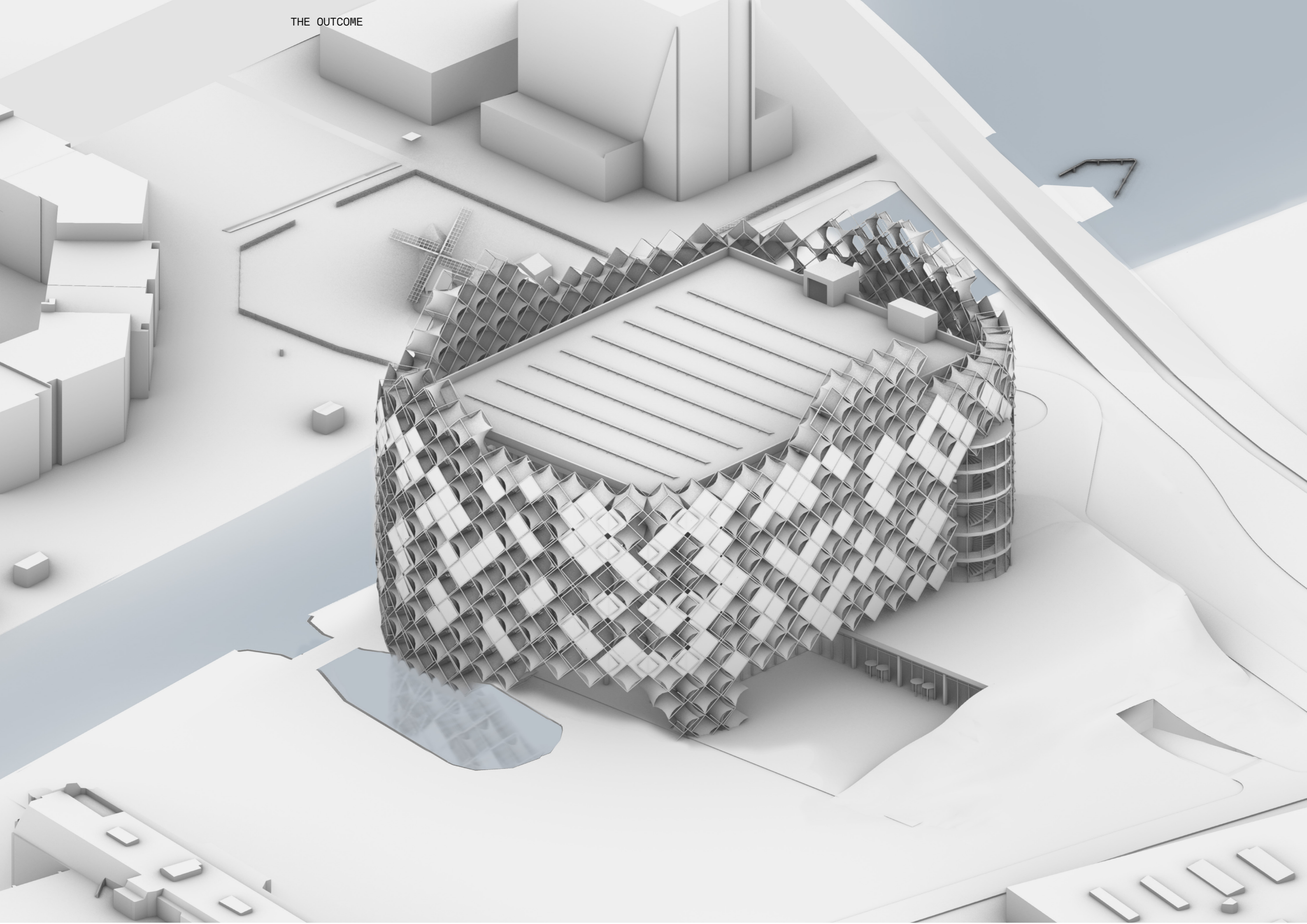
THE OUTCOME



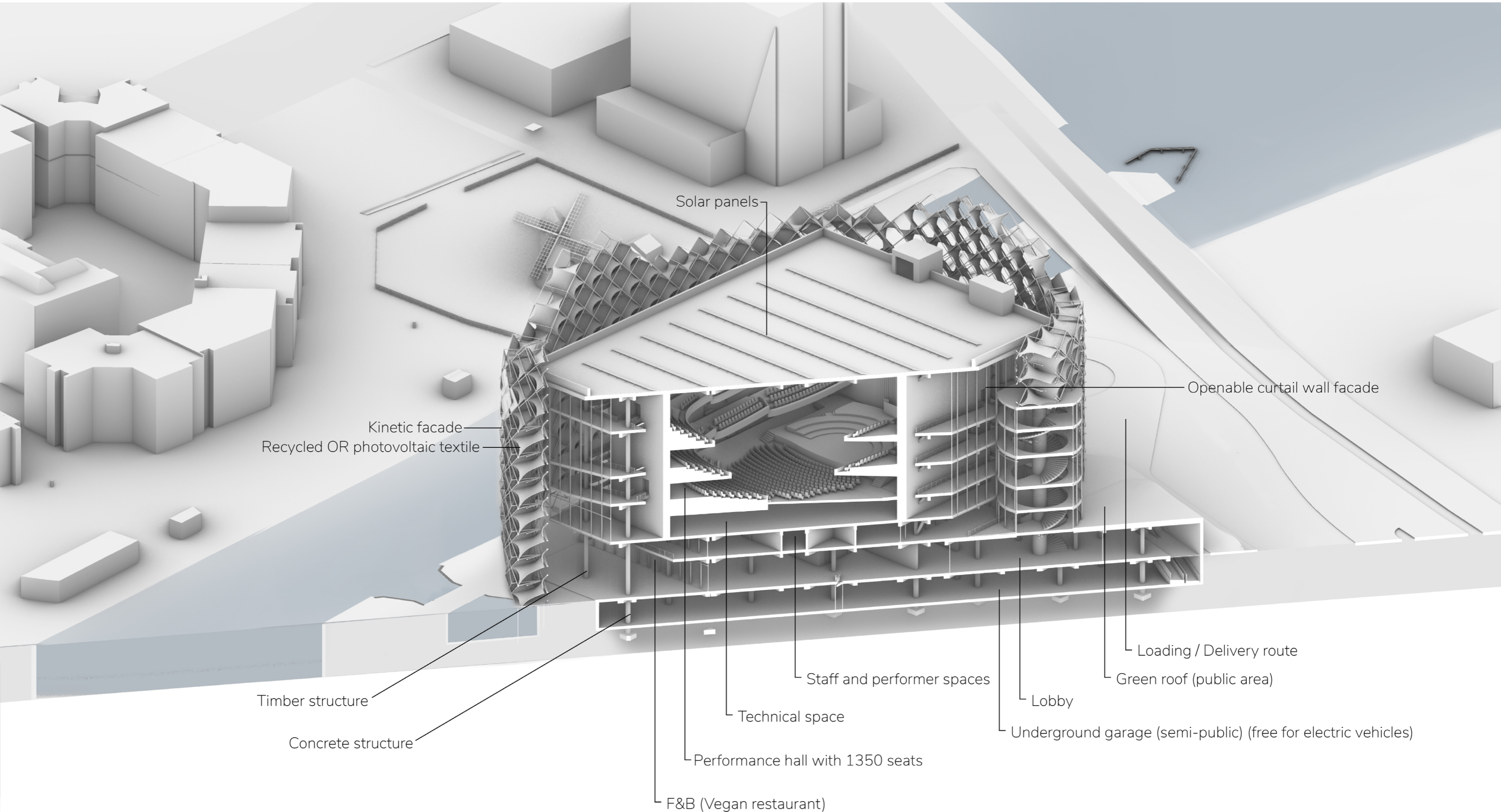
THE OUTCOME



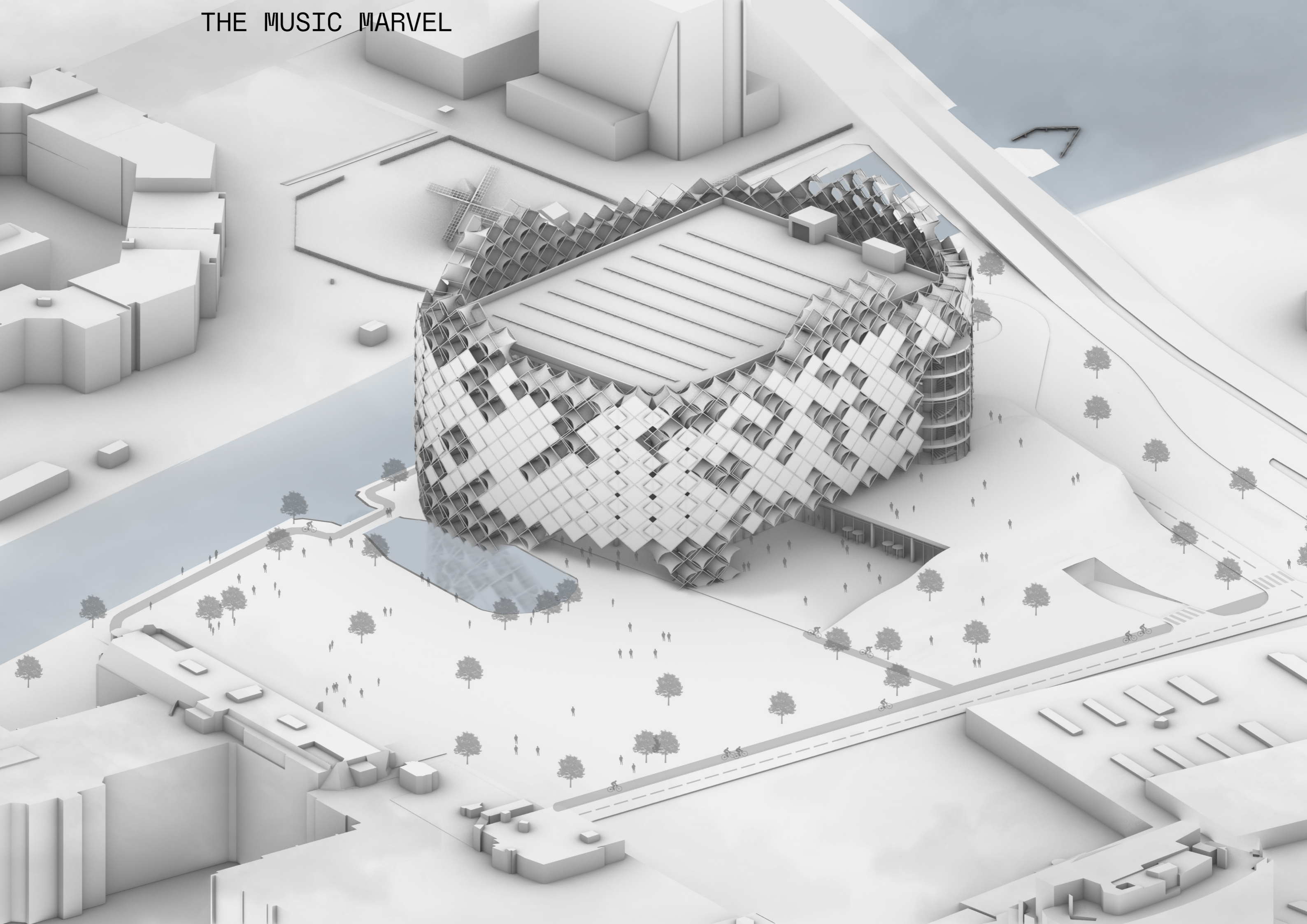
THE OUTCOME



THE SPACE



THE MUSIC MARVEL



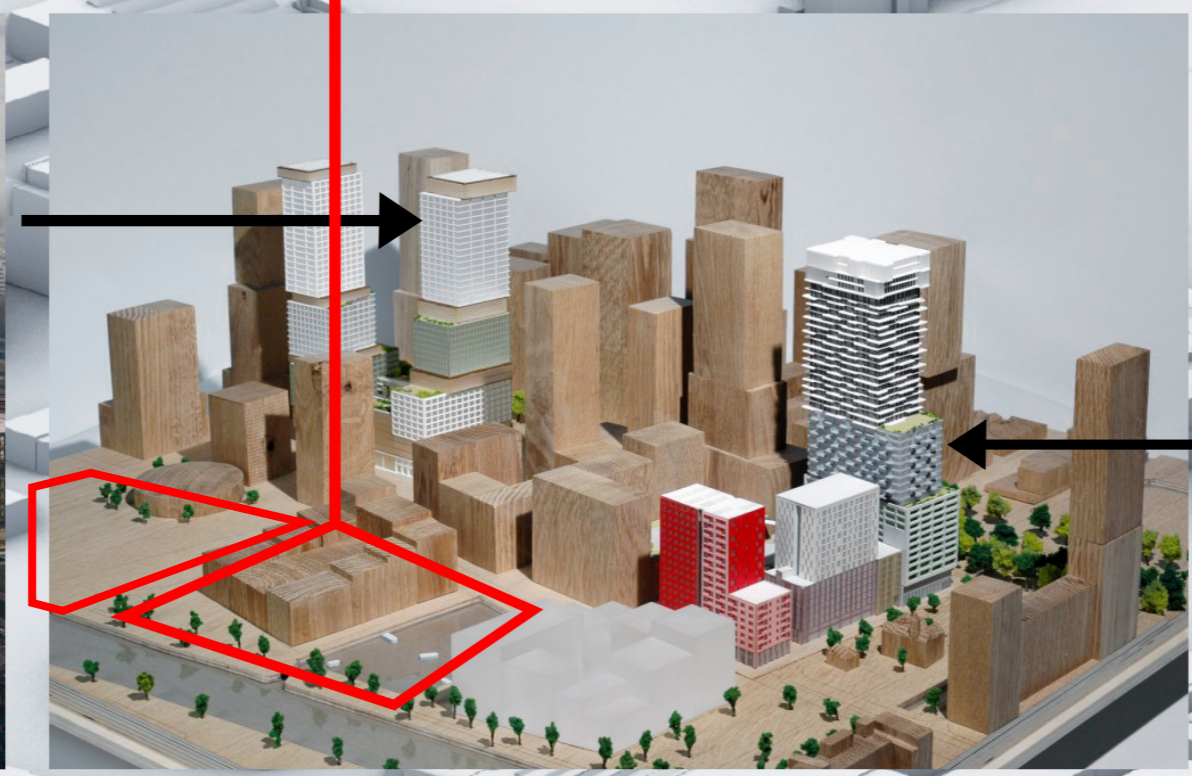
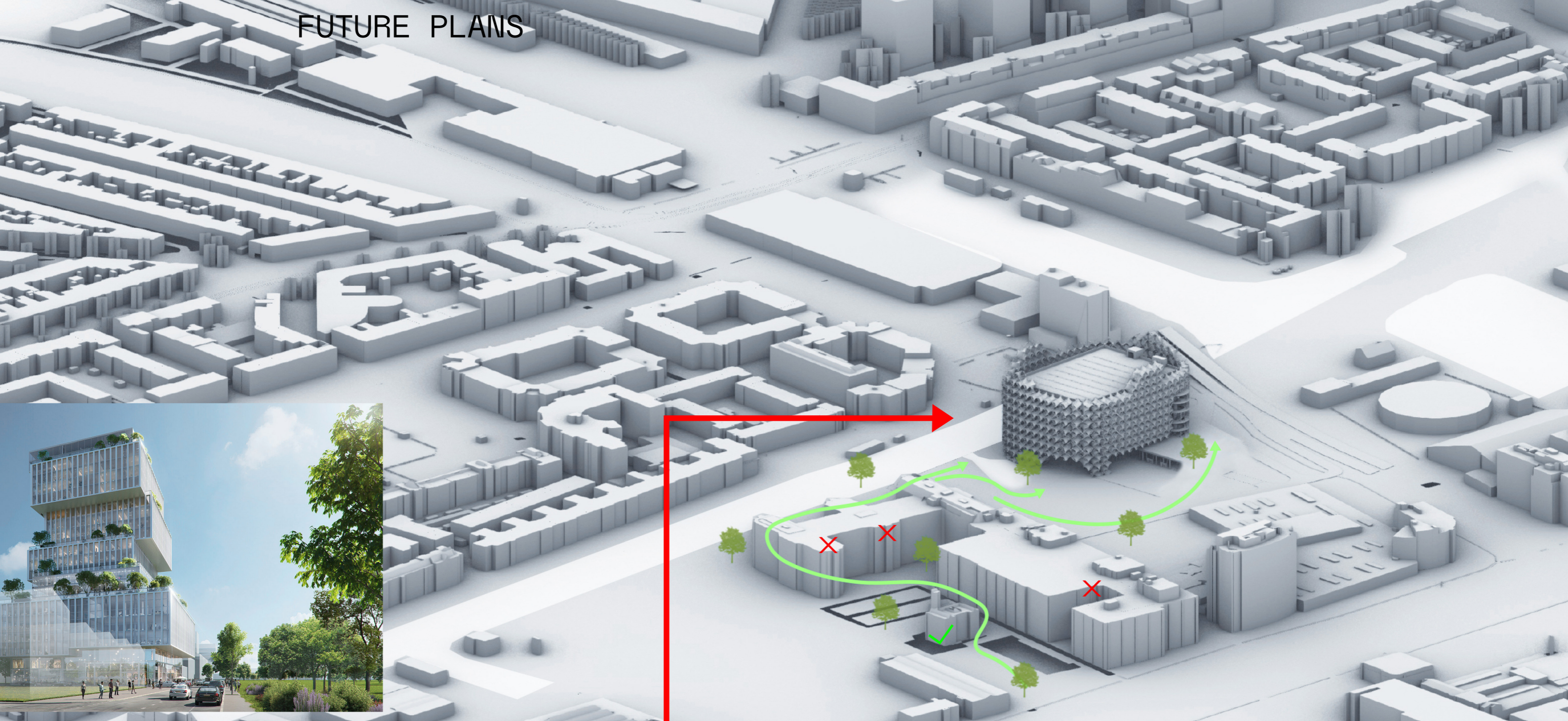
CONTEXT & APPROACH

C

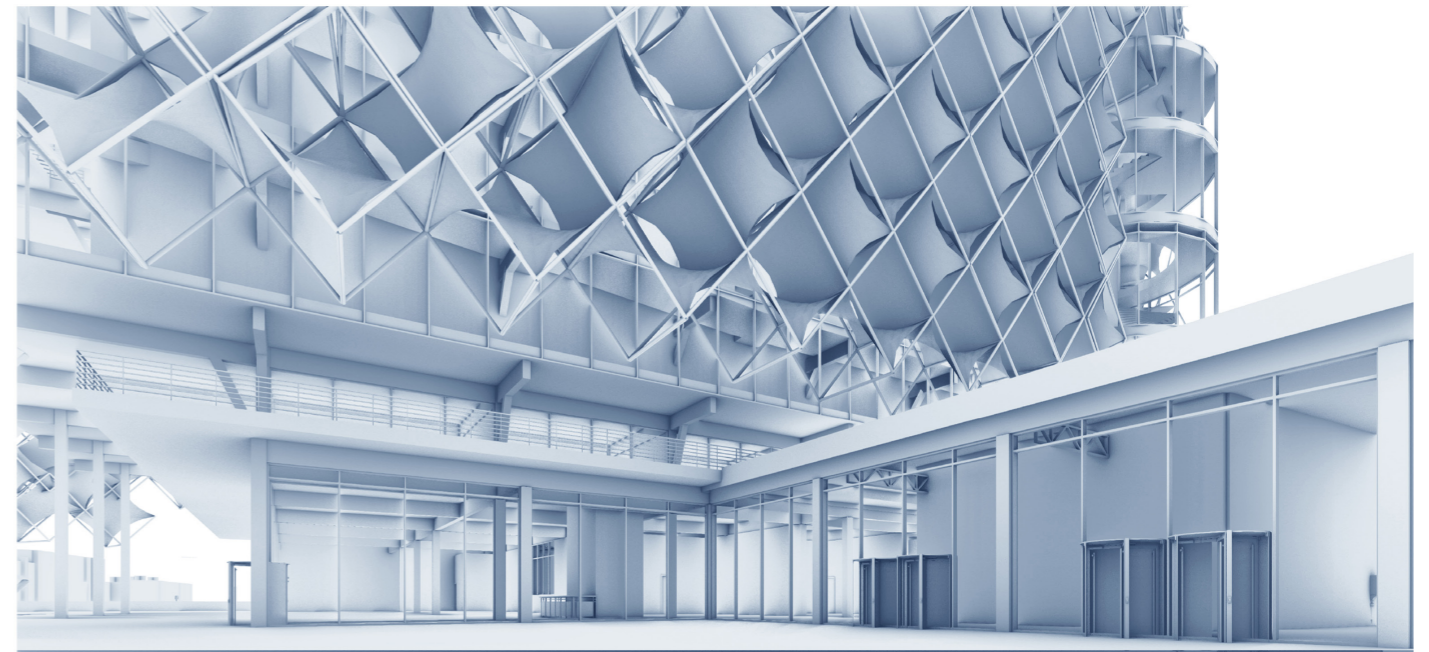
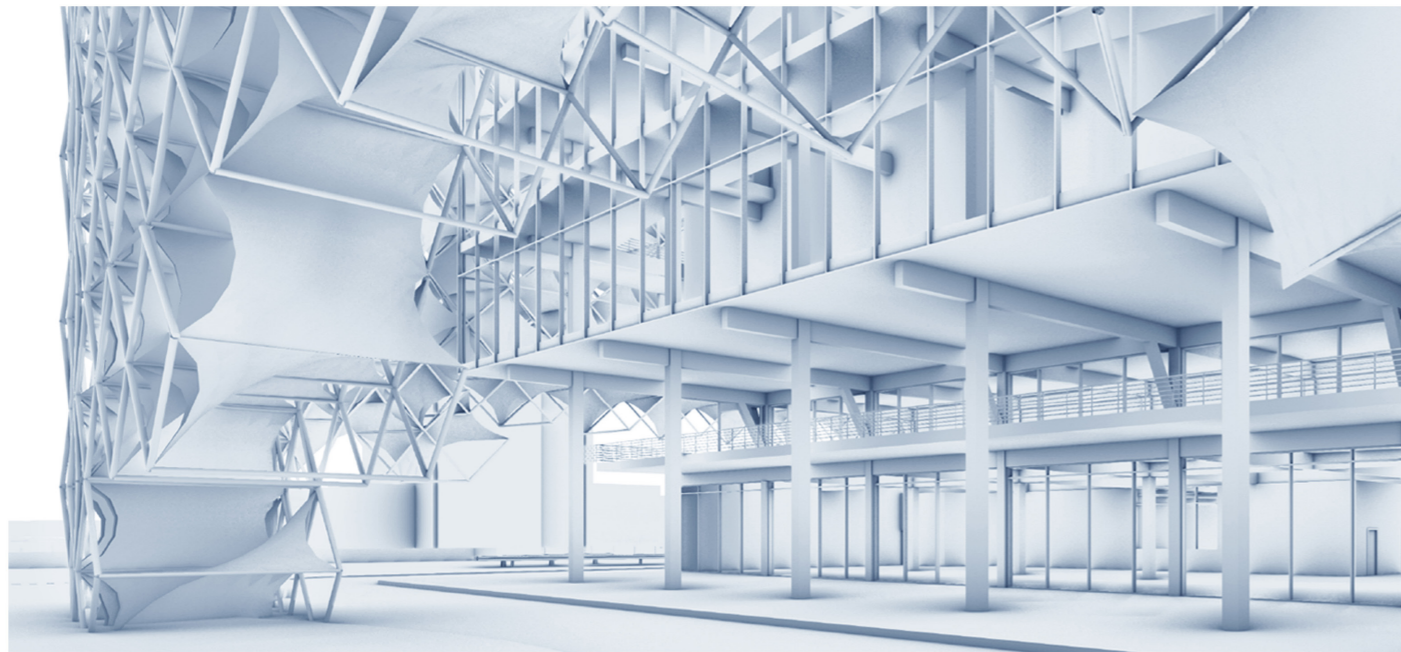
CONTEXT



FUTURE PLANS



APPROACH



DESIGN JOURNAL

D

DESIGN JOURNAL : EGOCENTRIC ARCHITECTURE

DOCUMENTATION OF ACTIVITY

Below is a collection of thoughts, photographs , sketches, and screen-shots taken in the pre-concept phase of this project.

All this material is a product of the ambition to find that which is not subjective and 'egocentric' design.

ONE

First studio assignment - Personal understanding of the relations between the topics City, Connection, Culture.

TWO

Persona diagram from the site for Theory Research. Overlapping and fading impressions.

THREE

Different interpretations of the site according to the researched manifestos. Part of the Delineation Process.

FOUR

Site analysis of the Binckhorst. Empathy map for the Theory Research.

FIVE

Notational system - Chess pieces of the Binckhorst. The battle between Culture and Capitalist investment

SIX

The physical model of the Binckhorst.

SEVEN

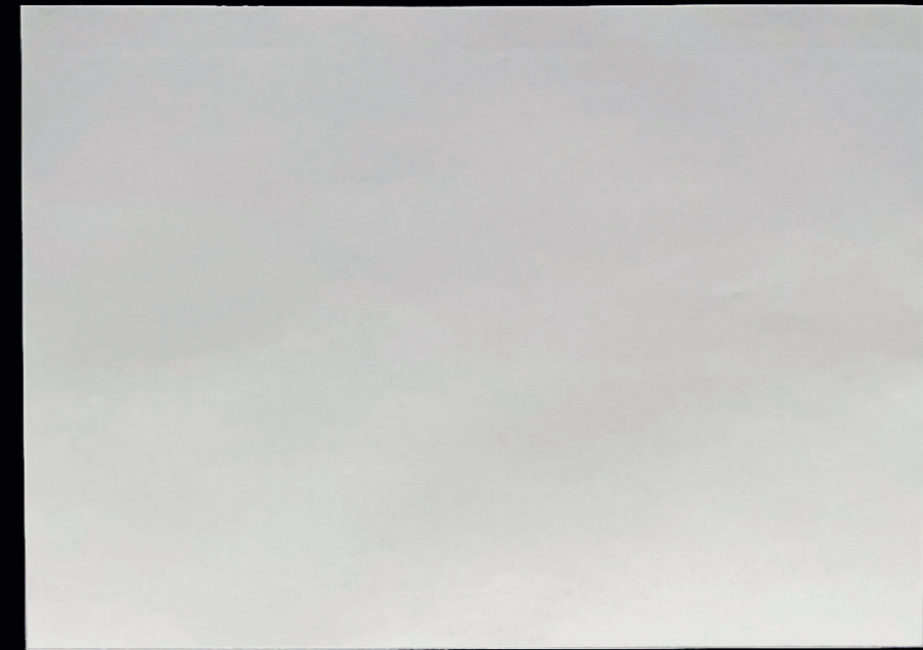
P1 site presentation. Emphasis on the views ability to activate peripheral or focused vision by choice.

EIGHT

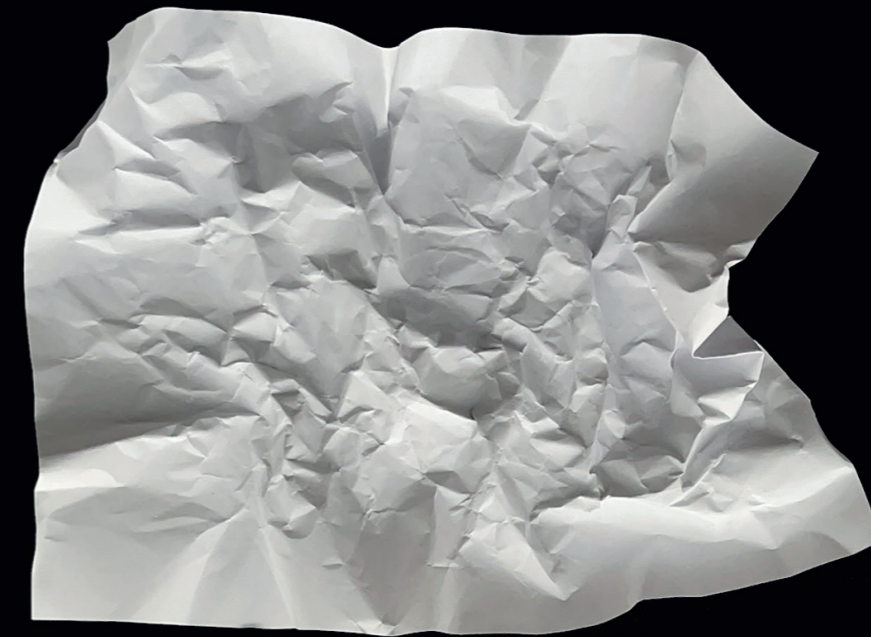
A Experimentation with the EEG (electroencephalogram) tool and measurement of brain waves.

B Initial scripting to create generative textures for the interior design using numerical values extracted from the brain waves as input.

ONE



city



connection
▼
city



culture
▼
connection
▼
city

TWO

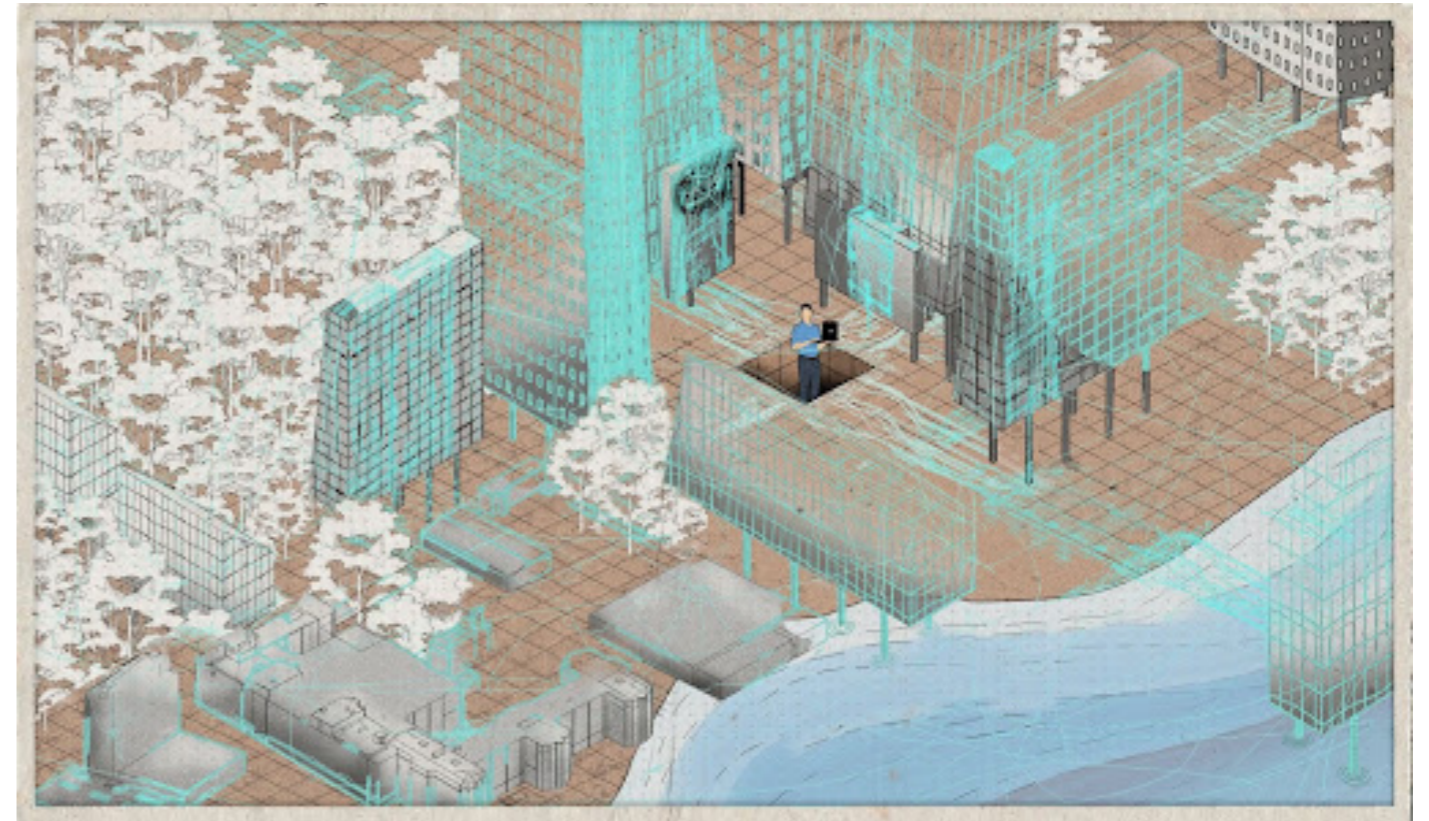
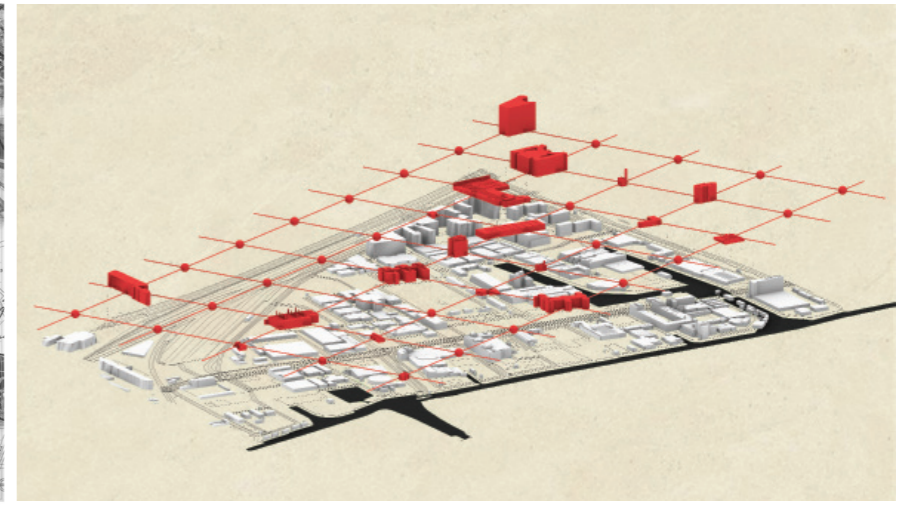
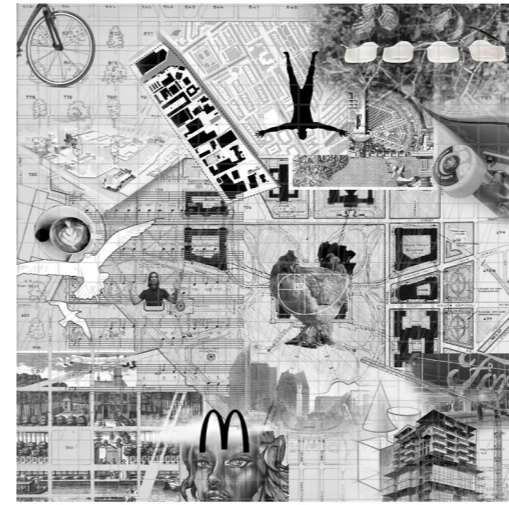
I like that the plan
of the new master plan

I wish the
be done

I wonder if
like a

What if
ideas

THREE



D2

FEEL

SENSATIONS
 - [redacted] warm
 and sunny
 - [redacted] cool
 - [redacted] ankles
 unit, that very dense air
 - Blowing air
 - Water
 - Leaves
 - Sand
 in my contact lenses
 relax walking
 first week of uni

TEXTURES
 - Baked bricks relief
 - Gaps between bricks
 - Hard wooden surface
 - Relief in wooden panels
 - Smooth metal
 - Pavement tiles underneath feet
 - Rough concrete
 - Smooth concrete
 - Bumpy soil and grass
 - Porous Rubber
 - Hard rubber
 - Weathered steel
 - Dock wood
 - Hard plastic
 - Smooth glass

THINK

THOUGHTS THAT CROSS OUR MIND
 - [redacted] only industry.
 [redacted] a concert hall here feels weird now.
 [redacted] more trees, [redacted] no shade or well kept grass
 [redacted] heritage value
 [redacted] contrast between the new and the old
 [redacted] effort to cross the area, [redacted] no bike paths, no crossings
 [redacted] drive very fast
 [redacted] a lot of rubble
 [redacted] inaccessible, I wish I could
 [redacted] grim, [redacted] bad state closed [redacted] ready to be demolished. [redacted] not a lot of people there, [redacted] feeling of safety.

Bridging the gap between experiencing and thinking
 -What do **you** feel when hearing these sounds?
 -Can you feel the sounds in front of you?

BINCKHORST



SEE (image)

[redacted] grey and brown
 - Sunlight
 [redacted] green between [redacted]
 - Bright and shiny [redacted] contrasting with grey and matte [redacted]
 [redacted] green and yellow
 - Blue and grey
 - Water reflections

HEAR (sound)

Trucks
 Construction
 Voices
 Car
 Vehicle
 [redacted] diving [redacted] water
 Rusty
 [redacted] birds
 Crickets
 Clamouring
 Wind
 Boats
 Reverberation
 Echo

SMELL

[redacted] grass
 - Exhaust
 - Garbage
 - Petrol
 - Food
 - Flowers and plants
 - Burnt
 - Iron



DO

SUBTITLE	Wonder	Enter
Cycle	Enjoy	Leave
Walk	Cross	Focus
Listen	Evade	Ignore
Stop	Use	Sketch
Stand	Experiment	Party
Take photos	Ask	Wait
Talk	Grab	Pour
Drink	Touch	
Ride		

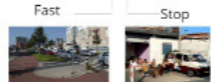
Cycle movement



Joy movement



Listen movement



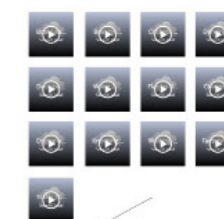
Speed of the movement through the site



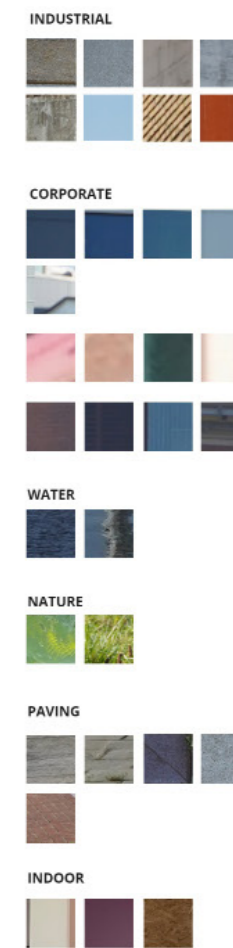
- Fast movement - Flowing traffic
- Slow movement - Exploring the area
- Slow/stop movement - Taking photo's or sitting on benches

Amount of (human) activity - hotspots

Sound Palette



Color Palette



Dividing 'SEE' & 'HEAR' in Natural world & Valorized world?

Natural world



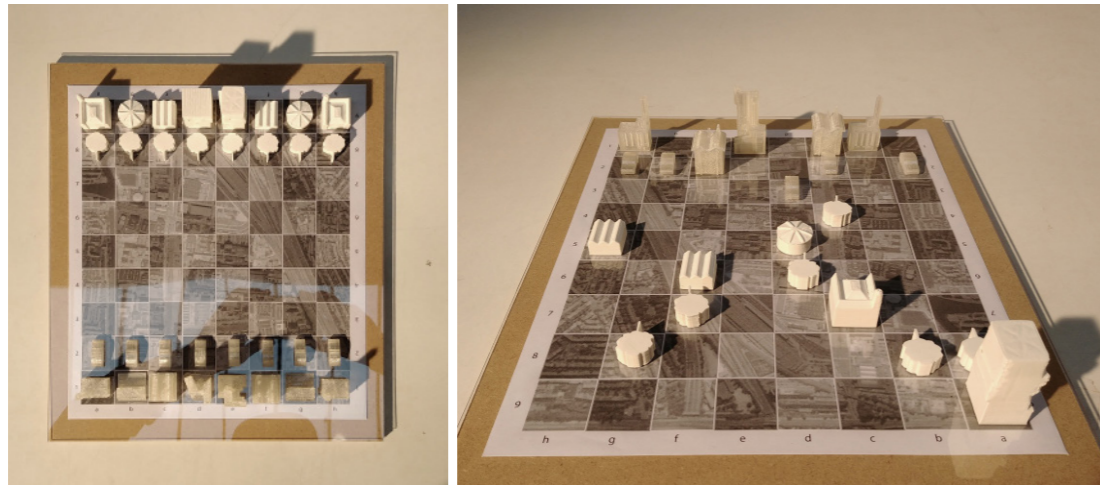
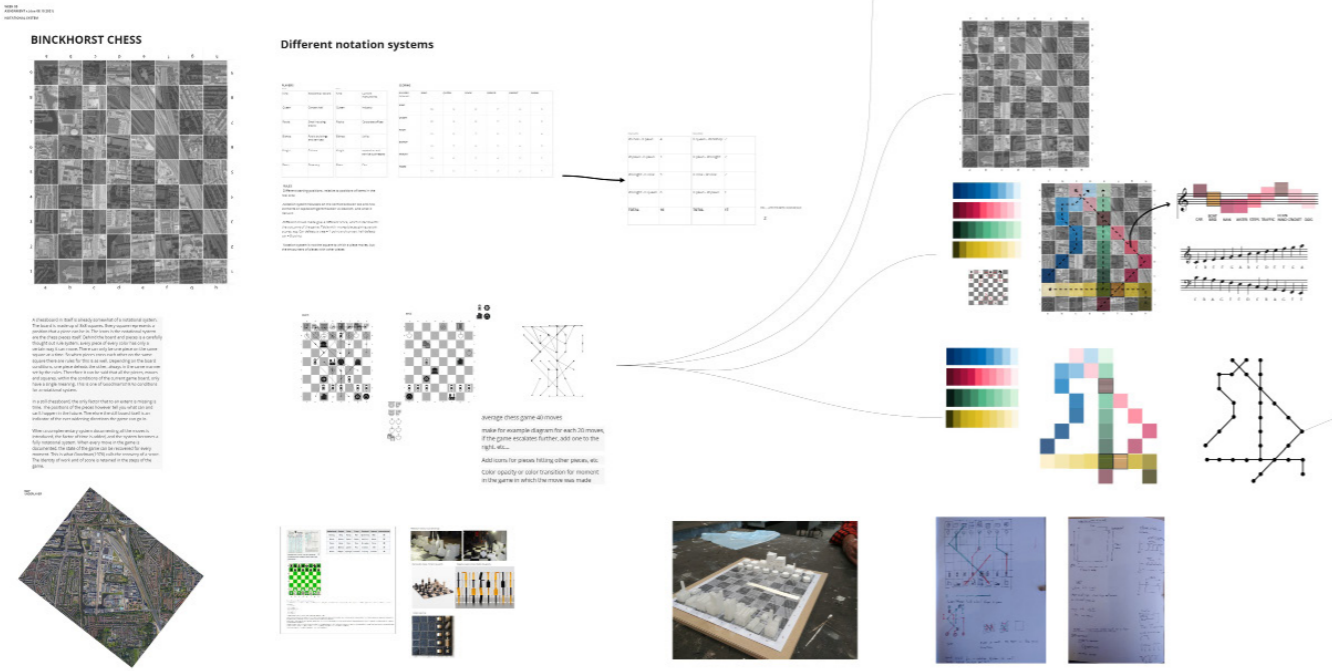
Valorised world



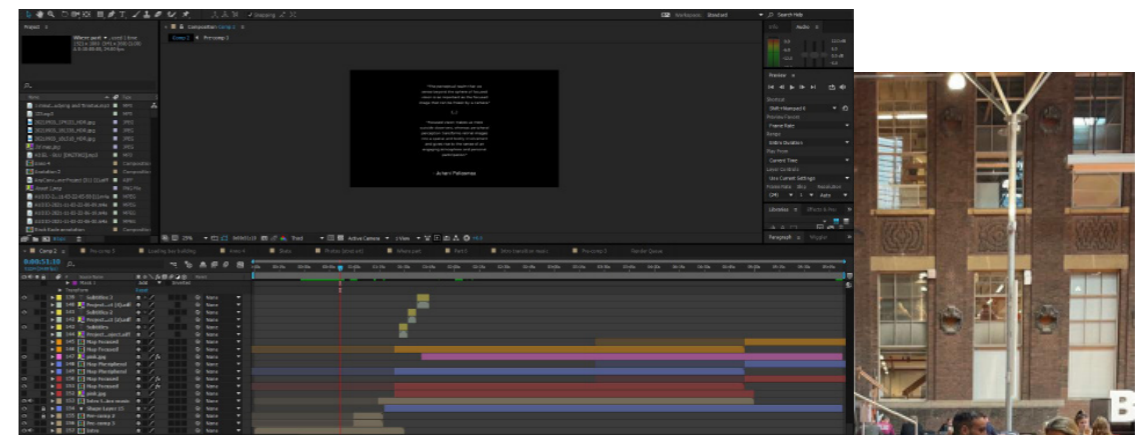
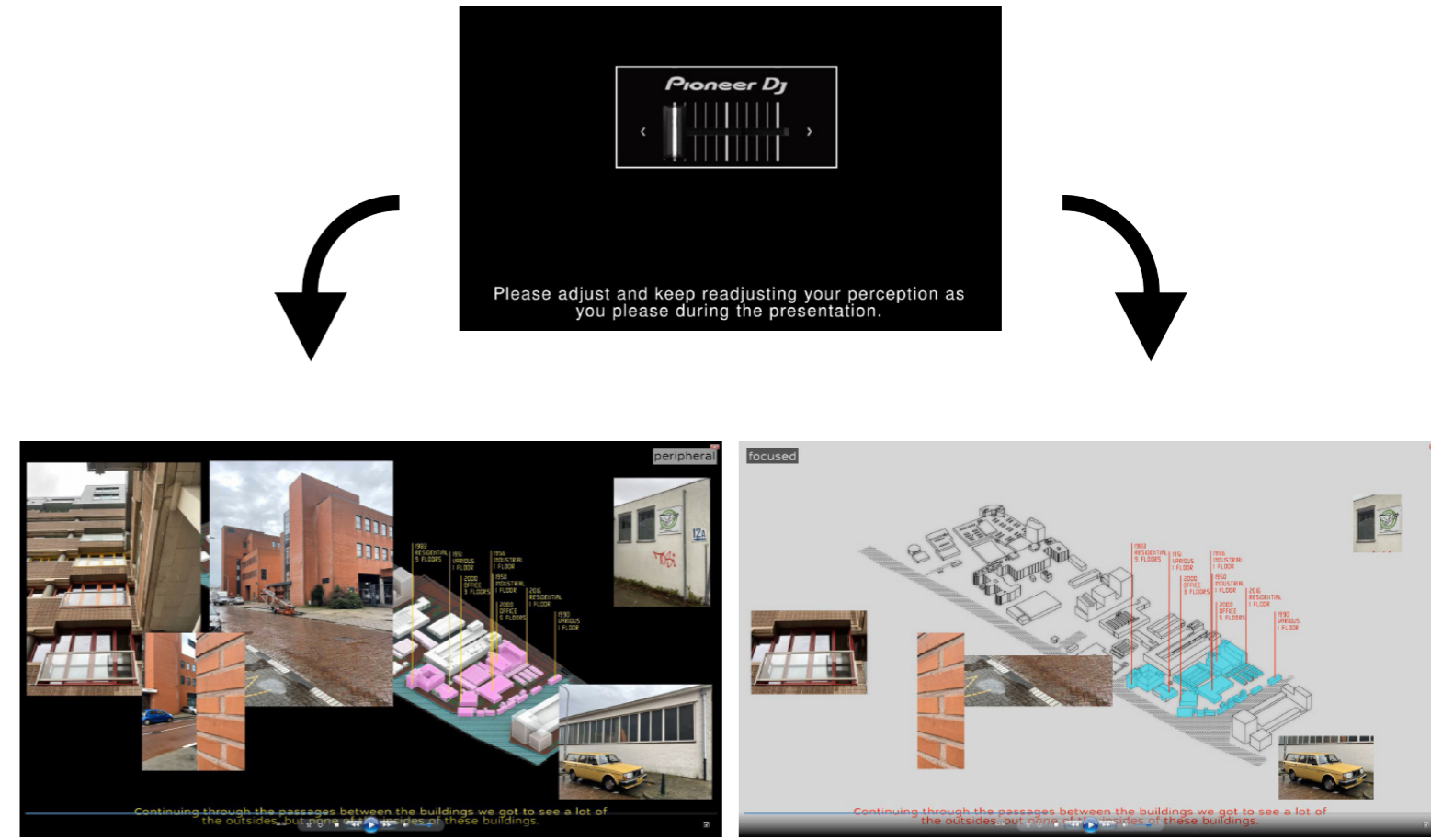
Amount of valorised vs amount of natural

- High activity
- Medium activity
- Low activity/abandoned

FIVE



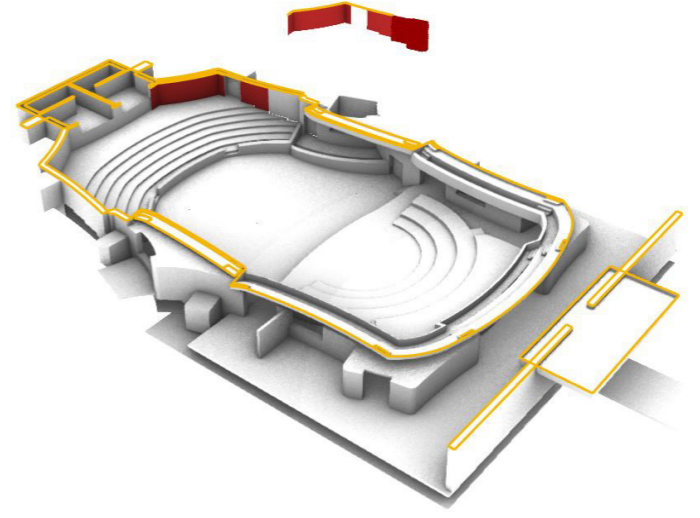
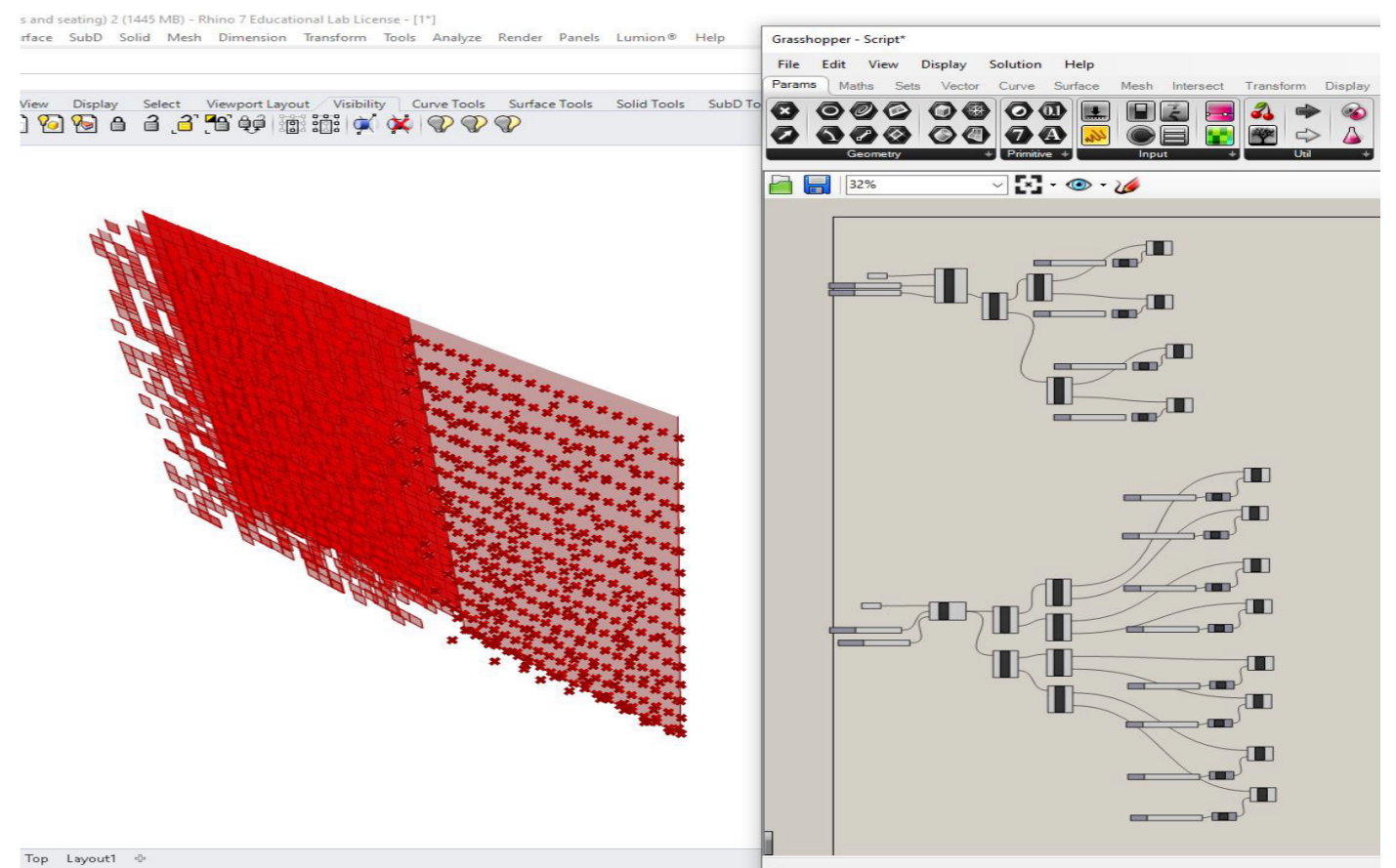
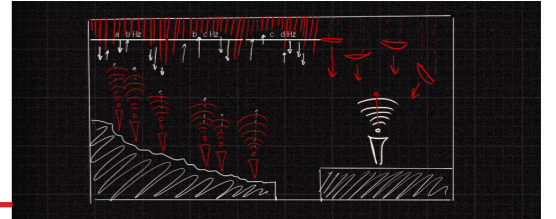
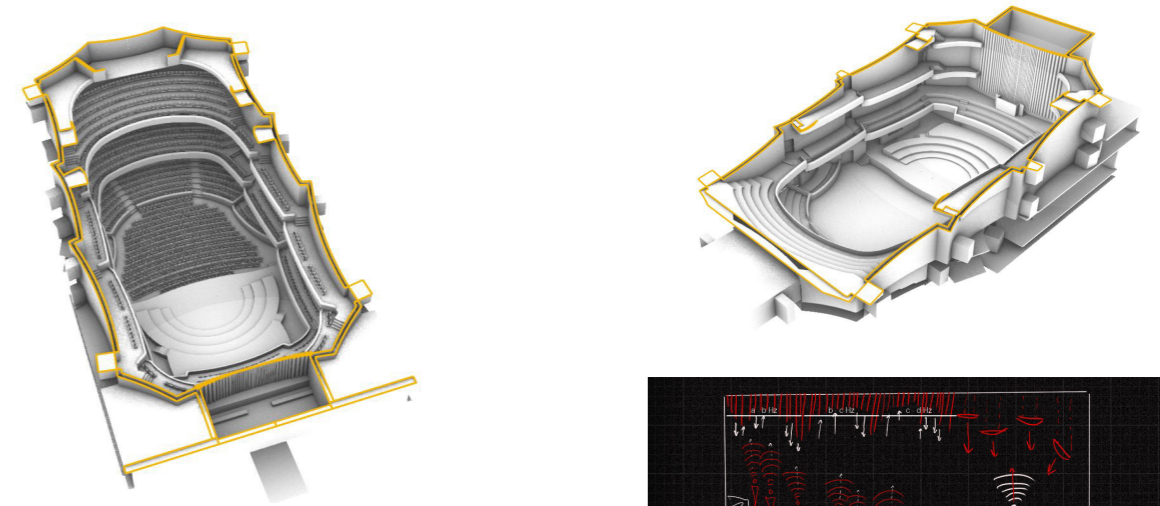
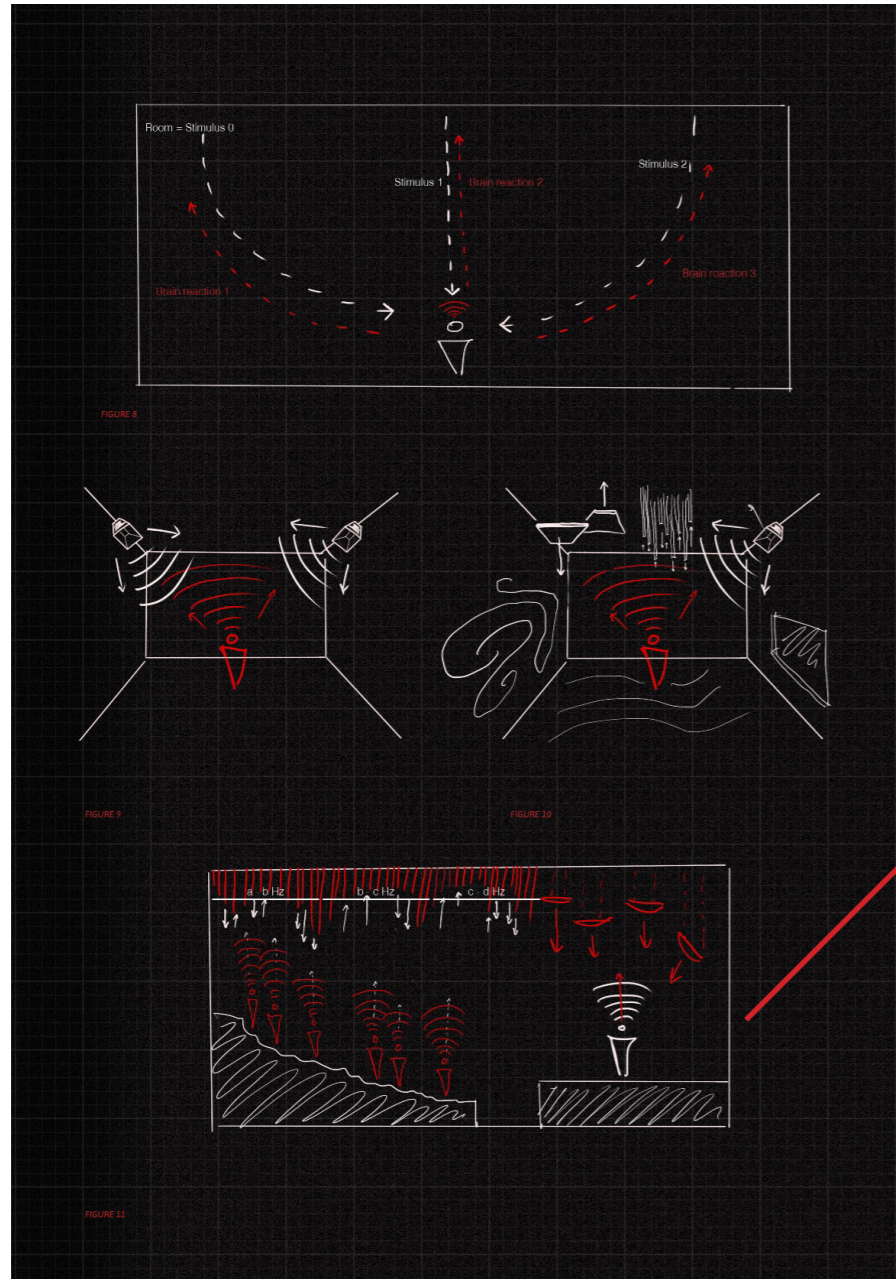
SEVEN

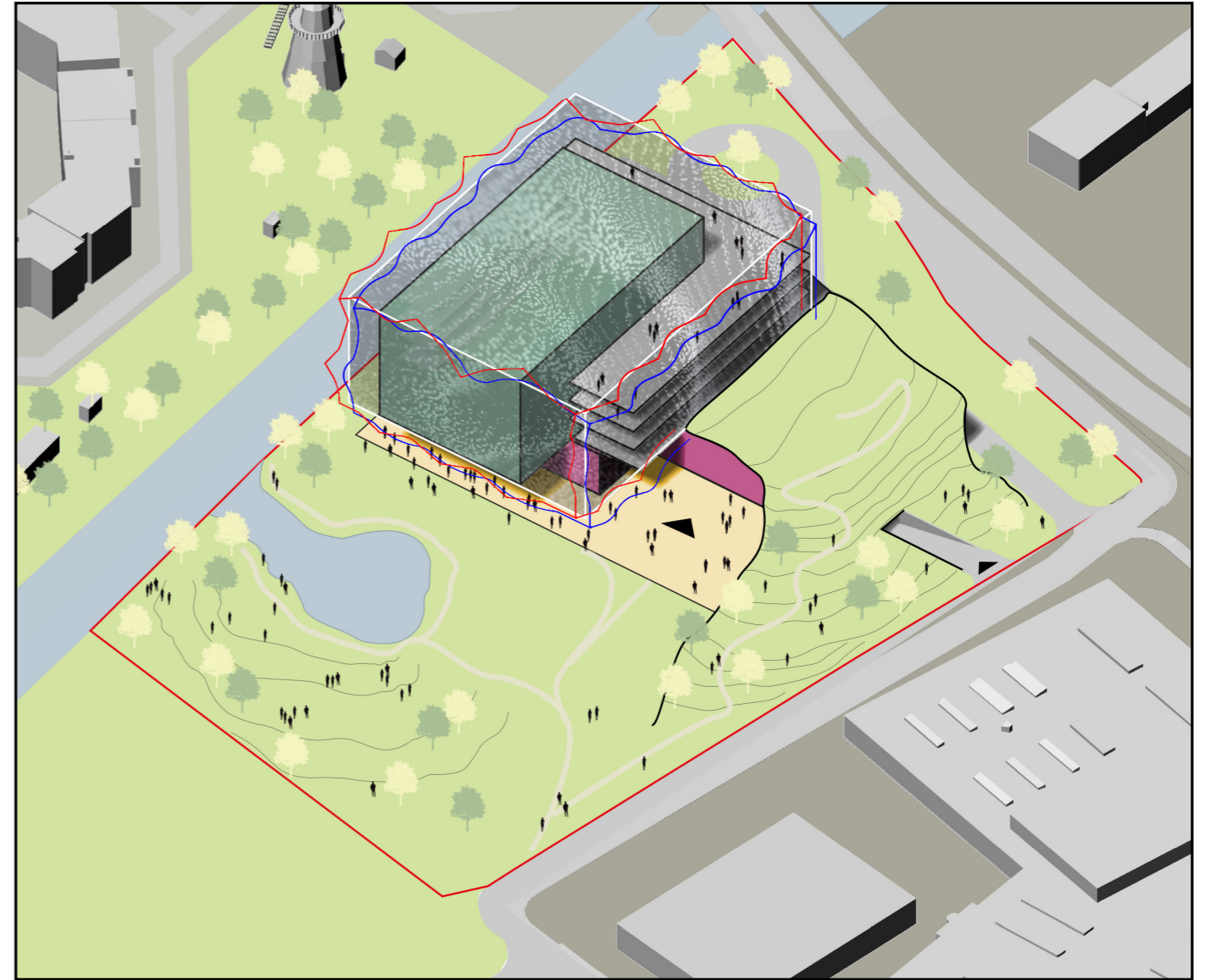
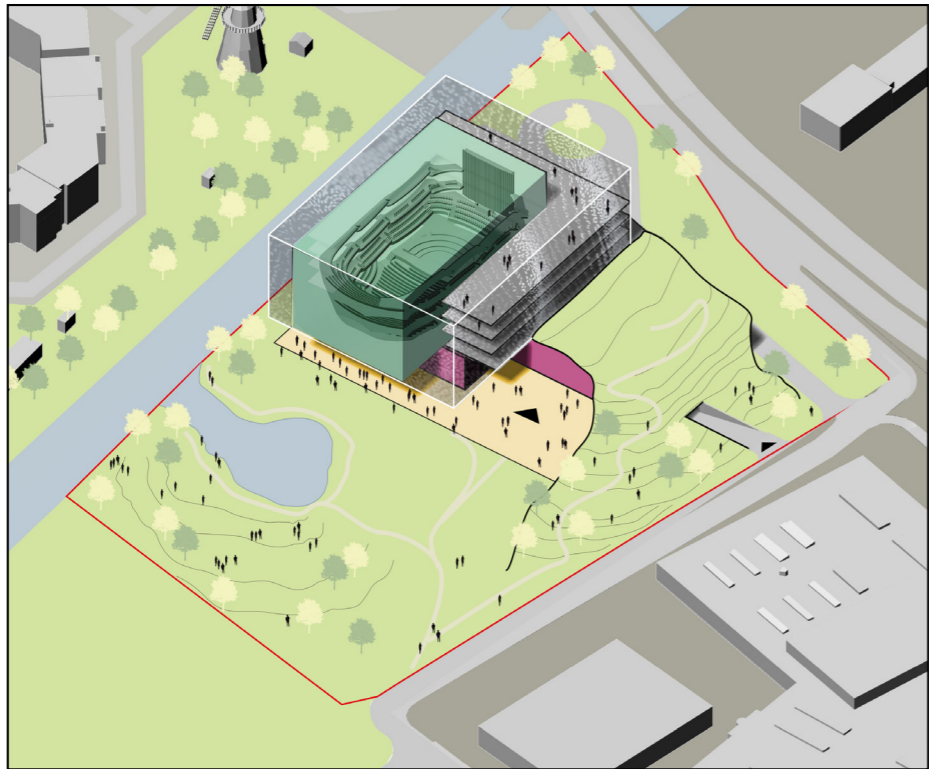
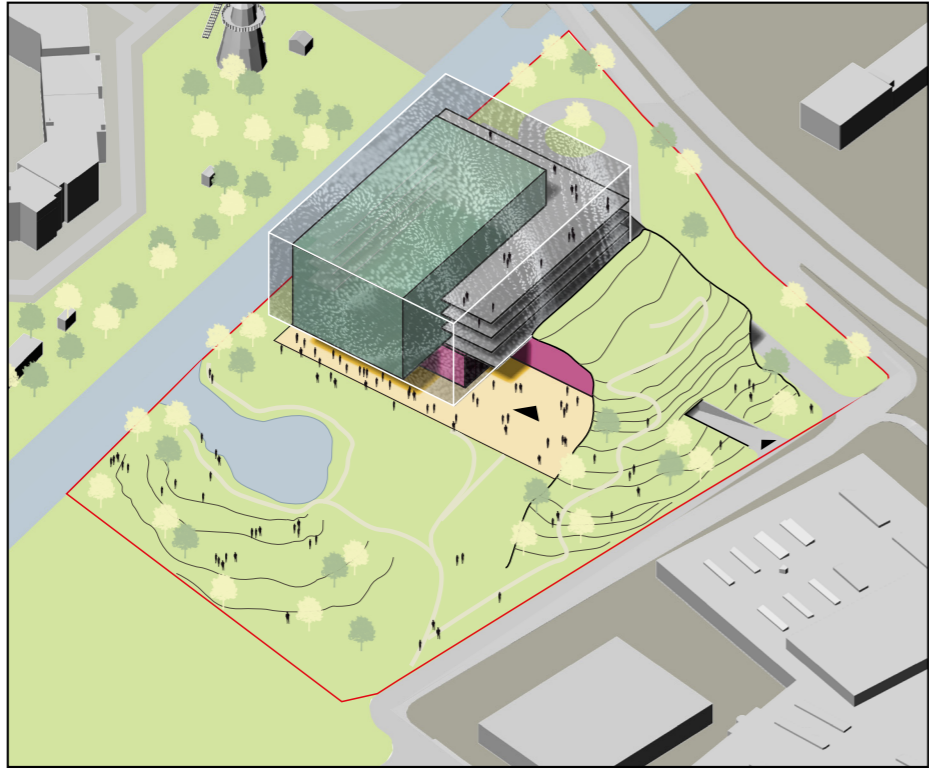


SIX



D2



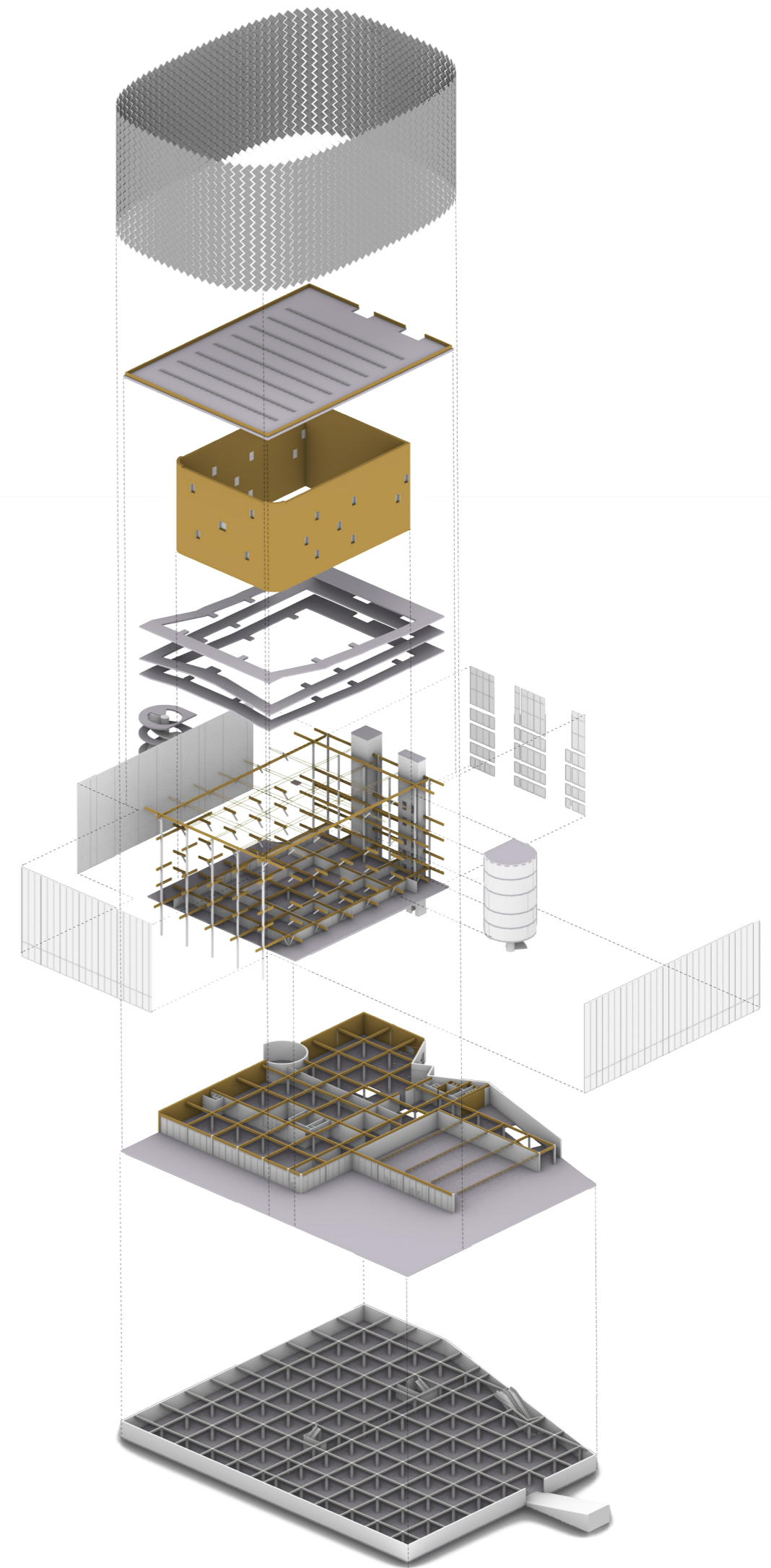


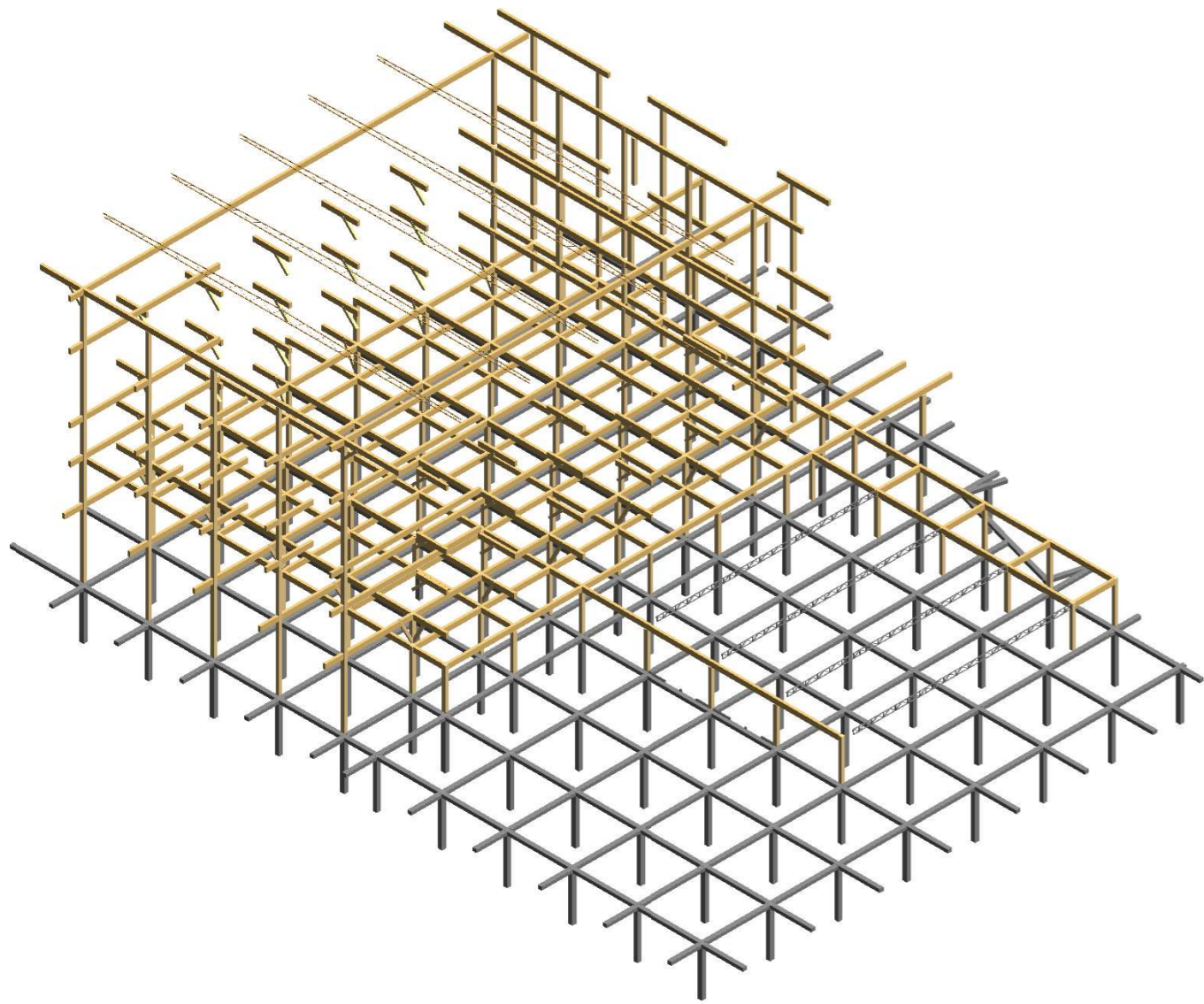
BUILDING TECHNOLOGY

E

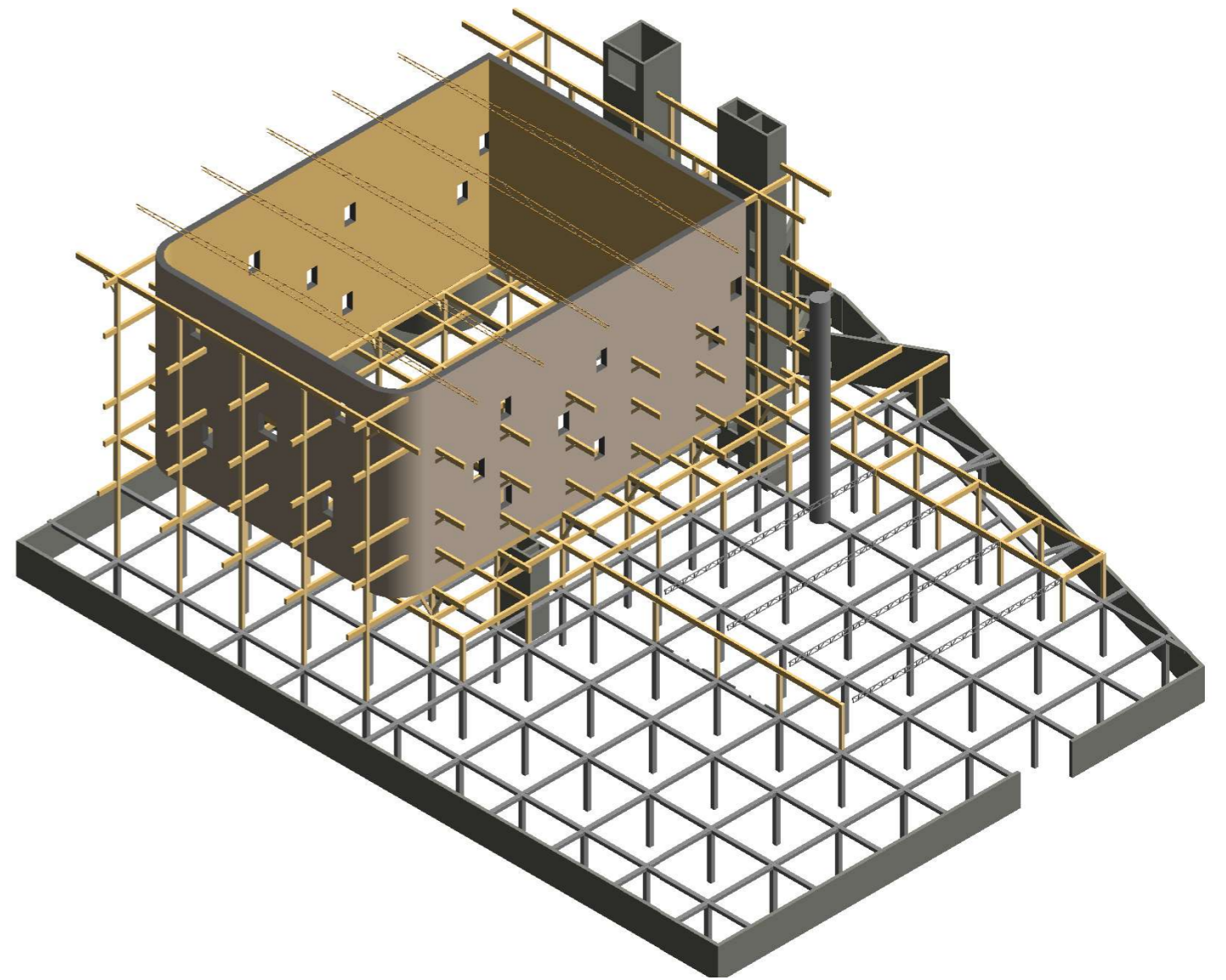
STRUCTURE

- 1 SKIN : Kinetic facade
- 2 Roof with solar panels
- 3 Performance hall timber caviti walls (load-bearing)
- 4 Circulation
- 5 Timber structure + Curtain walls + Vertical circulation
- 6 Ground floor (timber structure)
- 7 Underground level (concrete structure)



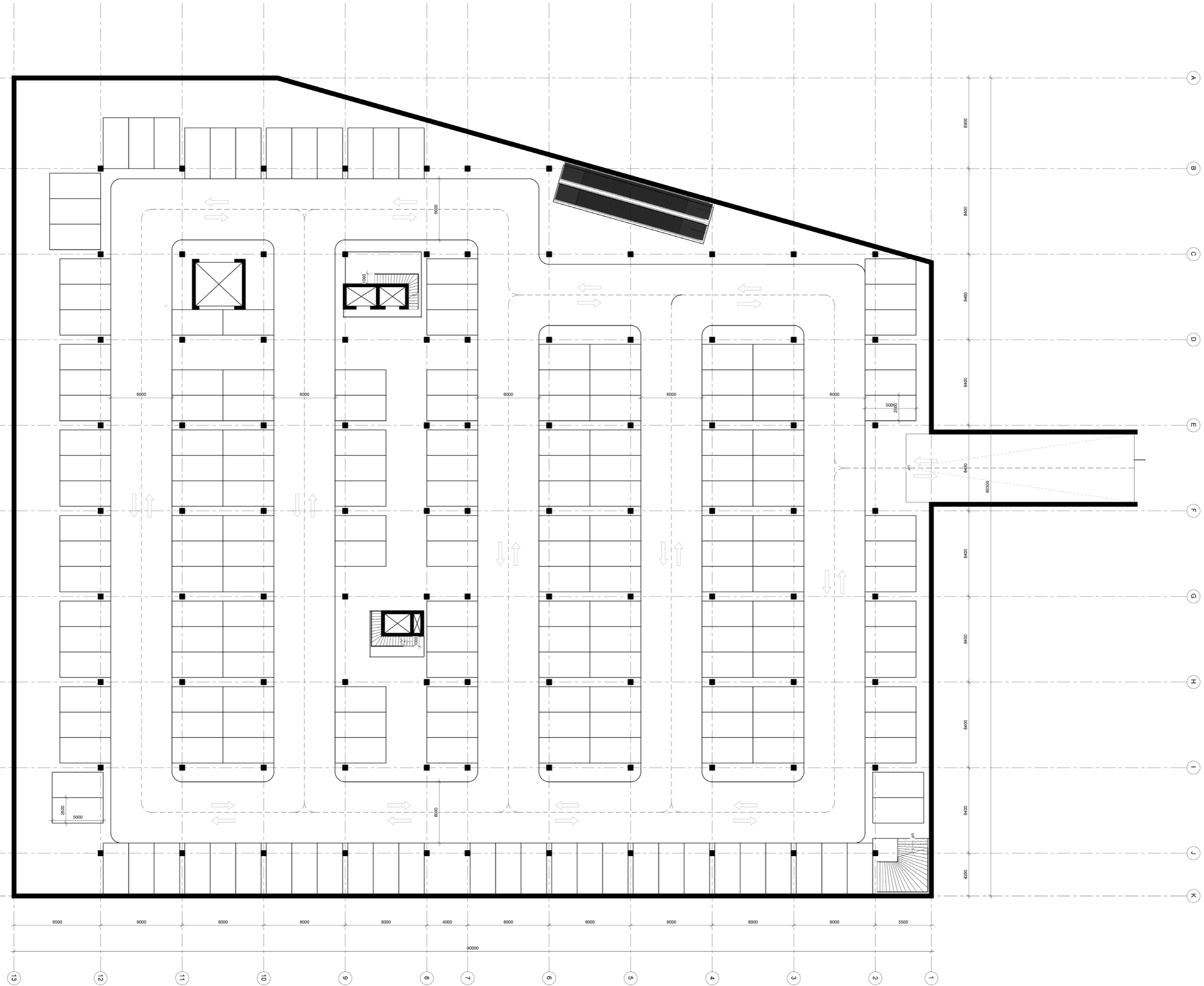


Timber structure

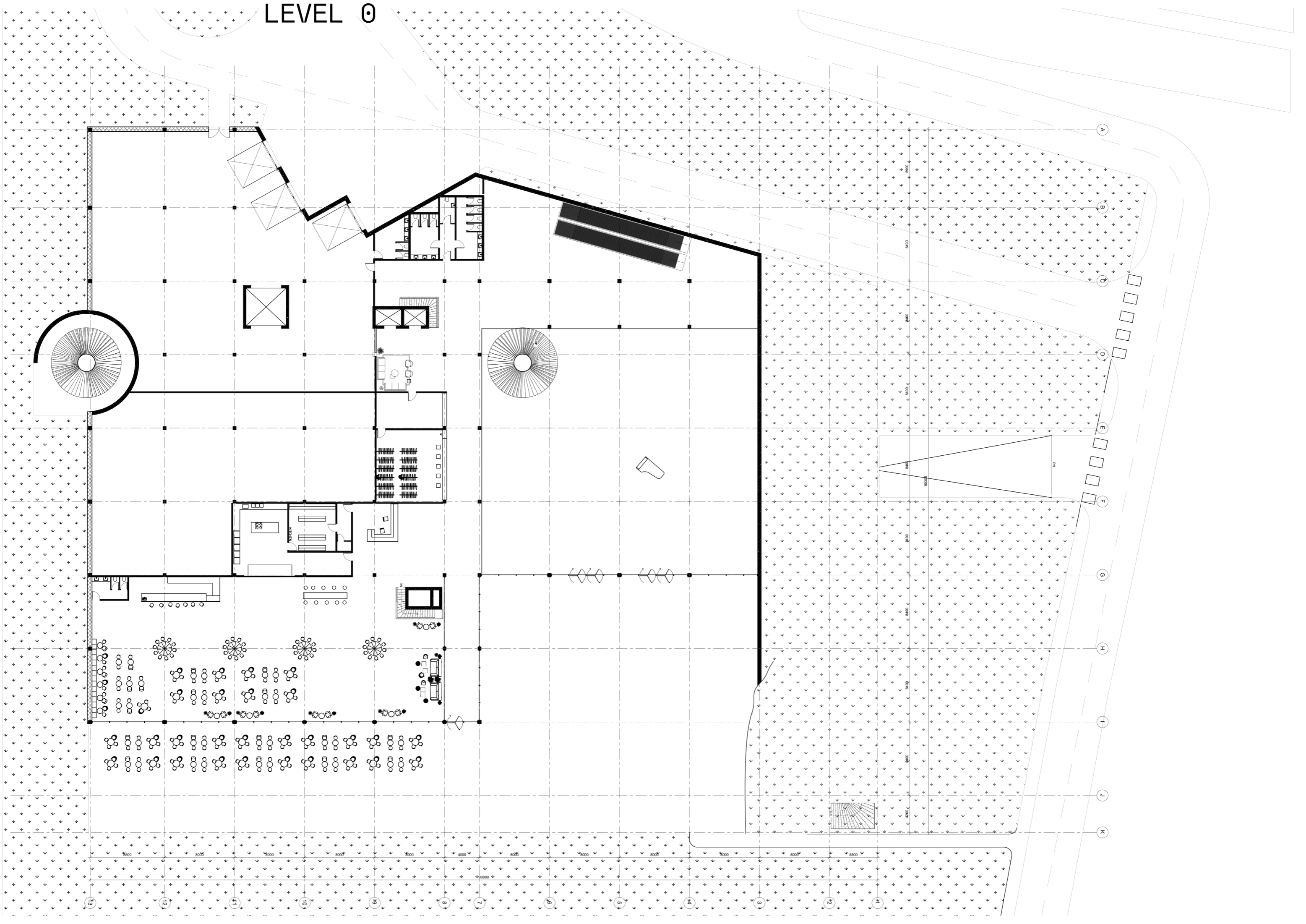


Load-bearing structure

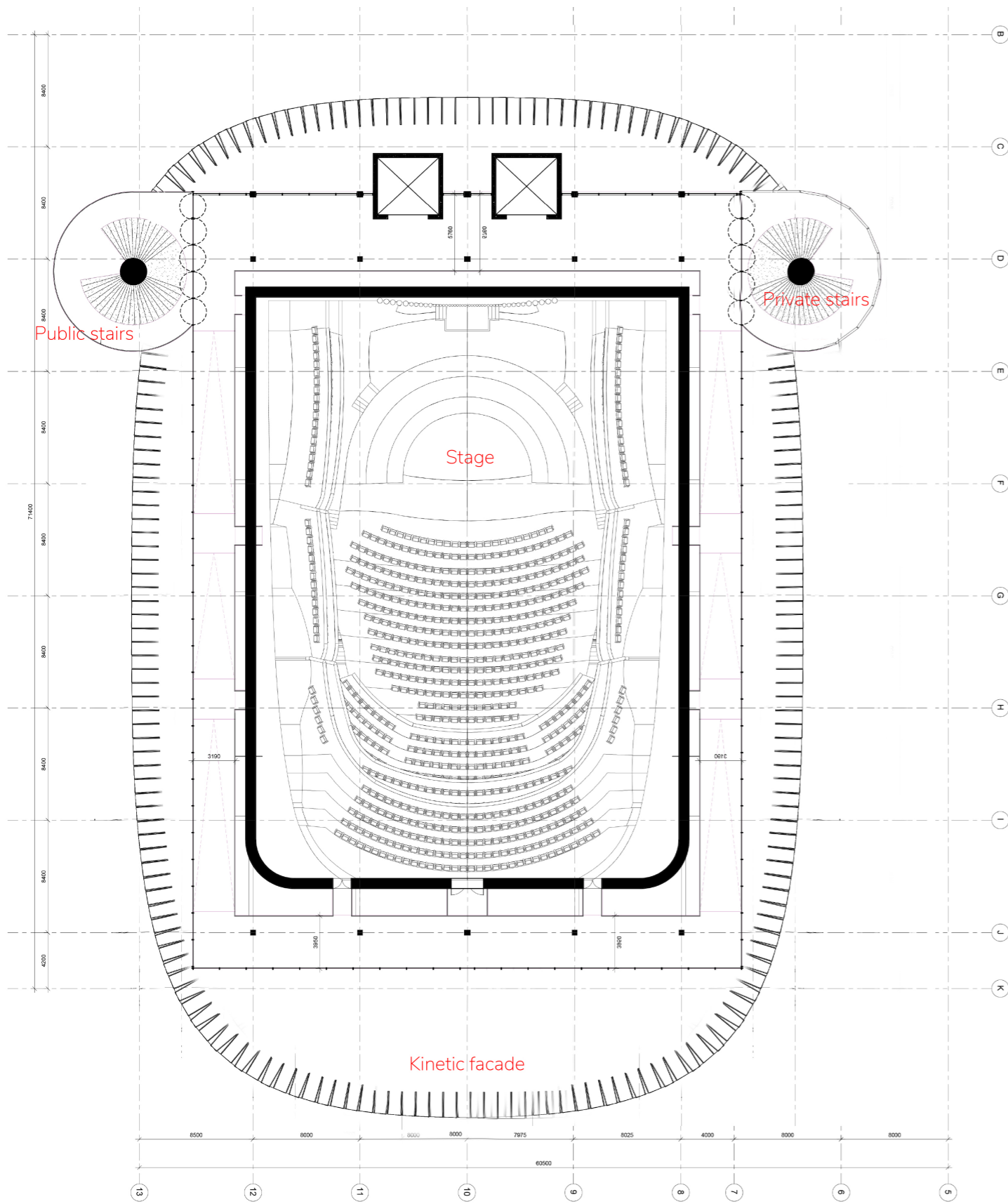
LEVEL -1



LEVEL 0



LEVEL 4

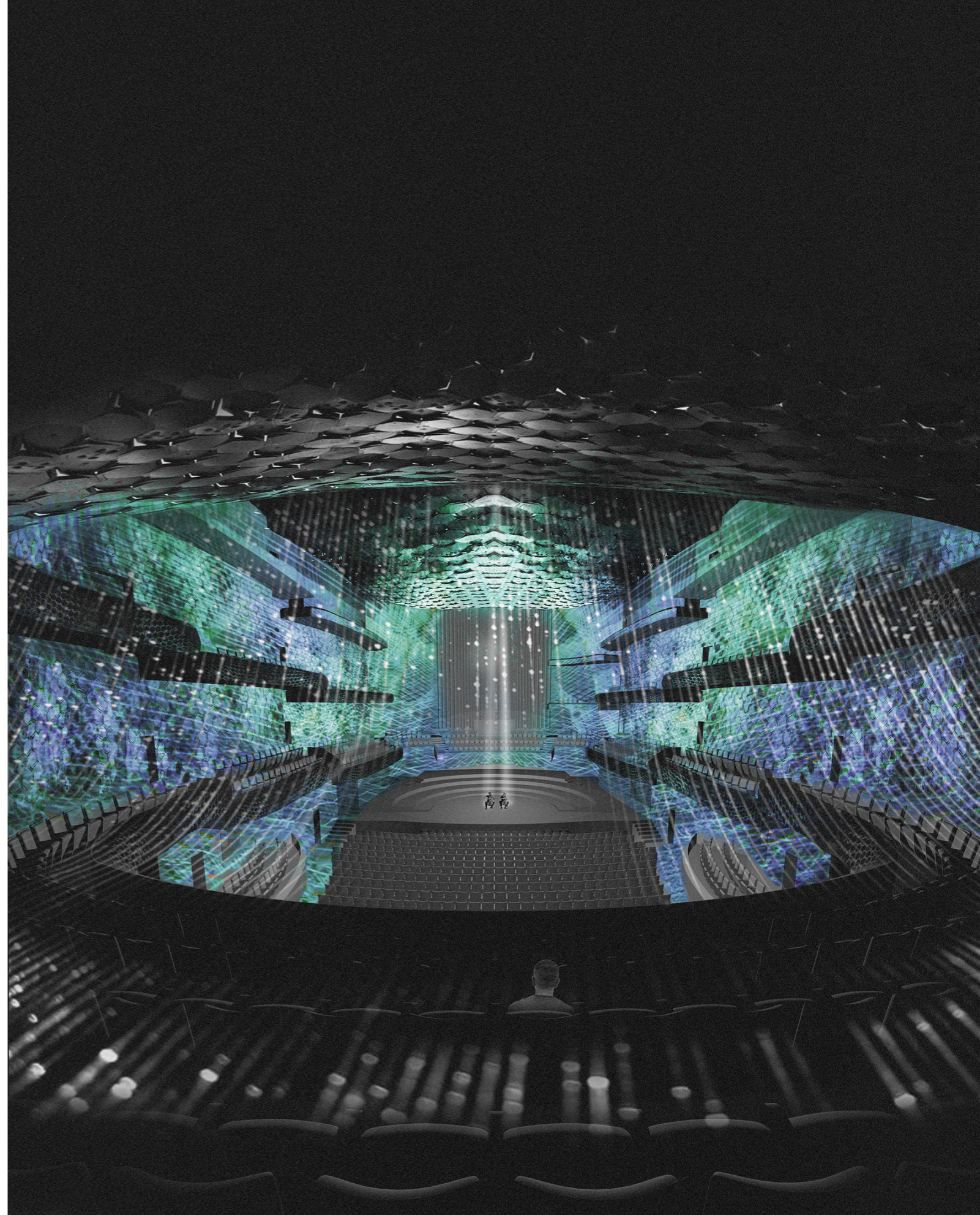


this is not a representation of architecture, this is a representation of experience

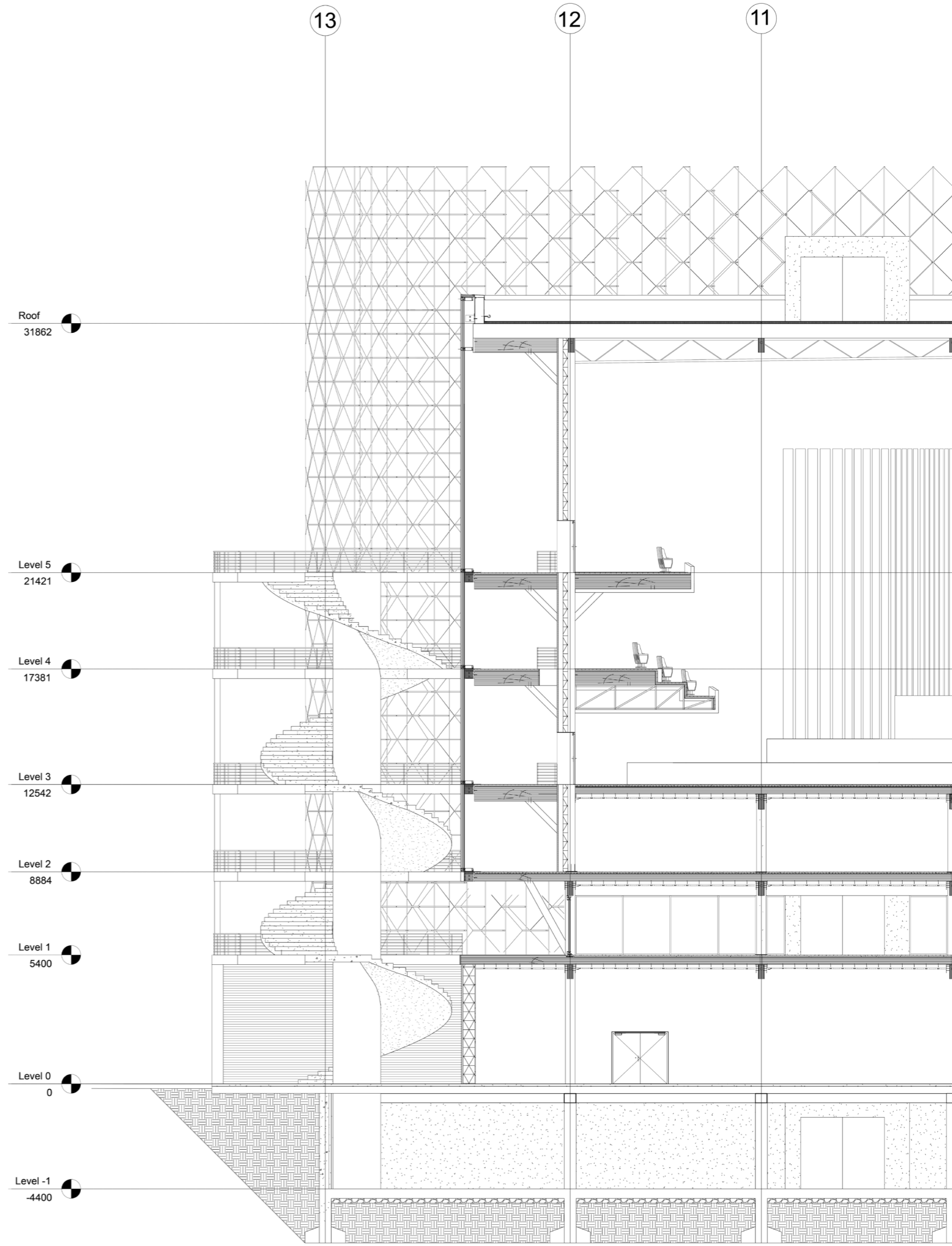
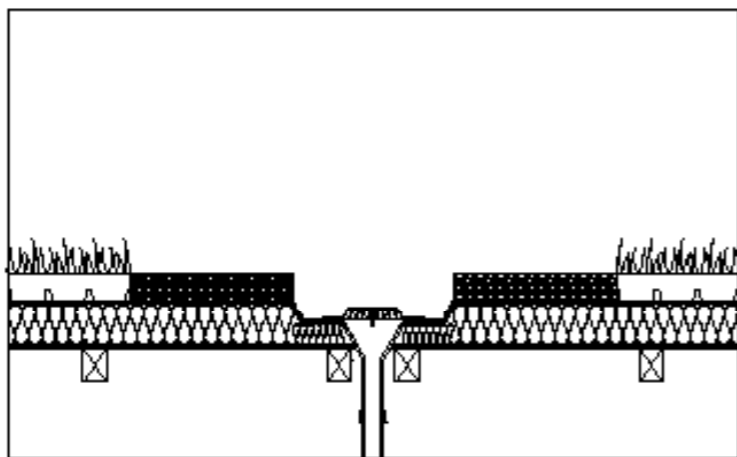
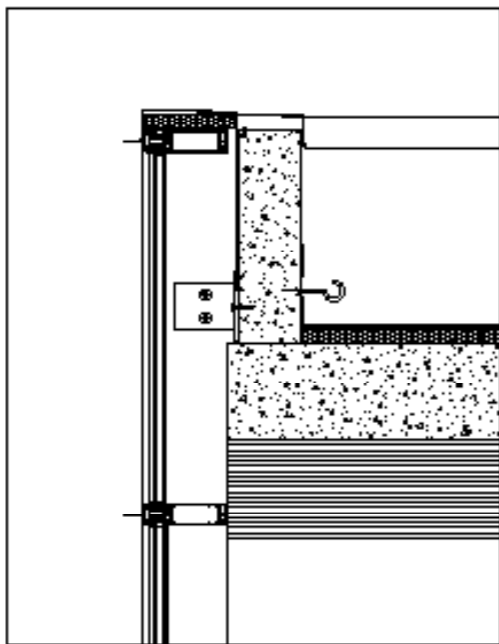
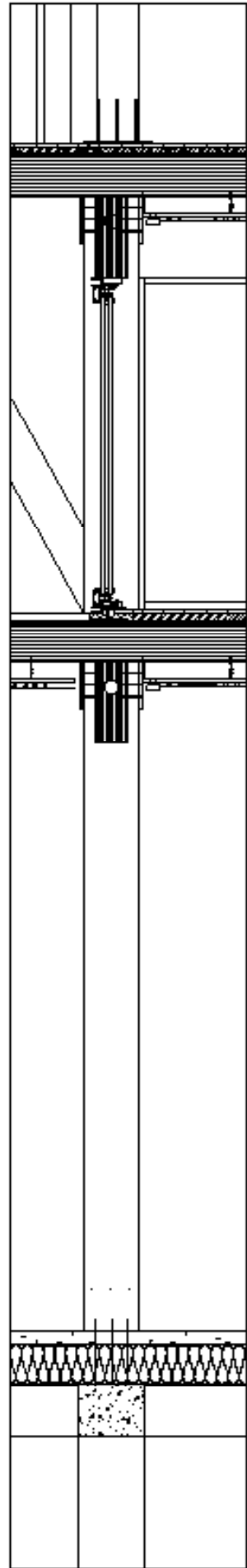
Public Building: MUSIC MARVEL (Music & Popular Culture Re-Wired)
AR3AP100 MSc3/4 2021-22

Graduation project by Dimitrije Milić

Responsible instructor: Prof. ir. Nathalie de Vries
Course coordinator: Ir. Paul Kuitenbrouwer
Tutors: Ir. Henk Bultstra
Ir. Florian Eckardt
Dr. Nicola Warzot

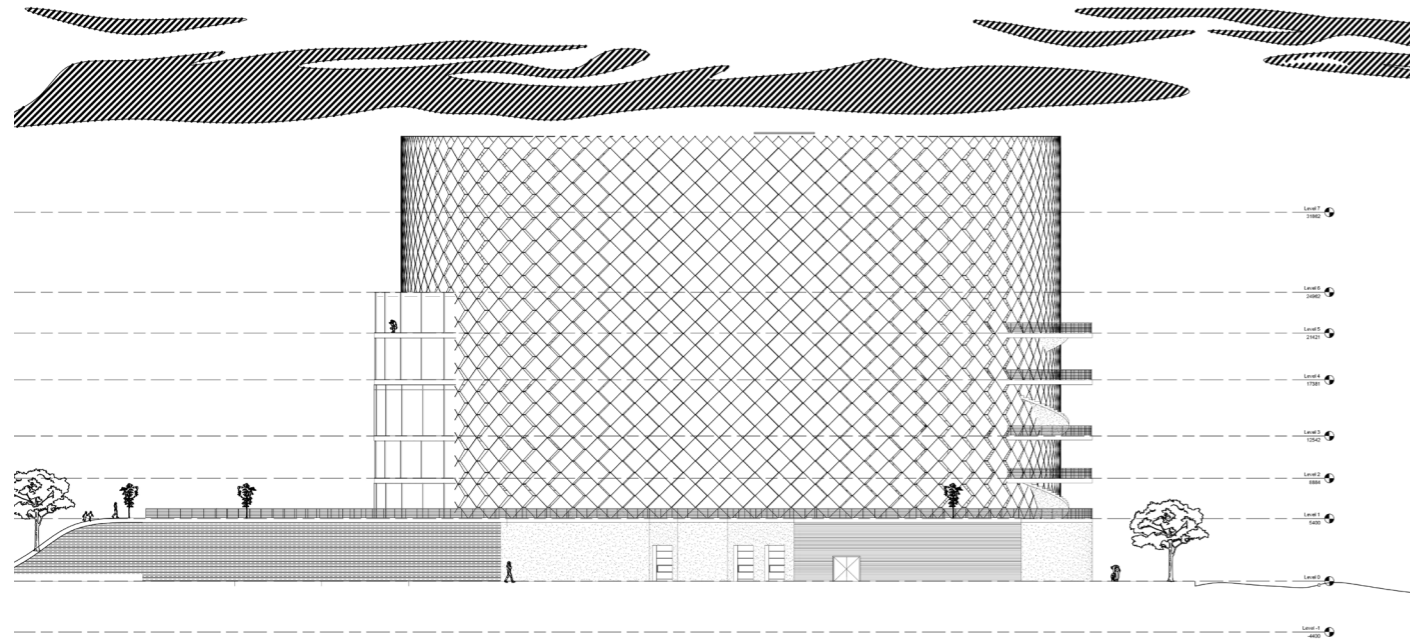


SECTION DETAILING

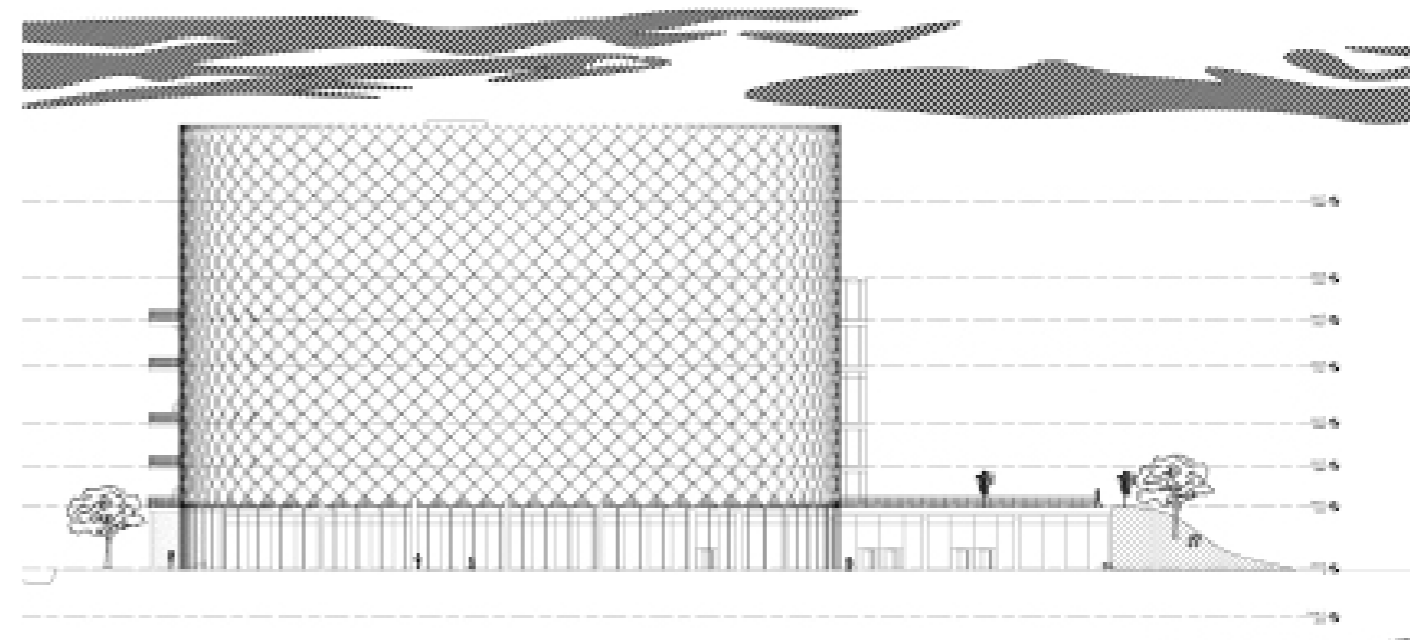


ELEVATIONS

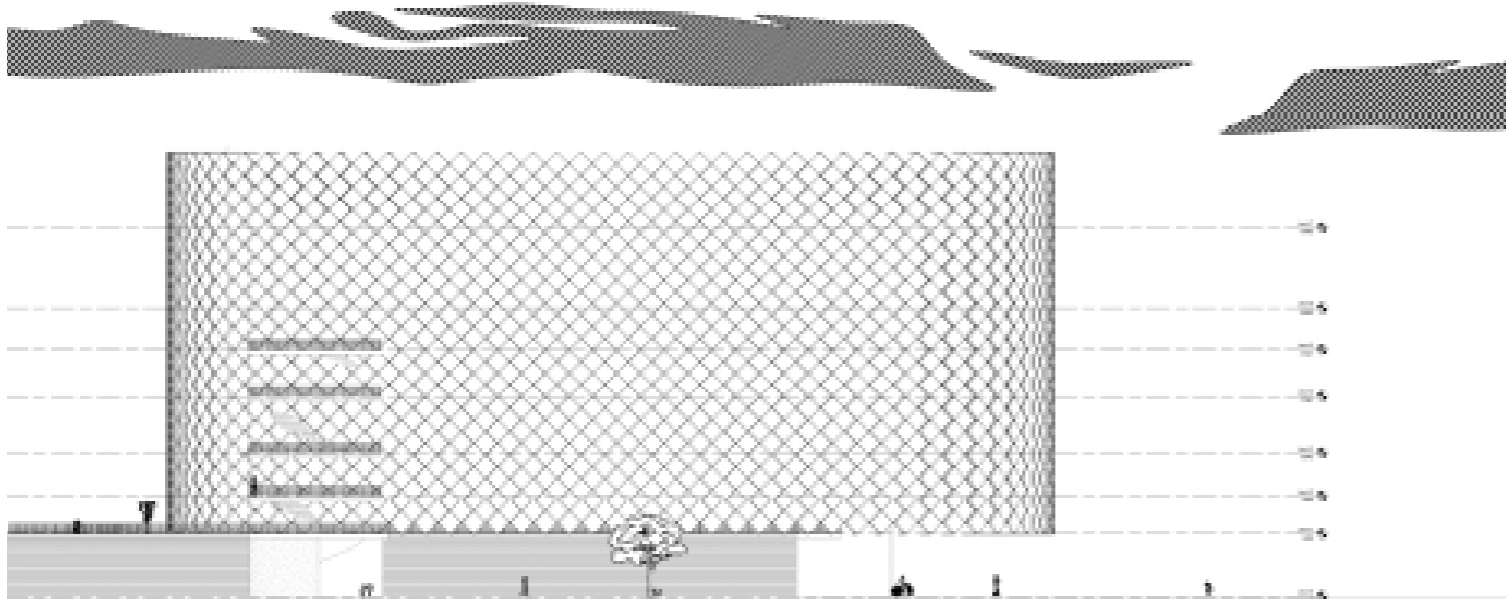
North-West



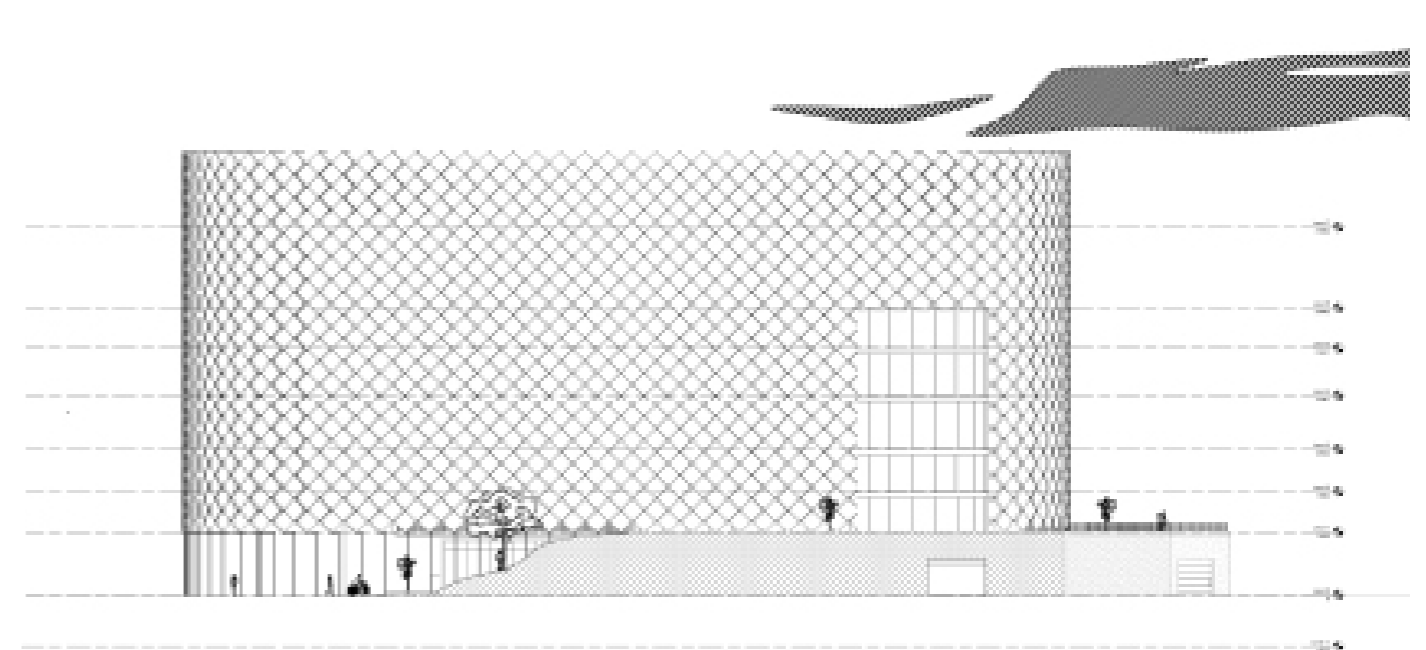
South-East



South-West



North-East

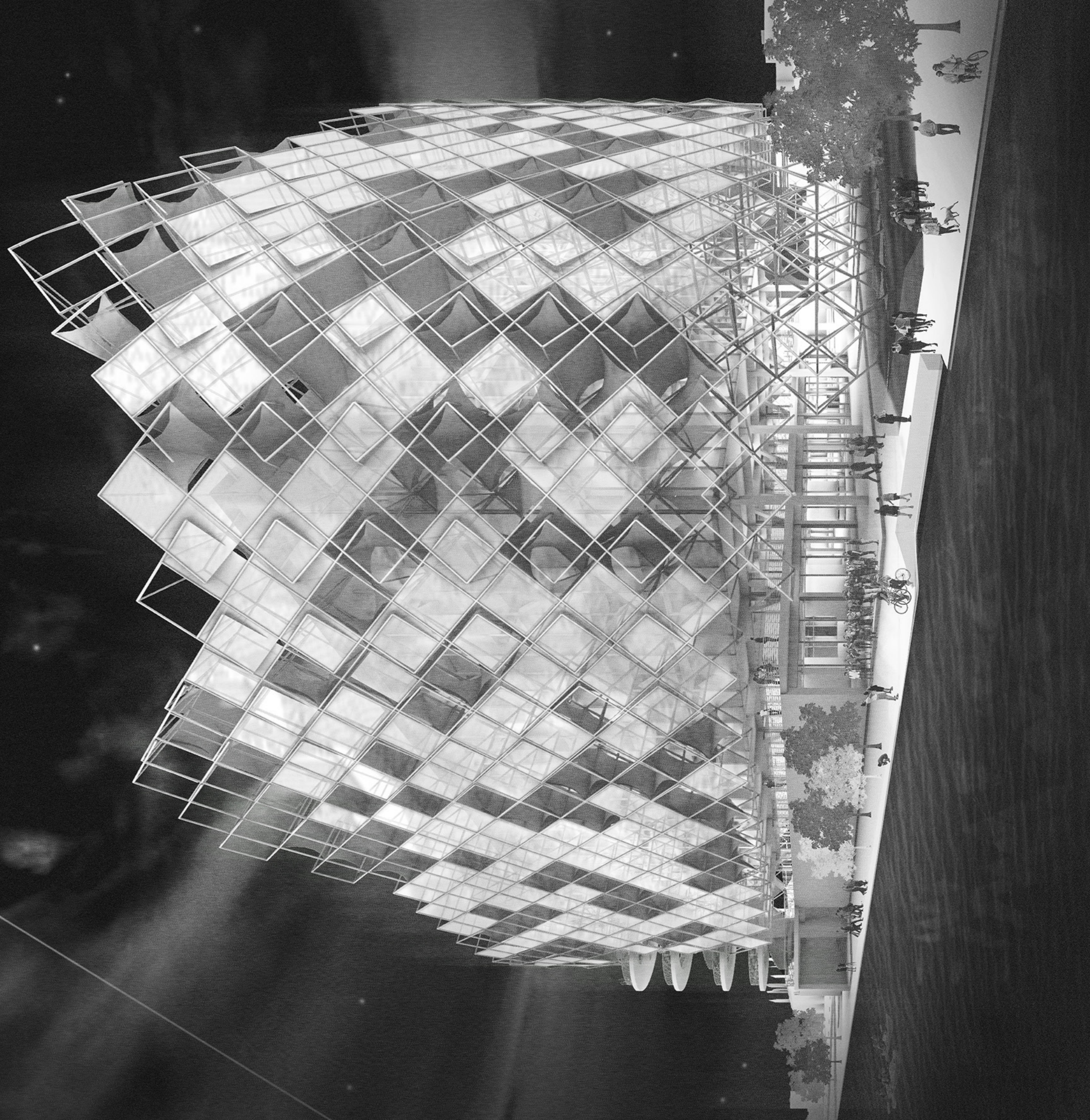


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CLIMATE

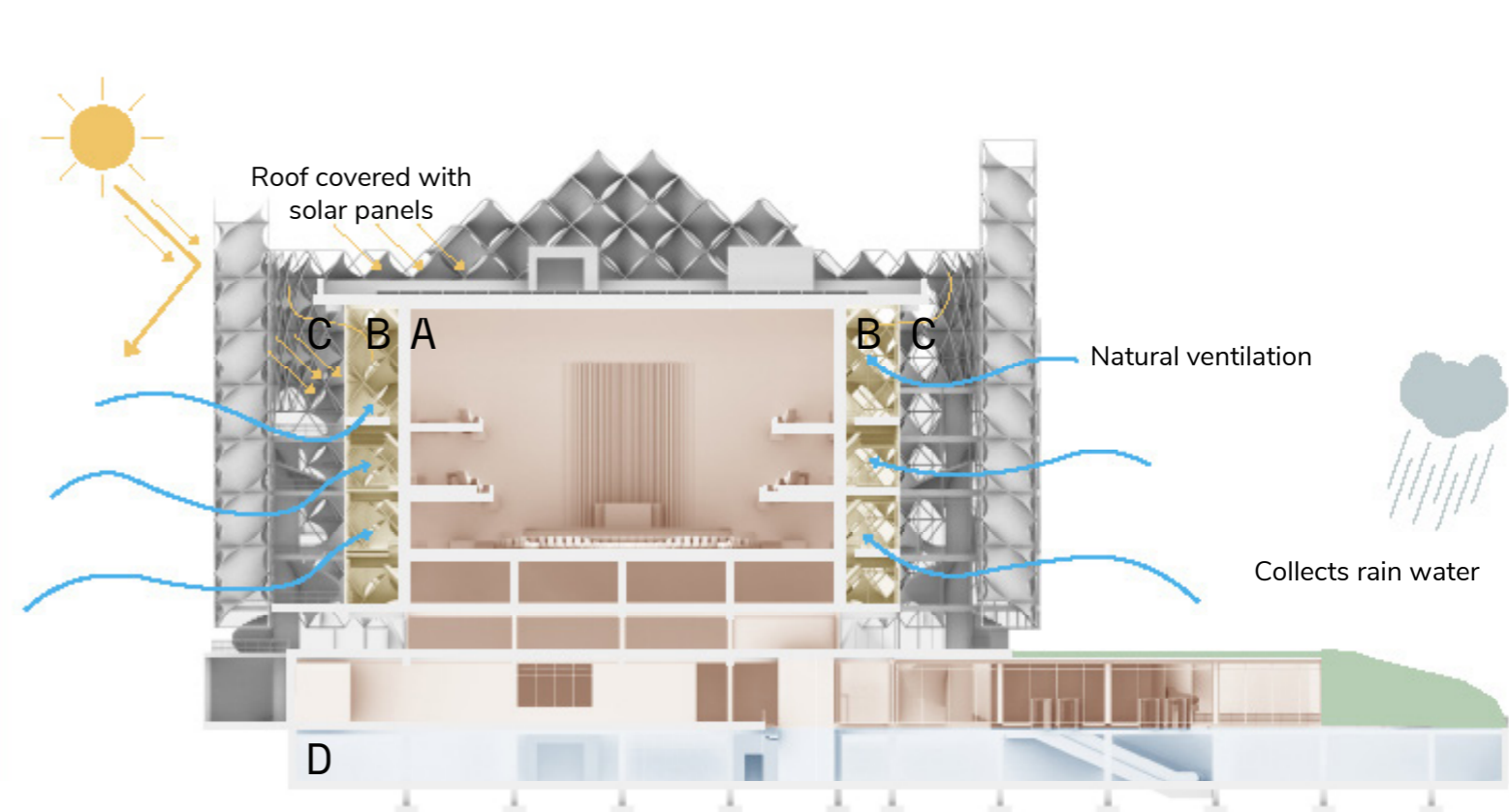
The gradient of climatic zones reduces energy demands and operating costs.

The green roof can collect rain water.

The kinetic facade allows perfect manipulation of the natural ventilation.

SUSTAINABILITY

E

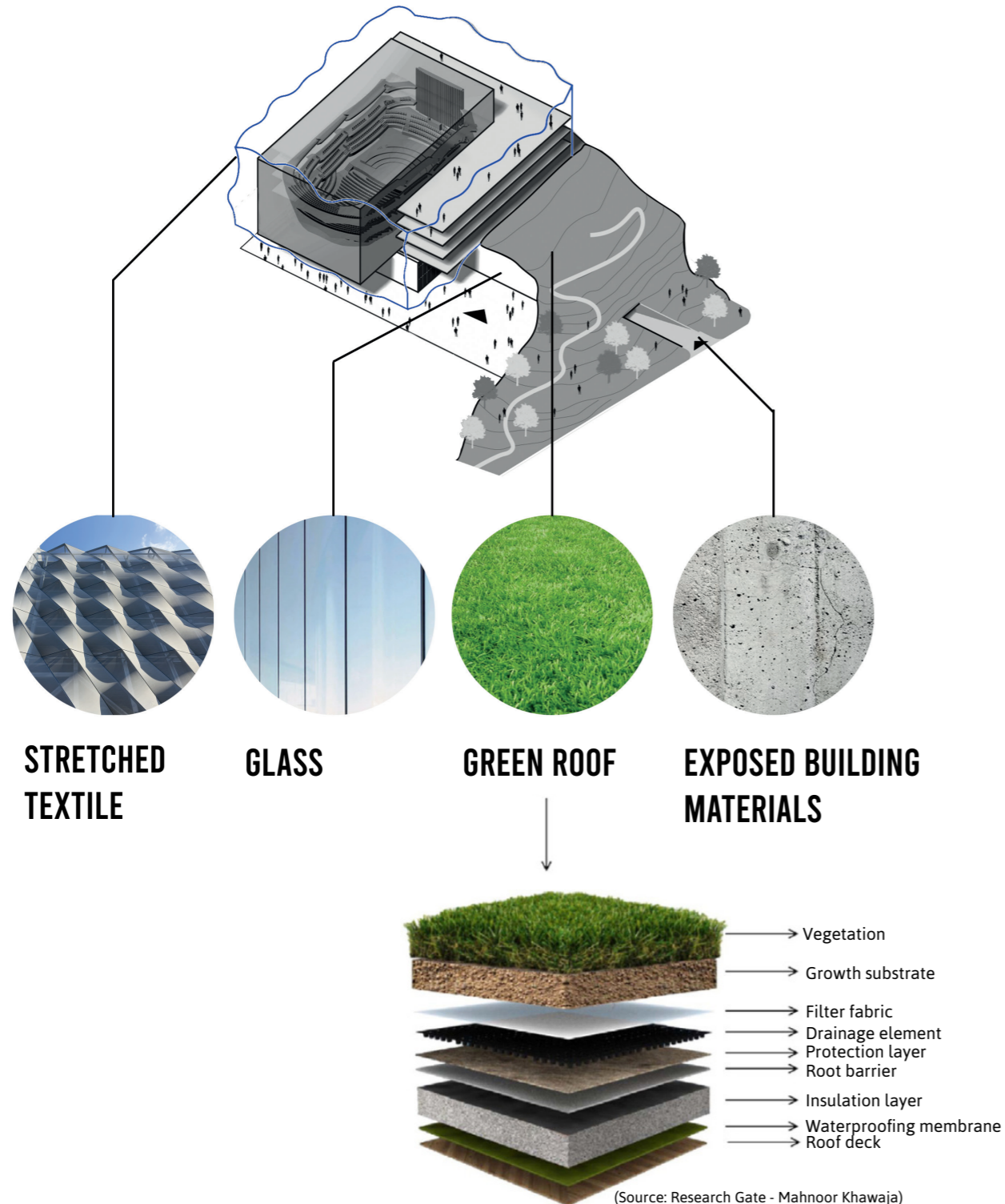


MATERIALITY

BUILDING IN THE BINCKHORST

In order to be able to perform as imagined in the concept design, the facade of the Music Marvel needs to be elastic and easily manipulated. For this reason the main material of the building covering almost 50% of the facade is a textile that is being stretched by the underlying mechanism that reacts to the brain waves in the building. This part of the building is the 'performer' and as any other it must not be overshadowed

by its surroundings. For that reason the rest of the building remains as simple as possible with the ambition of blending in with the surrounding nature. This will be achieved by covering the building with a green roof that will seem as an extension of the landscape. All façades will be glass in order to cause little distraction and any visible solid parts of the building will remain in its natural materials unless they require special treatment.



ACOUSTICS

SOUND ISOLATION

The performance hall will be completely sound isolated from the neighbourhood in order to provide a high degree of acoustic separation from the environment, but also from the rest of the building. The shell of the performance hall will be consisted of inner and outer layers (or inner and outer doors at the entrances that will form acoustic boxes as buffer zones). The inner wall must be concrete or solid, heavy masonry that is 200mm thick. The outer wall must be the same but 300mm thick. The ceiling of the hall must have two similar solid layers, each 250mm thick, with at least 2m of airspace buffer zone from the outside noise.

A low velocity, bottom-up displacement air system is planned for the ventilation of the performance hall as it has low noise levels.

MATERIALS - ACOUSTIC REQUIREMENTS

Wall and ceiling build-up materials must be massive to create little frequency channelling. Air cavities in build-up should be

avoided.

Seating must have hard reflective back and armrests supported on single or double pedestals to allow sound movement underneath the audience.

All floor finishing should be timber-hardwood with a matt finish seal that is bonded to a concrete slab.

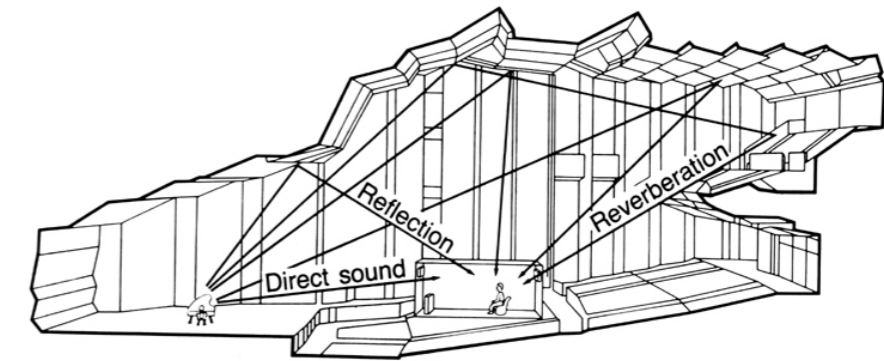
Balcony fronts and wall finishing should be hard (and subtle) structure to create sound reflecting performance.

SPECIFIC ELEMENTS

Reflectors must be of a solid material to provide appropriate reflection of sound at all frequencies so that all types of performance have same acoustics.

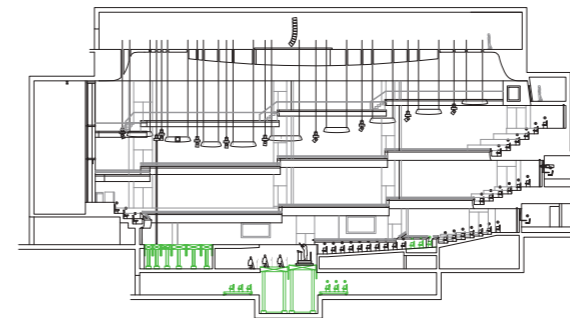
All exits and room portals must be covered with curtains.

Acoustic panels will be used for BoH rooms of the hall (control



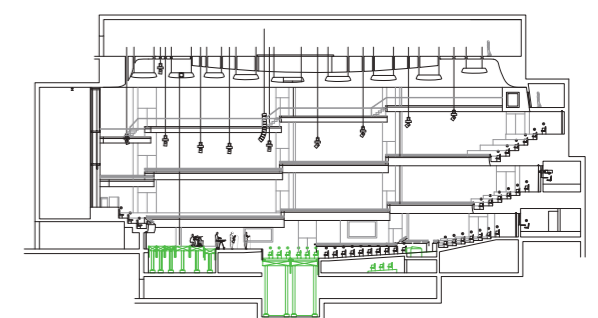
(Source: www.torgny.biz/)

5.3.7 Opera



(Source: ARUP)

5.3.8 Amplified music

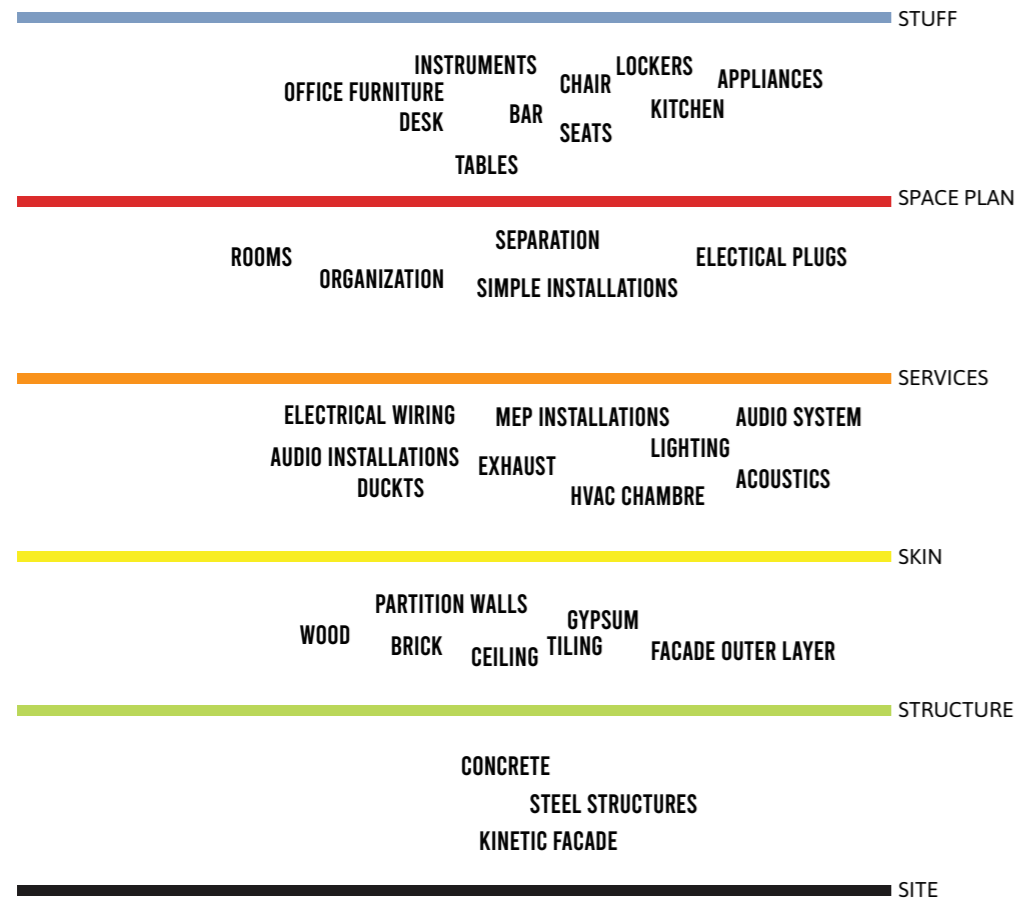
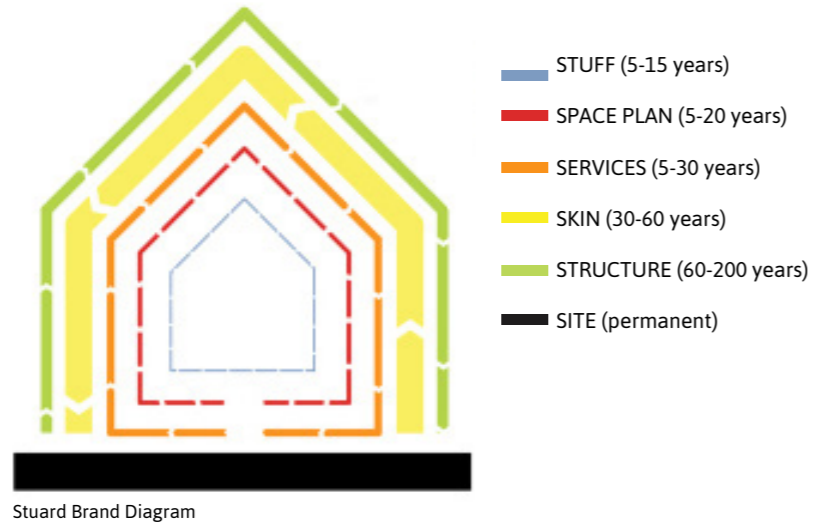


CIRCULARITY

STUARD BRAND DIAGRAM

Below is the circularity diagram showing 'Shearing Layers' of any building that should be used as a template for architectural design of buildings fabric in order to allow for easy deconstruction and re-use of materials.

According to this diagram every element in the building should have its life span. Following Figure _ is the list is a circularity check of these same elements within The Music Marvel.



FINAL REFLECTION

ASPECT 1

ARCHITECTURE -> STUDIO -> PROJECT

This is a reflection on the graduation thesis project The Music Marvel, a part of the Public Building studio at the TU Delft - Faculty of Architecture, Urbanism and Building Sciences under Track: Architecture and summarizes the design process and results achieved thanks to the tutorings of Ir. Henk Bultstra and Ir. Florian Eckardt. Additional consultations with experts and professors have proven beneficial in the early stages of the concept design.

The Public Building studio studies the importance of the public domain within the built environment and the atmospheres formed around the relations between individuals and/or groups and the designed building. The task is to design architecture for music, and these atmospheres will now include a very important cultural factor in the determination of their value. Architects will assume the position that is defined by participation in the revitalization of culture for all users of the space. Individuals' understandings of culture will be detached from their biological nature and patterns of emotional behavior through the use of virtual technologies that will help each person explore their own external consciousness. One that is independent of previous knowledge and experience and reacting only to a manifestation of isolated synesthetic experiences.

This design is embodied through the ephemeral architectural form that challenges subjectivity in design by including all users of the space in the never-ending process that provides this building with an ever-changing appearance. The architect stops acting as a sculptor of that which is built. Instead he creates a mechanism that shapes the building based on the data collected from all users. The users are participants in architectural expression and the public building is now made by the public.

ASPECT 2

RESEARCH <-> DESIGN

The first step in research that serves as a foundation to the produced design of The Music Marvel, starts with understanding of the location for which it is planned. In the first site visit, all were introduced to the factual reality of Binckhorst. Its historical value, position within, and connection to the rest of the city and the country, industrial significance and cultural characteristics. All students were familiarized with plans for future developments and the idea of contemporary living according to sustainable behaviour that this place will encourage. The commitment to pursue an environmentally responsible design was acquired before the intuitive spatial exploration of the location. Observations of the space, form, activity, the built and natural environment at the location had come after. This had caused retroactive disassembly of experiences created at the site into components that allowed for pragmatic exploration of the location. From this moment these components were also perceived as elements that could affect the design.

The theme of the thesis is music. I have made a decision to fully commit to music as an abstraction to be used both as an cause for and as a result of my project. Music was going to create architecture, and this architecture was going to be in service of music. The result was meant to be used by humans and humans know music only as the experience caused by noise organized in a rhythmic patten with unpredictable changes that cause arousal. Therefore, my ambition revolves around the human experience of music in relation to the quality of spaces where it is happening.

The part of this research was to analyse spaces created for experiencing music. Many different types of musical venues promise ideal conditions for the audience and the most valuable tend to adapt to the type of the musical performance and the frequencies of the sound. Most of the venues examine the ways to ameliorate the space based on these factors, which reside in reality. However, reality is a projection of consciousness and for this reason, my design examines personal experiences of each one of the audience members in relation to their awareness. Previous to this, research about neuro-oscillations and new technologies that are capable in deciphering them served as a necessary foundation for the produced architecture.

ASPECT 3

METHODOLOGY IN RESEARCH AND DESIGN

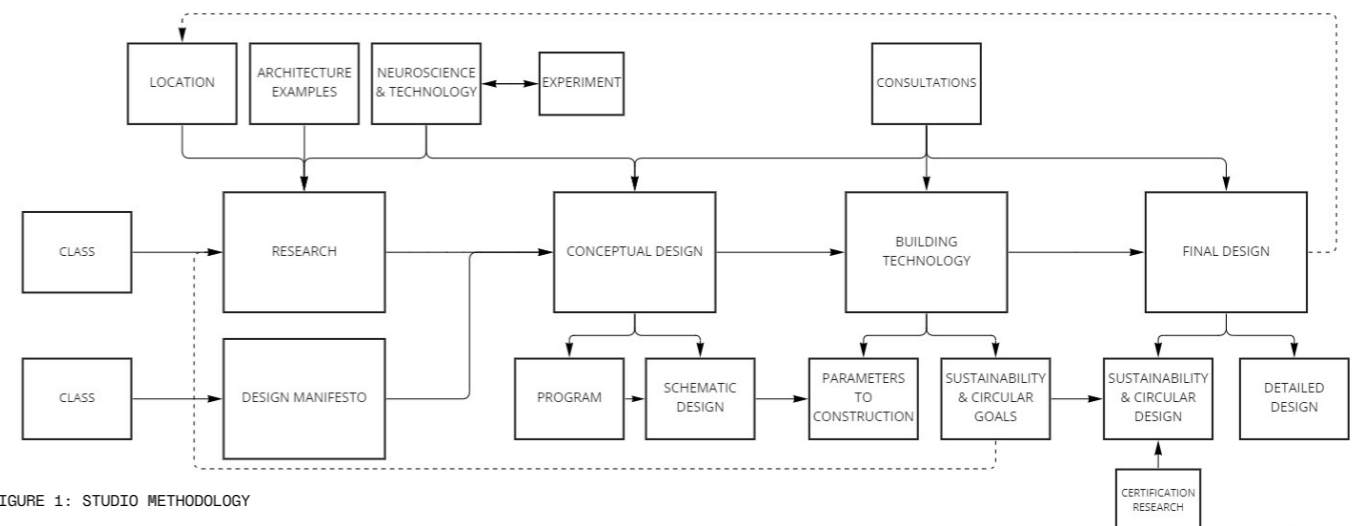
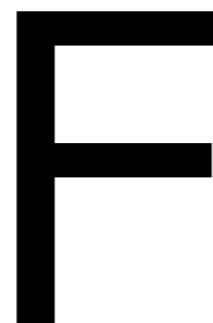


FIGURE 1: STUDIO METHODOLOGY

FINAL REFLECTION



F.1. (APPENDIX)

ASPECT 4

SOCIAL, PROFESSIONAL AND SCIENTIFIC RELEVANCE

The architecture of the Music Marvel depends on the changing data that ensures its relevance as the time passes. This means that the architecture itself changes based on the renewal of input parameters. This ephemeral characteristic is reflected in the changing shapes of the interior and the façade which depend on the movement and illumination of their many parts and their combinations. Together these changes can produce a nearly-infinite number of variations when it comes to the appearance of The Music Marvel.

This unpredictable nature of The Music Marvel was inspired by the Design Manifesto where I question subjectivity in architectural design. I ask a question: 'How important is the architect's intuitive and calculated nature in the aesthetical outcome of a public building?' and argue that public buildings, as they are made for all users equally, need to reflect their neutrality towards all (including the architect) by not favouring one's taste before the others'.

The changing design reduces the architect's unnecessary influence and demands of him a mechanism that will create a design for him as an indistinguishable member of the community. In the case of The Music Marvel the mechanism changes the building in accordance to the parameters collected from all users by recognizing their reactions to music – the essence of this design.

All human reactions can be traced through the measuring of neuro-oscillations by available, and very simple, devices. By eliminating perception of all unwanted elements in our surroundings during a musical performance, and by diminishing emotions related to individual realities that exist before and after the musical performance The Music Marvel ensures that only thought occupying the brains of the audience members is their current perception of music. This stimulus causes changes in everyone's brainwaves through shifts of awareness that are measured (with EEG devices) and translated into numerical values to be instantly used as parameters for the changing architecture.

This mechanism uses the musical performance to affect the brain that causes the architecture. From there on, the music and the architecture together form new experiences that cause this process to be repeated as a loop.

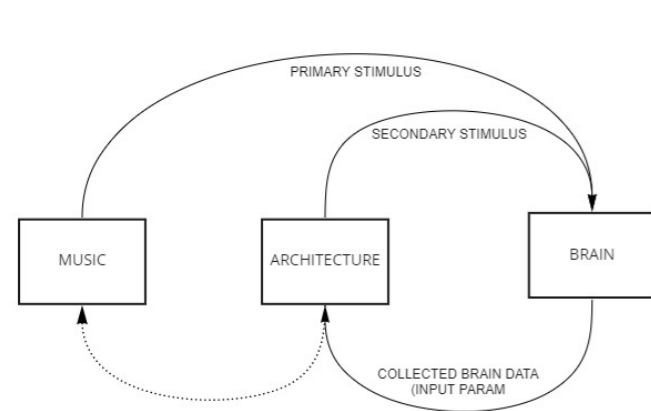


FIGURE 2: MUSIC - PRIMARY STIMULUS
BRAIN DATA - INPUT PARAMETERS
ARCHITECTURE - RESULT / SECONDARY STIMULUS

micro

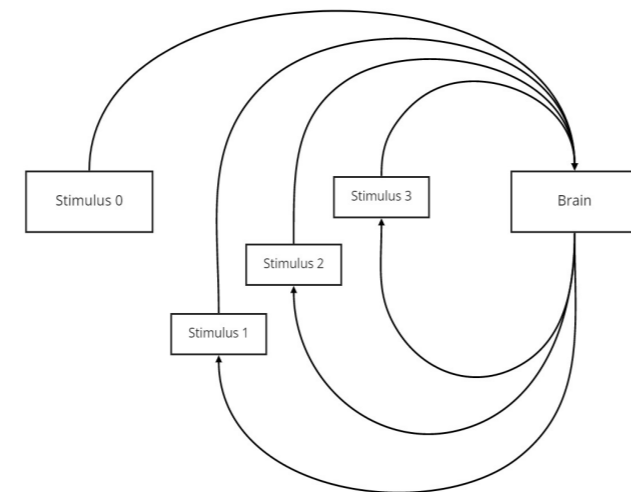


FIGURE 3: LOOP MECHANISM

ASPECT 5

ETHICS [RESEARCH -> DESIGN PROCESS -> DESIGN APPLICATION]

The Music Marvel eventually becomes a built structure and its design, as much as it is socially inclusive, must be equally aware when it comes to environmental responsibility. The last step of the design process was the implementation of the research on sustainable design and circularity. Without sacrifices to the concept, many changes have been introduced in the late stages of the design process in order to create a healthy and ethical architecture. This is noticeable in the hybrid structure that mostly relies on sustainable timber and less on recycled concrete that is responsible for less CO2 emission than is produced by regular concrete. Solar panels have been included where possible to maximize energy efficiency and a large green surface covers all supporting places in order to invite people to approach the architecture of the accented performance hall. This green roof is also capable of rain-water collection that may be reused for various purposes within the building. Lastly, the kinetic façade proves its double significance as it serves as a tool for the ephemeral architecture and as a second layer of the façade that creates a climatic buffer zone between the outside and the performance hall. This buffer zone reduces heating from the outside thanks to its natural ventilation and minimizes the wind effects. The underground garage is designed to provide parking for the public when The Music Marvel is not working. But its limited amount of parking spots for regular cars and well designed biking lanes in the landscape encourages visitors to use more sustainable modes of transport. These and other sustainable and circular solutions have been implemented as a result of useful consultations with the tutors and experts as well as with public information from organizations like UNDP and LEED.

