

The Modulator.

HAC Terrain, Binckhorst, the Hague

MSc 3 Public Building - Music Marvel - Bart Schipper - 4465741

Reflection

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Introduction

What is a music marvel?

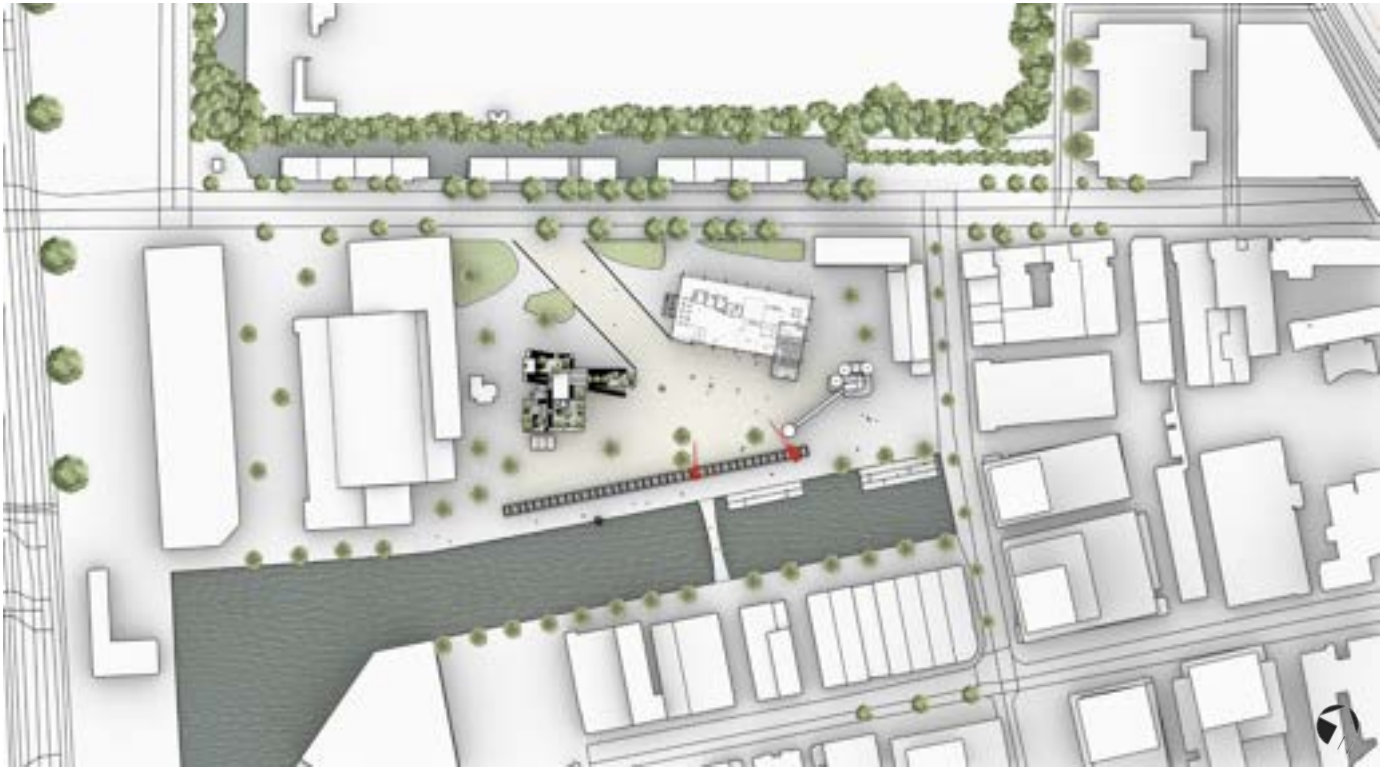
The goal of this design project is to design a music marvel in the Binckhorst, the Hague. But what exactly is a music marvel? Although this term can be interpreted in many different ways, following the developments in the Binckhorst, The modulator gives it the following interpretation:

The Binckhorst is a former industrial site that is in full transformation by the municipality to a lively urban area. Amidst rising up residential towers, the character that makes this site so telling seems to often get lost in the process. At the same time, as has come forward from the site and manifesto research, what the Binckhorst is lacking is exchange. Both the existing locations and the future projects are often fenced off, turned inwards, or only take into account their direct surroundings. They don't contribute something to the area as a whole. The same is the case for the Binckhorst in the context of the Hague. The Binckhorst is where the city put all the functions they didn't want. Now it could turn into a residential high-rise area without many facilities, which, other than providing housing doesn't establish a relation with the rest of the city. In the research I discovered a strong relation between music and exchange. There is an exchange between band members playing on stage. An exchange of ideas, when artists collaborate and create something larger than the sum of their parts. There is a huge exchange of energy between artist and audience during a live performance. A music marvel therefore is:

Not just a music building, but also a building that promotes musical exchange and interaction on many different levels. The music marvel uses this musical exchange to bring exchange to the Binckhorst as well. Lastly of course... it should do this in a conscious and sustainable manner.

The latter is also an important subject in the design. The design re-uses an existing building at the HAC terrain and sources the majority of the materials locally. There is also an emphasis on assembling the building in such a way that it can be taken apart again, and circular material choices. More on this can be read in the 'The Modulator' chapter. First the reflection will go into the research used to come to the final design. The reflection also goes into detail about the role of the manifesto and the site research that played a major role in the project. [If you wish to directly read about the P4 design, you can skip to page 9.](#) I hope you enjoy the design.

Bart Schipper



Site overview of the building at the HAC terrain



location in the Binckhorst

Research leading up to P2

Audience interaction

My research leading up to P2 initially started with the theme of audience interaction. For this, I researched if my building could provide a way for the audience to be involved in the creation of music during a concert. I used the process of sound synthesis, a great passion of mine, as the basis for this interaction. In sound synthesis, an electric base signal is taken, and lead through a number steps that shape the sound. These steps include filtering and controlling the pitch and amplitude of the sound. These steps that shape the sound can be controlled through other electric signals. This process is called 'modulation'.

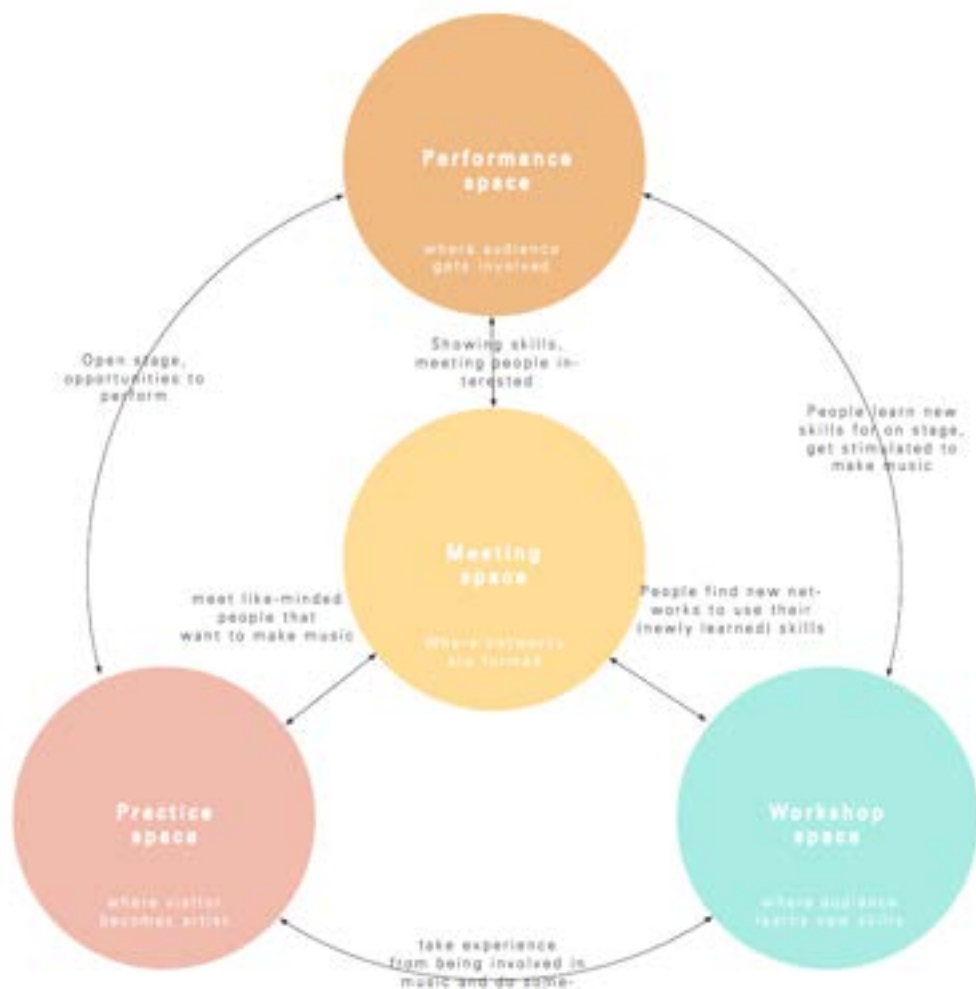
Initially, I viewed the concert as a one-way process. The artists gives a performance, and the audience receives this performance. The process of synthesis could serve as a means to change this, and involve the audience into various stages of the sound design (read: music making) process. For example, the artist could provide a base of the music, and the audience, through various means, could control the tempo, rhythm and direction the music went in. Alternatively, the audience could determine the base, and the artist could, following this, shape the sound and make something musical out of this. This process could be described as a musical exchange.

Because this is of course complicated, I looked for case studies where musical exchange had already been realised in practice. For this I looked for both direct examples of places that had done similar things as what I had in mind, and places that had realised exchange in a different manner. I also looked for theoretical research. For a case study which was similar to what I had in mind I found a project in Berlin. In this project they did music performances, in which the audience could control the lights and aspects of the music using sensors in columns and on the wall. Funnily enough, this project was also called 'EXCHANGE'. I also found papers describing methods of how the audience could be involved in music making during a concert, using mobile phones. Many examples of this were however not found. This is not surprising, as the technologies required are relatively new. I also looked at interactivity in other arts, and found a long history of this already in museums and art installations. For case studies describing other manners of musical exchange, I took inspiration from my personal experiences.

The most important case studies - framework of exchange

Two important projects for the shaping of my project are the public music space 'dB's', and the private music space 'Kytopia' which I also had the privilege of visiting multiple times. Both feature a mix of functions that make them work extremely well, and make them into some sort of a musical incubator. This is a fact they are well known for, and which you immediately feel when you are there. dB's consists of practice rooms, a performance space, and a bar and terrace, where bands play often. This makes it into a place where many bands who practiced there made it to the stage and gained an audience. At the same time, people visit the place to drink something together and get to know new music. Because of these things,

dB's has brought forward many big bands from Utrecht. Kytopia consists of the studios of many big and small artists, centered around the old main room of the venue Tivoli Oudegracht. Here the artists both perform to each other and host private concerts. People can also have a chat in this space and drink beers together. Kytopia makes it very easy to get to know other artists, collaborate and jam together. This shifted my perception of musical exchange. These places made me realise that music is all about exchange. There is exchange between band members on stage, exchange of ideas when artists collaborate and create something bigger than the sum of their parts. There is a huge exchange of energy between artists and audiences during a concert. There is also exchange between people who love music, and can talk about it and share their passion with fellow enthusiasts and musicians. From this, the framework of functions and their mutual relations for my building was born. This framework consists of a practice space, workshop space and performance space, centered around a meeting space was born. The goal of this framework was to center the building around this musical exchange. Musical exchange should be promoted in the building and its activities where present, and where it was not present it should be introduced. This lead to a building with the functions derived from the case study research that enable exchange and make it an incubator, and with the interactivity introduced into the concert space to fill the gaps in the exchange.



Framework of exchange

Manifesto & the Binckhorst

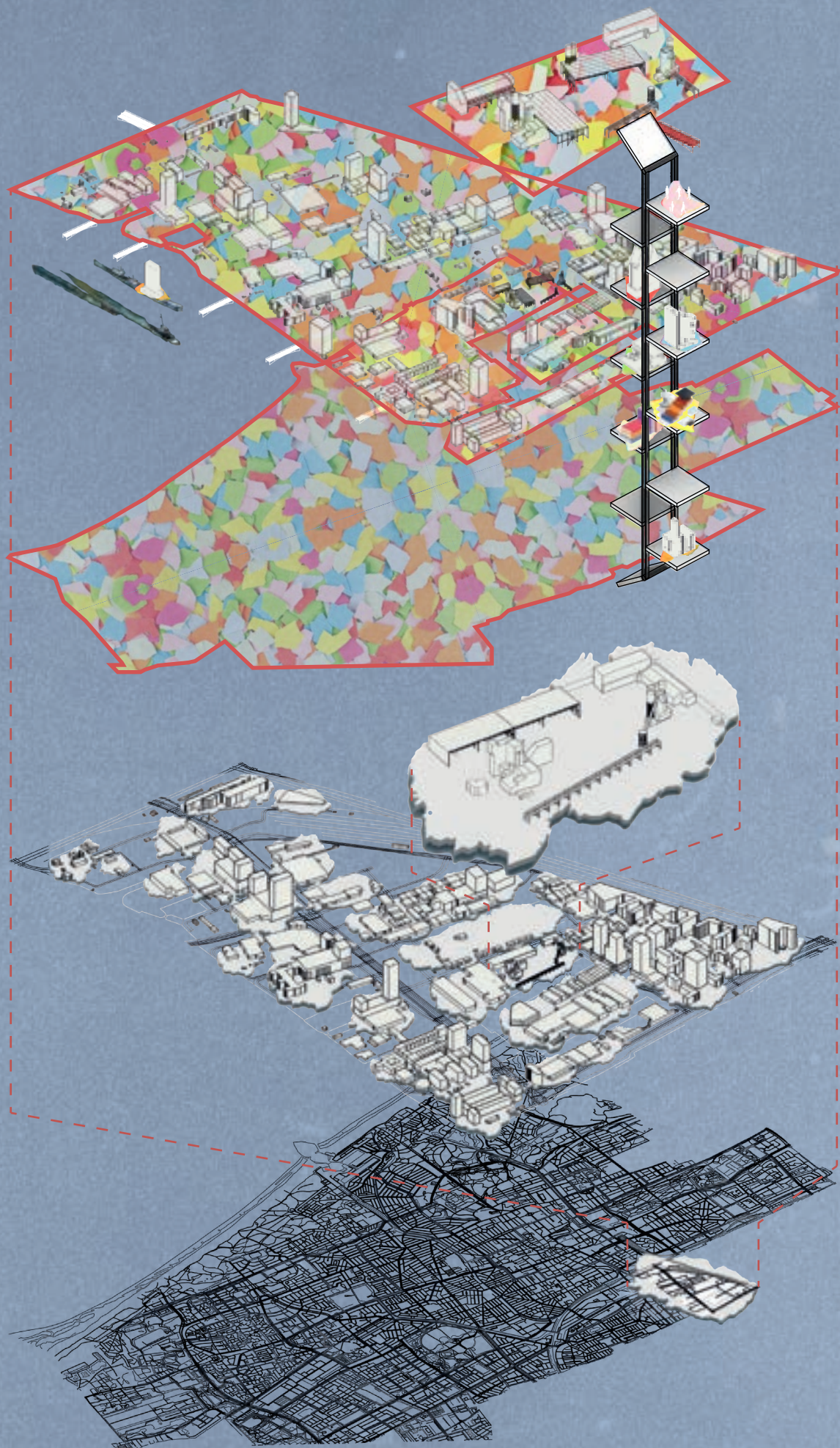
Manifesto

At the same time, I was researching the Binckhorst. This led to two important aspects of the design and research process. Firstly, the Binckhorst is an enclave in the city. It is where all the functions were housed that the city didn't want elsewhere. The area is also walled off by a railroad on two sides, and water on the other two, isolating it from the city and the surrounding neighbourhoods. Both the existing locations and the new projects in the Binckhorst are very turned inwards. Existing sites and buildings are often walled off, and new buildings mostly only take into account their direct surroundings and don't contribute anything to the area as a whole. What the Binckhorst was essentially lacking was exchange, both on the urban scale and the local scale. This was what my manifesto dealt with. The manifesto 'Bincx-change' sought to introduce this back to the Binckhorst, and promote an exchange of people, knowledge, facilities and goods at all scales to make it a coherent neighbourhood and a functioning part of the city again. To relate this back to the design, the building was to introduce the much needed exchange into the Binckhorst in the form of musical exchange.

Re-use and the character of the Binckhorst

The second discovery in the Binckhorst regards sustainability and re-use. With current-day global warming and a potential future material crisis, it is essential to re-use existing buildings and materials, and reduce emissions wherever possible. Additionally, old warehouses and industrial locations often provide a lot of quality for music locations. They are generally associated with a raw and underground feeling. This is something I have experienced myself as well many times. I wanted to utilise the opportunities that the Binckhorst provided in this regard, and find an existing building that would suit my music marvel. At the same time, especially for an industrial area like the Binckhorst, there is a lot of character embedded in the materials and objects in the location. Using these materials and an existing building is a means for showing and retaining the character of the Binckhorst. This is something I felt was important, especially as modern high-rise towers rise up in the area. In the end, my eye fell on a canopy at the old HAC-location, the old cement factory. During my site visits, I also noticed the presence of many containers in the Binckhorst area. These are an ideal format for many of the functions in my building. They are also very characteristic for the Binckhorst. That's why I wanted to employ those as well.

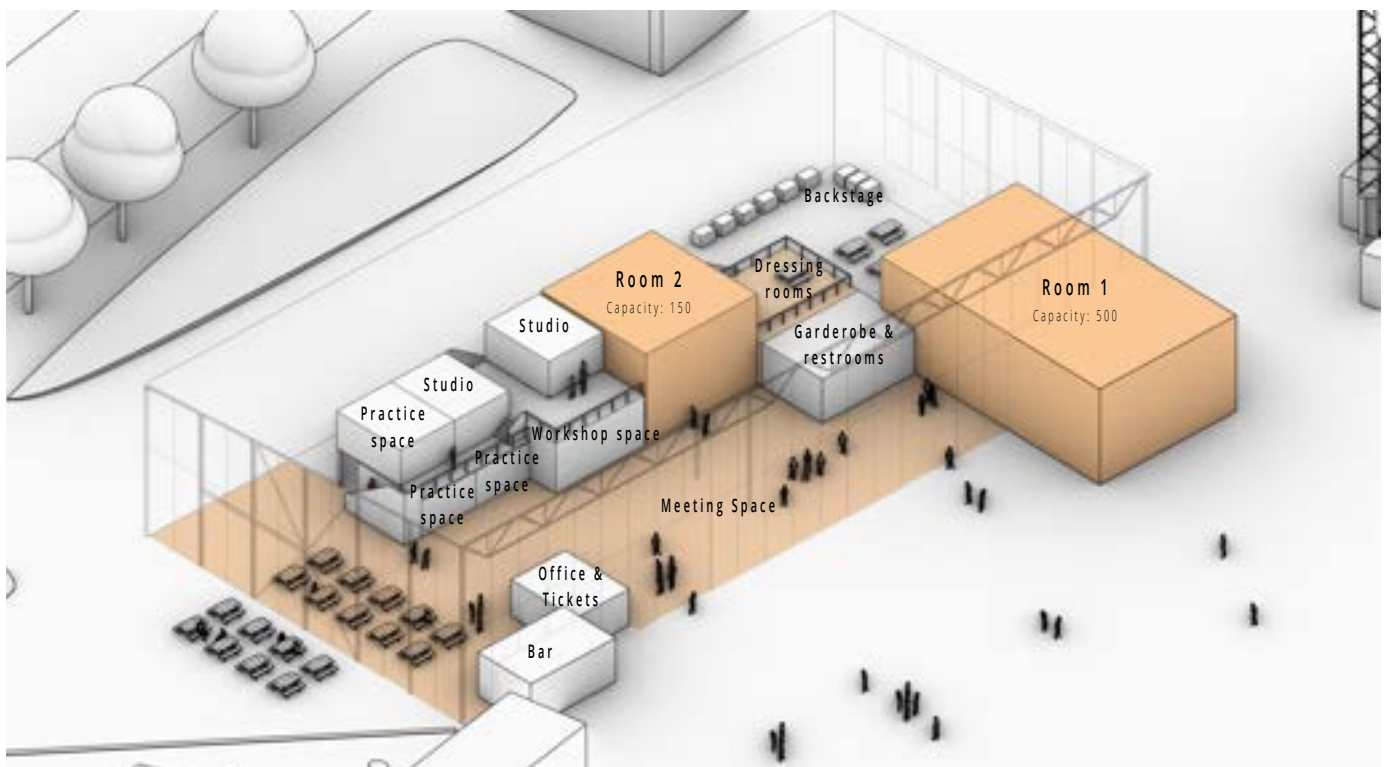
BIN CXCHANGE



Continuing after P2

Making the Modulator modular, and transitioning from interaction to exchange

All the previous discoveries formed the basis for the P2. The canopy was turned into a hall by adding a façade, in which the containers fulfilled the functions of the building, together with two concert halls. The modules divide the bigger hall up into different spaces. The front where all the people from the functions come together forms the meeting space. The back, which is walled off from the public by the containers forms the backstage. Following both the feedback from P2, and reflection of the design afterwards, it became clear that there was more potential in the design. The containers, an inherently movable system by themselves, provided an opportunity to allow the design to cater to more situations. The term 'modulation', and the title 'the Modulator' also almost implied that there could be going on more with the design, in terms of modularity. Regarding the audience interaction during a concert: Although you in theory could design a whole building based upon this, if it isn't done well it could become kind of a gimmick. Although it is interesting for a certain amount of time, it is also very limiting in terms of what concerts could be given. An alternative would be to only have these concerts sometimes. This would however not make it a strong building concept. Just audience interaction during a concert also didn't do the rest of the building justice. As mentioned before, in the research process I discovered that there is in fact a lot of exchange in music, so I decided to focus on this. Being able to move the containers also widened the scope to the rest of the area, and offered much potential to facilitate this exchange on many different scales and in many different ways. This, in combination with the theme of sustainable re-use, and keeping the character of the Binckhorst through the materials and architecture forms the basis for the design up to P3 and P4.



The building at P2

The Modulator

Today I present to you 'The Modulator'. Through controlling the different elements, the building 'modulates' the musical experience that can be provided to the visitor. This is done to create various different scenarios of musical exchange. Just like a synthesizer, with a limited amount of elements, the building can produce a wide variety of sounds. The building can also be viewed as a musical composition. The modules are the chords and notes, and by arranging them in a different way, different musical pieces can be created. This can be done very controlled, like Electronic Dance Music, or very improvised, like Jazz. And although the elements stay the same, the outcome is vastly different.

What this looks like in practice

How this looks in practice is that you have the containers housing different functions. The containers can be used to fulfill these functions, but by placing them in certain ways in the building, they can also fulfill different functions in this space. Think of segmenting off areas, creating stages or serving as support functions for bigger events. The program is no longer confined to the hall itself, but can extend to the square and waterfront in front of the building as well. This way, the building can facilitate scenarios anywhere from small concerts in the practice rooms, to concerts in the normal concert halls, to a full five stage festival taking place both in the building, and on the public space in front. In this, the building caters to the needs of the city in different ways as well. From the research came forward that the Hague is missing capacities of around 100-150, and 500 people in their music venues. The first is due to the closing of Magazijn during Covid, and the second is due to the Pip being too small for certain events, and Paard being too big to accommodate these as well. In the Popnota 2017, the municipality also described the wish for a new festival location in the city for 10 events of around 2.500 people, and 5 events for around 5.000 per year. They wished for this location to be in the Binckhorst. There are no suited locations for this in the Binckhorst yet, and the design creates this location. Following the conclusions of the manifesto, I wanted the square to be a place for exchange for the Binckhorst as well. Due to its central position in the Binckhorst it is ideally suited for this. The public events on the square facilitate this need.

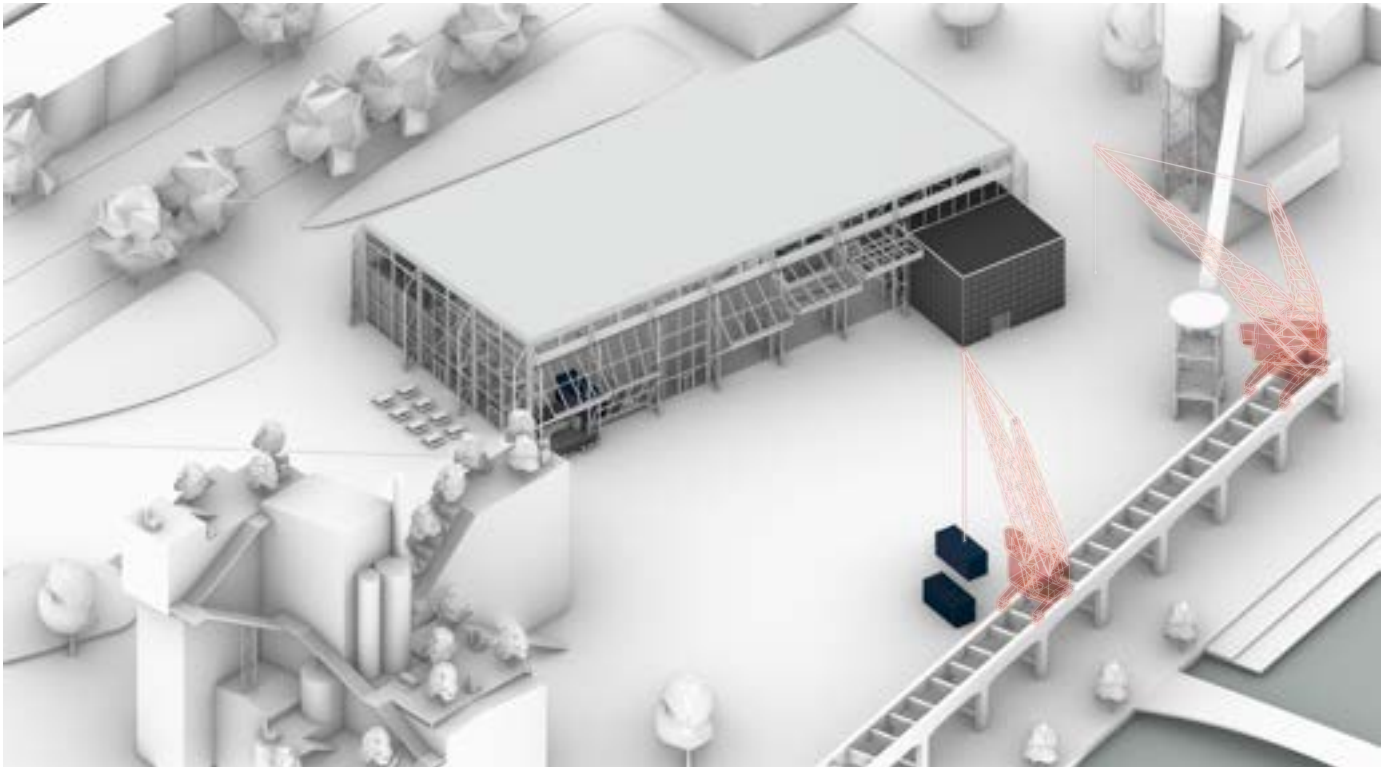
Building technical measures behind the movements

In order to make all these movements possible, a combination of building technical measures is used. Firstly, as mentioned before, the containers are already a movable system. When designing and adapting these containers, it is necessary to make sure they can still be moved and are impact proof. Therefore, this was taken into account in the design. The containers are moved using small drivable elements that you call 'transport cassettes'. Firstly you raise the containers using hydraulic raisers. Then you put them on the cassettes. With this system, you can drive them around using a simple forklift truck. Because of this free system, you can put the containers anywhere, providing a lot of freedom. The containers can also be stacked to create multiple levels or bigger stages. To do this, the cranes at the waterfront in front of the buildings are used. From there they can be ridden to their desired location again. Because of this weight is a significant consideration to be taken into account. Therefore a lot of research was done on

this subject. Firstly I determined what weights the containers would have when transformed and carrying out their function, including potential variable loads from people inside. Containers can also only be stacked on their corner points. This is where they are strongest. For stacking in other ways, frames or platforms in between need to be used. I did a visit to the site as well, and interviewed the head of operations and the crane operator. This allowed me to determine what load the crane could carry. It also gave me valuable insights on the construction of the canopy and the site. The crane could carry 10 tons, or 100 kN. This means this was the maximum weight a double container could have, in order to be stacked by the crane. The transport cassettes also have a weight limit. These findings lead to the maximum of 2 double containers stacked in the design. Due to the large weight of the containers, any conventional floor method was completely unviable for the design. This led me to research into industrial floors, which can generally carry a lot of weight. For heavy weight you need what is called a 'pavement floor', which is not placed upon a foundation, but instead placed upon a subbase of gravel, and a layer of sand underneath. Calculating the dimensioning of this floor was also the biggest challenge of my structural design. Finally, in order to allow the containers to move in and out the building, I decided upon a bifold façade system. These are large upward folding doors that allow the building to open up to the square. This makes it also that the square and the hall can be connected to form one larger event space. The need for such a system was the need for acoustic glass in the façade, which allows concerts to take place both inside and outside, without acoustic interference. Although not strictly related to the rest of these elements, the truss columns on the façade can be used to further attach elements like lights, curtains and art to, to further increase the versatility of the space.

Material sustainability and circularity

Architecturally speaking, the building could be called a summary of the site and its surroundings. This was also done from a motif of sustainability. The building re-uses the existing canopy. The parts of the second canopy adjacent to the building are used for parts for the first building. The roof truss beams are used as façade columns to carry the façade. The steel H-beams are used to make up the structure of the concert hall. The corrugated sheet façade and roof of the second canopy are used as an addition to the roof and façade of the first canopy, allowing insulation to be put inside. The façade material of the concert hall is made from re-used PVC from building wrap of building materials for- and around the project. The containers are sourced from the Binckhorst. Except for wherever new materials are completely necessary, existing materials are used. During the design process, energy-wise, it turned out that containers are not sustainable anymore when you modify them too much, or take too much parts out of the container. Therefore when using regular containers was not optimal from a sustainability standpoint, I decided to use building containers. Whenever there is more than one extra opening it was not worth it anymore to use existing containers. Building containers, although they contain new materials, consists of a separate structural frame, where the infill panels can be taken out at will. Both the frame and the panels can be used infinitely. Therefore from a circularity perspective, the building container is still a



The building at P4

good choice. Regarding circularity, the building is also constructed primarily with screw connections. This allows most of the materials to be re-used after the life of the building is over. For the existing containers, when they are exposed to temperature differences, due to the closed nature of the façade, the façade starts to 'sweat'. This makes it necessary for closed cell spray insulation to be used. The traditional solution for this would be PU-foam. This material is however very bad for the environment and emits toxic fumes. This would not rhyme with the rest of the project. Therefore, after research into the subject I opted for closed cell icynene, which is a much more sustainable and less toxic alternative.

Acoustics

In the rest of the building, mainly rockwool is used. This is done for acoustic purposes. The main hall features sound absorbing panels on the back façade and ceiling to dampen standing waves and diffuse reflections. This gives the space better acoustic qualities. Fabric can be attached to the façade columns to darken the space and further reduce sound problems. The concert halls feature a box-in-box construction to prevent sound leaking to the adjacent space. Acoustic treatment in the studio in practice containers is also taken into account with bass traps, diffusors, absorption panels. Diffusion and absorption treatment can also be found in the concert halls.

Conclusion

Did the design succeed in its goals?

All in all, the Modulator is a building that can facilitate many different scenarios of musical exchange, with a limited amount of space and a limited amount of elements. Through this, the building also provides a place for the Binckhorst to come together, and for musicians in the Hague to come together. The building fills a gap in the city and in the Binckhorst. In the process, the building keeps alive and shows the character of the Binckhorst, which is sometimes lost in the new developments taking place in the area. So in this sense, the building succeeded in its goals. The research played an important role in realising this. The manifesto and the case study research especially were vital in developing the concept and coming to these conclusions.

Although not all the elements of the previous designs and research made it into the final design, they played a key role in the coming to be of the project. In the end, I think it was a good choice to transition from musical interaction to musical exchange in the design. Although there is a lot of potential in musical interaction as well, focussing more on musical exchange made the design more coherent, and allowed the design to be more relevant to the Binckhorst and the city. All things considered, all the different branches of research came together nicely, and I think the project does the term 'the Modulator' justice.

The building also manages to do this with a high measure of circularity, and a small material footprint. A large amount of materials are re-used, and many building parts can be taken apart and re-used after the building's service life. In this sense, the building also mostly reached its goals. However, there are some properties inherent to a concert hall that conflict with these ideals:

Ethical dilemmas & contribution to architectural discourse

The main dilemma inherent to halls for amplified music is the requirement of mass and air-tight enclosure. It is almost impossible to realise an amplified music hall without the use of large amounts of concrete. This was unfortunately impossible to circumvent in the design. The re-use of containers also poses a few sustainability problems. Although re-using containers is a good alternative to the energy costly remelting of steel, many of these benefits are lost when putting a lot of energy and resources into modifying the container. The containers need to be stripped of toxic paint, and making too many openings negates the energy benefits of using a container. Because of this, where many openings were required, building containers were used. Lastly insulating the containers also requires a non circular solution.

Therefore as you can see, it was not possible to realise the complete building in a sustainable or circular way. The building does however use sustainable solutions where possible. It can serve as an example for the application of sustainable and circular measures in the architectural and scientific discourse. The building however also shows that for some applications, improved solutions need to be found.