

**MASTER**

**Vyborg Mill**

**transformation : from industrial site to cultural identity**

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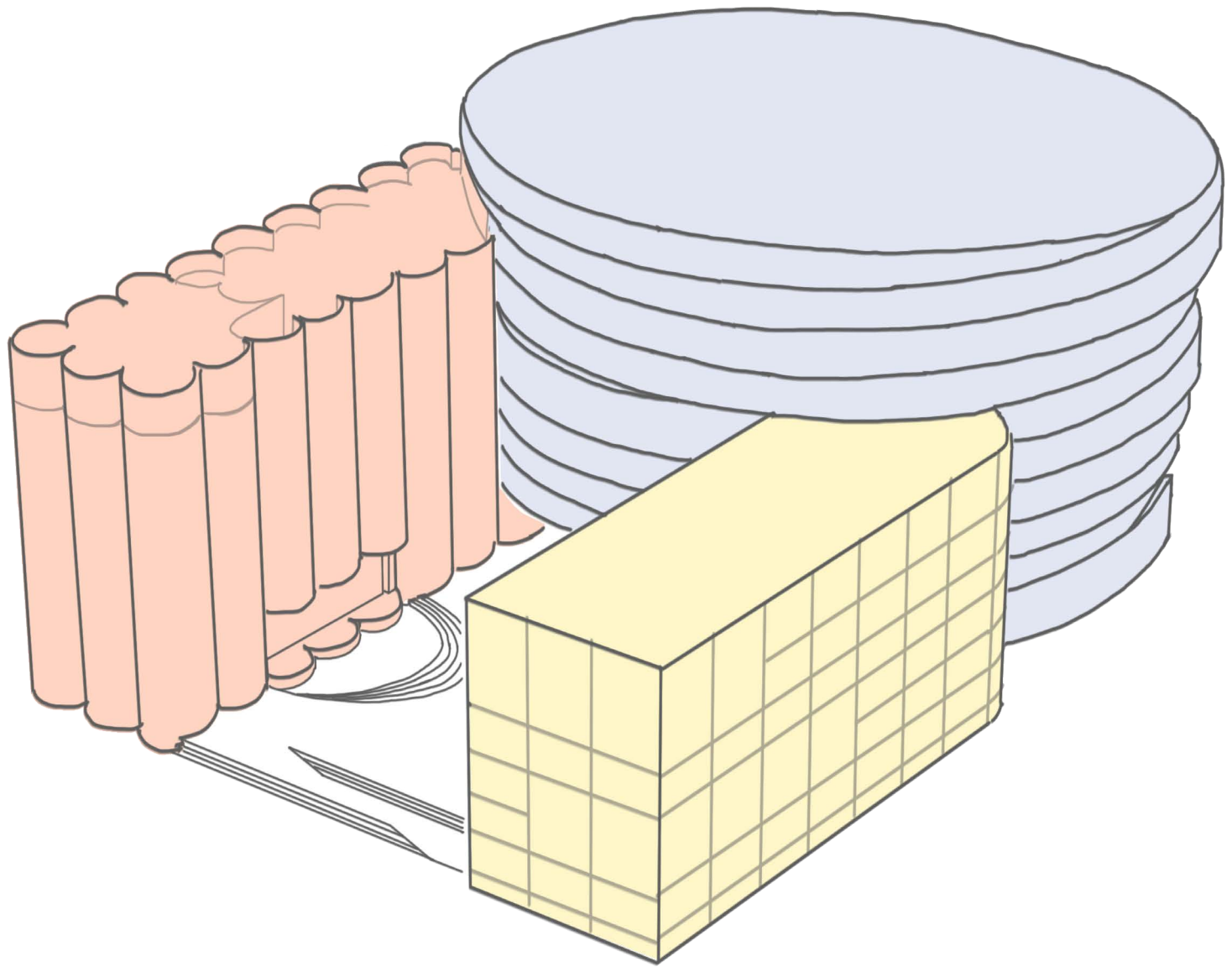
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# Выборг мельница

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Transformation;  
From Industrial Site  
to Cultural Identity

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From Industrial Site  
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## ABSTRACT

The Vyborg mill is an abandoned bread factory and located in Vyborg, which is a city on the border of Russia, nearby Finland. The city has a very rich history and belonged to Finland until World War II. Vyborg was one of the three largest cities of Finland and the Finnish history can still be seen in the architecture. The Vyborg Mill is located at the harbor on the border of the city center, which is also the district with the most tourist spots. The transformation of the Vyborg mill will create a combination of the Finnish and Russian cultures and promote Vyborg.

The Finnish and Russian culture both have had a great influence on the city of Vyborg. Nowadays these two cultures are very different. Where the Russians like to talk, open up and be emotional, the Finnish are listeners and modest. The Russians live in a country with a high rate of unemployment, criminality and poverty, while the Finnish live in a country with a low rate of unemployment, criminality and poverty. This contrast can also be seen in the relatively high GDP differences.

The two countries also have some similarities. Because Saint-Petersburg, Vyborg and Helsinki are almost located on the same latitude, they have the same type of climate. Therefore the same seasons and same types of festivals, like the white nights in the middle of the winter. Furthermore, both countries have a strong history in ballet and opera, which is still noticeable in the today's culture.

The first elements of the Vyborg Mill were built in 1931-1932 and designed by the Finnish architect Erkki Huttunen. The Finnish architect designed the silos and the U-form at the south, which created a courtyard connected to the streets. The other building elements are designed in different periods of time. Although, the Mill got severely damaged by the Soviet troops during the Second World War, the Finnish could resettle the building at the end of the trench warfare.

For the transformation of the Vyborg Mill, the weaker elements of the building are to be demolished. These elements are weak in sense of maintenance and construction, or are weak from an architectural point of view. The bakery is still operating and won't be taken into account during the transformation.

The silos remain because they are the most recognizable and unique element of the building. Therefore, they will be recognizable as silos after the transformation, even though several silos will be demolished and openings will be made. The former storage also remains, because of the view from the backside of the building. The round corner at the south has a great architectural value from the point of recognition.

Because these two elements are now separated and the program cannot be completed within the remaining elements, a new volume is added. The new volume respects the existing volumes and wraps around the existing buildings. Furthermore, the new volume creates an interior connection between the two existing volumes. This interior connection is needed because of the Russian climate, which makes it uncomfortable to walk outside from function to function. The new added volume connects and makes one building out of the three volumes, but it is also clearly visible which volume is new and which already exist.

This design will include three new functions; first, the opera and ballet theatre, that is located inside the new designed volume, which will attract people from larger surrounding cities. This volume partly wraps around the existing buildings; second, a public theatre for the inhabitants of Vyborg, which is located inside the silos; third, a dance school to educate the future performers of the theatre and will be a connection between the public theatre and opera and ballet theatre. The dance school is located inside the former storage. These three functions are connected via a public route which is accessible for everyone.

The program for the transformed building will connect with the cultural identity of both Russia and Finland, has an outdoor square for several activities, is a public location where people can meet, and attracts tourists to Vyborg.

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# INTRODUCTION



## INTRODUCTION

This graduation thesis is part of the Graduation studio: Transformation; from industrial site to cultural identity. The graduation project was divided in two parts, the M3 project, which can be named the research part, and the M4 project, which is the design part.

During the M3 project, we, a group of 15 students, were divided into three groups, and each group analyzed transformed projects in a different part of the world; these parts were America, Europa and Asia. Within these groups we analyzed various projects in which industrial sites had already been transformed from industrial site into sites with a cultural identity. These transformed projects were analyzed by timelines which combined all project information. When finished with these analyzes, we searched with the same groups for abandoned industrial sites, which have the potential to be transformed into buildings with a cultural identity. To be able to compare the different project locations, the cities of the project locations were analyzed by factsheets and mapping. All findings of the M3 projects are described in the M3 booklet.

One of the sites which were found during the search for abandoned buildings was the Vyborg Mill, located in the city of Vyborg, on the border of Russia, near Finland. The city has a very rich history and belonged to Finland until World War II. Before the war, Vyborg was one the three largest cities of Finland and the Finnish history can still be seen in the architecture of the city.

Within this project I want to identify the culture of Vyborg and be able to refer to it through the function and design of the transformed building. The process of this research is structured chronologically within this book. First the building and its context will be elaborated on, then the cultural function chosen is explained through some personal research. Afterwards the final design is presented.

CONTEXT





## 2.1 HISTORY OF VYBORG

The city of Vyborg has a very rich history and originates from 1293 as a Swedish fortress city. Around 1710 Vyborg was captured by Russia and in 1744 Vyborg Province was created, which is shown in figure 2.1. During this occupation the residents were allowed to maintain parts of the Swedish legal system, therefore, for example, the Lutheran religion could stay. During the Russian domination, see figure 2.2, Finland was a Grand Duchy, and was an autonomous part of the Russian Empire. The Grand Duchy of Finland existed until 1917.

In 1917 the Finland Revolution started, which created an independent Finland. In 1918, there was a civil war, caused by the World War I. Before this civil war Vyborg was a cosmopolitan city, with many Germans, Sweden, Finnish and Russian living together. After the civil war, the cosmopolitan status deteriorated. Although the cosmopolitanism decayed, Vyborg became Finland's second-largest city and the center of cultural and social life of Eastern Finland. Around 1930 many important buildings, were built in the style of functionalism. At the same time Vyborg was considered the industrial center of Finland, with 38 industrial enterprises in various industries.

### Second World War

This status soon changed after the 1930s. From 1939 until 1944 there was a war between Finland and the Soviet Union. This war took place on the border of Finland and had a huge impact on Vyborg. The war can be divided in three stages. The Winter War (November 1939 – March 1940), the peace period (March 1940 – June 1941) and the Continuation War (June 1941 – September 1944).

In November 1939 the Winter War began and the Red Army came close to Vyborg. During this period the city was severely damaged and eventually the Winter War was ended by the Moscow Peace Treaty on 13 March 1940. The division of land after the peace treaty is shown in figure 2.4, the parts highlighted in purple were ceded by Russia.

Although there was peace, Finland found the peace treaty very unfair. They had to cede almost all of the Karelian Isthmus, including Vyborg and the Finnish part of the shore of Lake Ladoga. Furthermore, military troops and remaining civilians, (over 70.000 people from Vyborg) were evacuated to Western Finland.

The Finns were shocked by the harsh terms of the peace treaty. They felt that more territory was lost because of this treaty than during the war, and the loss was in some of the highest valued parts of Finland. For example, Finland lost its industrial and cultural heart. The loss of these highly valued parts started the Karelian Question. This question is the debate about whether or not to try to recapture sovereignty of the ceded Karelian territories.

The Continuation war, where Finland tried to reclaim their lost lands, started in June 1941 and the Finnish front was divided between German and Finnish troops, in such a way that the German troops were at the Lapland front and the Finnish



Figure 2.1  
1743 Swedish domination



Figure 2.2  
1833 Russian domination



Figure 2.3  
1920 Independent Finland

troops at the southern front. Finland was recapturing parts of Karelian Isthmus very quickly and they recaptured Vyborg in August 1941; therefore most of the evacuated inhabitants returned to their homes. In December 1941 the southern part of Finland and the Soviet Union stopped attacking and were engaged in a trench warfare till 1943.

In 1944 the Soviet offensive broke the Finnish defense line and after heavy losses, the war was ended in September 1944 by the Moscow armistice, signed by Finland and the Soviet Union. The conditions for this treaty were about the same as for the Moscow Peace Treaty, only now Finland was forced to cede parts of Finnish Karelia (including Vyborg) a part of Salla and island in the Gulf of Finland, which are marked purple in figure 2.5. Therefore, the inhabitants and military troops had to re-evacuate to western Finland. Another condition was that armistice demanded that the German troops had to leave the territory, this demand caused the start of the Lapland war in the north of Finland and Russia, this did not directly influence Vyborg. The final peace treaty was signed in February 1947 in Paris.

Until this war period, Vyborg was one of the three most important cities of Finland. After the annexation it became 'just' a district town within the Region of Leningrad and since then, the city is overshadowed economically and culturally by the importance of Sint-Petersburg.

### Recovering from the war

In 1948 the effects of the war were mostly eliminated and Vyborg attracts thousands of migrants from Soviet Union republics. From this moment on the city became again a major industrial center. A Shipyard, Power plant, Citric Acid plant and an instrument making plant were built. The main engine of economy, the Saimaa Canal, started in 1968.

### After the Soviet Union

Since 1991, after the collapsing of the Berlin Wall, the city has still belonged to Russia. The borders are open and more trading between Vyborg and Finland occurs. From this moment on Vyborg starts to develop as a tourist center and also attracts more inhabitants; in 1994 there were 400.000 visitors and in 1996 already 600.000. In the 1990s, several buildings were rebuilt in the historic center. However, the economic decline in the 1990s also had a significant impact on Vyborg. Nationwide problems occurred such as lower standard of living, growth of crime and communal problems. Since that moment the city did become a more comfortable city, and in 2007 it even came second in the contest of most comfortable cities in Russia.



Figure 2.4  
1940 Redrawn border

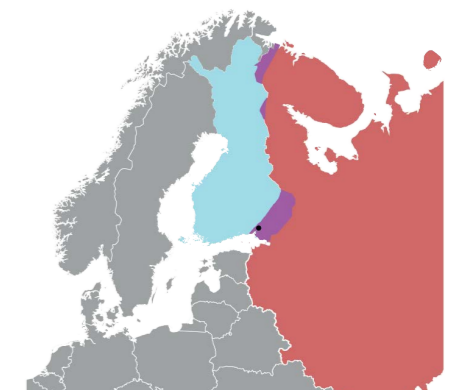


Figure 2.5  
1944 Final redrawn border

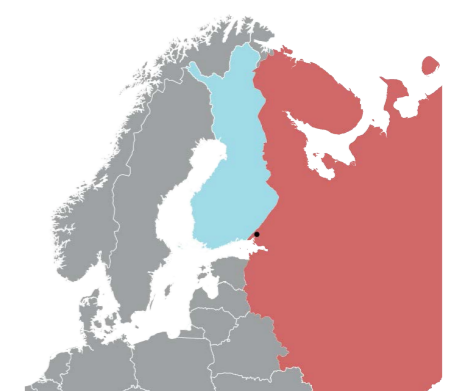


Figure 2.6  
2016 Current situation

## 2.2 CITY OF VYBORG

Nowadays Vyborg is still a small atypical Russian city located in the 'Region of Leningrad' nearby the border of Finland and in between Saint-Petersburg and Helsinki, which can be seen in figure 2.7. However Vyborg is an active harbor city, most of the West-Russian harbor activity is located in Saint-Petersburg which is located nearby.

The city is well connected with Helsinki and Saint-Petersburg, and most visitors travel to the city by train, because the relatively new connection makes it possible to travel within one hour to Saint-Petersburg and within 2,5 hours to Helsinki. Besides arriving by train, the city is reachable by car. It takes 2 hours to visit Saint-Petersburg and 3 hours to visit Helsinki

Vyborg has some attractions which are just interesting for tourists. For these tourists there are a few tourist attractions. 'For architectural enthusiasts the main attraction of Vyborg has been the municipal library designed by the Finnish architect Alvar Aalto.' (Neuvonen, Pöyhä, & Mustonen, 1999) However, the city has many more architectural heritage buildings. Each of the different time periods of history has left its mark on the city. Because the city has unique architectural heritage ranging from mediaeval times to the present century. Unfortunately, the economic and political turbulence of Russia has jeopardized the town's preservation. Because of the history the town holds a special interest for not only the present inhabitants but also for many Finns.

Within this chapter a few of the most important and noticeable buildings of the city, together with the main cultural attractions for the inhabitants and tourists will be elaborated on. The locations of these buildings are shown in figure 2.8. Figure 2.8 shows the most important buildings, together with the walking distance from the Vyborg mill.

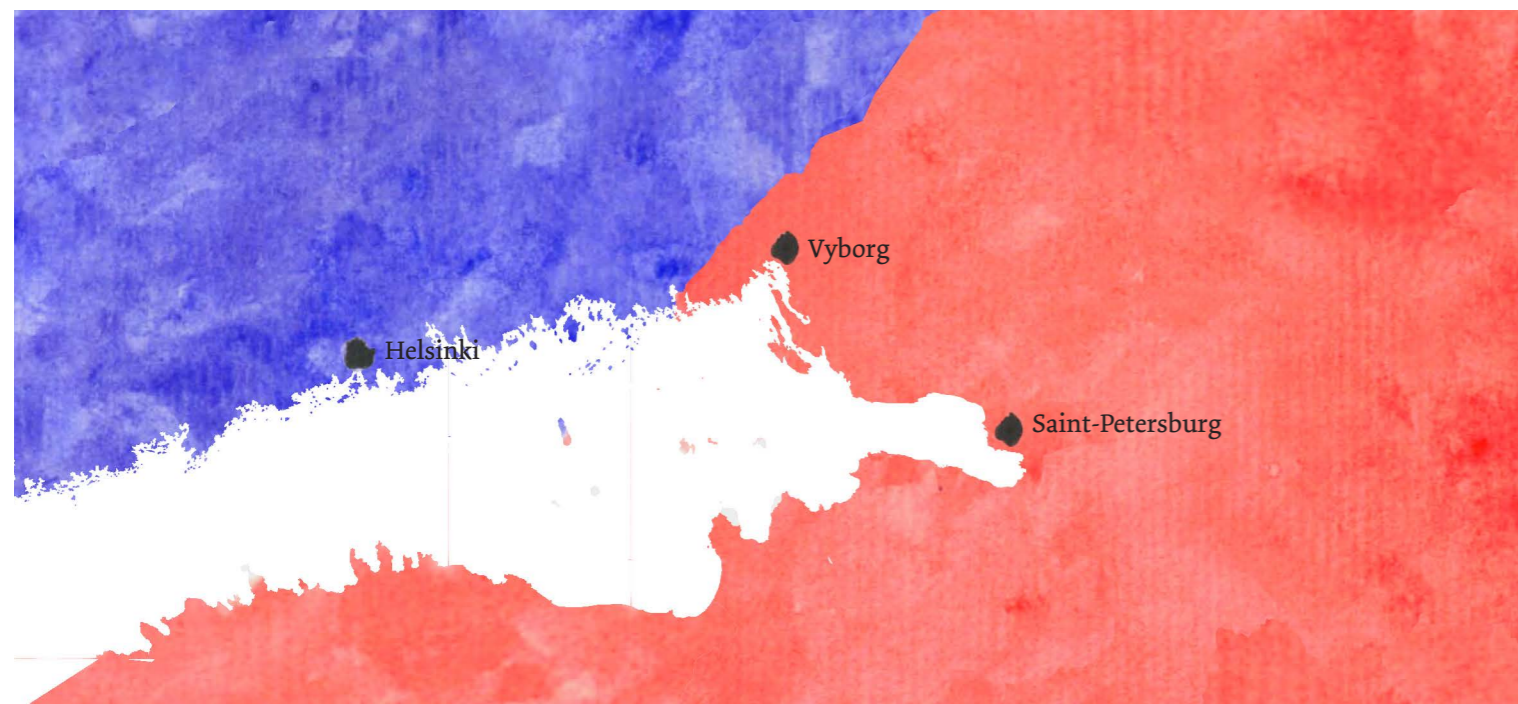


Figure 2.7



Figure 2.8  
Analyzes Vyborg



Figure 2.9  
Train station

### Vyborg by train

When entering the city by train, the first thing the visitor will see is the train station. Since 1870 many railway stations have been used. The current station was first built by architects Eliel Saarinen and Herman Gesellius in 1913. And it was renovated after the war in 1953 in the classicist style of the Stalin era. This architecture was also used at the metro stations in Moscow and Saint-Petersburg.



Figure 2.10  
Red square

### Red Square

Like almost every Russian city, Vyborg has a red square with the statue of Lenin. Around this square there are many types of buildings from different eras, the buildings were built in the period from 1890 till 1907 and contain residential housing, offices, a super market and a restaurant.



Figure 2.11  
Waterfront

### Elements of Vyborg

Figure 2.11 shows the waterfront of Vyborg with the main different elements of the city. The city is still an active harbor city; a touristic city, with the castle as the main attraction; and people live there in different types of housing.



Figure 2.12  
Round tower

### The round tower

The round tower is situated at the market square and is used as a restaurant. This building originally belonged to the fortification of the city during the Swedish empire and was built around 1550.



Figure 2.13  
Housing

### Contrast in Architecture

Vyborg has a contrast in types of buildings, some buildings are maintained very well, while others are desolated. Figure 2.13 shows the contrast with abandoned buildings standing next to used buildings which need maintenance. Located within the same district is the Alvar Aalto library, shown in figure 2.14, which was renovated and reopened in 2013. Although, step by step maintenance is carried out to the buildings in the city, it can be seen that the city still needs much maintenance which shows it is still a very poor city.



Figure 2.14  
Library Alvar Aalto

### Alvar Aalto library

The library was built after Alvar Aalto won the competition held for the Vyborg Library in 1927. Because of the economic recession the building could not be started directly, therefore the library was built in 1933-1935. When built, the building represents modern architecture with its white unornamented surfaces softened with Aalto's personal details and architectural features (Neuvonen, Pöyhä, Mustonen, 1999) The library was empty and abandoned after the second world war because of damage from the war. In 1950 the municipality started to renovate the building, which was finished in 1961. At that moment the architects were not allowed to ask for assistance from Finland and did not have access to the original drawings, therefore the library was refurbished with just a little respect to the original design. In 2010 the Russian government cooperated with the Finnish government to finally restore the building in its original state. The restored library was opened again in November 2013.



Figure 2.15  
Cinema

### Cinema

The building shown in figure 2.16 housed the town hall until 1940. After the second world war the building was severely damaged and transformed into a cinema during the soviet period. The cinema, which was opened in 1962, is currently the only theatre of Vyborg and has 560 seats. Most movies that are shown are the same as in the Netherlands but are translated into Russian, the tickets are about 3 euro per person.



Figure 2.16  
Castle

### Castle

The castle was originally built in the 13th century as part of the Swedish fortress city and altered by cannons many times. Therefore, the current castle exists of building parts from different eras. Nowadays the castle houses a museum of the history of Vyborg and the region, has a cultural program of music and medieval festivals, and on the top of the tower there is currently the best view of Vyborg.

### Hermitage

The hermitage in Vyborg is located on top of a hill, which creates a nice view of the city. One of the views is shown in figure 2.17, which shows the view towards the Vyborg mill. The building was built in 1930 and is one of the exhibition centers of the Russian state hermitage. Therefore, it has a relatively big collection which changes twice a year. The main hermitage is located in the well-known winter palace of Peter the Great in Saint Petersburg. The main activities of the Vyborg hermitage are educational activities, tours and lectures are provided for adults and children. (The Hermitage-Vyborg Exhibition Centre, 2016)

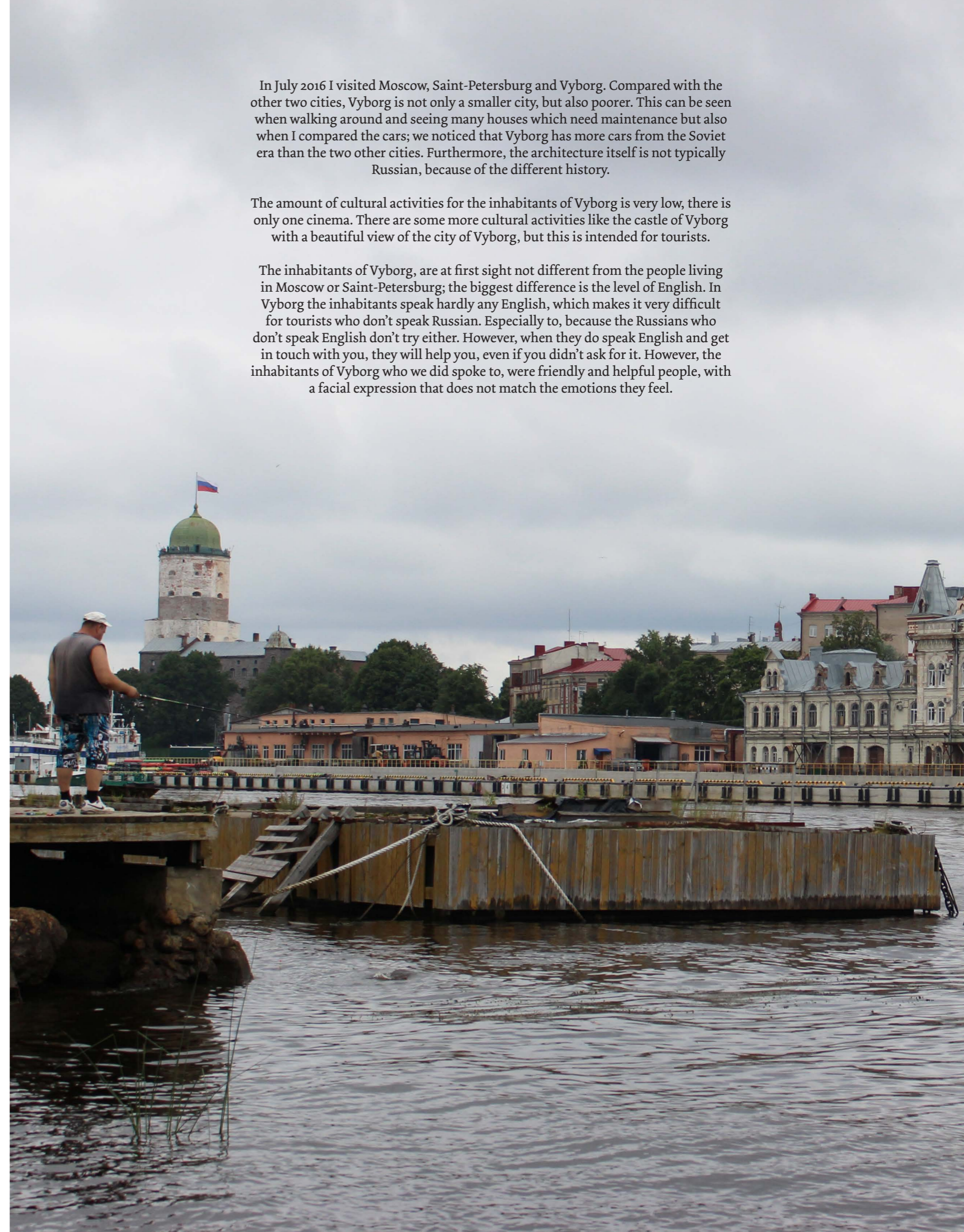


Figure 2.17  
Hermitage

In July 2016 I visited Moscow, Saint-Petersburg and Vyborg. Compared with the other two cities, Vyborg is not only a smaller city, but also poorer. This can be seen when walking around and seeing many houses which need maintenance but also when I compared the cars; we noticed that Vyborg has more cars from the Soviet era than the two other cities. Furthermore, the architecture itself is not typically Russian, because of the different history.

The amount of cultural activities for the inhabitants of Vyborg is very low, there is only one cinema. There are some more cultural activities like the castle of Vyborg with a beautiful view of the city of Vyborg, but this is intended for tourists.

The inhabitants of Vyborg, are at first sight not different from the people living in Moscow or Saint-Petersburg; the biggest difference is the level of English. In Vyborg the inhabitants speak hardly any English, which makes it very difficult for tourists who don't speak Russian. Especially to, because the Russians who don't speak English don't try either. However, when they do speak English and get in touch with you, they will help you, even if you didn't ask for it. However, the inhabitants of Vyborg who we did spoke to, were friendly and helpful people, with a facial expression that does not match the emotions they feel.



## 2.3 ANALYZE VYBORG

### Climate of Vyborg

Because of the size of Russia, the country is about twice as big as Europe, there is a big variety of climates. To be able to grasp the climate of Vyborg, it is compared with the climate of Eindhoven. To make the analyses, enough data must be collected. Because there were enough data available of Saint-Petersburg, which is located nearby and on the same geographical height as Vyborg, the average weather conditions of Saint-Petersburg are compared with the ones of Eindhoven.

The graph in figure 2.19 shows the amount of rainfall, temperature differences and hours of Sunshine. The left axis shows the temperature and hours of sunshine, and the right axis shows the millimetres of rain.

Most months in Saint-Petersburg are relatively dry, the summer months from June till October contain most rainfall. The lowest temperatures are not as low as expected, the minimum is just -10 degrees, however, the high temperatures in the summer are higher than expected and therefore the temperature is almost the same as in Eindhoven.

The hours of sunshine are low in both cities. This is probably caused by the amount of rain and as a result cloudy weather. Saint-Petersburg has 2 months without any sunshine at all, 8 months with less than 5 hours sun a day, and there is no month with more than 10 hours of sunshine a day. Comparing this to Eindhoven, Eindhoven always has a few hours sun a day, 7 months that have less than 5 hours sun a day, but does have 4 months with more than 10 hours sunshine a day.

Because of these weather conditions, which are about the same as in the Netherlands, the buildings should have all the functions available inside. The building will be in the dark most of the year, so the lighting of the exterior of the building can be of great importance.

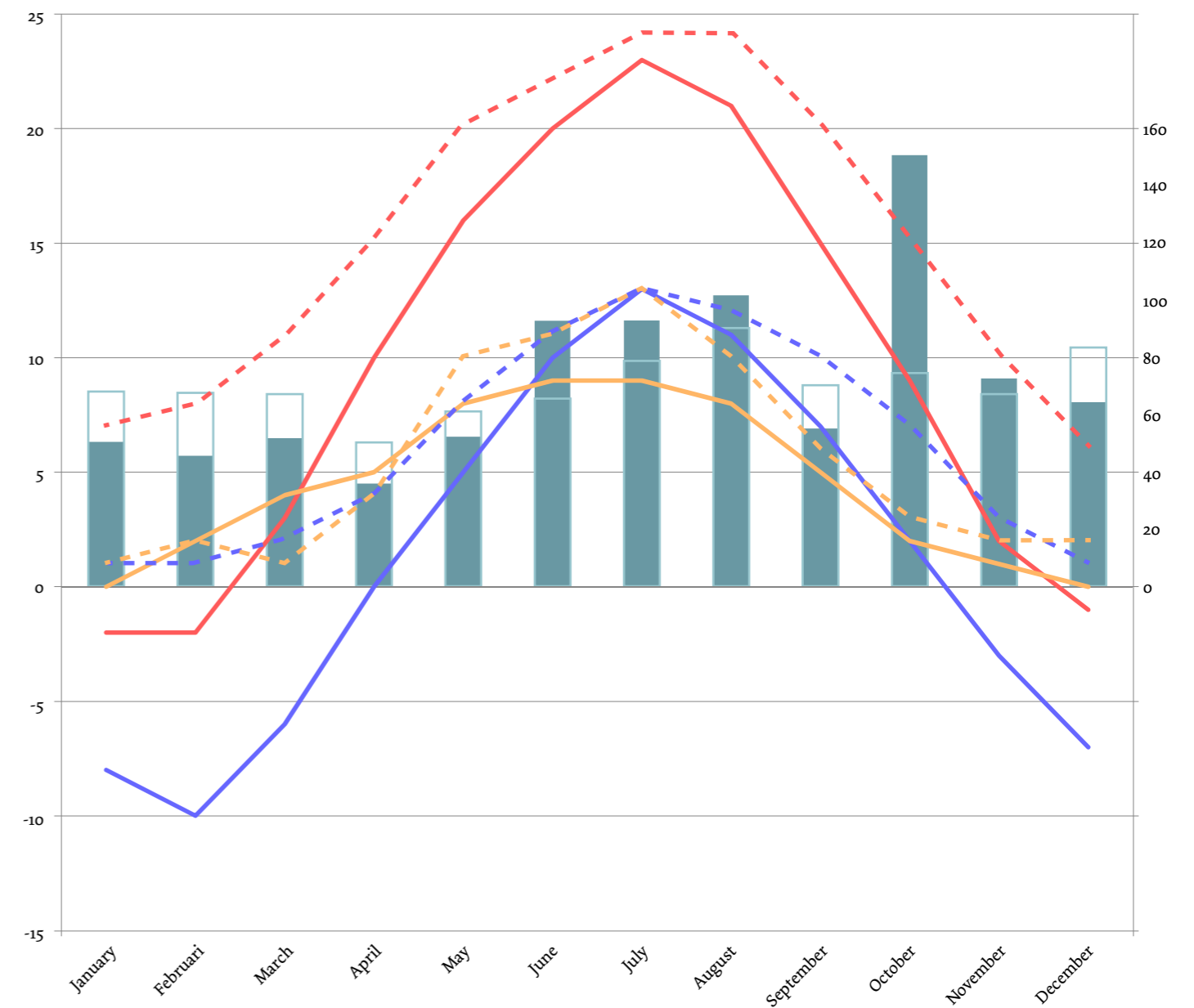
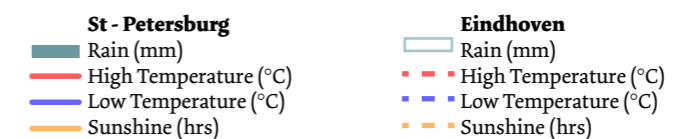


Figure 2.19 Weather comparison





### Tourism Vyborg

Although Vyborg was one of the three most important cities, nowadays it is just a small Russian harbor city with many tourist spots. These are shown in figure 2.20. The city has a relatively large horeca industry, which is an industry that varies from very small unknown places to the larger tourist restaurants. Most of the tourist spots are located within the old city center of 1840, which is marked by the darkest grey. The two lighter greys show the growth of the city throughout the years, with the lightest grey as the current situation. The city is located only 30 km away from the border of Finland and will be crossed when travelling from Saint-Petersburg to Finland by the highway, which is shown by black lines in figure 2.20. There is also a public transport station, located north of the city and can be reached easily from Finnish and Russian cities.

The old city center, named the Linnoitus District, has a mix of architecture, with buildings from the Swedish, Finnish and Russian empires, the diversity of architecture is shown in figure 2.21.

The location of the Vyborg mill within the city center is the more Finnish section, with, for example, the Library of Alvar Aalto. This area is also the district with most tourist spots, which are buildings such as the castle, which, for the greater part, date back to the Swedish empire.

The current city center, shown in figure 2.22, is the heart of tourism with many buildings from the Swedish fortress era and therefore the cultural center of Vyborg.

### Conclusion

After the analyses in this chapter and the visiting of Vyborg, the conclusion is drawn that the new function of the Vyborg mill should be able to attract people from Vyborg and from larger surrounding cities. And to attract the inhabitants of the city itself at least one of the new functions needs to be easily accessible.

The buildings of Vyborg show that it is a city with poverty, and one of the solutions to lift the economy would be more tourism. To attract people from the larger surrounding cities, the building should have the quality to promote Vyborg as a city. Therefore, I want to be able to combine the Finnish and Russian cultures and promote Vyborg as a city which should be taken into account.

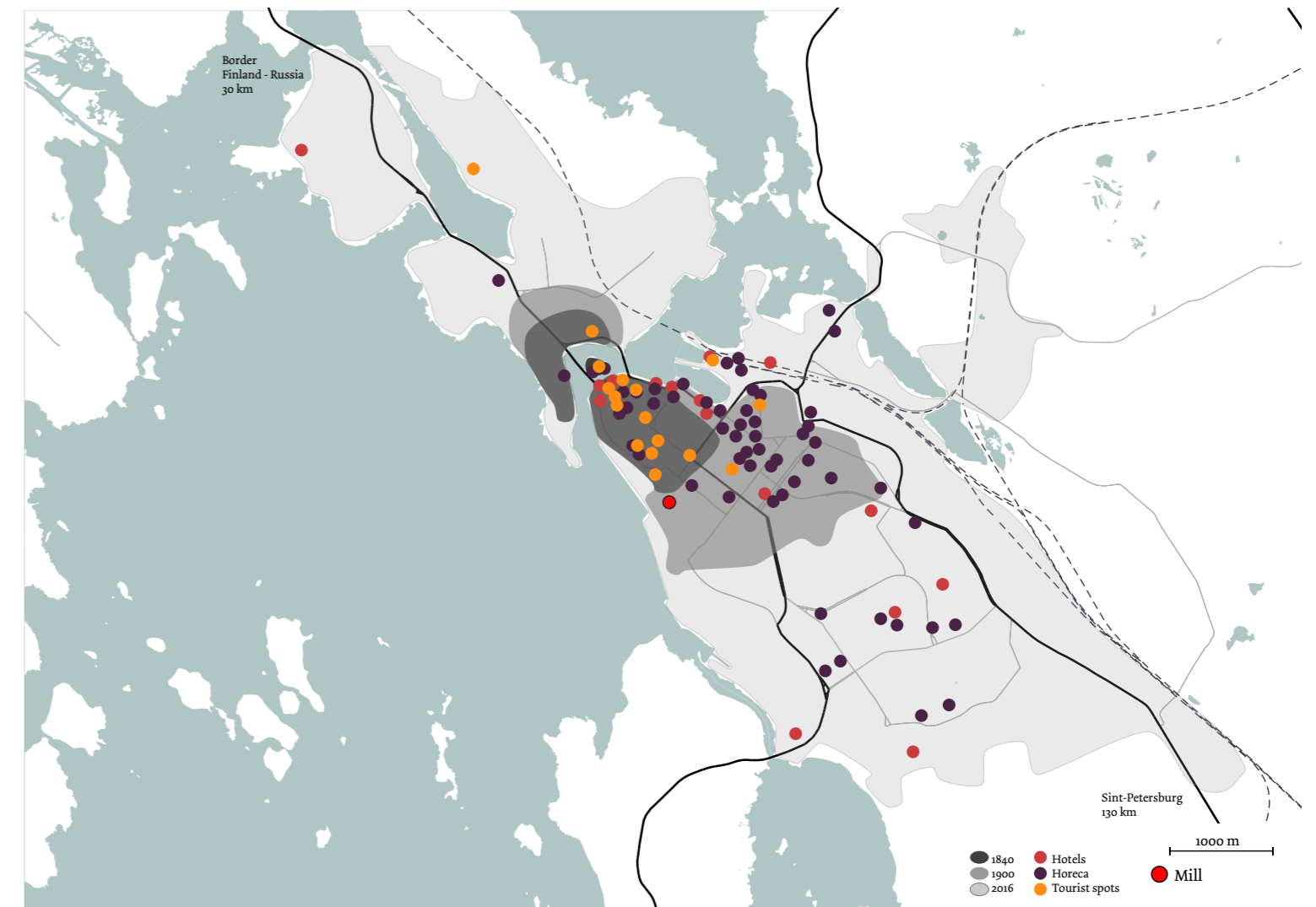


Figure 2.20



Figure 2.21  
Architecture period, Linnoitus District

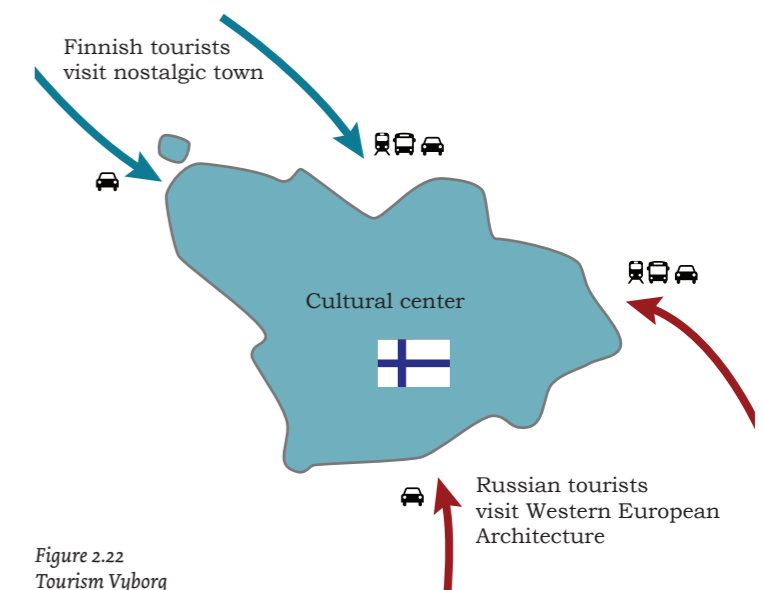
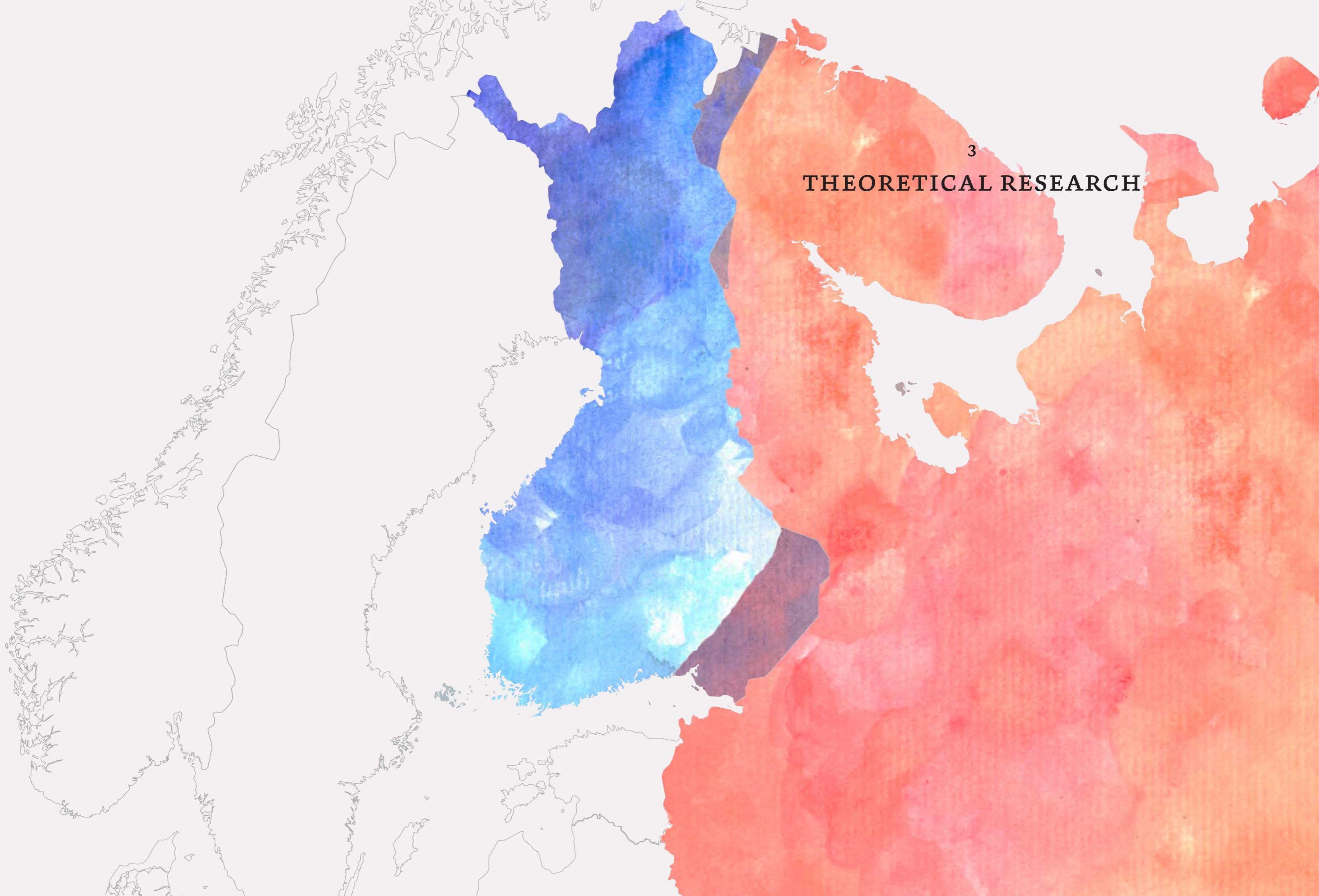


Figure 2.22  
Tourism Vyborg



3

**THEORETICAL RESEARCH**

## DIFFERENCES BETWEEN RUSSIA AND FINLAND

Because the city of Vyborg is not just a Russian city, but also one with a rich Finnish history, both cultures should be represented in the building. To be able to grasp the two cultures, three types of sources are used: the documentary of J.B. Corstius about Russia, the book 'When cultures collide' by R.D. Lewis and some interviews with people from Moscow, Saint-Petersburg, Vyborg and Helsinki.

### Definition of cultural identity

Each person has their own individual identity which can be part of multiple cultural identities. Individuals connect with certain groups of people that form a cultural identity. These cultural identities are formed by the mental programming of people (Hofstede, 2000) and will make each group different from another. These groups can be formed by the following categorizations on personal level, amongst many others: nationality, ethnicity, place (location) and sexuality. (Hofstede, 2000)

Furthermore, there is the culture which people live in. Because Vyborg is located in Russia, the inhabitants probably have a Russian culture. As can be seen in the diagram of figure 3.2, Russia is a multi-active country, which means that they are 'lively, loquacious people who do many things at once, planning their priorities not according to a time schedule, but according to the relative thrill or importance that each appointment brings with it.' (Lewis, 1998)

Vyborg is located nearby the border of Finland, where the cultural type is mainly reactive but can be Linear-active when reacting. 'reactive are those cultures that prioritize courtesy and respect, listening quietly and calmly to their interlocutors and reacting carefully to the other side's proposals.' (Lewis, 1998) Linear-active cultures are those who plan, schedule, organize, pursue action chains, do one thing at a time.' (Lewis, 1998) The Lewis model shows that the Finnish and Russians have a very different behaviour.

And as can be seen in the mental programming triangle of figure 3.1, human nature is what all people have in common and is inherited by genes. The personality, culture and human nature are all part of our mental programming which together form cultural identity.

Not only visitors or the inhabitants of the surroundings have a cultural identity. A building has a cultural identity as well. An architect creates a building with a certain function for users which are part of a cultural identity. When the architect keeps the cultural identity of the users in mind during the design process, the architect can reflect this cultural identity from the fine details of the building until the design of the masterplan. In turn, the building itself will have a cultural identity to which the users can feel connected. This might occur because of a certain style the architect utilizes in his design.

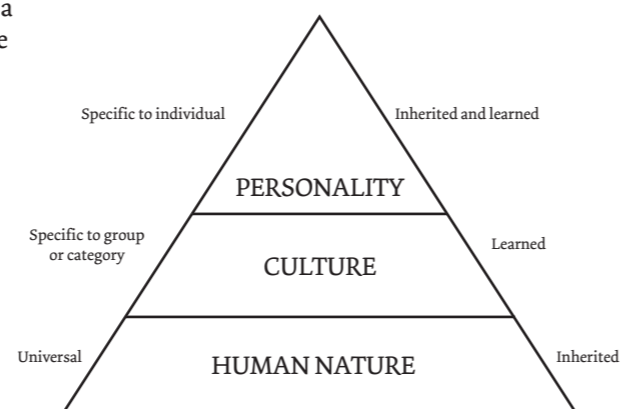


Figure 3.1  
Mental Programming table

### Russia

Even though Russia is not communist anymore since the disintegration of the Soviet Union, there are still some signs of this history in current Russia. For example, Russia is one of the most dangerous countries in the world for journalists (Corstius, 2012). When journalists investigate details which the Russian government does not like, the same things can happen to them as during the Soviet period, for example, journalists can disappear or even be killed. This is probably also why the 'Russians are still very suspicious of the news.' (Lewis, 1996)

Another shocking fact, is the average alcohol use, which is one bottle a week per Russian (women and children not included in calculations) (Corstius, 2012). This can happen because the national drink, everyone drinks, named Kvass, contains 1.5% of alcohol and is even served to kids.

Furthermore, Russia is a very outdoor country, even with their extremely cold winters people go outside to play chess or musical instruments. And the Russians are very fond of ballet, the country has a very strong history in ballet, which started in 1738 and survived the Soviet period (Countries and their cultures, 2016). One of the worst elements of places like Moscow, is the crime rate. Since the end of the Soviet Union, the crime rate has risen rapidly throughout Russia; crime is mostly drug related and not immediately dangerous to the average person (Paranyushkin, 2015).

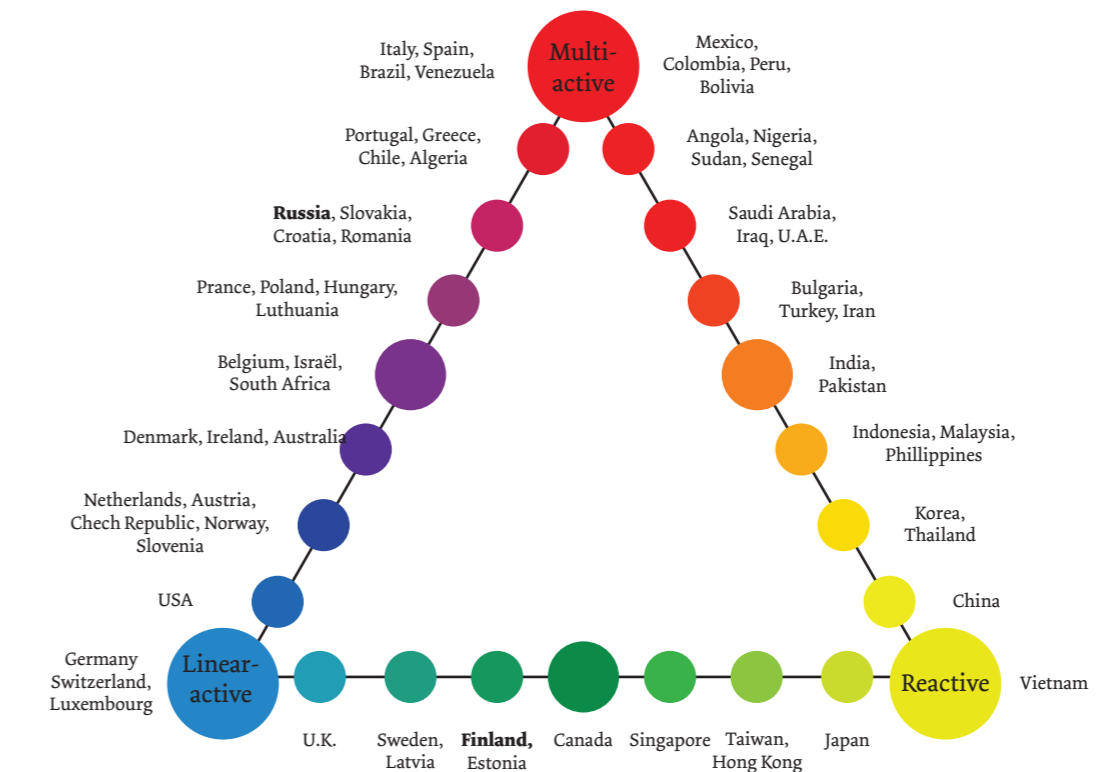


Figure 3.2  
Cultural types: Lewis model

When walking around in Moscow or Saint-Petersburg you would see more women than men working in the metro, which is rather unusual in comparing with to other cities. This is probably related with the high unemployment rate for women and the fact that there are more women than men in Russia (Corstius, 2012).

When talking to people from Russia, they will mostly open up in private, and they are caring, warm, and emotional people, although also pessimistic and cautious (Lewis, 1996).

### **Finland**

The Finnish people attach considerable weight to the spoken word and 'base their dialogue on careful consideration of the wishes of the other party' and will not likely start a monologue (Lewis, 1996). Therefore the Finnish say little and avoid unnecessary small talk, and are also called 'listeners'. It is a country which thinks but doesn't speak and is very introspective (Lewis, 1996).

Although the Finnish will not talk much, they do have a strong sense of national identity, which is shown when they are playing for example Ice hockey or Football (Alho, 2010).

The country has a strong position for women. The Finnish are modest, live in a crime-free and poverty-free society, have a strong sense of justice, and respect for education. Furthermore, the Finnish people have high standards in cleanliness, honesty, workmanship, stamina, reliability, hygiene, safety and education. (Lewis, 1996)

### **Differences and similarities between Russia and Finland**

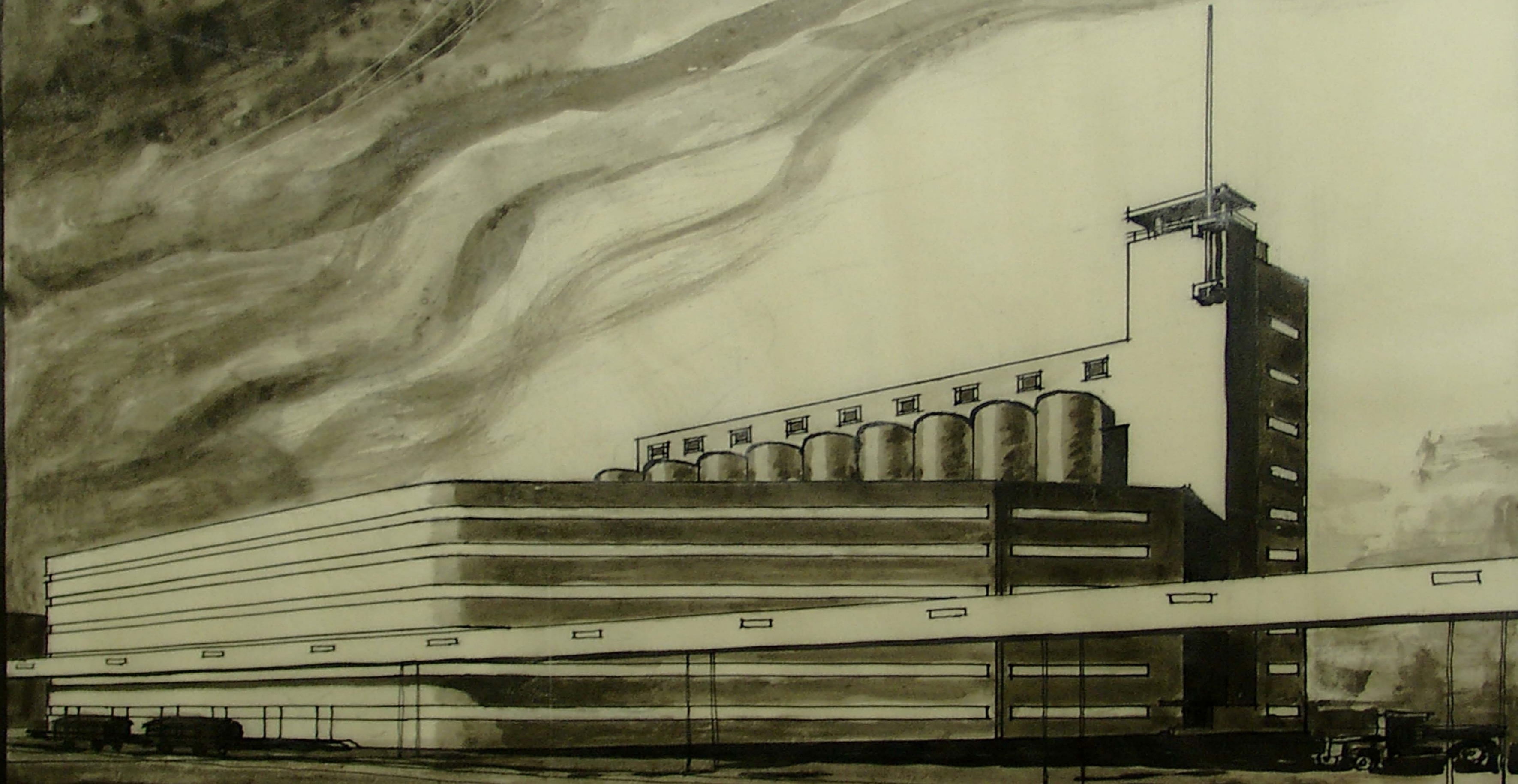
The two countries have two very different cultures. Where the Russians like to talk, open up and be emotional, the Finnish are listeners and modest. The Russians live in a country with a high rate of unemployment, criminality and poverty, while the Finnish live in a country with a low rate of unemployment, criminality and poverty. This can also be seen in the high GDP difference in the border region, which is shown in figure 3.3. The border region of Russia is rather poor, while on the other hand Finland is more wealthy. Russian cities like Saint-Petersburg and Moscow also have a relatively high GDP, but this is not shown in figure 3.3, because they do not belong to the border region.

There are also similarities between Finland and Russia. Because Saint-Petersburg, Vyborg and Helsinki are almost at the same latitude, they all have the same type of climate. Therefore they have the same seasons and same types of festivals like the white nights in the middle of the winter. Furthermore, there is, in both countries, a strong history in ballet and opera, which is still noticeable in the culture of today.



Figure 3.3  
GDP differences

THE EXISTING BUILDING



## 4.1 HISTORY OF THE VYBORG MILL

The Vyborg mill was built in 1931-1932 and designed by the Finnish architect Erkki Huttunen. Even now the building is an icon for functionalism in Finland. The building is located in the South Harbor area, approximately 250 meters from the harbor. The building used to be connected with the harbor via a railway, which is not located on the terrain anymore. The building consist of concrete silos, a mill, storage, and a bakery. There are 18 silos, each with a diameter of 5.5 meter and a height of 30 meter.

As can be seen in figure 4.1, the different building elements were built at different moments of time. The granaries, mill and storage were built in 1932; the six-story wing for the bakery, which extended to the other side of the railway tracks in 1935. And in 1937 the silos and warehouses were connected at the north, as an extension to the bakery. This new connection closed the open parts of the U in the original plan.

During the thriving period of the bread factory the silos were able to accommodate up to 450.000 kilograms of grain. This grain was transported from the harbor with the train or in a later stadium via a belt, which ran approximately 7 meters above ground in a 2 meter high tunnel. The grain continued its journey via a grain belt in the mill which lead towards the top of the silos.

As shown in figure 4.2, in 1939 the winter war highly damaged the building and in August 1941 the Soviet troops attempted to destroy the complex, but only the tower on the south side and a part of the sea front were blown up. Eventually the destruction was eliminated and in 1942 the building was renovated by the Finnish government. From that moment on, only parts of the building were used. In 2014, the owner of the mill got bankrupt and the building became obsolete.

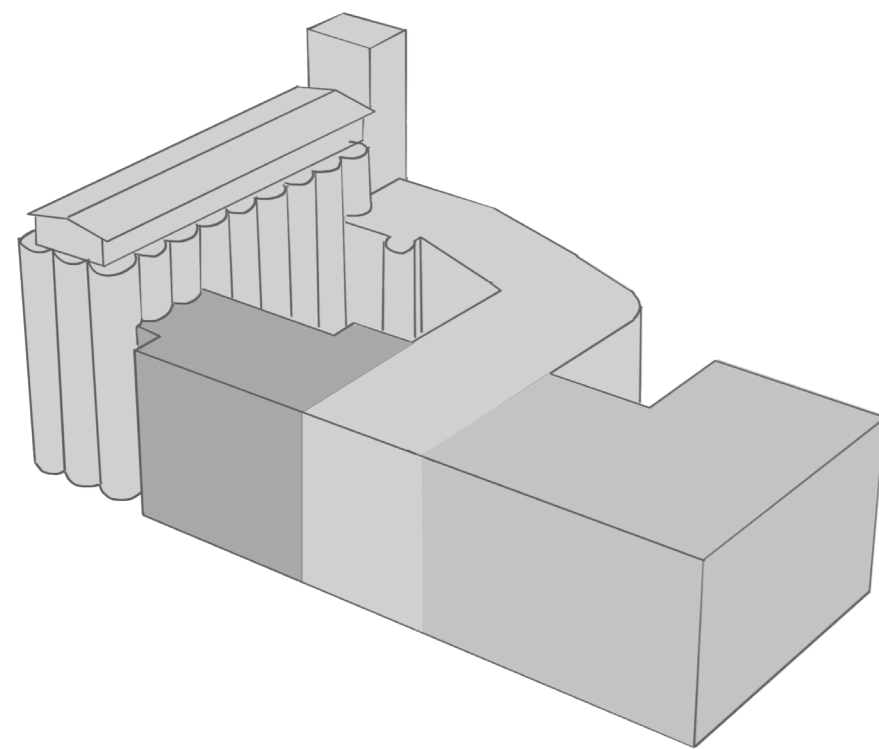


Figure 4.1

■ 1932  
■ 1935  
■ 1937



Figure 4.2

## 4.2 ACCESSIBILITY OF THE VYBORG MILL

The city center of Vyborg is a rather small center, with only a few bus lines, therefore, most inhabitants travel on foot. As mentioned in chapter 2.3, Vyborg is well reachable by car and by train, the city is one of the main train stops in between Saint-Petersburg and Helsinki, which implicates that most visitors of the city will arrive by train and travel within the city on foot. The main routes from the city towards the Vyborg Mill are shown in figure 4.3.

There are three main pedestrian routes within the city, two from the train station and one from the touristic city center. When walking from a random point within the city towards the Vyborg mill, there is a substantial chance that one of these routes is used.

Besides traveling on foot, many people will also visit Vyborg by car. The two main roads which are used by car are also shown in figure 4.3. Most of the roads, for pedestrians and cars lead the visitors of the Vyborg mill towards the north-west side of the building.



Figure 4.3

## SURROUNDING

Within the next part of this chapter, the direct surroundings of the Vyborg Mill, red lined in figure 4.4, will be elaborated on by pictures. The building is located on the border of the harbor area, which can be noticed by the surrounding buildings.

Picture 1, 2, 6 and 7 of figure 4.4 show the Vyborg Mill from the two main access routes. Picture 11-18 show the back of the building and the existing plot. Some of the viewpoints in figure 4.4 will be expanded and further elaborated on within this chapter.

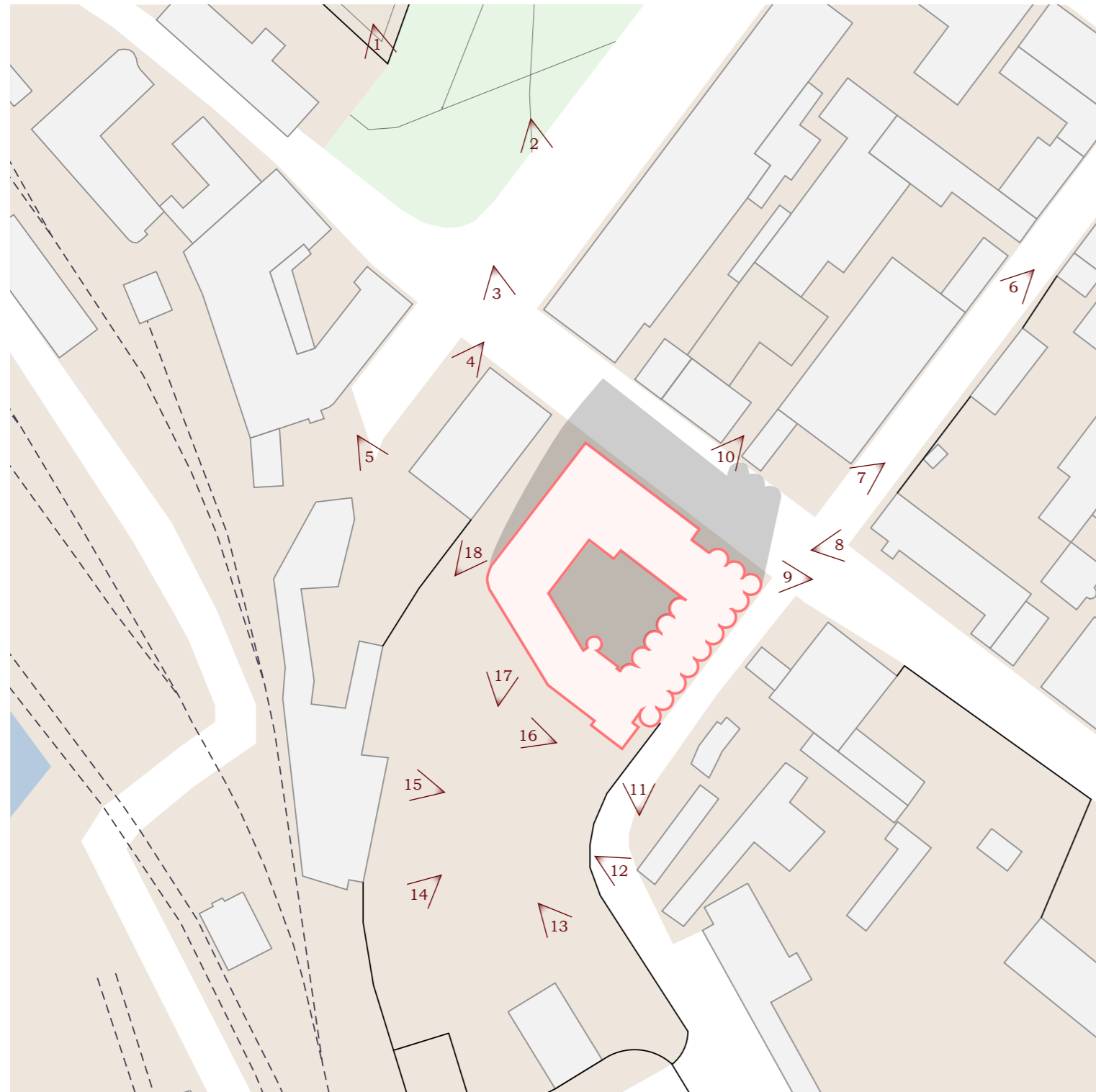


Figure 4.4







Figure 4.5  
Park Hermitage

The main route from the city center towards the Vyborg Mill is via the park which is located next to the hermitage. The hermitage is situated on a mountain-like structure of black stones, as can be seen in figure 4.5. This park can be seen as the threshold between the harbor area and the residential area, with the silos of the Vyborg Mill already visible from the beginning of the park.



Figure 4.6  
Harbor area

The factory is not only visible from the park, but also from many other points in Vyborg as the picture in figure 4.6 shows. This picture shows the view from one of the main routes when travelling by car. The location is at the border of the city center, and shows the still lively harbor area with the cranes located next to the waterfront and the Vyborg Mill at the rear part of the photo, recognizable by the silos.



Figure 4.7  
Bakery

When walking through the park of figure 4.5, towards the Vyborg Mill, the first part of the building which is shown, is the bakery that is still in business. In figure 4.7 it is marked by red lines. The purple sign on this building 'аренда', which means for rent, is clearly visible and refers to the red lined part. Some floors in this building part are in use by the bakery and other parts are for rent.



Figure 4.8  
Store

On the ground floor of the building there is a very small store, which can be seen in figure 4.8. The store still sells bread for relatively inexpensive prices.



Figure 4.9

Access to the Vyborg Mill can also be gained via the street as shown in figure 4.9, which corresponds with the viewpoint of figure 4.4.7. The street does not offer the same atmosphere as the park in figure 4.5, but is still one of the possible access routes. The buildings next to the Mill are mainly one or two-story residential or office buildings and are in desperate need of maintenance. The streets themselves are very wide streets, which is rather characteristic of Russian streets.



Figure 4.10  
North-east neighbor

Figure 4.10 shows the neighbor at the north-east side of the Vyborg mill. This building is still in use and in summer, men are sitting underneath the tree in front of the building almost every day. It is unknown if it is a residential or office building.



Figure 4.11  
Garage boxes

Figure 4.11 shows the east side of the Vyborg Mill with an unpaved street, which is mainly used to get access to the garage boxes next to the street. Furthermore, this street is used to get access to the south of the plot. The plot is fenced by a concrete wall and has only one big sliding door which connects this street with the plot.



Figure 4.12  
South side

The southern part of the building, together with the existing building-like structures on the plot can be seen in figure 4.12. The plot has been neglected, which can be seen when looking at the plants, the stacked concrete slabs, the poorly maintained sheds and south façade of the Vyborg Mill.

The Vyborg Mill itself clearly needs maintenance, the plasterwork is partly gone and the windows are shattered. When zooming in on the building and the original wooden floors become visible, one can see that these floors have holes and are unsafe to walk on.



Figure 4.13

As can be seen in figure 4.13. The bakery, which is the left part of the building, is separated from the mill, the right part of the building with the curved wall. The two building parts are separated by a passage which is shown in figure 4.14. This passage connects the plot with the street at the north side of the building. This passage was also the location of the final train stop, where the trains unloaded their grain and loaded it into the building.



Figure 4.14  
Passage



Figure 4.15  
West border

The plot is located next to the harbor, but there is no direct connection between the harbor and the plot site because of many concrete walls which surround the plot. However, as can be seen in figure 4.15, the cranes are visible from the plot site. The concrete wall on this picture is not only the harbor border, it is also the wall which separates the Vyborg Mill and the active bakery.



Figure 4.16

Figure 4.16 shows a part of the west border of the site. This part is the only part which creates a border by buildings. These buildings look more like garage boxes, and contain a car repairer. This car repairer forms the connection between the bakery and the plot site of the Vyborg Mill.

### 4.3 PRESERVATION STRATEGY

The Vyborg Mill is currently one building, with several volumes designed in different periods of time. The original design of 1931 of architect Erkki Huttunen only consists of the silos and the U-form at the south, which created a courtyard connected to the streets. The other part, almost the complete front at the north side, was designed in 1932 by an unknown architect.

#### Elements for demolition

The weaker elements are to be demolished. These elements are weak in the sense of maintenance and construction, or are weak from an architectural point of view. Figure 4.18 shows which parts are to be demolished.

Part A, the front side of the building, was not in the original plan of Erkki Huttunen. This part creates a border between the city and the courtyard of the building, therefore, to open up the building towards the city, this part is to be demolished.

Part B, the former mill. This part is to be demolished because it is not maintained and has many holes in the façade and floors. After demolishing this part, the building will need a new connection between the silos and former storage to make it one building again.

Part C, the roof building and part D, the tower. These parts are to be demolished because of an architectural point of view. The silos will stand more on their own and become an essential element.

Part E, the bridge. This part is to be demolished, because of the poor state of maintenance, and from an architectural point of view. The backside of this part has not been maintained and is a complete mess. Furthermore, after demolishing, the factory will stand apart from the still existing bakery.

The bakery is still used and won't be taken into account during the transformation of the bread factory.

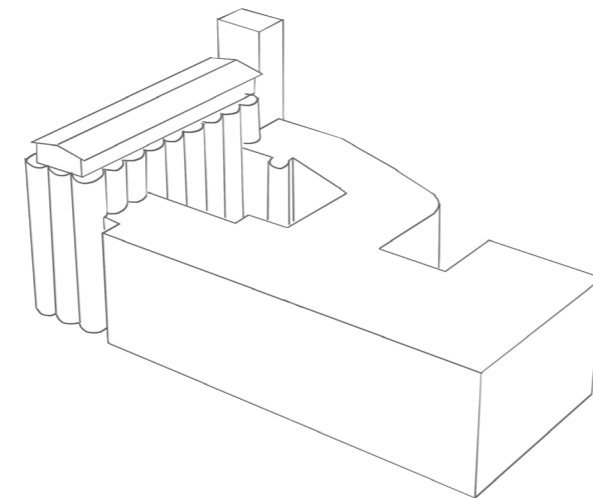


Figure 4.17  
Current situation

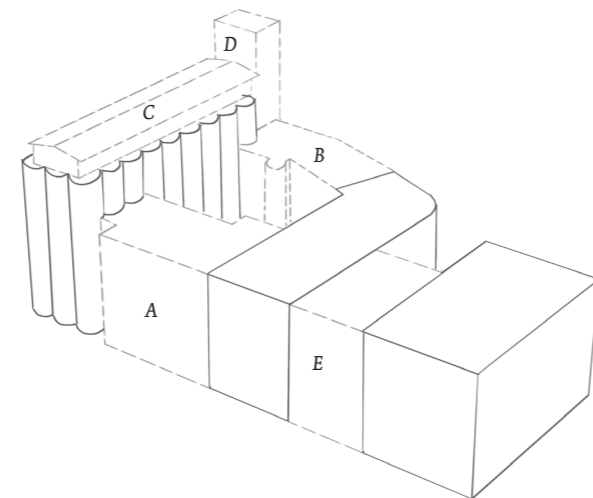


Figure 4.18  
Demolish elements

#### Transformation

Figure 4.19 shows which parts still exist after the demolition of the elements mentioned in figure 4.18. The remaining building is divided into two parts.

The silos remain because they are the most recognizable and unique element of the building. Therefore, they should still be recognizable as silos after the transformation, although several silos can be demolished and openings can be made. In the end it is important that the users know that, when they are inside they are in the silos and can also experience the height and structure of the original silos.

The former storage also remains, because of the view from the backside of the building. The round corner at the south has great architectural from the point of view of recognition. Although the building can remain as it is, the building is in a relatively poor state of maintenance, therefore the former storage's façade and wooden secondary construction will be replaced, only the main concrete construction which consists of columns and beams will be preserved and provides the grid for the new function.

Because these two elements are now separated and the program cannot be completed within the remaining elements, a new volume will be added. The new volume should respect the existing volumes and will partly wrap around the existing buildings. Furthermore, the volume should create an interior connection between the two existing volumes. This interior connection is needed because of the Russian climate, which makes it uncomfortable to walk outside from function to function. The newly added volume needs to connect and make one building out of the three volumes, but is also needs to be clearly visible which volume is new and which already exist.

Figure 4.20 shows the final design, which will be further explained in the next few chapters.

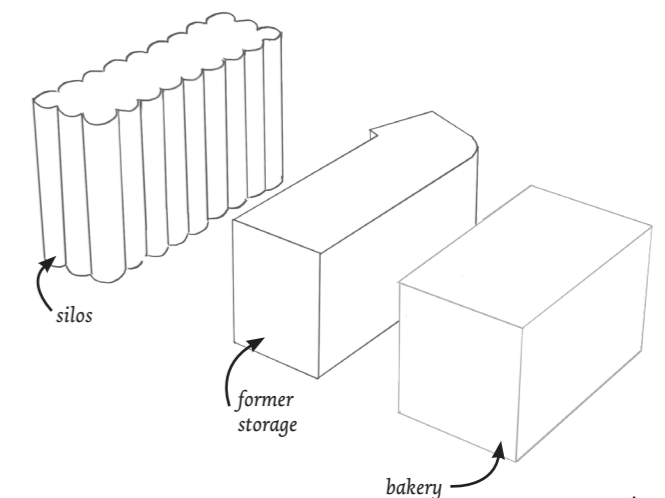


Figure 4.19  
Remaining elements

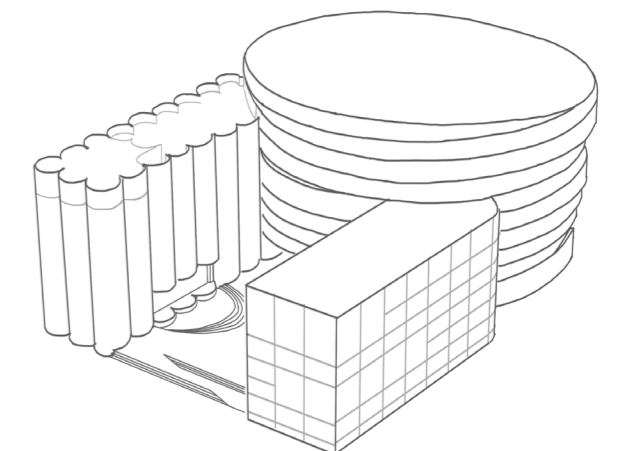


Figure 4.20  
Transformation

5

# NEW FUNCTIONS





## 5.1 NEW FUNCTION RESEARCH

In order to define the program in the Vyborg Mill, a list of requirements was made after analyzing the theoretical research. The program must meet the following requirements: 1; It needs to be able to identify with the cultural identity of both Russia and Finland. 2; It needs to be a public location where people can meet. 3; It needs to attract tourists to Vyborg. 4; There should be the possibility for an outdoor activity.

Before the final choice was made, a few other options were also analyzed, because there can be more than one function which meets the four requirements. There are a few possible cultural venues which meet the first requirement and can identify with both Russian and Finnish culture, such as sport venues, for example a pool in summer and ice hockey rink in winter, or a wrestling school, which is a very active sport in mainly Russia. Unfortunately, these functions will not attract many tourists in the cultural area. Another option was the leisure activity laser tag, which hasn't been chosen because of the first requirement, it is not known as a Russian or Finnish cultural activity. But a laser tag battle can be played between Russia and Finland, which expresses the history of the city.

To find a function which meets all requirements, a short list was made with cultural activities that are very popular in both Russia and Finland. These activities are: Theatre (ballet, opera, dance, music, circus); Music: metal and classic; Musea: art, photography, history, gallery. Keeping the list of requirements in mind and considering the existing activities of Vyborg, the choice went to theatre with the main functions of ballet and opera. Opera and ballet are still frequently attended by adults in both Russia and Finland; furthermore, in both countries, children still learn about classical music.

Because ballet and opera are still relatively exclusive, and Vyborg is not a well-known and prosperous city, there is need of an extra function. This function must be found in the same area as opera and ballet, and is meant for the local inhabitants. Which means it needs to be easily accessible and needs to be cost efficient. The function chosen is a public theatre with a varying program, from dance and music to drama. Because a public theatre does not need the standard dimensions, there is a certain freedom in design which makes it interesting to place the public theatre inside the silos.

The two functions are very different and therefore will attract a mixed crowd. The opera and ballet theatre will be visited by the people who have to travel further, while the public theatre will be visited by locals. To combine the two functions and make sure there will always be people inside the building, the choice is made for a dance academy for ballet and street dance. This function is chosen because school is a very important element in both Russia and Finland, and the Russian ballet with the Vaganova method, is one of the best known in the world. The students can practice their performances in both theatres and find out what their future may look like when they have finished school.



Fig. 5.1

**Opera/Ballet theatre**

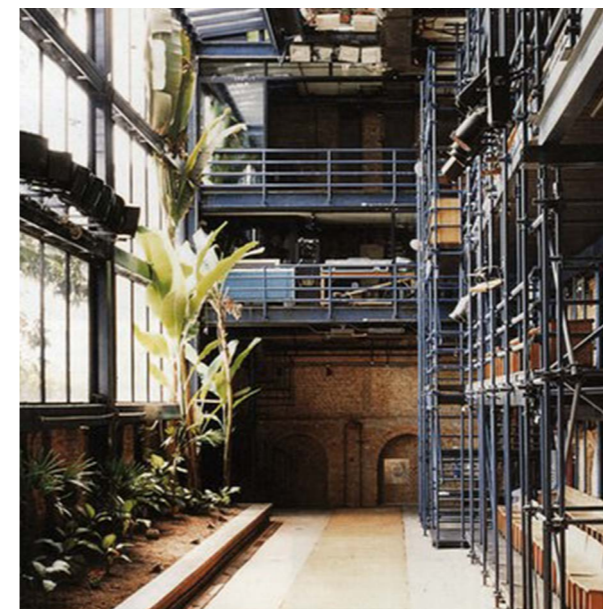


Fig. 5.2

**Public theatre**



Fig. 5.3

**Dance school**

## 5.2 OPERA AND BALLET THEATRE RESEARCH

There are many different types of opera and ballet theatres built throughout the world. To analyze the differences, I looked to 7 different modern theaters, two of which have been studied programmatically.

The Winspear Opera House is designed by Foster + Partners and has a horseshoe type auditorium with a slightly angled arena. The foyer is located around the auditorium, with the staircases that are directed towards the three balconies of the auditorium directly visible. In this case the visitors can directly see where they have to go from the moment they enter the building.

The Guangzhou Opera House is designed by Zaha Hadid Architects and has a fan shaped auditorium with two balconies and an angled arena. The design of the building is evolved from the concept combining a natural landscape with architecture. The foyer is located around the auditorium and has a different atmosphere than the interior of the auditorium; the auditorium is more curved and warm toned, while the entrance is very white and angular.

The Opera House in Linz is designed by Terry Pawson Architects and is located in Austria. The auditorium is a compact horseshoe design with a capacity of 1000 visitors. The auditorium has steam-heated acacia wood on the walls and ceilings, the floor is made of light oak, which is a contrast to the golden balconies. The foyer is located at the back of the theatre, and has a relatively low ceiling. The back of the stage has a relatively small floor capacity, with only a rear stage.

The Opera House in Sydney has multiple theatres, the second largest is the Joan Sutherland theatre. The auditorium is a proscenium arch. The auditorium has yellow Caribbean timber walls, a matte black painted ceiling and the floor is clad with satin matte clear polyurethane. The theatre foyer is located around the auditorium, and offers views across the Sydney Harbour, the Harbour Bridge, and it shows a city skyline to the south.

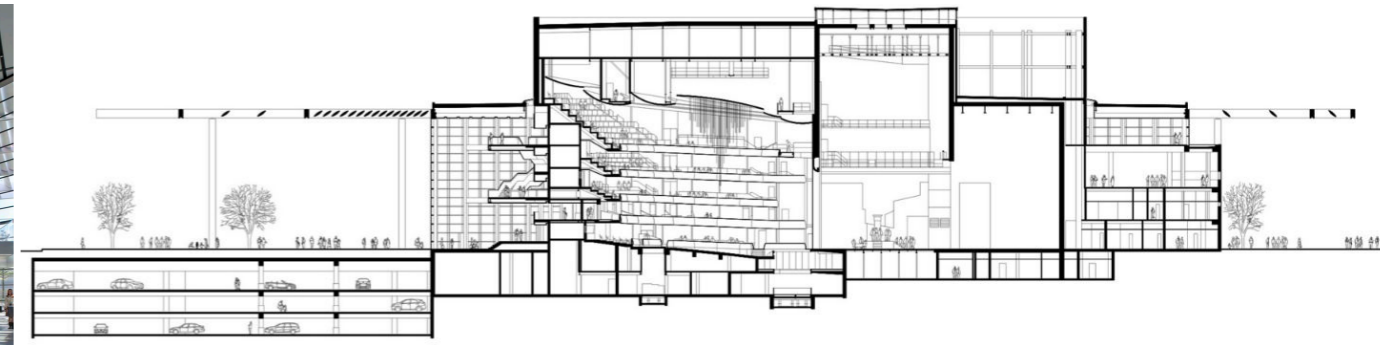
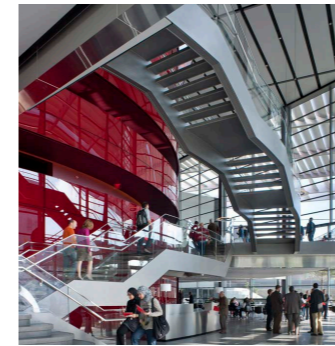
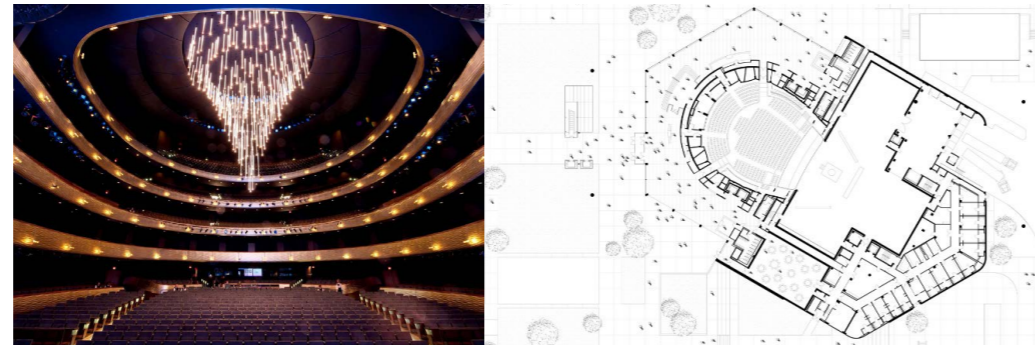
The Harbin Opera House is designed by MAD Architects and is located in China. The main auditorium is a proscenium arch and is clad with Manchurian Ash wood sculptured as if a wooden block which is gently eroded, these wooden walls wrap around the main stage and seating. The back of the house is mainly used by the back stages, with two side stages and a rear stage.



## FIVE OPERA HOUSES

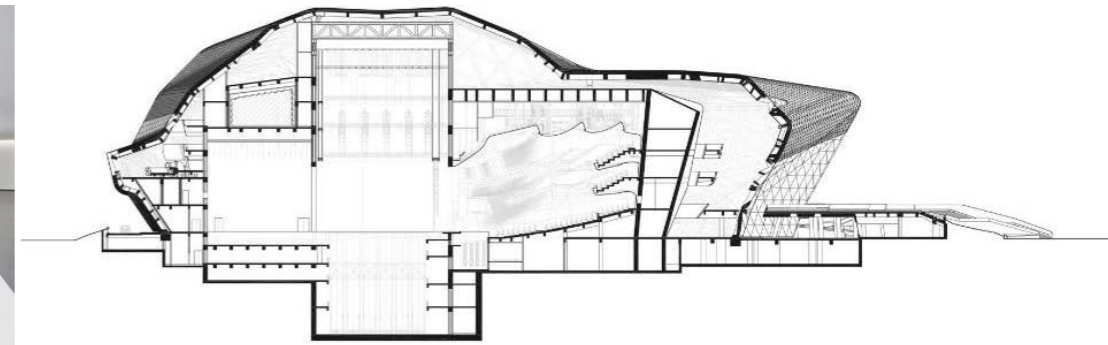
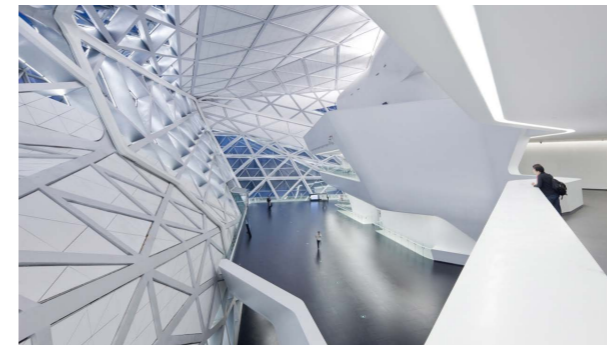
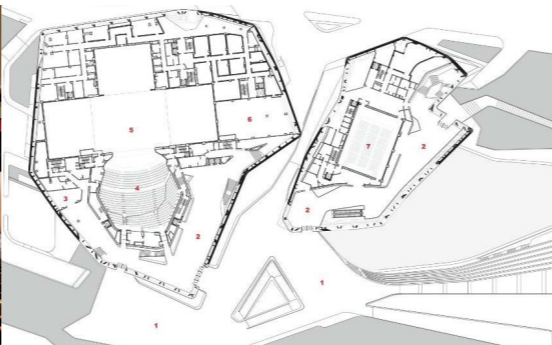
Name: Winspear Opera House  
 Architect: Foster + Partners  
 Location: Dallas, United States  
 Opening year: 2009  
 Auditorium type: Horseshoe  
 Capacity: 2200

Figure 5.4



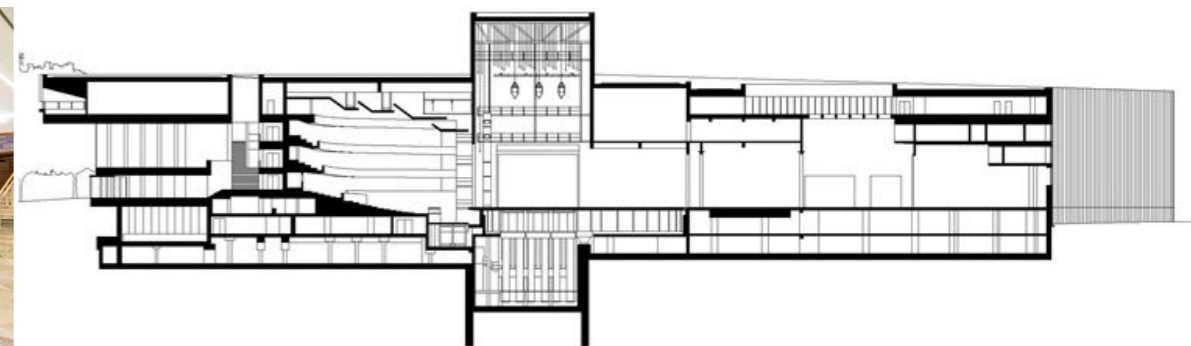
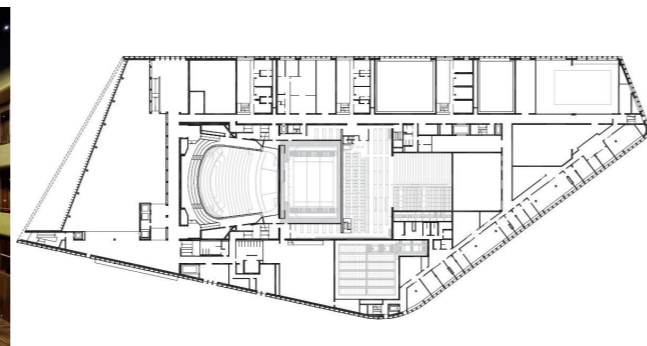
Name: Guangzhou Opera House  
 Architect: Zaha Hadid Architects  
 Location: Guangzhou, China  
 Opening year: 2010  
 Auditorium type: Fan shaped  
 Capacity: 1800

Figure 5.5



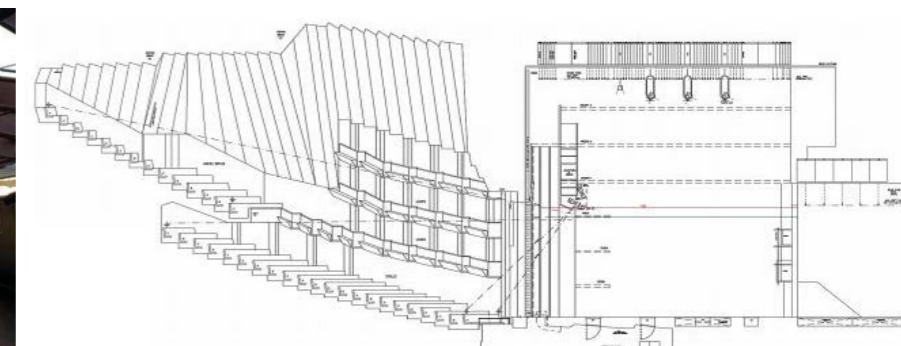
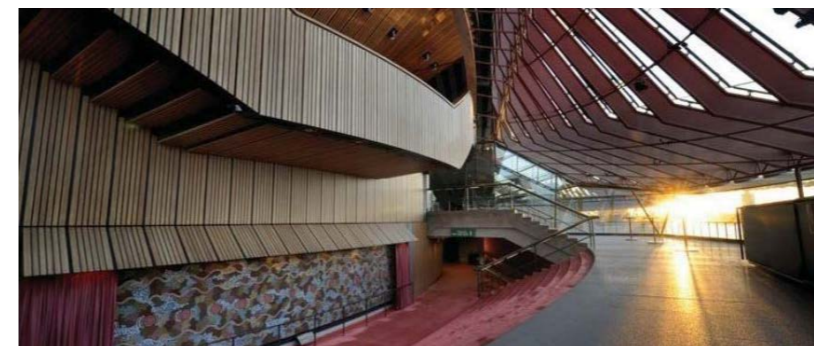
Name: Opera House Linz  
 Architect: Terry Pawson Architects  
 Location: Linz, Austria  
 Opening year: 2013  
 Auditorium type: Compact Horseshoe  
 Capacity: 1000

Figure 5.6



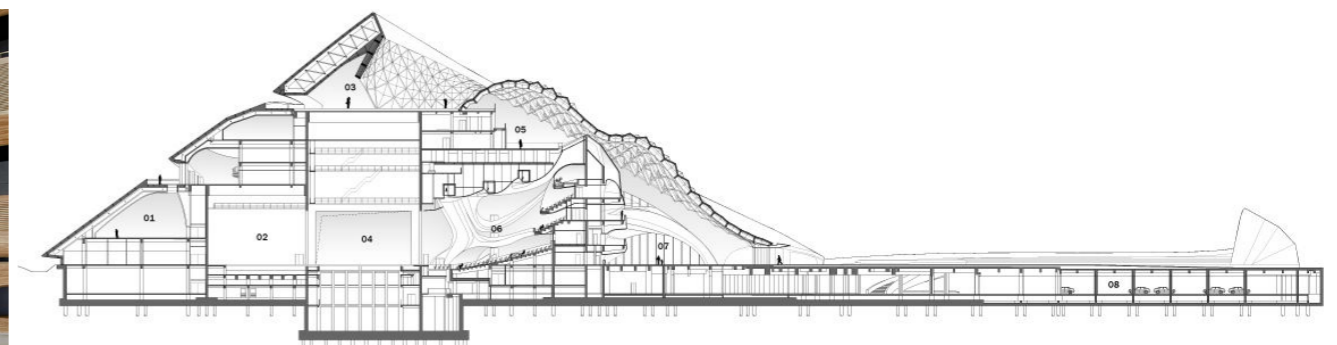
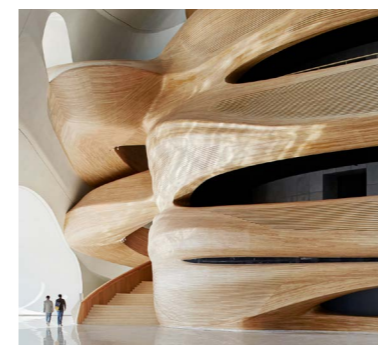
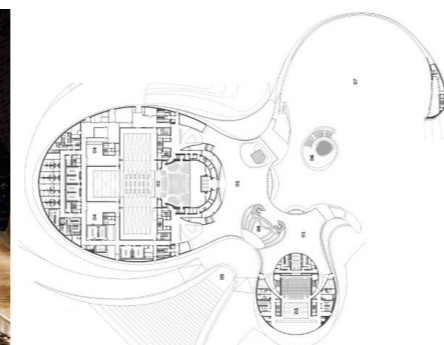
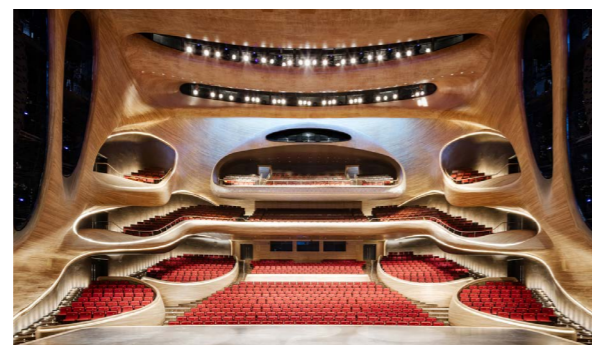
Name: Joan Sutherland Theatre,  
 Sydney Opera House  
 Architect: Jørn Utzon  
 Location: Sydney, Australia  
 Opening year: 1973  
 Auditorium type: Proscenium arch  
 Capacity: 1507

Figure 5.7



Name: Harbin Opera House  
 Architect: MAD Architects  
 Location: Harbin, China  
 Opening year: 2015  
 Auditorium type: Proscenium arch  
 Capacity: 1600

Figure 5.8



## STOPERA AMSTERDAM

The Stopera in Amsterdam was designed by Cees Dam in 1986. It is a five storey building and used by the Dutch National Opera and Dutch National Ballet.

### Rehearsal rooms

Within the Stopera there are a few types of rehearsal studios; these are designed for The opera company: 'De Nederlandse Opera', the orchestra: 'Het Muziektheater' and the ballet company: 'het Nationale Ballet'.

### Dressing rooms

The building has many different dressing rooms. These dressing rooms are located on the ground floor and in the basement. The room for the dressers, wigs and make-up are located next to the dressing rooms. The conductor's dressing room is located next to the orchestra pit, at basement level.

### Communication

In every production there is a stage manager, his desk is situated at the right side of the stage. From this desk a large number of functions can be operated, the stage manager is simultaneously communicating with the artists, technicians, lighting- and stage services.

### Stage

The Stopera has only one stage, with a total of 1594 seats, excluding wheelchair places. The stage is used alternately by the opera and ballet. This means that on one day a production can be built, lit or rehearsed on stage, while another production will be performed in the evening. Therefore, in addition to the main stage, there is also a similarly sized side stage, rear stage and assembly stage. At these stages the scenery will be assembled after it has been delivered in smaller pieces by truck. Each of the stages has a size of approximately 300 square meter.

The floor of the main stage can be changed for every show, this can be done by the five stage lifts, each 16.5 meter wide and 2.7 meter deep. These lifts can be independently raised or lowered for 3.05 meter and tilted to a maximum of 10%.

### Sound control

In order to have an optimal sound in the auditorium, the lighting and sound control booths are permanently located at the back of the 1st balcony. A production desk can be situated at the 11th row during rehearsals. The sound mixer has a permanent position at the 17th row, at the back of the stalls underneath the balcony. At the back of the 2nd balcony the projection booth is located, from this booth the subtitles are coordinated.

### Loading and unloading

The loading bay has room for 2 trailers side by side. The maximum height of the trailer is 4 meters and the loading platform is adjustable in height to a maximum of 1.26 meter.

Name: Stopera  
 Architect: Cees Dam  
 Location: Amsterdam, the Netherlands  
 Opening year: 1986  
 Auditorium type: Fan Shaped  
 Capacity: 1594



Figure 5.9 Front view



Figure 5.10 Foyer

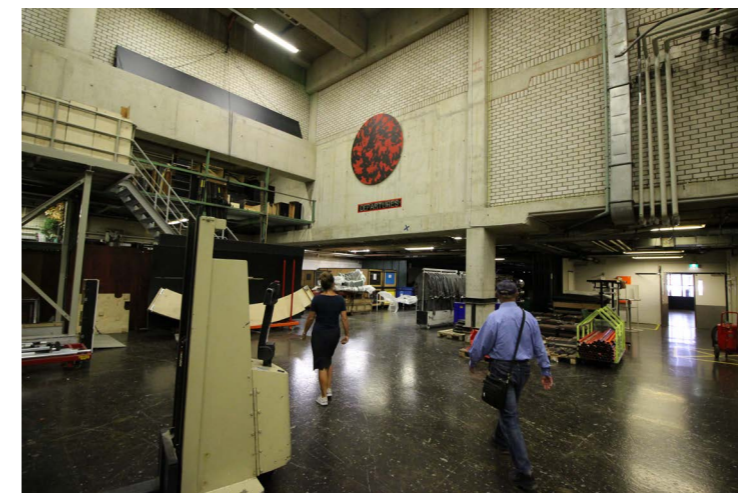


Figure 5.11 Backstage



Figure 5.12 make-up room

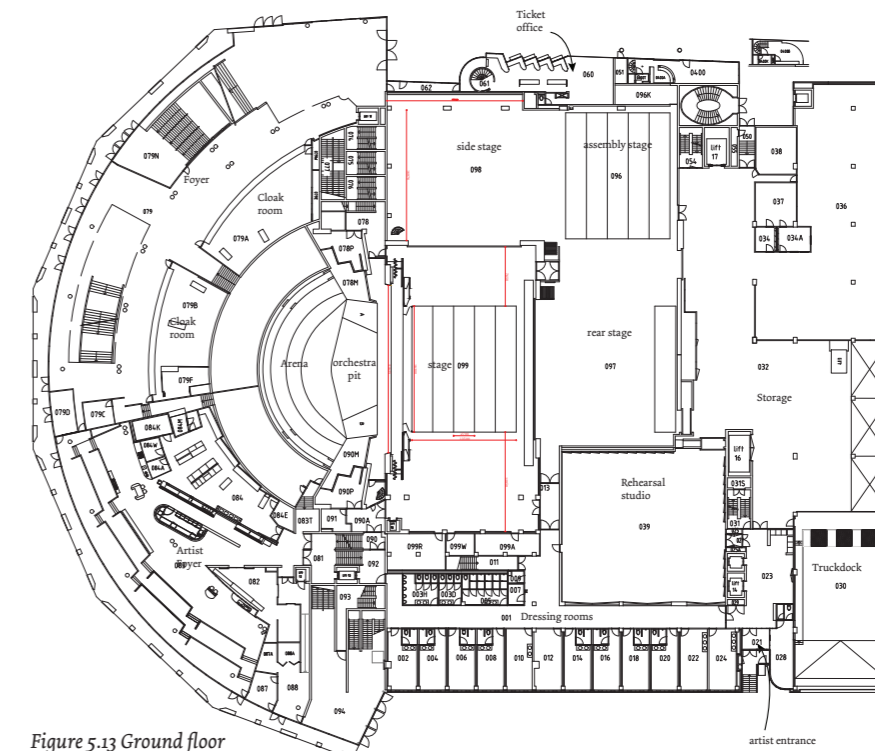


Figure 5.13 Ground floor

## OPERA HOUSE OSLO

The Opera House Oslo was designed by the architect Snohetta and built in Bjørvika, Oslo in 2007. The total area of the building is 38500 sqm. The end user of the building is the Norwegian National Opera and Ballet, they are Norway's largest music and theater institution (ArchDaily, 2008)

### Materials

The building has two main materials: Marble and Oak. The roof's cape is made of marble cladding and forms a large public space within the landscape in between the city and the fjord. Oak is used for the main auditorium and interior walls.

### Floorplan

The floorplan is split in two by a corridor which runs from north to south, which is named the 'opera street'. The offices, dressing rooms and production areas are located at the east side of the opera street. The main entrance, public areas and stages are located at the west side of the opera street. The foyer at the south side of the building opens up at the inner Oslo fjord.

### Stages

The Oslo Opera House has three stages: The main auditorium with a maximum of 1400 audience members; stage 2 with a maximum of 400 and rehearsal room 1 with a maximum of 150 audience members. The rehearsal room 1 is also a theater because it can be used as a black box theatre.

The main auditorium has a stage of 16x16m with an 11.8 meter deep sub stage. Furthermore, it has two side stages and two rear stages. The stage of the main auditorium is directly connected to large rehearsal room 1, which can also be used as a black box theatre. This room is located at the south side and can be accessed by the audience via a small gallery from the lobby. The other gallery is located at the north side of the main auditorium and gives access to stage 2.

### Rehearsal rooms

Besides the large rehearsal room 1, which is connected to the main auditorium there are a few more rehearsal rooms. There are several rehearsal rooms for opera and ballet on the 2nd, 3rd and 4th level, the largest room has a clear height of 9 meters and is bigger than the stage of the main theatre.

### Dressing rooms

There are a few types of dressing rooms, because there are three types of performances: ballet, opera and orchestra, which all have their own changing room requirements. The orchestra needs large changing rooms with 10 persons, with areas for unpacking instruments, change clothes and rest, there is a shared access to toilets and showers.

The ballet and opera have smaller rooms with 4 or 6 persons, or have soloist rooms which share their bathroom with the neighboring dressing room.

### Loading and unloading

The loading deck is located at the east side of the building and splits this side in two. The height of the loading deck is 9 meters and it is directly connected to the rear stage of the main auditorium. An elevator is located halfway the loading deck, which has a clear height of 6 meters, and is used to bring pieces of the scenery to the rehearsal rooms on the 3rd floor.

Name: Opera House Oslo  
Architect: Snohetta  
Location: Oslo, Norway  
Opening year: 2007  
Auditorium type: Horseshoe  
Capacity: 1400



Figure 5.14 Main auditorium

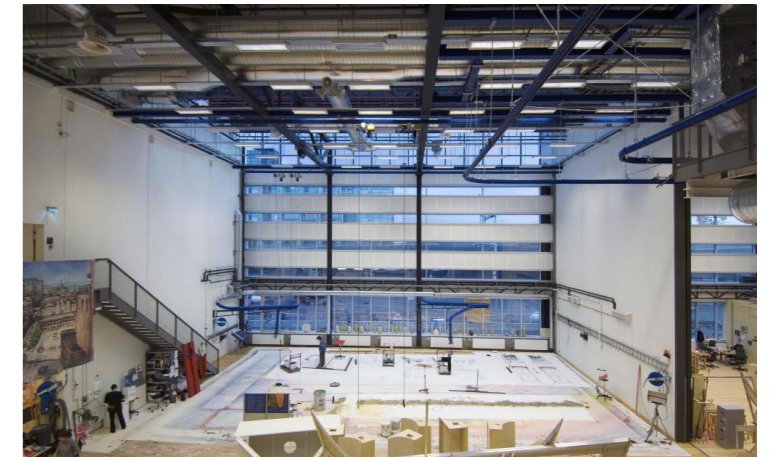


Figure 5.15 Workshop space



Figure 5.16 Orchestra rehearsal room

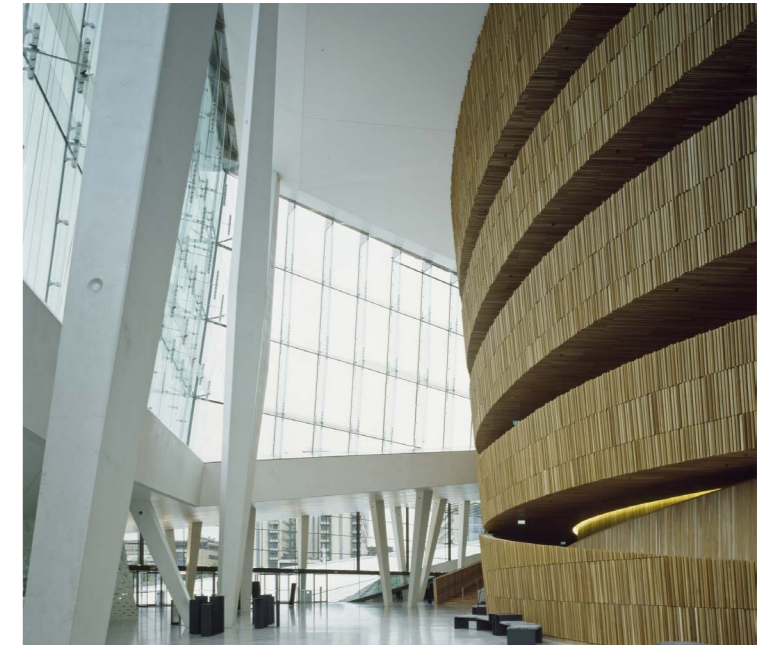


Figure 5.17 Foyer

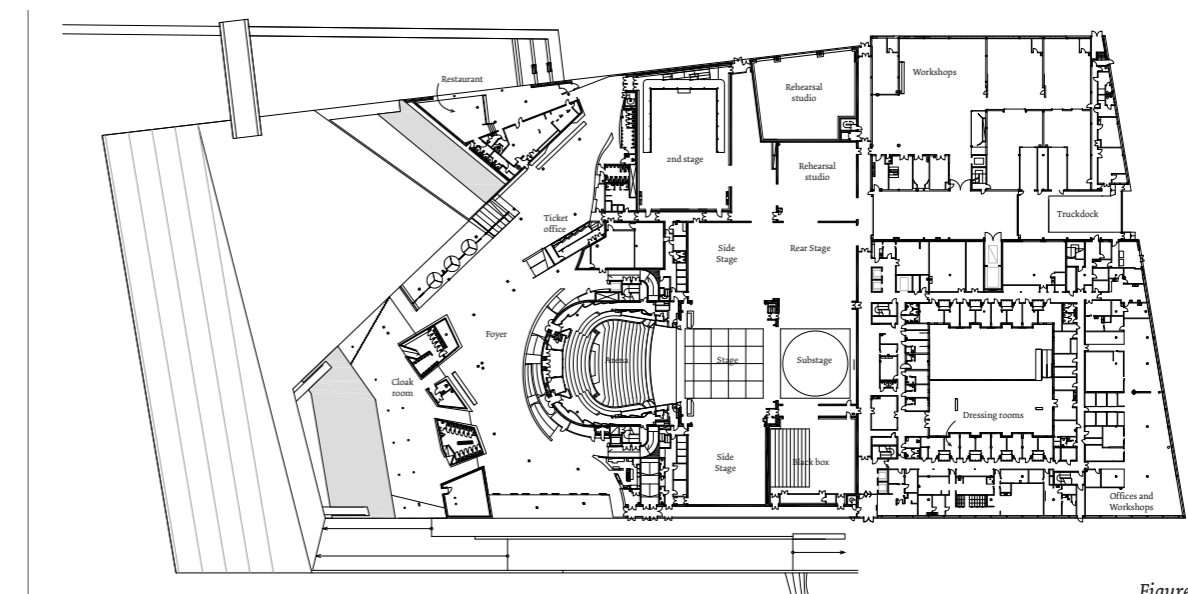


Figure 5.18 Floorplan level 1

## THEATRE TYPOLOGY

When analyzing the building plans of the various Opera Houses, it may be concluded that there are a few elements which are present in each building. These various elements are shown in figure 5.19. In almost all cases, the entrance or foyer is wrapped around the auditorium and its staircases. The foyer varies in height, but in most of the seven cases, the height was more than 6 meters. The staircases of the auditorium are often directly wrapped around the auditorium to give access to all seats of the auditorium, in some cases the staircases are placed within the foyer, as in the Stopera Amsterdam, this makes it possible to have multiple foyers above each other.

The actual auditorium design was different in most buildings and will therefore be further elaborated on, on the next page. The stage always contains a stage tower which is approximately 2.5 times the size of the proscenium. The proscenium is the opening between the auditorium and the stage, the measurements of the proscenium are necessary to develop the optimal auditorium size.

The backstage usually contains two side stages and one rear stage. These three stages have at least the same size as the stage and are used to rehearse the performances and build the décor in advance. By using multiple stages, there can be a variation of shows within one time frame. At the back of the backstage there is the back of the house, this area is used by the employees and there are offices, dressing rooms etc. The height and size of this area varies most and is dependent on the amount of productions per year and on the type of productions the opera or ballet company want to do themselves.

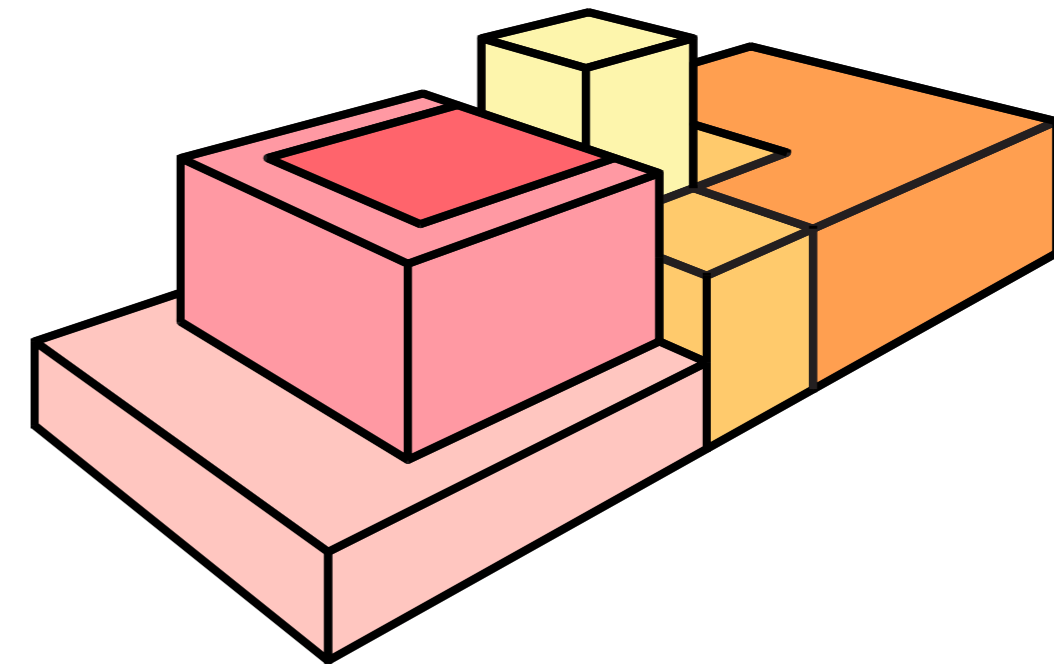
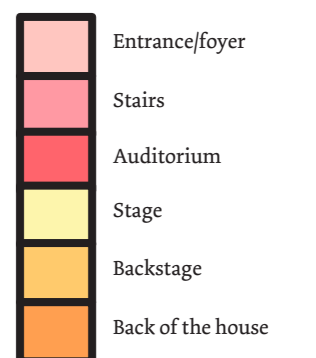


Figure 5.19



## AUDITORIUM TYPOLOGY

Throughout the years many different auditorium designs have been created, and the ones that are still frequently used by modern architects, are schematically elaborated on within figure 5.20.

Although, the seven different analyzed theatres all have their own auditorium designs, they can be related to original designs shown in the figure. The proscenium stage, horseshoe-shaped and fan-shaped auditorium are the three types which were all used by the seven analyzed buildings. The Grande salle is not used by the analyzed buildings, although it is still a well-known theatre form, it is nowadays mostly used for cinemas. In most cases the horseshoe-shaped auditorium also has a proscenium stage nowadays.

For the auditorium design for the opera and ballet theatre, one of these three typologies will be chosen. The proscenium stage is a wider theatre which causes a lesser view for the spectators on the side, therefore this theatre typology is not further analyzed.

The two other shapes will be further analyzed, these are the fan-shaped auditorium with proscenium stage and the horseshoe-shaped auditorium with proscenium stage. Within both designs the orchestra is located in between the first row and the proscenium.

The horseshoe-shaped auditorium form allows a good view for all spectators. The form of this theatre allows many boxes at the side of the auditorium which also contribute to a good sound transmission. Furthermore, this shape allows a relatively large audience in a small area.

The Fan-shaped auditorium also provides a large audience with a good view and good acoustics. The good acoustics are caused by the angle of the walls which prevent flutter echo.

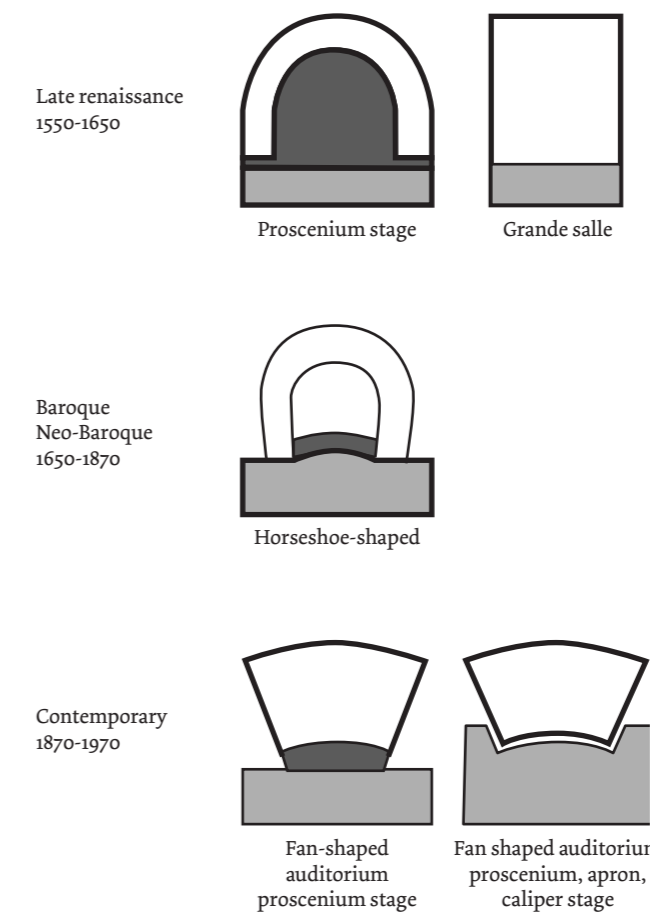


Figure 5.20 Auditorium design

On the 27th of July I visited the ballet 'Swan Lake' performed by the Leonid Yakobson Ballet in the Alexandrinsky theatre in Saint-Petersburg. It is a 3 hour ballet with two breaks and started at 19.00. The Swan Lake is the well-known traditional ballet about Prince Siegfried who has reached the age to be married, and has to choose a bride at the ball. The evening before the ball he goes hunting in the forest and sees Odette the swan Queen who is, together with the other swans, under the power of the magic spell of the evil Rothbart.

The Alexandrinsky theatre is the oldest and one of the best known theatres in Saint-Petersburg, and during summer they show a few classic ballet performances like the Swan Lake for a smaller price. Although recently renovated it is still an old theatre building and when walking towards the building the visitors will first walk through a park which creates a static view of the building. The entrance of the building is also the foyer, noteworthy is the absence of a bar, so there was no possibility to have a drink before the show or during the break. The auditorium itself is very classically decorated with red flannel and gold ornaments and has multiple balconies which follow the walls and stop almost at the stage.



Figure 5.21  
Photo of swan lake ballet with personal  
experience of visit the performance.



### 5.3 DANCE SCHOOL TYPOLOGY

Because there is a full-time dance academy for ballet and street dance, with a curriculum of 2 years. Two dance schools have been analyzed, both give different types of ballet classes, use different dance techniques, and have multiple rehearsal spaces.

Because most of the full-time dance schools are focused on ballet, the two schools which were analyzed are mainly teaching ballet. Every ballet school uses a training method of its own which originates from different styles. Throughout the years different ballet training systems have been practiced, which all originate from different countries. The mainly used ballet styles are the Russian ballet with the Vaganova method, the English ballet with the Royal Academy of Dance (RAD), and the Italian ballet with the Cecchetti method.

The Vaganova method originates from 1920 and first became the standard of the Soviet ballet instruction, and today in most parts of the world. With this system the dancer uses the whole body in every movement in order to have a harmony in these movements, the focus is on training the strength and flexibility of the dancer.

The RAD method was established in 1920 and also has an examination board. It is now one of the world standard education methods. The style is formed by mixing various methods, such as the Italian, French, Danish and Russian methods. The focus is less on the technique but more on learning the details of the various movements of the ballet.

The Cecchetti method was also established around 1920 and is a style with a training system which demands a special concern for the anatomy and the classical technique of ballet. The focus of training is on the basic principles, so the dancers can become self-reliant and will copy less movements of the teachers.



## HOUSTON BALLET CENTER FOR DANCE

The Houston ballet Center for Dance is a 6 storey high building with 9 dance studios, a dance laboratory and artistic, administrative and support facilities, which makes it the largest dance education facility of the United States. The rehearsal rooms have a double-height, which offer the first floors interior views of the rehearsing dancers. With the design of the building collaboration between students and staff is promoted because of these interior sight lines and of open places where they can interact.

The interior galleries and rehearsal studios are made of walnut planks, which are used to soften the thresholds between the spaces. The rehearsal rooms have very large windows which offers a view over the city, but also allows the sun to enter, especially in the afternoon when the sun is low at the west façade. Therefore, blinds are placed in the west façade which are lowered automatically in the afternoon.

Within the building, the Houston Ballet Academy is housed and they train over 1000 students per year. The training varies from first introduction through a full-time ballet education. The full-time ballet academy classes start after high school and take 6 days a week and 9 hours per day. The students will mainly study the Vaganova method, but also the RAD and Cecchetti method. Furthermore, the students will take modern dance classes and will learn about choreography.

Name: Houston ballet Center for Dance  
 Architect: Gensler  
 Location: Houston, Texas  
 Opening year: 2010  
 Area: 115000 sqm



Figure 5.23 Academy rehearsal studio



Figure 5.24 Lobby



Figure 5.25 Section

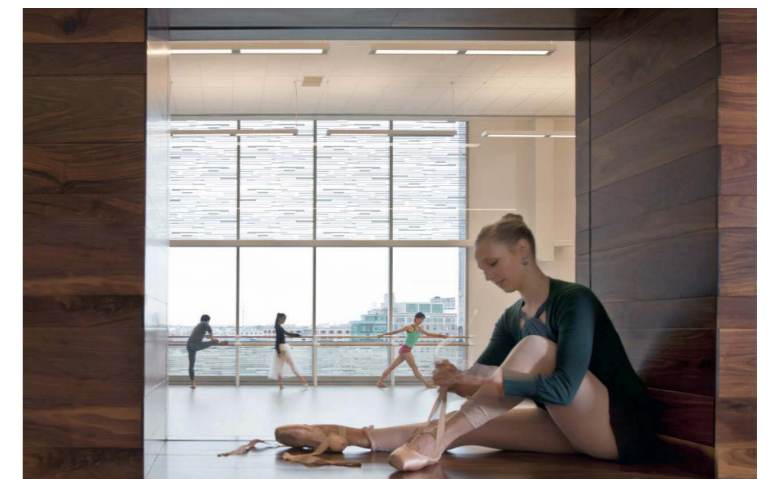


Figure 5.26 View from hallway

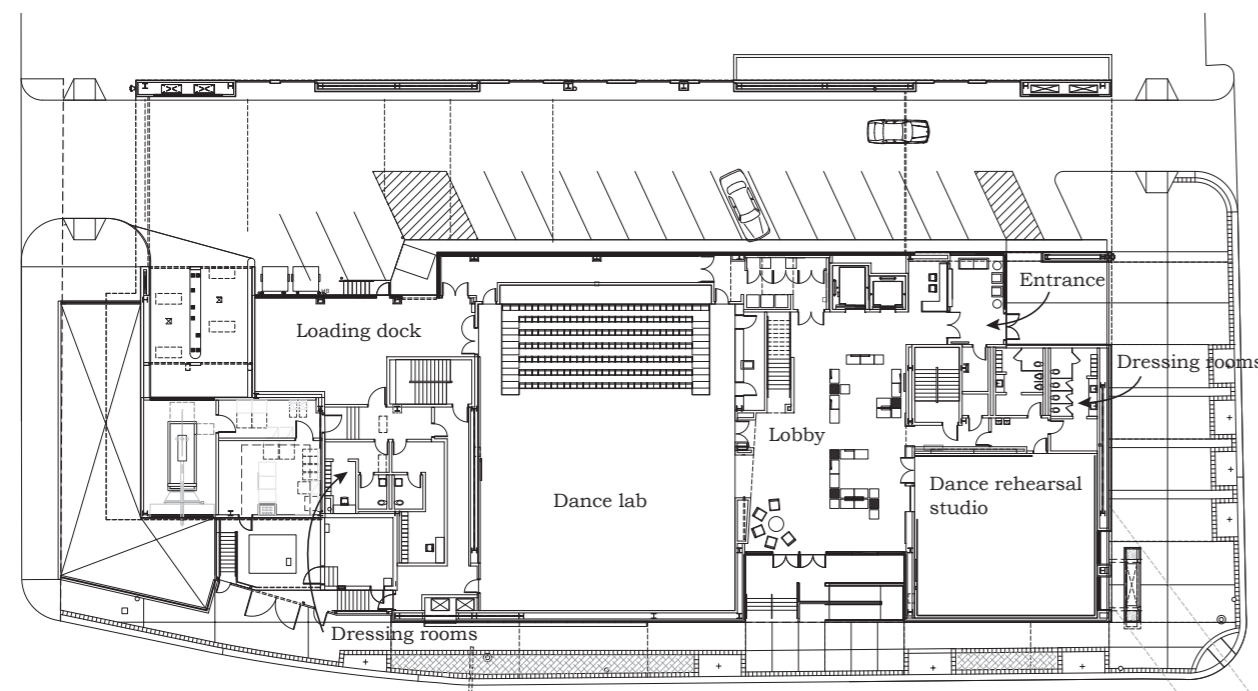


Figure 5.22 Level 1

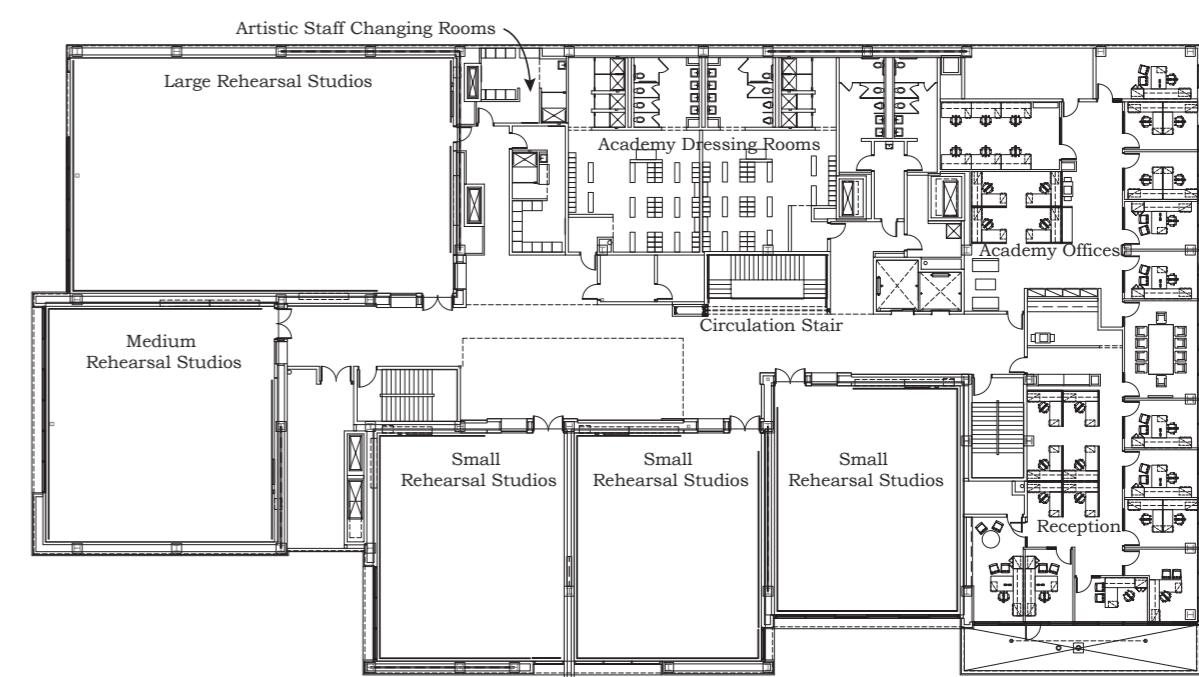


Figure 5.27 Level 3

## BALLET AM RHEIN

The Ballet am Rhein contains two large rehearsal ballet rooms, with full-size stage dimensions and three smaller rehearsal rooms. Furthermore, there are changing rooms, a physiotherapy room and there is an apartment for guest artists. From the entrance, which is also the foyer and has a height of 6 meters, the circulation areas lead through the building on all floors. The ballet rooms are located on the first and third floor and have a double height.

The building materials of the interior of the building are mainly concrete which is left in sight, or the walls are made stucco white. The mirrors in the rehearsal rooms are room wide and 3 meters high. The entrance of the rehearsal rooms are on the opposite side of the mirrored wall, to not disturb ongoing classes.

Within the building, the ballet school of the Ballet am Rhein is located and they train 55 students divided in four groups and an extra 50 students in advanced class. The ballet techniques that are trained are a mix between classic academic ballet and the more modern dance techniques, which makes the students own a style which is individual and contemporary. Although the school does not teach students until performance level, the Ballet am Rhein ensemble is considered one of the most successful and innovative ballet ensembles.

*Name: Ballet am Rhein*  
*Architect: gmp Architekten*  
*Location: Düsseldorf, Germany*  
*Opening year: 2015*  
*Area: 4500 sqm*



Figure 5.29 Hallway



Figure 5.30 Exterior

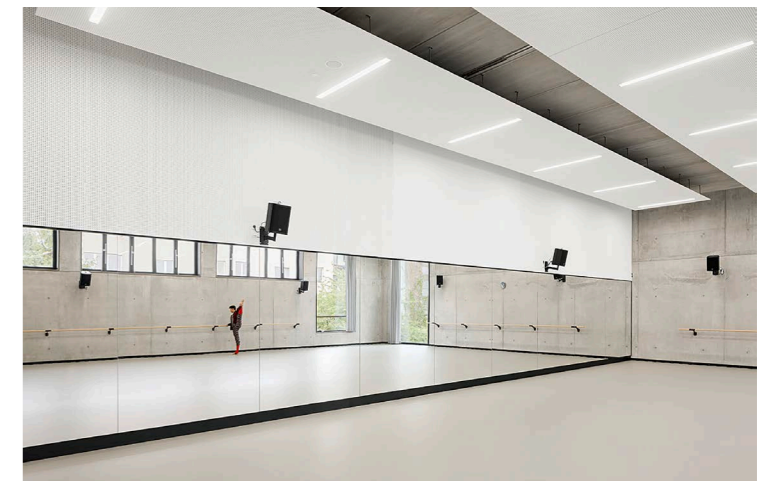


Figure 5.31 Rehearsal studio

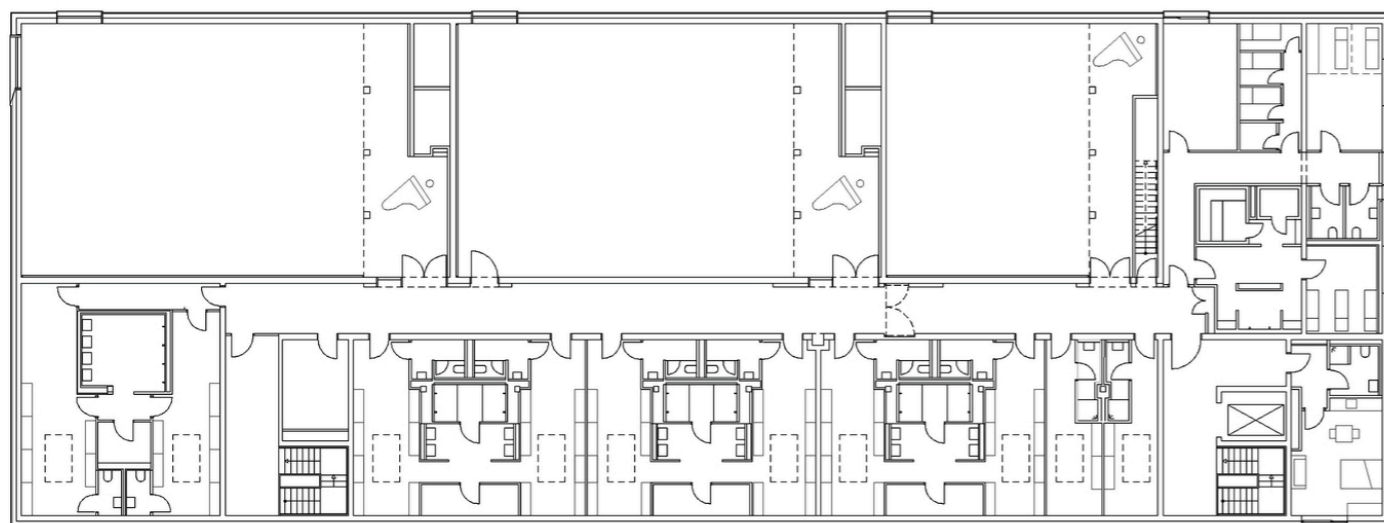


Figure 5.28 Level 2

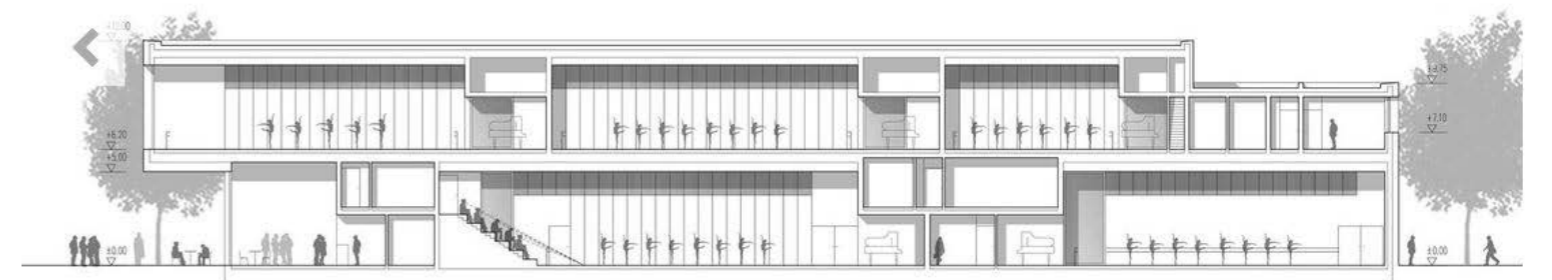


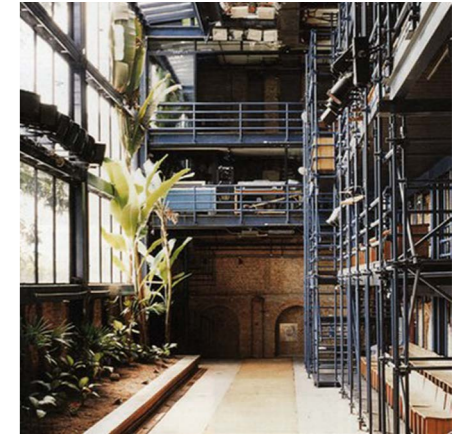
Figure 5.32 Section

## 5.4 PUBLIC THEATRE

The public theatre will be located within the silos. Because of this extraordinary theatre form, two analyzes have been made. One of the Teatro Oficina and one of Zeitz MOCAA.

The Teatro Oficina is analysed because of the theatre design, this building is, just like the silos, a very long and small building, which creates a unique connection between the performers and the audience.

Zeitz MOCAA was already analyzed during the M<sub>3</sub> project, and is used for this part of the building because of the transformation of silos to museum. This building shows one possibility of transforming silos.



## TEATRO OFICINA

Teatro Oficina is the renovation of a historic, previously burned down office building, and the location for the seating has been designed almost entirely out of painted scaffolding. Because of the small size, the building has a depth of 9 meters, and because of the hard seating, the theater does not have the shape and atmosphere normal theaters do. Because of the small depth of the theater, visitors have a very challenging sight line on the performance, and all have a completely different view on the show. The performer therefore is being watched from all sides.

Because of the building size, the stage also is an untypical stage and demands a certain creativity from the performers. Furthermore, the stage causes everything, the performers, technicians, scaffolding and even the public to be part of the show and to participate in the scenes.

Name: Teatro Oficina  
 Architect: Lina Bo Bardi  
 Location: São Paulo, Brazil  
 Opening year: 1984  
 Area: 450 sqm



Figure 5.33

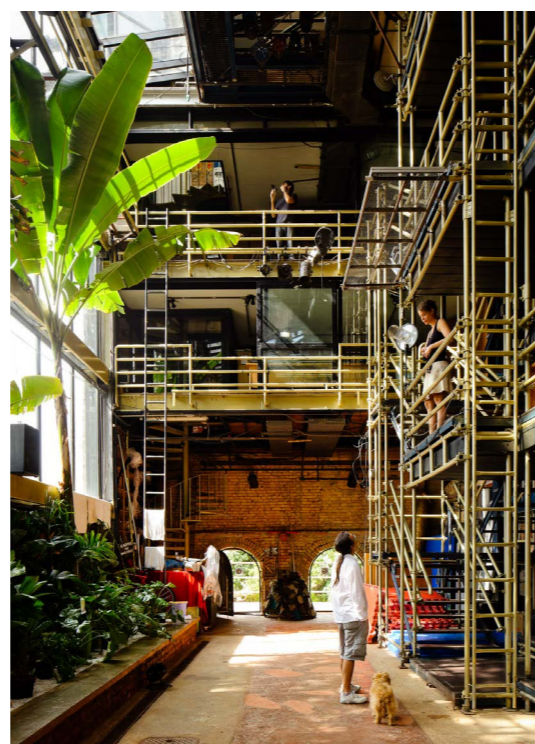


Figure 5.34

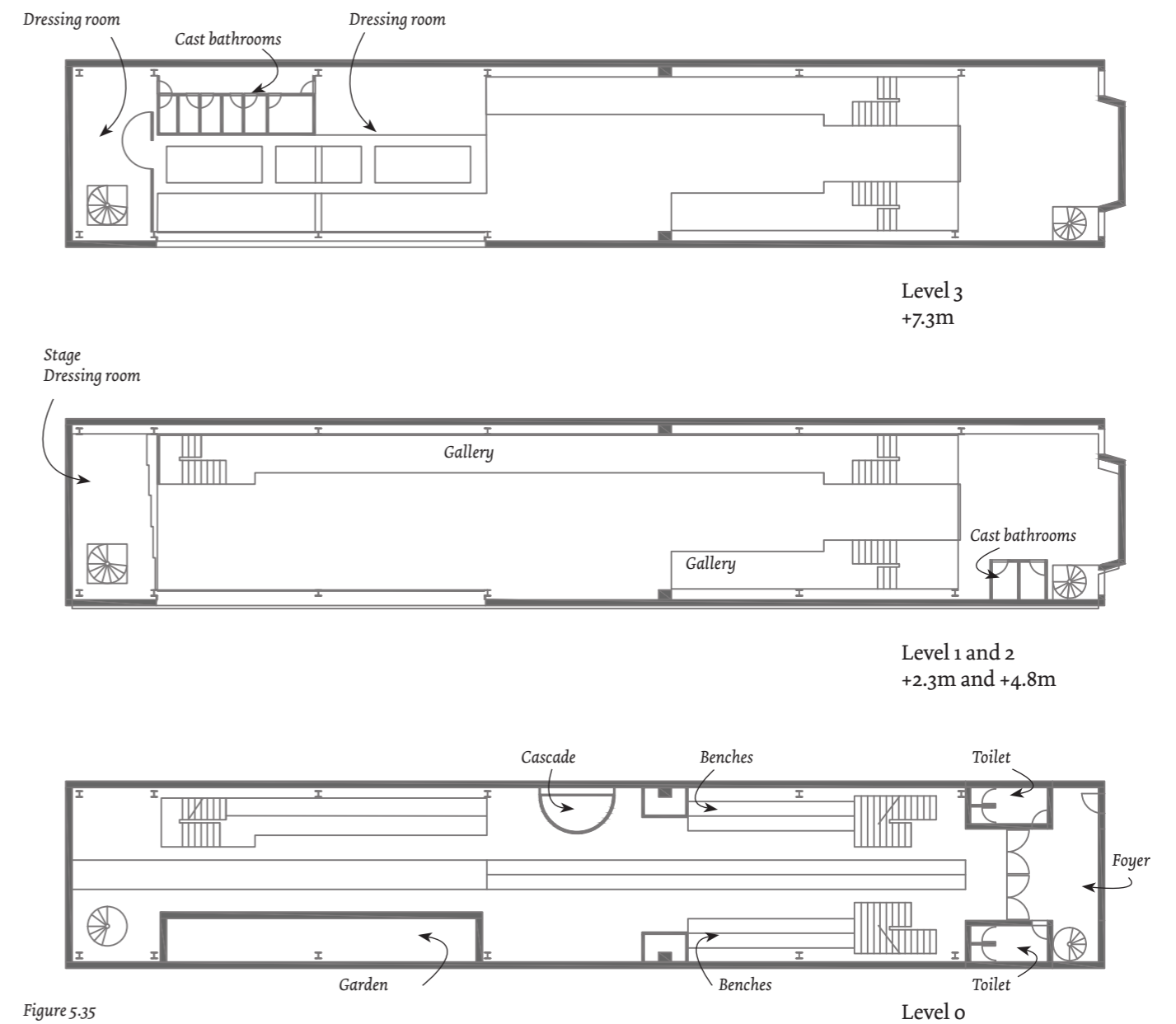


Figure 5.35



Figure 5.36



Figure 5.37

## MOCAA

Zeitz MOCAA was one of the projects analyzed during the starting period of this graduation project. The old grain elevator Zeitz MOCAA is located in the harbor of Cape Town of which the first basin was built in 1870 and has been the gateway to Southern Africa for many years. The grain elevator was built in 1921, which was delayed because of the first world war. Not much later the gateway status closed, probably because of the growth in air transport. However, the harbor was still growing and in 1960 the harbor had its heydays. Before the heydays, the foreshore was also built in 1945, which cut-off the city centre of the sea and is the base of the renovation project of the harbor area which started in 1984. The design for the Zeitz MOCAA is made by Heatherwick Studio and started in 2014.

The grain elevator will be transformed in an art gallery with educational areas, stores and a hotel. The art galleries are located in the silo part of the building, to meet the requirements of the art galleries, several incisions had been made. Therefore, there are spaces carved out of the silos, which create pictures such as the oval atrium. In figure 5.40 and 5.42 it can be seen how they carved out the top of the silos. Unfortunately it is not clear if the top of the oval atrium are the existing silos, or if they have been rebuilt to create the effect.

*Name: MOCAA*  
*Architect: Heatherwick Studio*  
*Location: Cape Town, South Africa*  
*Opening year: 2016*  
*Area: 9500 sqm*



Figure 5.38



Figure 5.39



Figure 5.40



Figure 5.41 Oval atrium

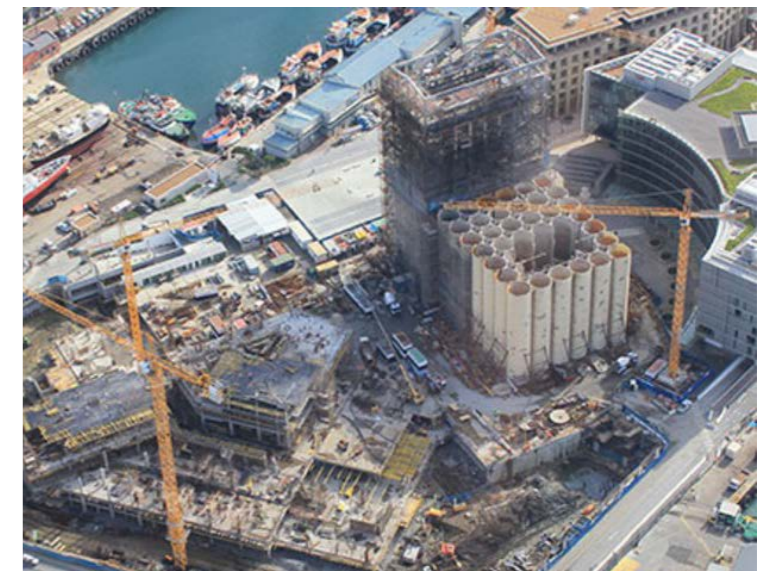



Figure 5.42



On the 15th of September I visited a new production of 'Le Nozze di Figaro' in the Dutch National Opera. It is a 3.5 hour opera, which started at 19.00, by Wolfgang Amadeus Mozart in Italian, with Dutch and English subtitles and directed by David Bösch; the music was performed by the Netherlands Chamber Orchestra. Le Nozze di Figaro is a comic opera about a hectic, eventful wedding party, with many intrigues, disguises, mistaken identities and hidden meanings. In Le Nozze di Figaro, the Count Almaviva wants to settle with the maid Susanna, however, Susanna doesn't want to be involved with the count but wants to marry Figaro. Figaro, on the other hand, had once promised the wealthy Marcellina to marry her, who is now there to claim the marriage. Although the count is unfaithful to his countess, he is jealous when the servant Cherubino flirts with the countess.

Although I had already visited the building before, this time I was able to experience the building as a visitor. The Opera and Ballet entrance is connected to the town hall entrance, and in this main entrance the ticket office is located. The access to the opera and ballet hall itself is through another entrance with two doors where the tickets are checked. When you have entered the opera and ballet hall, the wardrobe is located on the left side. It was not really used the time I went because of the beautiful 30 degrees weather that day. Then we went upstairs to the entrance of the arena, where some bars are located together with a balcony to smoke or enjoy the view over the Amstel. The doors of the arena open 15 minutes before the performance; from that moment on you can look for your seat. There were no employees who helped to find the correct spot but the chairs and rows all had numbers, so we could find our seats ourselves. Besides the Opera itself, from all sides you could see the Netherlands Chamber Orchestra play the accompanying music, and you could also see the subtitles above the proscenium, which allows you to follow the story when you don't speak the language. There was one break halfway the opera of approximately 15 minutes which allowed us to get a drink and a small snack and again to go outside to enjoy the still warm evening. At the end there was a standing ovation for the performers and we went back home to Eindhoven with happy memories of the show.

Figure 5.43  
Photo of Le Nozze di Figaro with personal  
experience of visit the performance.





## DESIGN

As explained and analyzed in the previous chapters, there are three main functions in the building: the Dance School, the Opera and Ballet theatre and the Public theatre. These functions are all connected via a public route which is accessible for everyone. This public route is shown as a dotted line in the schematic program of figure 6.1.

The three functions are chosen to invite different type of visitors towards the building. The inhabitants of Vyborg, tourists from Russia and Finland, and students are brought together by the different functions.

In function, the dance school will be the connecting element between the public theatre and the opera and ballet theatre. Both theatres will use the rehearsal rooms of the dance school, while the dance school uses the auditoria for performances.

The visitors, students, performers and employees will all use the building in different ways. Students will mainly use the dance school, but in order to rehearse or watch the shows in the public theatre and opera and ballet theatre, they have access to these areas as well. Performers and employees all have their own building part where they will stay most of the time, and have access to the other building parts.

There are three main types of visitors of the Vyborg mill which will all use the building in different ways. 1. People that visit the public route; they are allowed to follow the route which should be closed and easy to follow. 2. The visitors for the opera and ballet theatre, which are visitors who travelled further and most likely come from bigger cities or from different countries. These visitors are allowed to enter the opera and ballet theatre and are able to walk down the public route. 3. The visitors for the public theatre, which will be more often inhabitants from Vyborg. They are allowed to enter public theatre in the silos, and can walk down the public route.

In this chapter the complete design will be explained, first the total process with some general design decision will be explained in chapter 6.1, then in chapter 6.2 the public route which connects all the functions and finally the opera and ballet theatre; dance school and the public theatre designs will be clarified in chapters 6.3, 6.4 and 6.5.



## 6.1 DESIGNING

The research of the surroundings and buildings which were explained in the previous chapters offered several conclusions. One of these conclusions is that it should also be easy for the visitors to enter the building; therefore there is an open square in between the silos and the old mill. This square will allow people to gradually enter the plot before they really enter the building. The three main functions all have their entrance at the square. Furthermore, there are some public functions connected to the square, which are accessible for all visitors. One of these functions is the restaurants, which are situated in the old storage, below the dance school, which is yellow in figure 6.2. There is chosen to locate these restaurants there because of the high alcohol consumption rate of the city and small amount of bars within the city. There will be two types of catering at the square. One part will be a restaurant with a kitchen which is shared with the bar on the other side, and the other part will only be a bar.

Besides the three restaurants, the public theatre, which is located inside the silos, will also have a direct connection to the square in summer, which will create a very lively square.

As analyzed in chapter 4.2, the pedestrians will always enter the building via the square. Besides, the visitors which will travel on foot, the buildings should also be accessible for two other types of traffic: trucks for delivery and cars for visitors. Although these two types of traffic will also first pass the building at the front side of the building, the parking and truck delivery both have access at the back of the opera and ballet volume, which can be seen in figure 6.8.

Another conclusion of the research is that the building should attract people from outside Vyborg. This attraction is created by the function chosen, but also needs to be promoted by the design of the building, which will be done by the creation of the new volume of the opera and ballet theatre.

The opera and ballet theatre will need a new volume, mainly because of the dimensions required for the auditorium, stage and backstage. Furthermore, the research has shown that it is important to create one building, which can connect the three functions, therefore, the new volume of the opera and ballet theatre needs to bridge the public theatre and dance school. Because of the Russian climate it is preferred to make it an indoor connection.

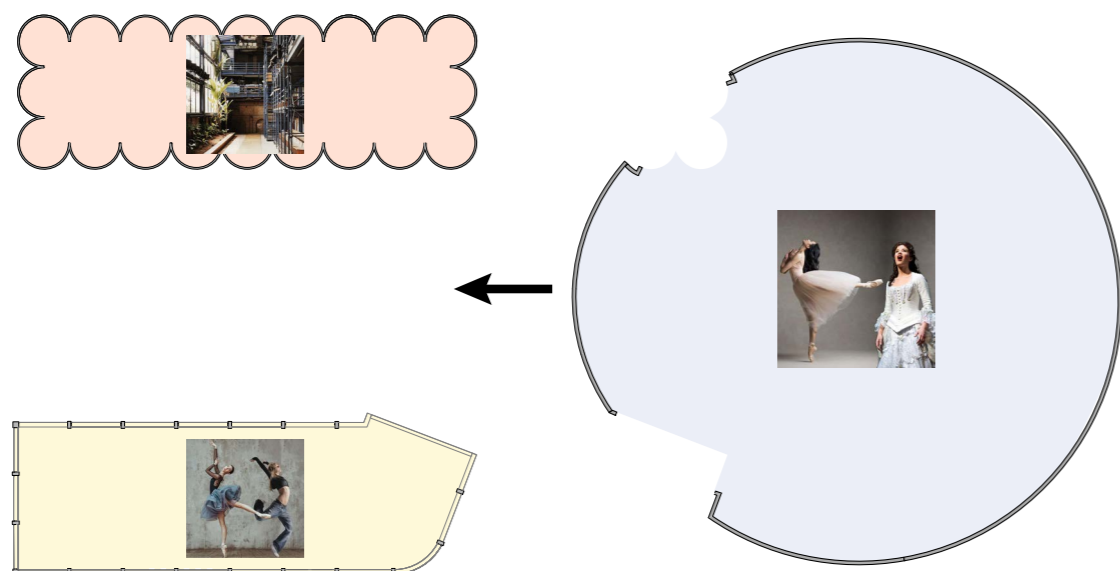


Figure 6.2  
Connection scheme

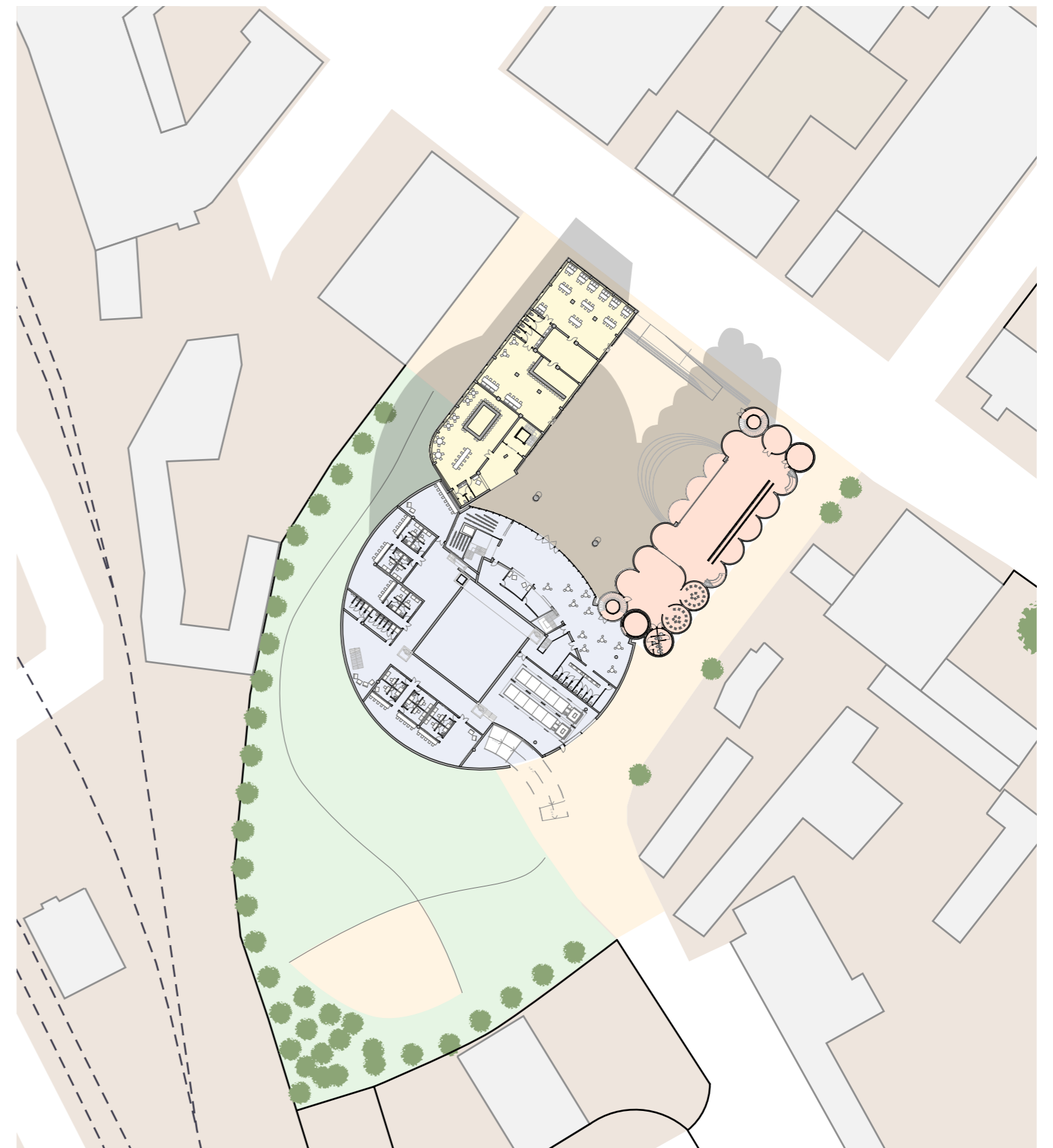


Figure 6.3  
Ground Floor

Multiple prototypes have been tested to get towards the final design which can be seen in figure 6.10. The testing has been achieved by a 1:100 sketch model which is shown in figure 6.6-6.9. With this sketching model the new volume of the ballet and opera building part is defined, the concept of the public route within this building is analyzed and a final auditorium typology is chosen. The public route will be explained in chapter 6.2.

The round shape of the opera and ballet building part refers to the existing silos and is tilted towards the square to connect and wrap the existing building elements. In order to connect to the old storage part of the building the belts of the building are in line with the floor heights of the old storage.

Because the back of the building part remains vertical, and the front of the building parts is tilted towards the square, as can be seen in figure 6.4, each oval belt has its own dimensions. Because the building is tilted towards the square, the higher the belt is situated the larger the diameter becomes. The front side, which is situated at the square, is opened up at the square by opening the ground floor. This location will also be the entrance for all three main functions, which results in a grand entrée created by the square.

To create an interesting relation between interior and exterior, the oval belts are all shifted in such a way that there are openings in between the belts, which allows the interior lighting to lighten the belts during the night. To enlarge the effect of the lighting, a reflecting façade material is chosen.

The auditorium is located at the front of the building part, in between the two existing volumes, by leaving the space underneath the auditorium open; the auditorium creates the entrance with a slanted ceiling. Furthermore, to create a relationship with the round shape of the building and the curves of the auditorium, the back side of the auditorium and curve of the building were altered towards the same curve. The test of this altering is shown in figure 6.9.

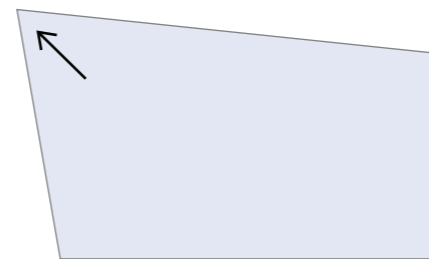


Figure 6.4

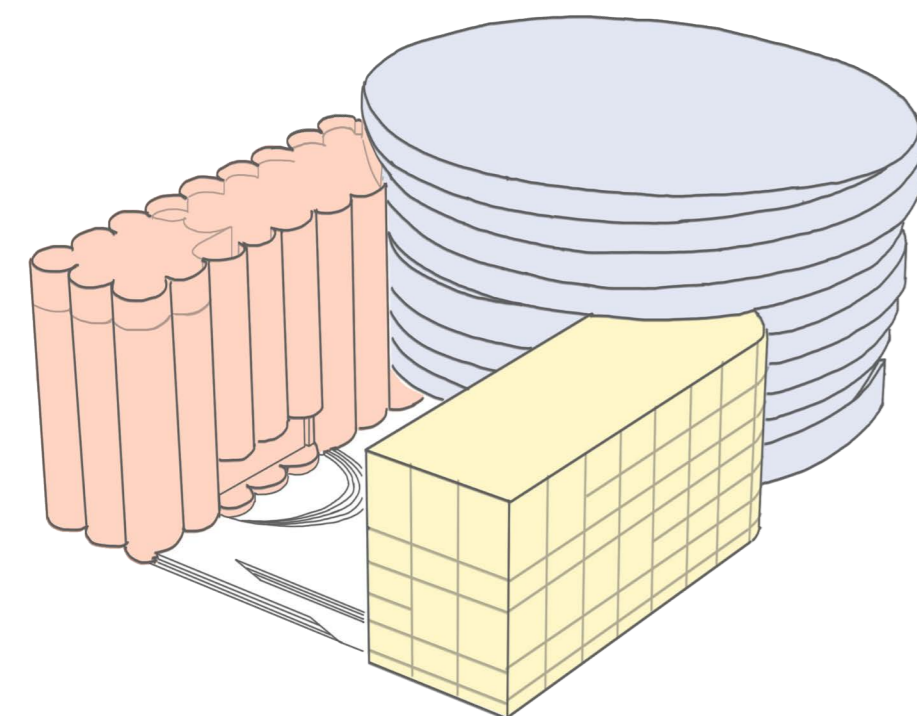


Figure 6.5

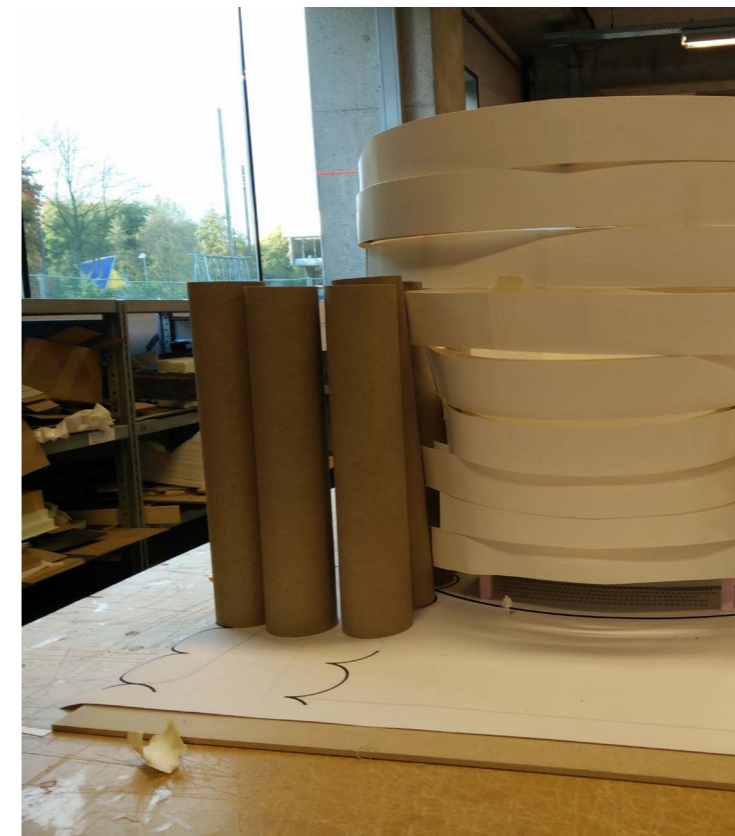


Figure 6.6



Figure 6.8

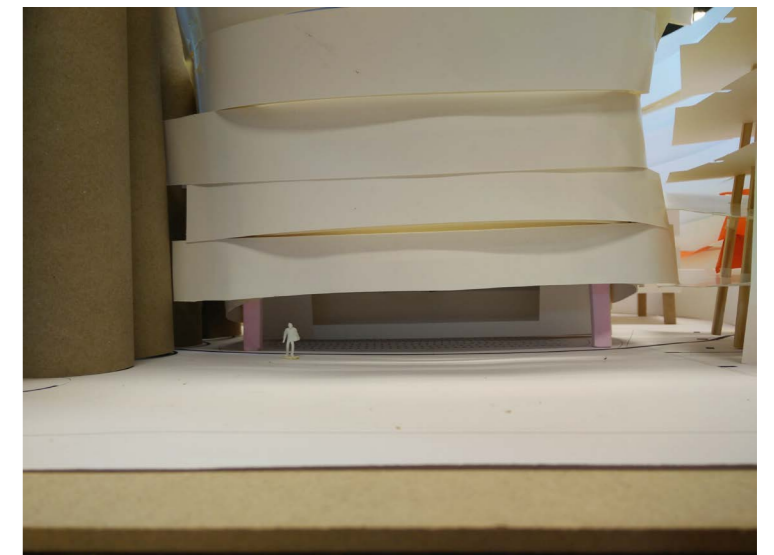
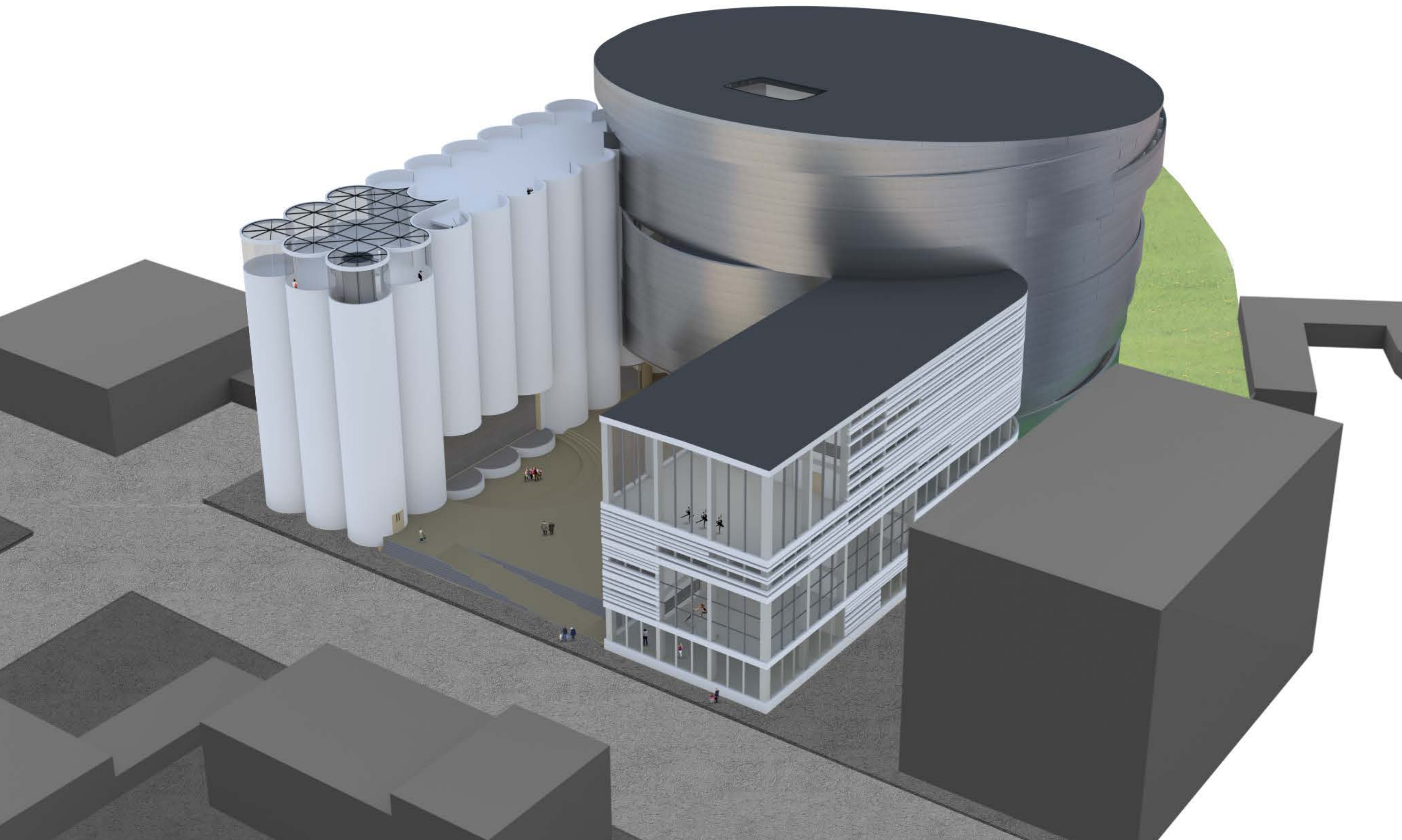


Figure 6.7



Figure 6.9



6.2

PUBLIC ROUTE



The public route is there to connect all three elements and show the visitors some of the backstage areas of the different functions.

The route already starts at the beginning of the square. From the square all three different building parts are visible. On the right there is the dance school, on the left the silos with the public theatre and in front the opera and ballet theatre. Because of the restaurants and public theatre which are connected to the square there will always be activities on the square.

The actual entrance of the public route is at the end of the square on the ground floor of the dance school. This entrance has a small reception desk which visitors need to pass before they can continue their route. A closed circulation has been chosen to make sure the visitors of the public route cannot stray too much through the building and to make sure that the visitors without a ticket for one of the theatres will not get access to these theatres.

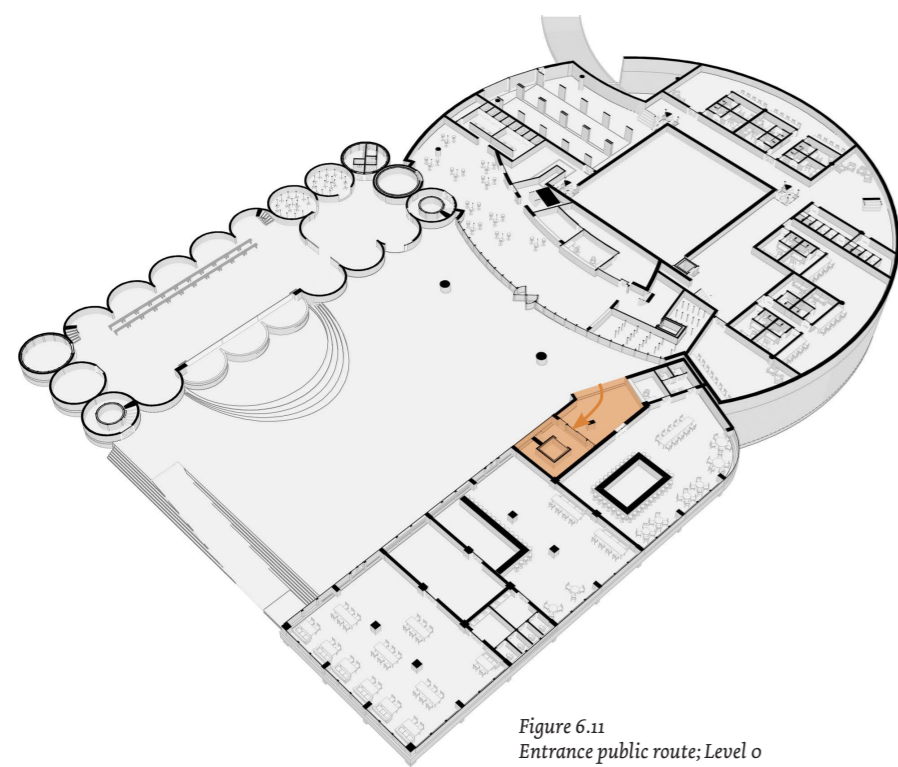


Figure 6.11  
Entrance public route; Level 0

When the visitors have started their public route, they first go up to the second floor and start their route at the dance school.

The second floor of the dance school allows visitors to walk by the rehearsal spaces and look inside through big windows as shown in figure 6.14. The students will dance one floor lower and therefore will not be distracted too much by the visitors. Besides watching the students dance, the visitors have a view of the square directly after entering the second floor, and have a view towards the harbor from the curved wall which is connected to the opera and ballet theatre, which is the next part of the public route.

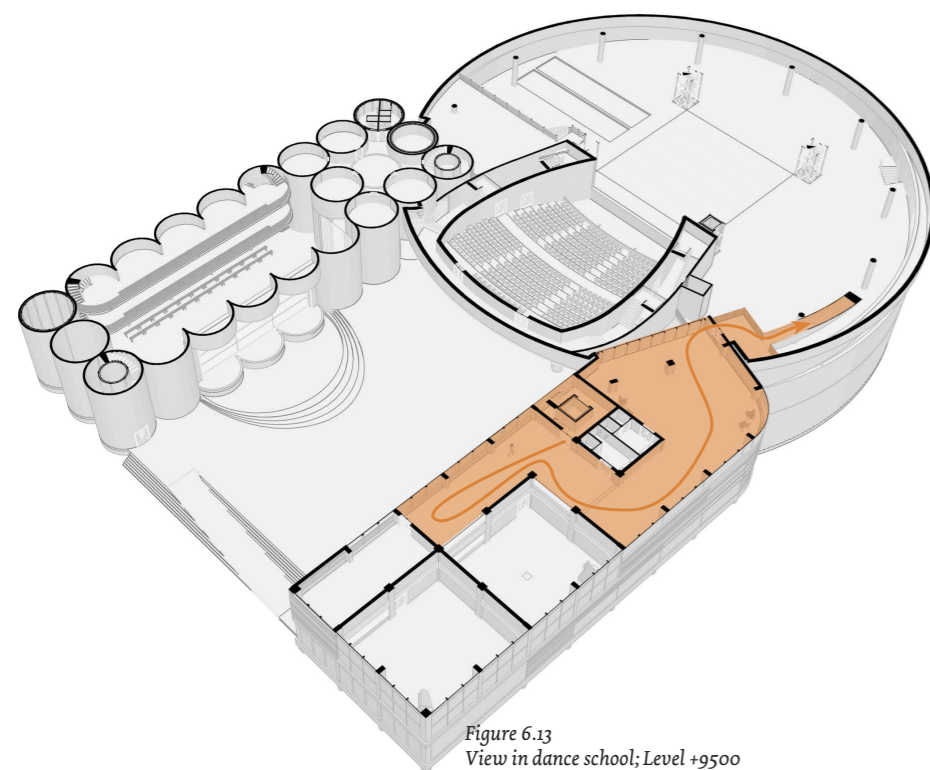


Figure 6.13  
View in dance school; Level +9500

After visiting the dance school, the backstage area of the opera and ballet theatre is visited. This part of the route will vary most because of the different ballet and opera performances. The route follows the exterior wall of the building and has a relaxing area at the plateau, the view from this plateau is shown in figure 6.16. Even the auditorium of the theatre can be seen when the curtains are open. These curtains will be open when the shows are being prepared; when there is a performance the most interesting views will be from the sides of the theatre, where parts of the show can be seen.

Another interesting element of the plateau is that the façade switches from closed panels to perforated steel plates, which gives the possibility for the visitors to look over the harbor.

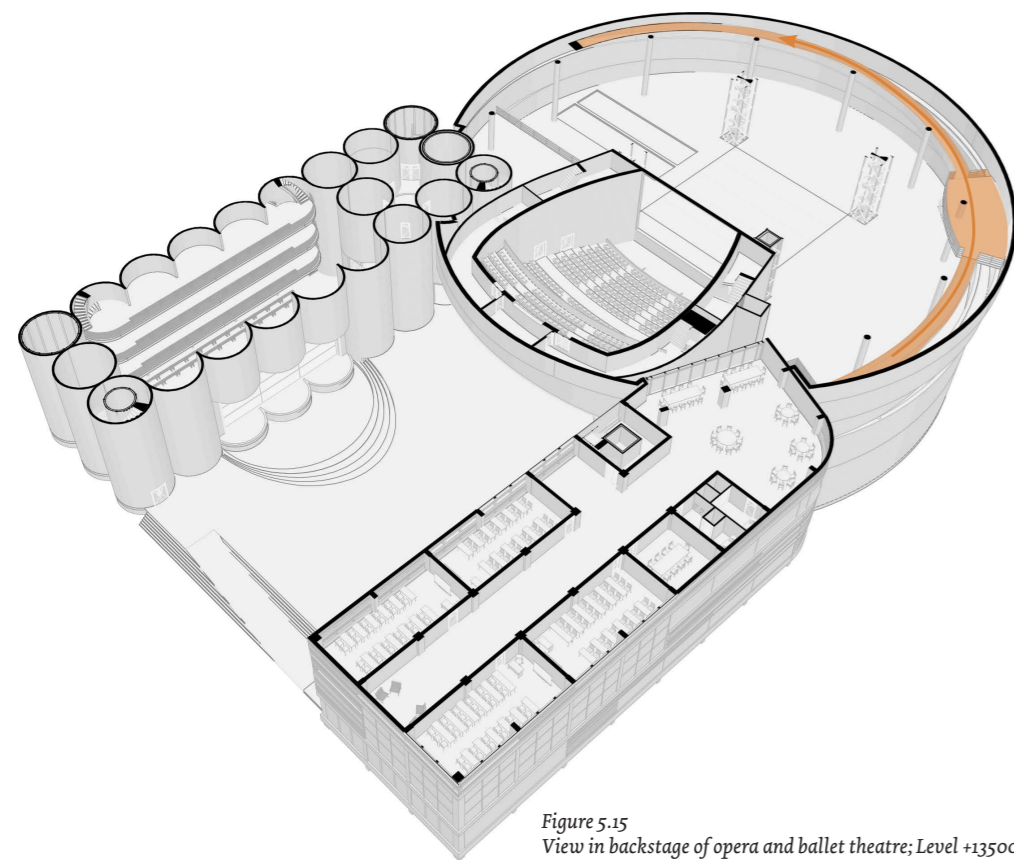
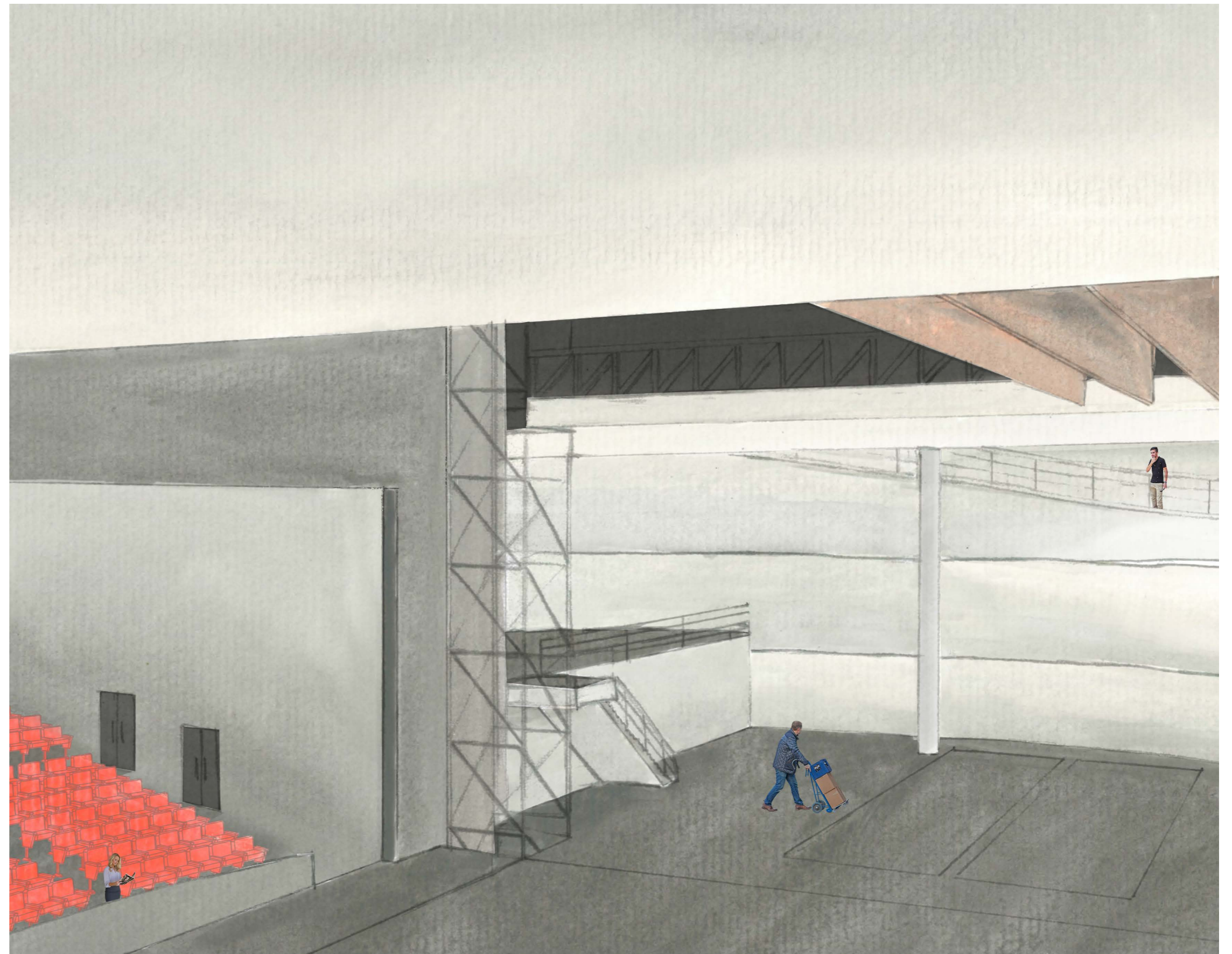


Figure 5.15  
View in backstage of opera and ballet theatre; Level +13500





After finishing the backstage part of the route, there is a possibility to have a small drink and have a look inside the public theatre. This point shows the connection between the old silos and the new opera and ballet theatre, furthermore, this is also the location where some history of the Finnish and Russian ballet is shown.

The room within the silos does not only offer a view inside the public theatre, but also shows the enormous scale of the silos because of the curved open ceiling which has been cut out of the silos.

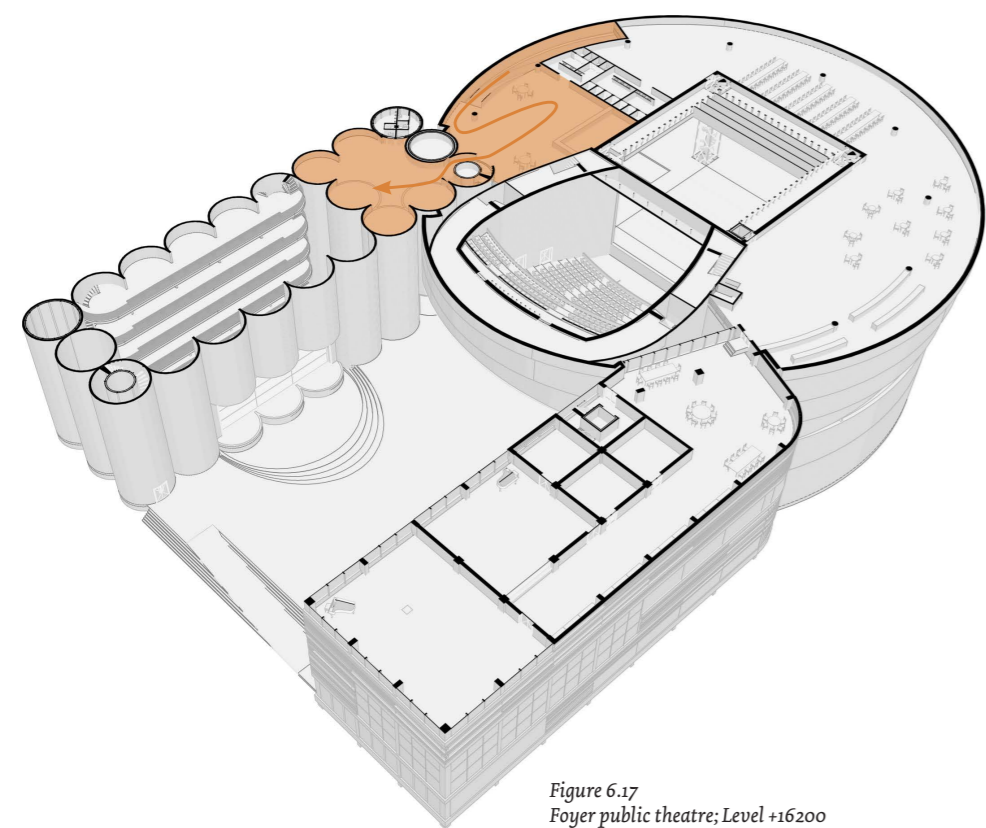
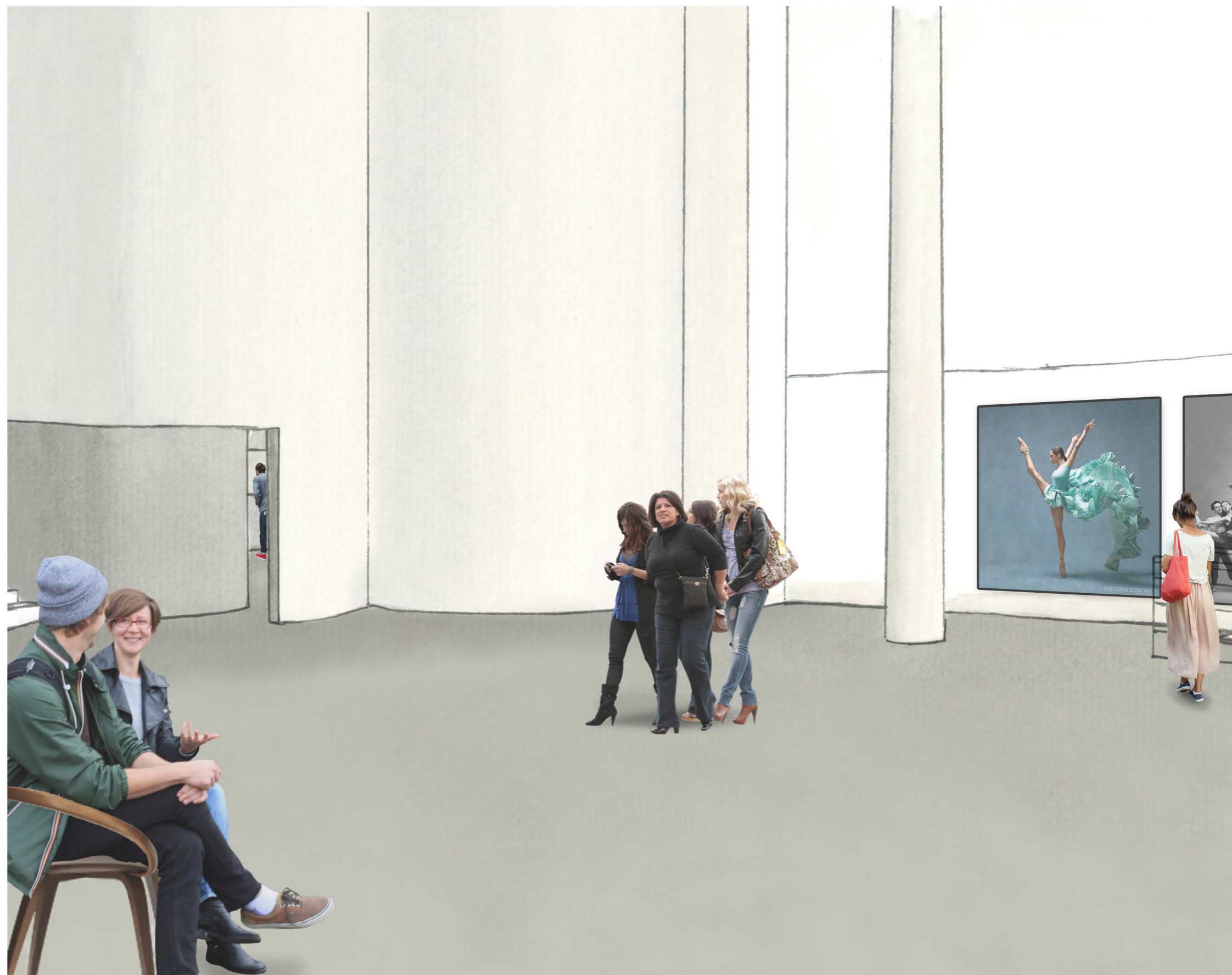


Figure 6.17  
Foyer public theatre; Level +16200



The route ends at the top of the silos, with a view over the harbor area and city. The visitors first have a walk over the roof terrace, which allows the visitors to look over the harbor on one side and to look towards the city center on the other side. When the visitors have crossed the roof terrace, they end in the rooftop restaurant. One of the views from this restaurant is shown in figure 6.20.

This restaurant has a small kitchen and attracts two types of visitors by offering lunch and dinner. The lunch is offered to the visitors of the public route, while the dinner is more exclusive. The rooftop restaurant is covered in glass, which allows the visitors to have a panoramic view over the city. The silo structure is also shown within the design of the restaurant, there is one hole in the restaurant, which is covered with glass and is exactly the diameter of one silo; this hole enables the visitors to look down into the silos.

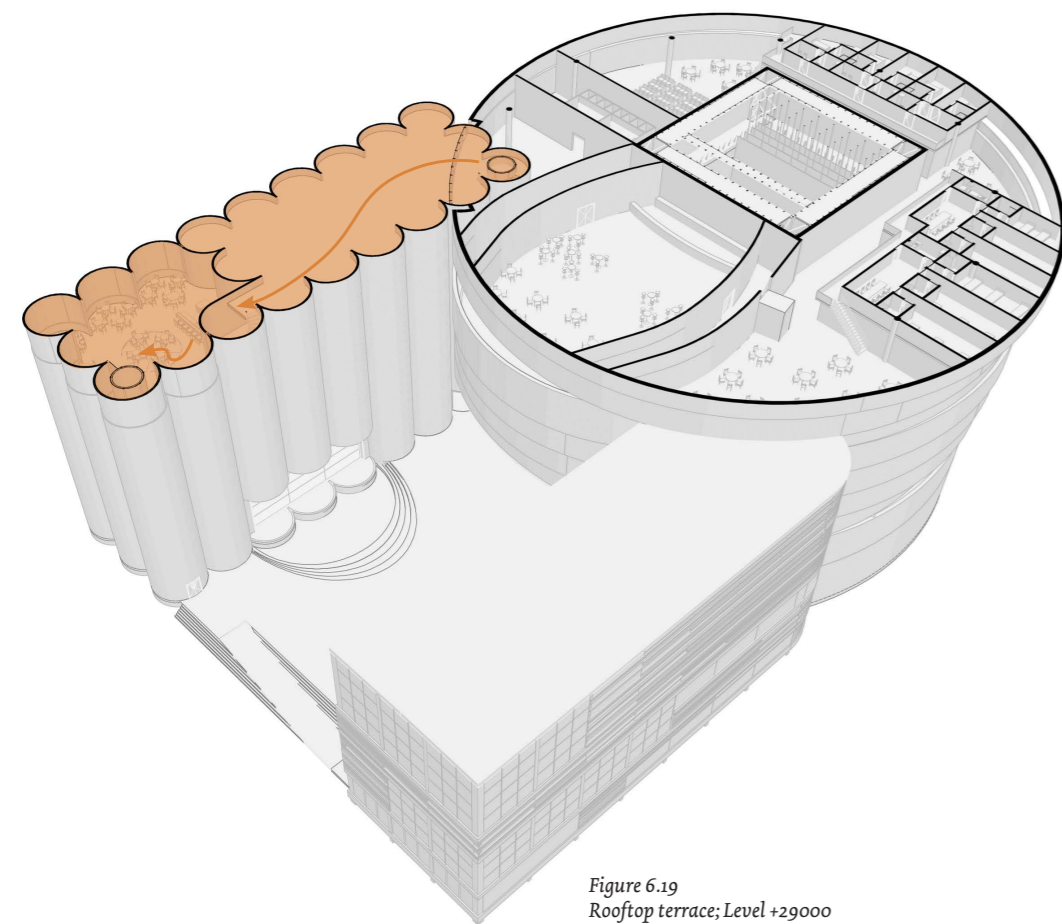


Figure 6.19  
Rooftop terrace; Level +29000



6.3

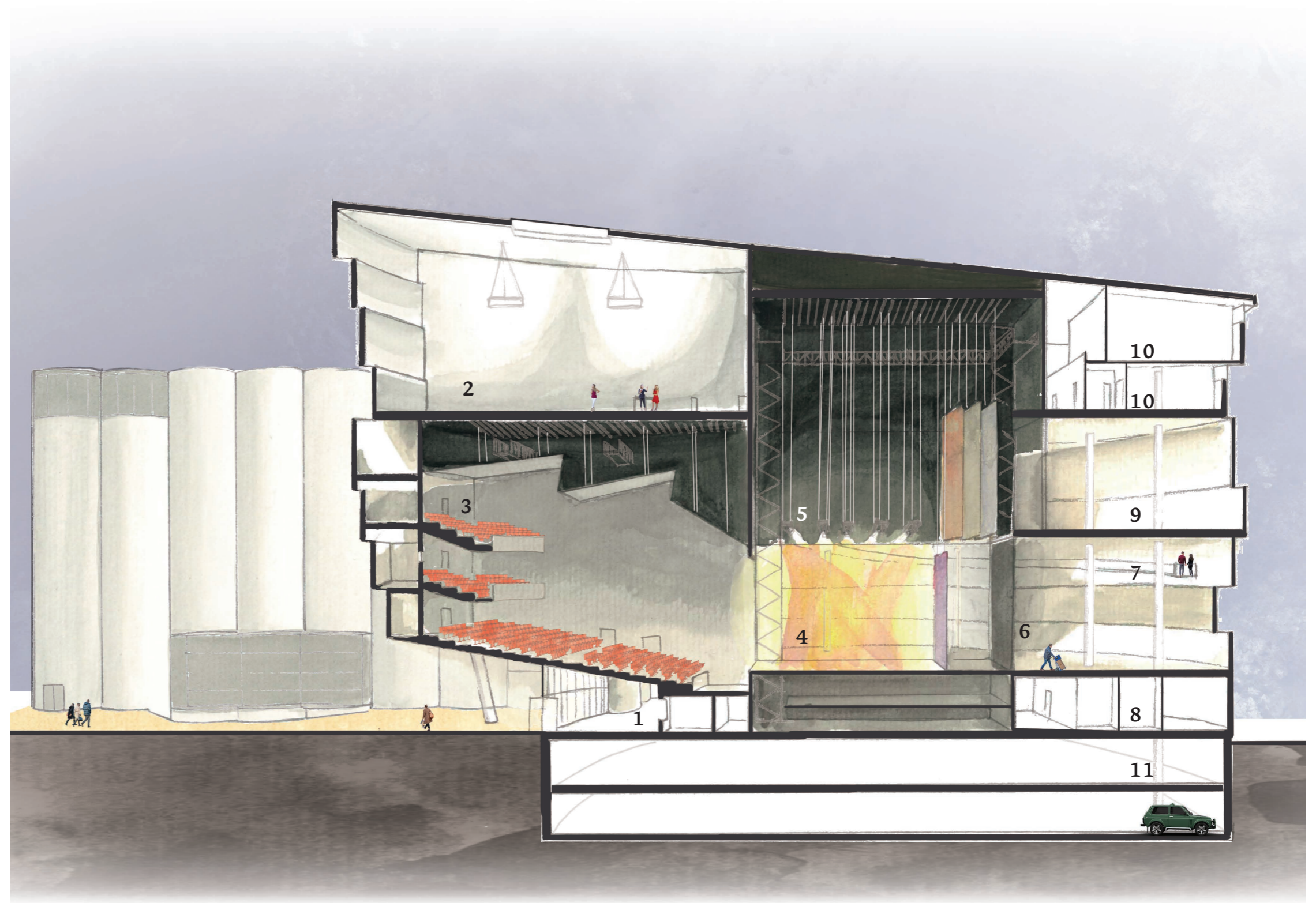
# OPERA AND BALLET



The opera and ballet theatre is located in between the silos and the old mill and has a complete new design, as explained in chapter 6.1. The building part is divided into two segments, a public and private area. The front of the building which is connected to the square is the public area. The back side of the building is private, with the exception of the public route which crosses this private backstage area.

The public entrance of the theatre is connected to the square on the ground floor and the ceiling of the entrance is parallel to the angle of the auditorium which is situated on top of the entrance. The transparent glass façade is the small threshold between the square and the theatre and invites the visitors inside. The visitors of the opera and ballet theatre will first have a drink in the lobby, which is in the same area as the entrance, then they will go up towards the auditorium. The auditorium can be reached by elevator or stairs; in order to have the fastest route the stairs are situated around the theatre. During the break, the spectators can go to the foyer. The foyer is situated on top of the auditorium, as can be seen in the section of figure 6.22 and allows the visitors to experience the shape of the building. The foyer is a very high room with a roof window and horizontal windows in between the belts which allows daylight to enter the foyer. When it is night, these same horizontal windows show the interior lighting towards the square, so that people in the surroundings can see when the foyer is used.

The back of the theatre, which is the more private side, is directed towards the harbor. The back of the house consists of the dressing rooms on the ground floor, on the same floor; there is the loading deck and parking entrance. The stage and backstage are located on the ground floor and have a height of more than 9 meters; on top of the backstage is the artist foyer, with a height of more than 6 meters. The top two floors of the opera and ballet volume are used as a dormitory, mainly used by performers and teachers who live far away, but can also be used by students of the dance school.

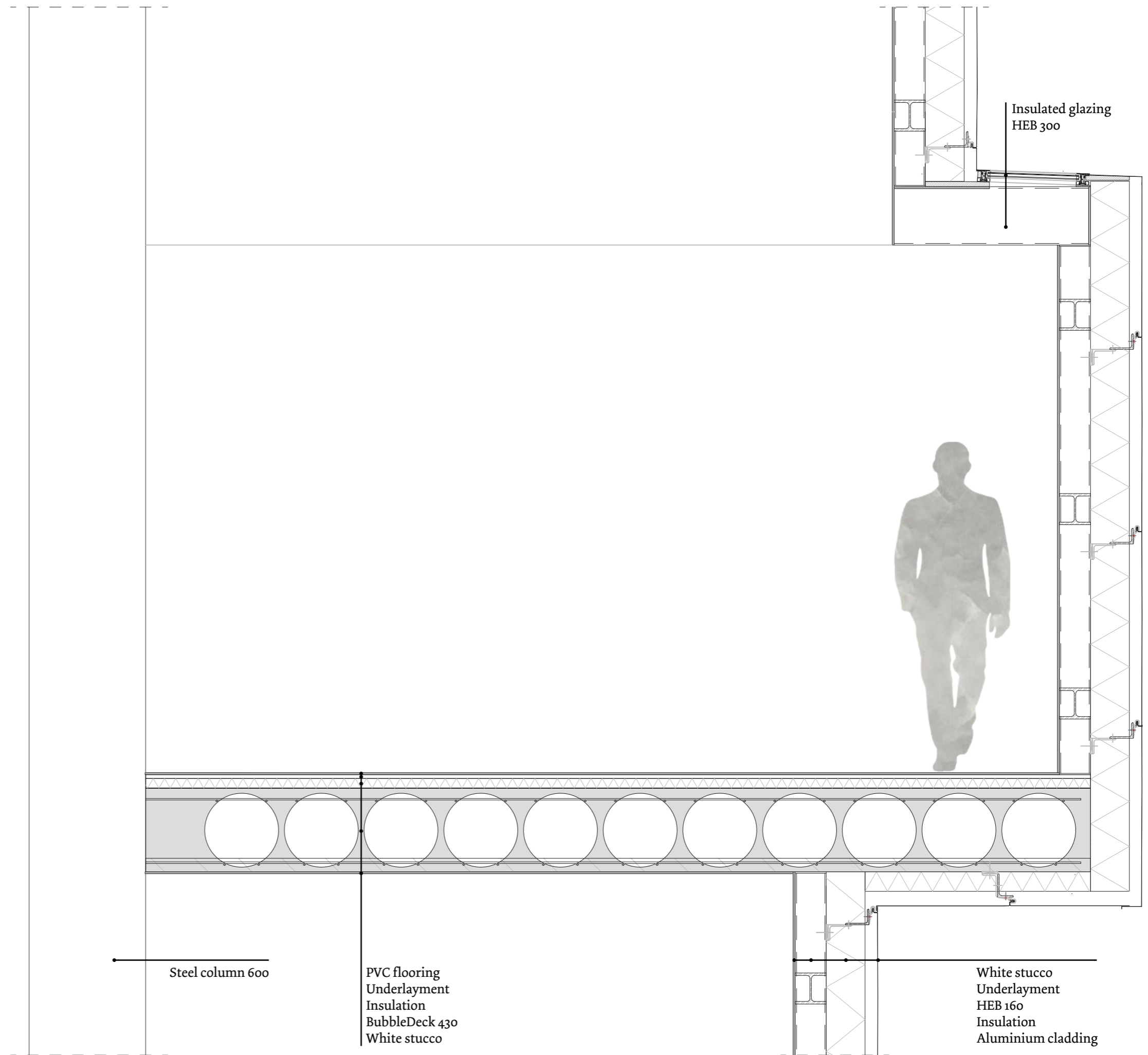
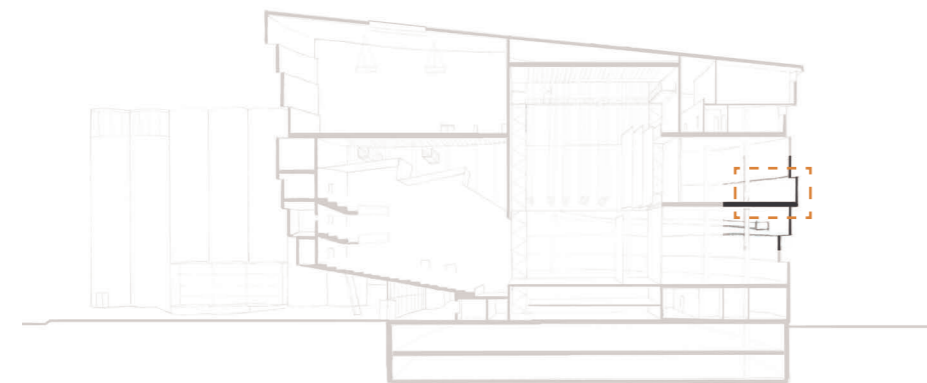


1. Entrance
2. Foyer
3. Auditorium
4. Stage
5. Stage tower
6. Backstage
7. Public route
8. Dressing rooms
9. Artist foyer
10. Bedrooms
11. Parking

The building part of the opera and ballet theatre consists of multiple belts which are cladded with aluminum. Because of the free space needed in the backstage area, the floors of this building part must span approximately 15 meters without columns. Therefore, the floor is a BubbleDeck floor which can span the required length and hold the façade. Each two or three belts are hanging on one floor; this has been achieved by a steel construction which is located inside the façade elements. The construction scheme is shown in figure 6.23.

Each of the belts has its own unique diameter, these shifts create open spaces in between the different belts. At the levels with floors these openings are closed by the BubbleDeck floor, but horizontal windows are placed at all other locations.

Because the building is mostly used in the evening and the exterior façade consists of reflecting aluminum, these open spaces create an interesting light play during the long dark Russian nights.



## AUDITORIUM

As seen in chapter 5, there are several possibilities of auditorium typologies to choose from. Together with the model study explained in chapter 6.1, the final auditorium form was chosen. The theatre is situated in between the two existing buildings, therefore there is limited space available. To create a relationship with the round form of the building and the rounding of the auditorium, the backside of the auditorium and curve of the building were altered towards the same curve. Because of the relatively small auditorium width, and of the angle at the back of the auditorium the horseshoe-shaped auditorium is selected.

The horseshoe-shaped auditorium also allows multiple balconies. It has been decided to only design balconies at the back side of the auditorium. Because when balconies are too close to the stage, the spectators will not have a good view of the stage anymore.



Figure 6.24  
Horseshoe-shaped auditorium

### View lines

To make sure an optimal experience of the performance is created, several rules need to be followed when designing an auditorium. These rules concern the view lines of the seating, the acoustics of the ceiling and walls and the typology of the theatre.

First the typology of the auditorium and proscenium width and height were determined. With this information the auditorium seating can be designed. In order to create the optimal sound reflection and view lines for the visitors, the orchestra will be placed in between the first row and the stage. The seating of the auditorium was determined following the rules shown in figure 6.25, 6.26 and 6.27.

These rules mainly concern the view lines of the audience. 'View lines are the path of vision, from the position of the spectator in the auditorium' (Izenour, Knudson, & Newman, 1977). To make sure the spectators can comfortably watch the performances, the seats have to be positioned in the right way. There are a few rules to position the seats, with regard to the view lines of the visitors and the distance between the stage and the seating. The head movement, shown in figure 6.27, is one of the most important elements to determine the view lines, because there is a maximum eye rotation, which is the sight without turning the head, which has an angle of 30° horizontally and vertically. With the rules of figure 6.27 it can be determined how high the steps in between the rows need to be. With the rules of figure 6.26 the seating can be determined. To have the best view of the stage, the spectator should have a free sight of 27° between the spectators in the next row.

The available space and rules allow around 700 seats inside the auditorium of the opera and ballet theatre. Because of the followed rules, all 700 spectators will have a good view with optimal sight on the stage.

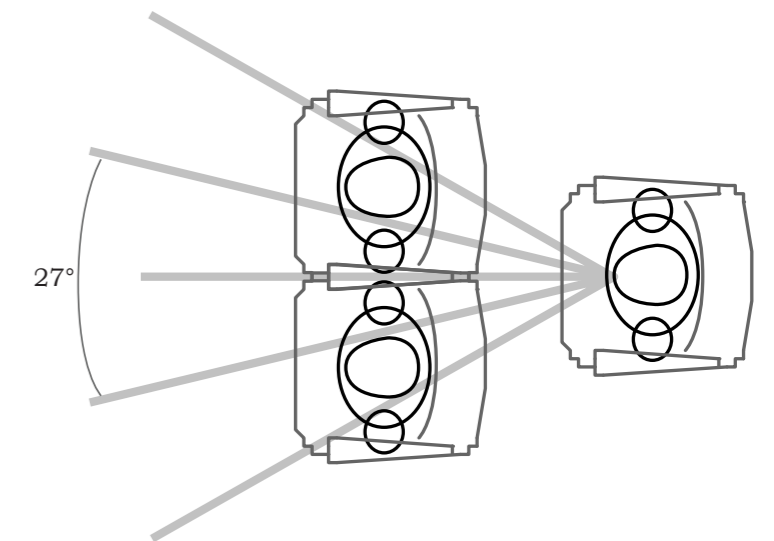


Figure 6.26  
Horizontal view lines

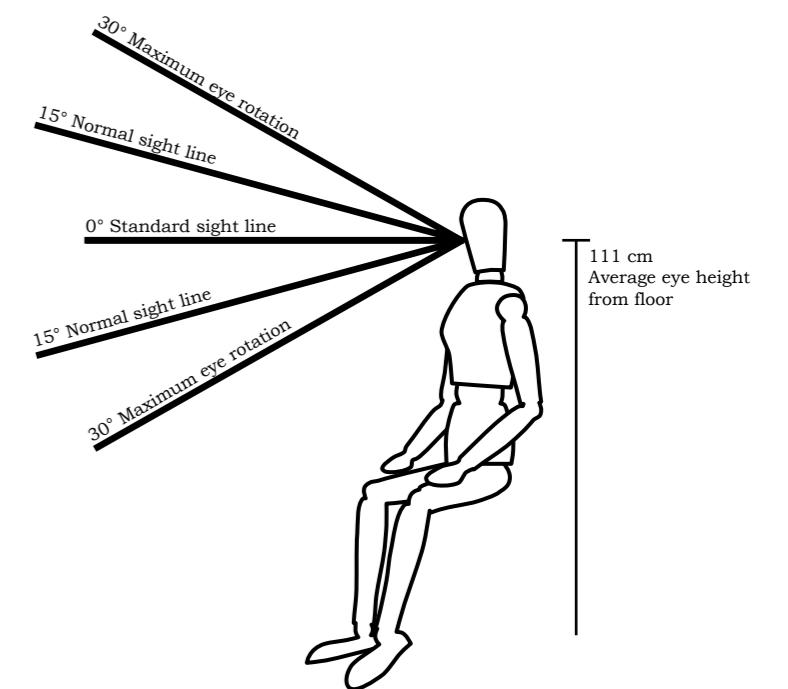


Figure 6.27  
Vertical view lines

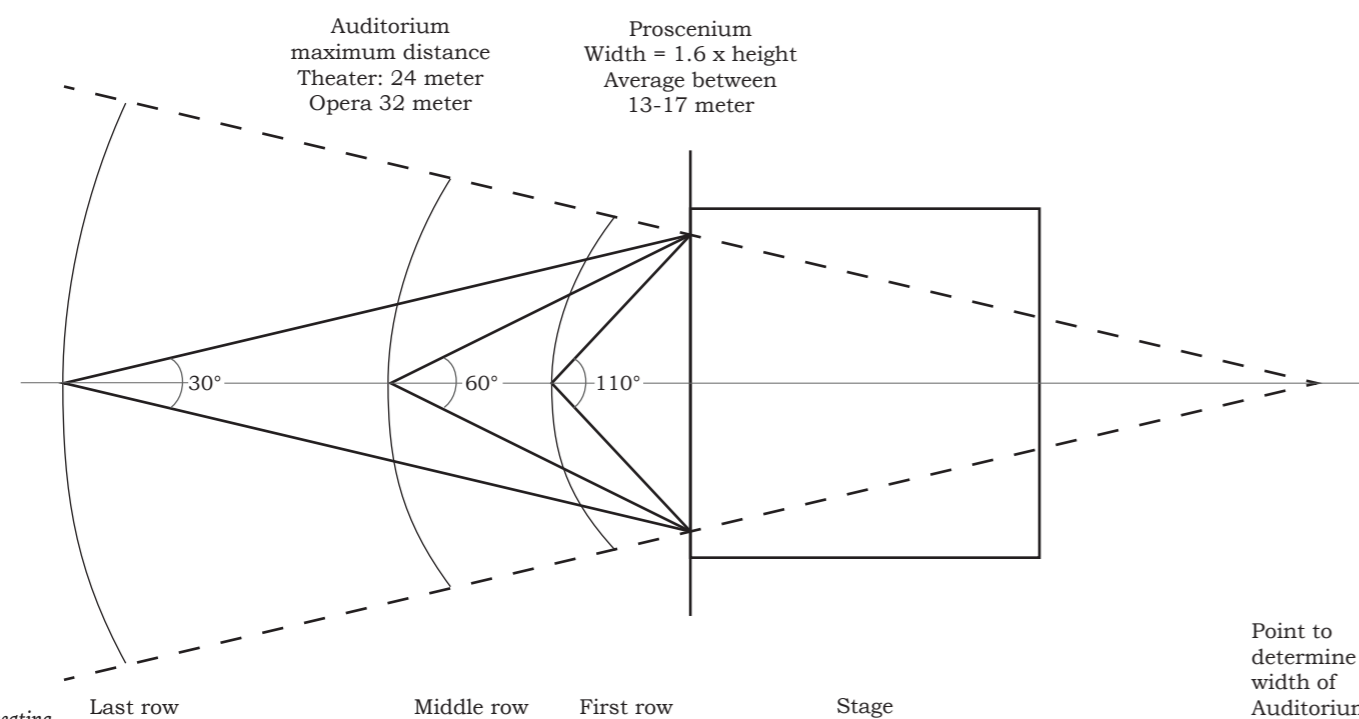


Figure 6.25  
Auditorium seating  
120

### Acoustics

Not only the view lines of the spectators are important, the acoustics of the theatre also have a great influence on the experience of the performance. Because all of the visitors have a direct view of the stage, the sound which derives from the stage will also directly travel towards the spectator. The main difficulty is the orchestra, because the music they play will travel indirectly towards the spectators. Therefore the ceiling of the auditorium is made of acoustic reflection panels which are placed in an angle.

To choose the angle of the panels, acoustic lines have been drawn, these lines show how the music is travelling from the orchestra via the ceiling panels towards the audience. The final acoustic lines, with the panels are shown in figure 6.28.

The bottom of the balconies are also made of a reflecting acoustic material, so the spectators in the last row can also hear the orchestra. To make sure there is not too much reflection in the auditorium, the walls and railings of the balcony absorb the sound.

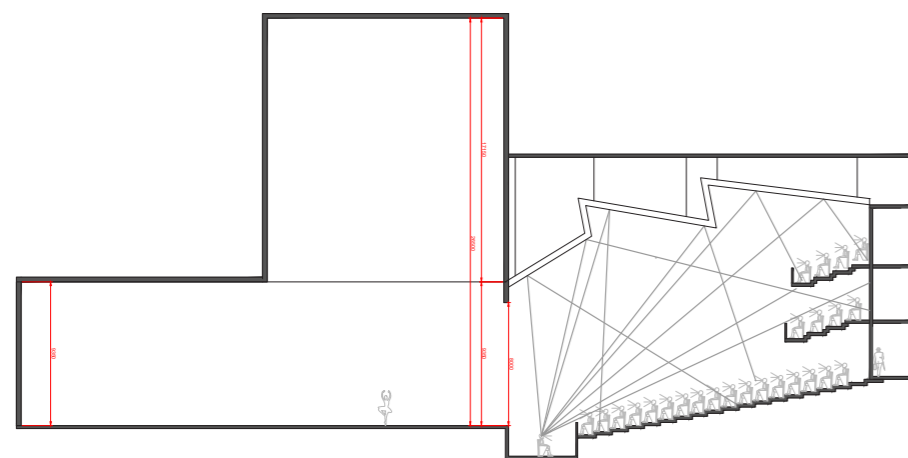
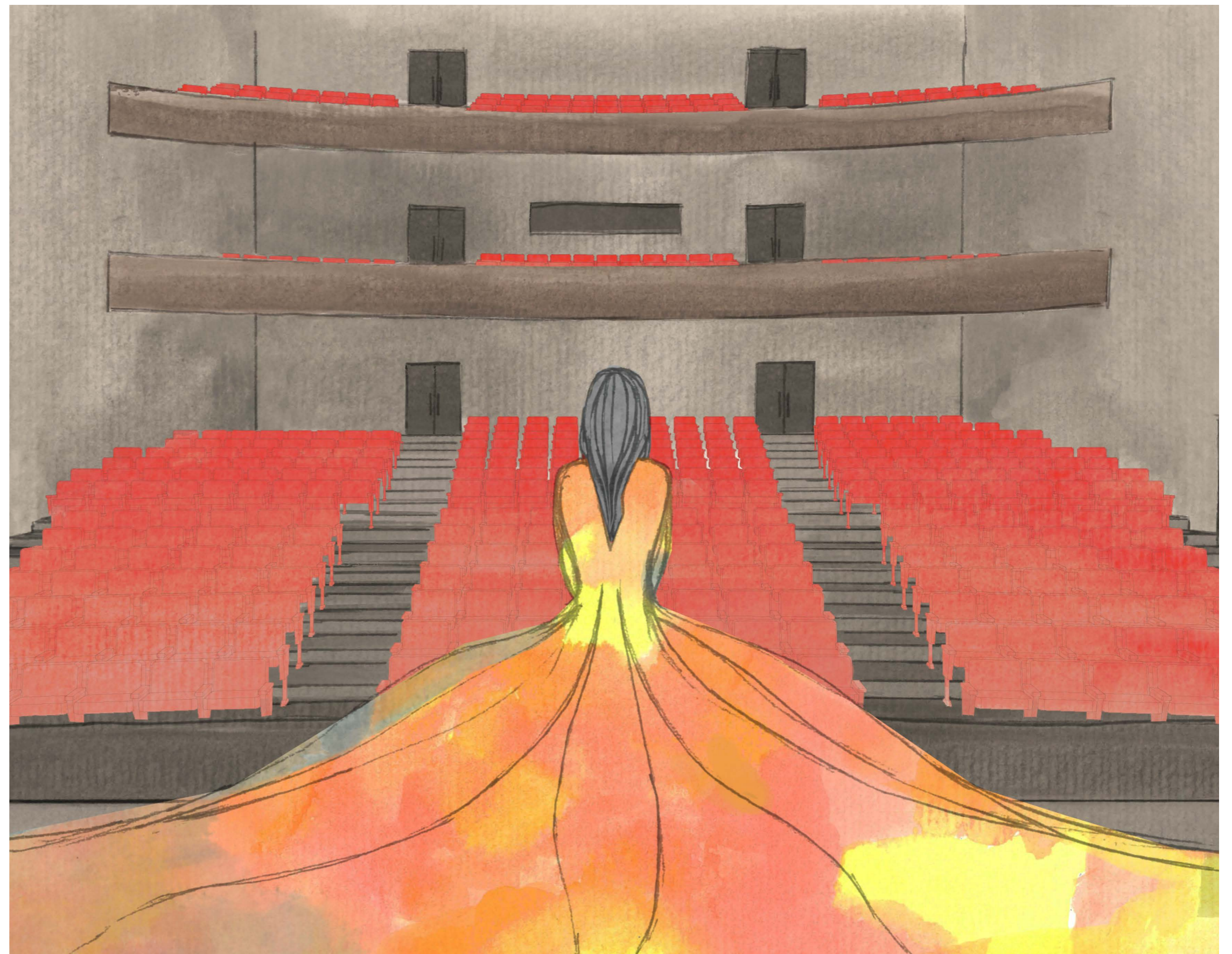


Figure 6.28  
122

## BACK OF THE HOUSE

The back of the house contains a large proportion of the building. The stage with the backstage, the bedrooms, artist foyer, and dressing rooms all belong to the back of the house. The dressing rooms and artist foyer will be further elaborated on.

### Dressing rooms

There are three types of dressing rooms which are all located on the ground floor; the soloist room, the shared dressing room for ballet and opera performers and the dressing room for the orchestra. These rooms are connected to the stage via an elevator and staircases.

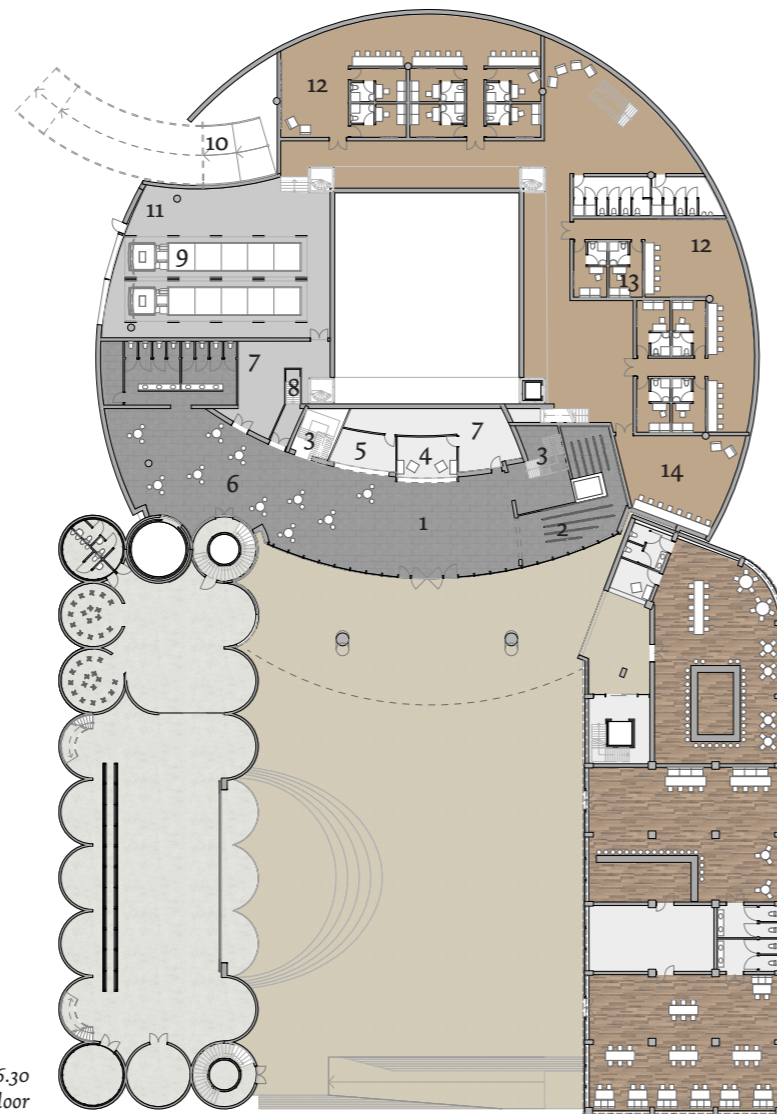
The two types of dressing rooms for the ballet and opera performers all have extra space for their costumes, while the dressing room for the orchestra has more space for their instruments. The shared dressing rooms for the ballet and opera performers are larger rooms with shared bathrooms.

There are always moments in a performance when some of the performers are not on stage or the dressers have a break. At those moments the room in between the dressing rooms can be used for relaxing, playing games or chat.

Apart from the dressing rooms, the loading deck is also located on the ground floor. This loading deck is mainly there for the décor pieces of the performances, and is therefore located below the side stage. The unloading of the trucks happens on the first floor, which is made possible by the two truck elevators.

1. Entrance
2. Wardrobe
3. Stairs to auditorium
4. Reception
5. Bar
6. Lobby
7. Storage
8. Parking entrance
9. Loading deck
10. Parking entrance
11. Back entrance
12. Shared dressing room
13. Individual dressing room
14. Orchestra dressing room

Figure 6.30  
Ground Floor



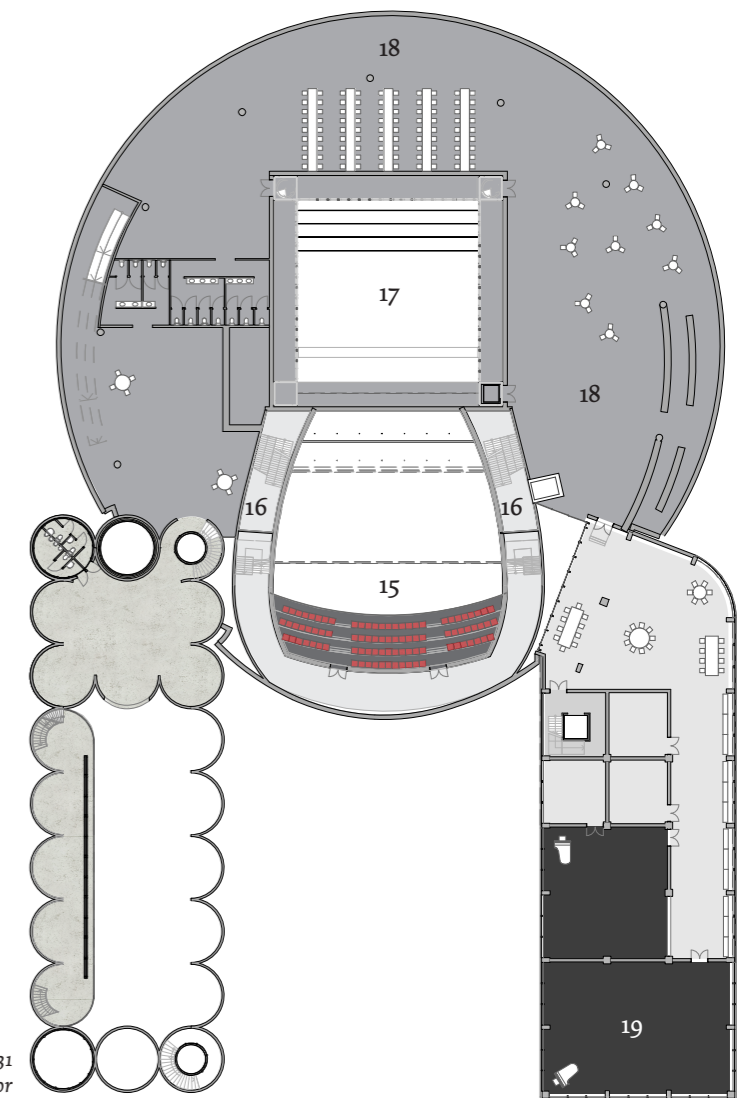
### Artist foyer

The artist foyer, which is also used as a canteen for the students, is located on the fourth floor and is a very open space. The canteen has a direct connection with the dance school and the big rehearsal room which is used by the performers to rehearse their play.

The façade of the artist foyer is partly opened up by perforated steel plates, which allows the performers and students to look outside and enjoy the view of the harbor.

15. Auditorium
16. Stairs
17. Stage tower
18. Artist foyer
19. Large rehearsal room

Figure 6.31  
Fourth Floor





## MATERIALS

Some different types of materials are used within the building. The entrance has its own materials with the glass threshold between outside and inside, the interior has an oak wood ceiling cladding and the stone tiles on the floor. The walls of the public area are all of white stucco, except for the interior of the auditorium.

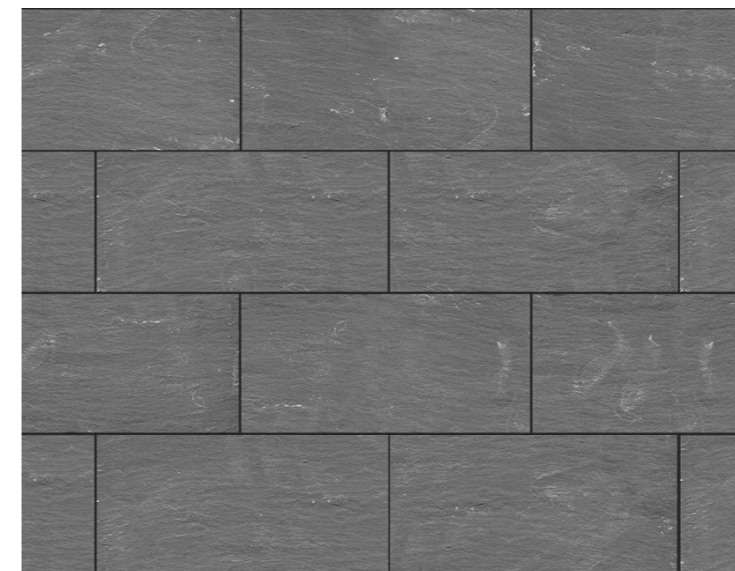
The auditorium is darker, the anthracite cladding on the walls, ceiling and floor give a darker atmosphere and direct the view of the spectator towards the stage during the play. The chairs are of a dark red fabric, just like the stage curtains.

The backstage area has floors which are cladded with black pvc flooring; together with the white ceilings and walls very open spaces are created.

The exterior of the building is in contrast with the oak wood panels of the interior and is made of aluminum plates. These plates are chosen because of the contrast with the existing buildings, which are made of white concrete and white stucco, and because of the reflecting property of aluminum. There are a few strokes in the building which consist of perforated aluminum plates, these provide the extra daylight next to the horizontal window openings between the belts.



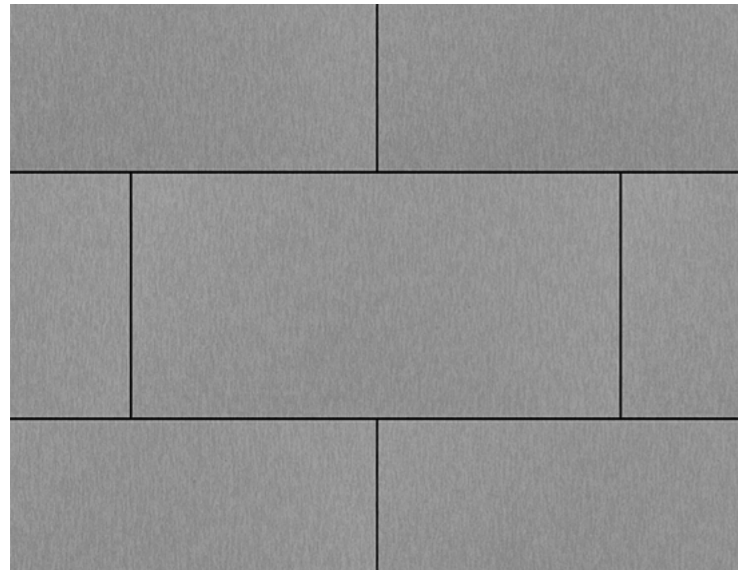
Oak wood tiles  
Entrance ceiling



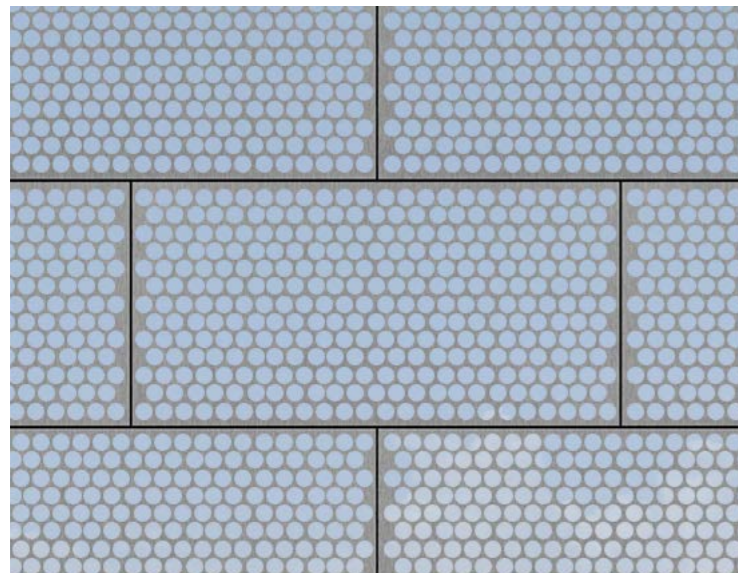
Concrete tiles  
Entrance floor



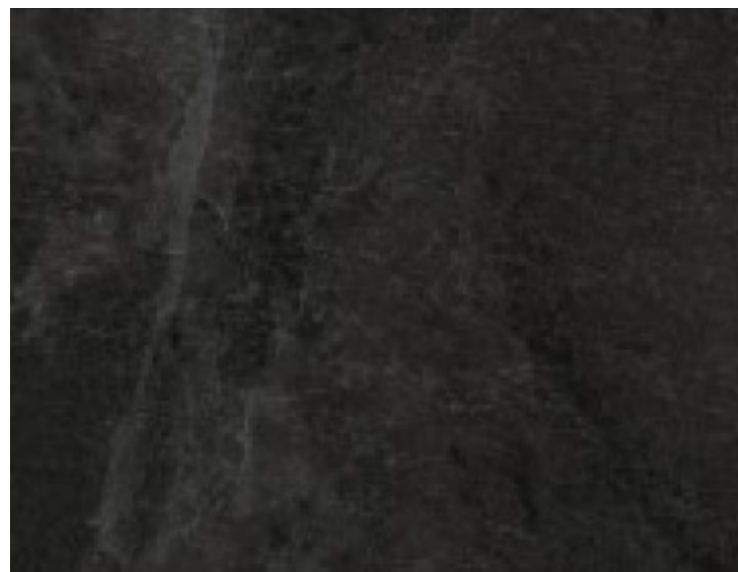
White Stucco  
Interior walls



Aluminum tiles  
Façade exterior



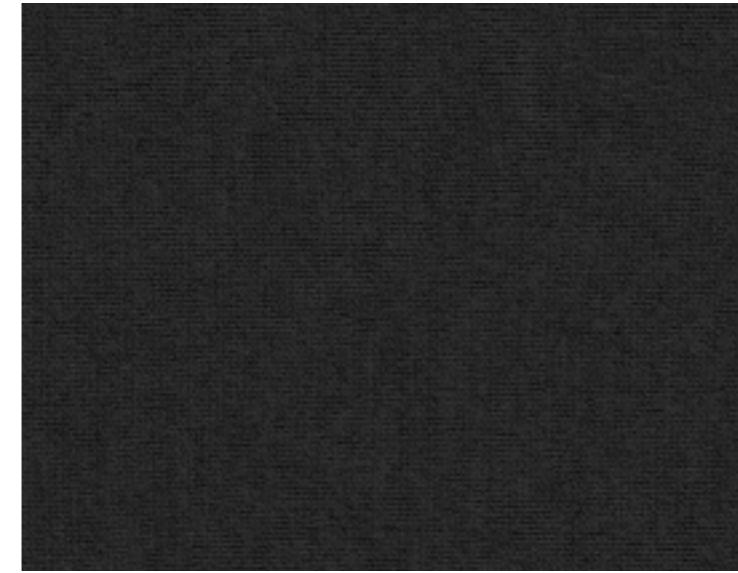
Perforated aluminum tiles  
Façade exterior



Black pvc flooring  
Backstage floor



Red fabric  
Cladding theatre chairs



Black fabric  
Cladding theatre



Red curtain  
Theatre

6.4

DANCE SCHOOL



## 6.4 DANCE SCHOOL

The dance school is located within one of the existing building parts, the old storage. The old structure of columns and beams will be respected during the transformation. However, the floors and façade need to be replaced because of bad maintenance; the materials remain the same as the materials which were used in the original building.

The façade does not only exist of the same materials as the original building, it also refers back to the original lining of the façade. In order to strengthen the relation between the lines of the dance school with the belts of the opera and ballet theatre, the levels of the dance school are expressed with thicker concrete slabs which correspond with the spacing of the theatre belts.

The horizontally lined concrete façade elements will be opened up at a few places. These open spaces correspond with the public route and with the several rehearsal rooms. Because of these open spaces, the visitors and people who pass by the building can see what happens inside. Furthermore, the openings at the square side of the building create an interesting relation with the students and visitors.

The students will practice ballet and street dance classes during a fulltime study with a curriculum that takes 2 years. The two types of dance are chosen because they both attract very different people. Ballet is something which has always been practiced in Russia and Finland and street dance is a more emerging genre. The type of ballet training, will be the Vaganova style, which has already been explained in chapter 5.3.

To encourage interaction between the students of ballet and street dance, the different rehearsal rooms are all used by both dance styles. The hallways will be 5 meters wide, so students and teachers, can meet and interact.

Because the rehearsal rooms need a certain height, floors have been opened up. This creates the opportunity to create windows on the second floor, as can be seen in figure 6.42, where fellow students can look inside the rehearsal room and learn from their movements.

Besides teaching dance, also other forms of education will be given, which need a 'normal' classroom. To make a clear division between the two types of education, the classrooms and rehearsal rooms have been separated from each other.

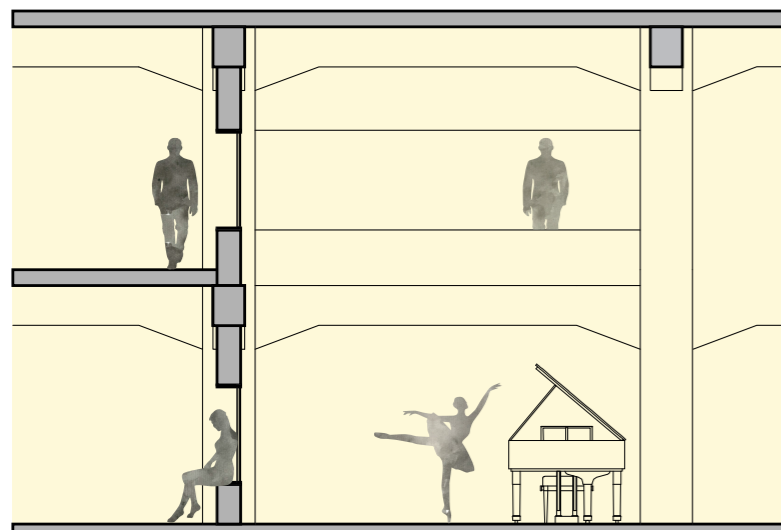
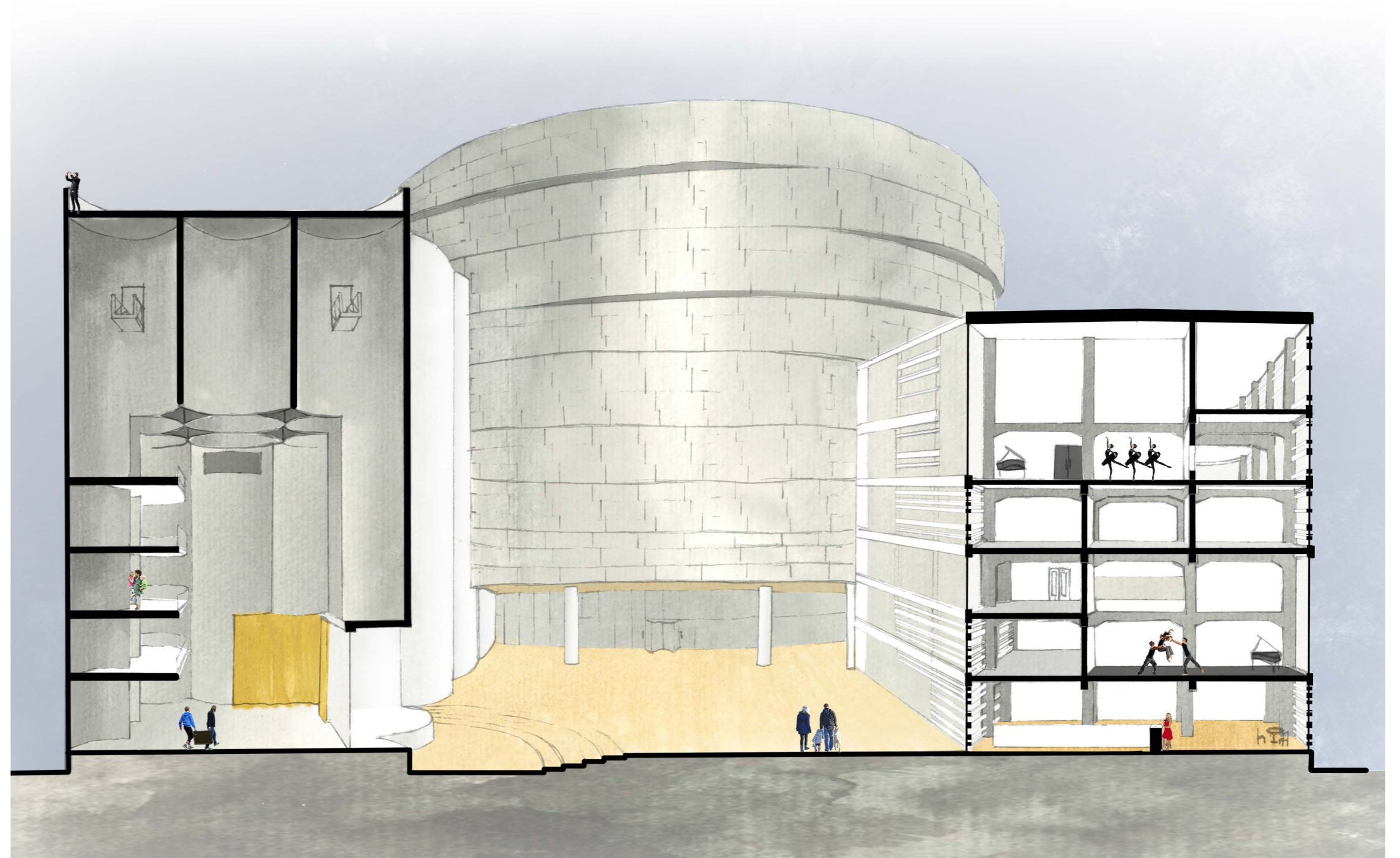


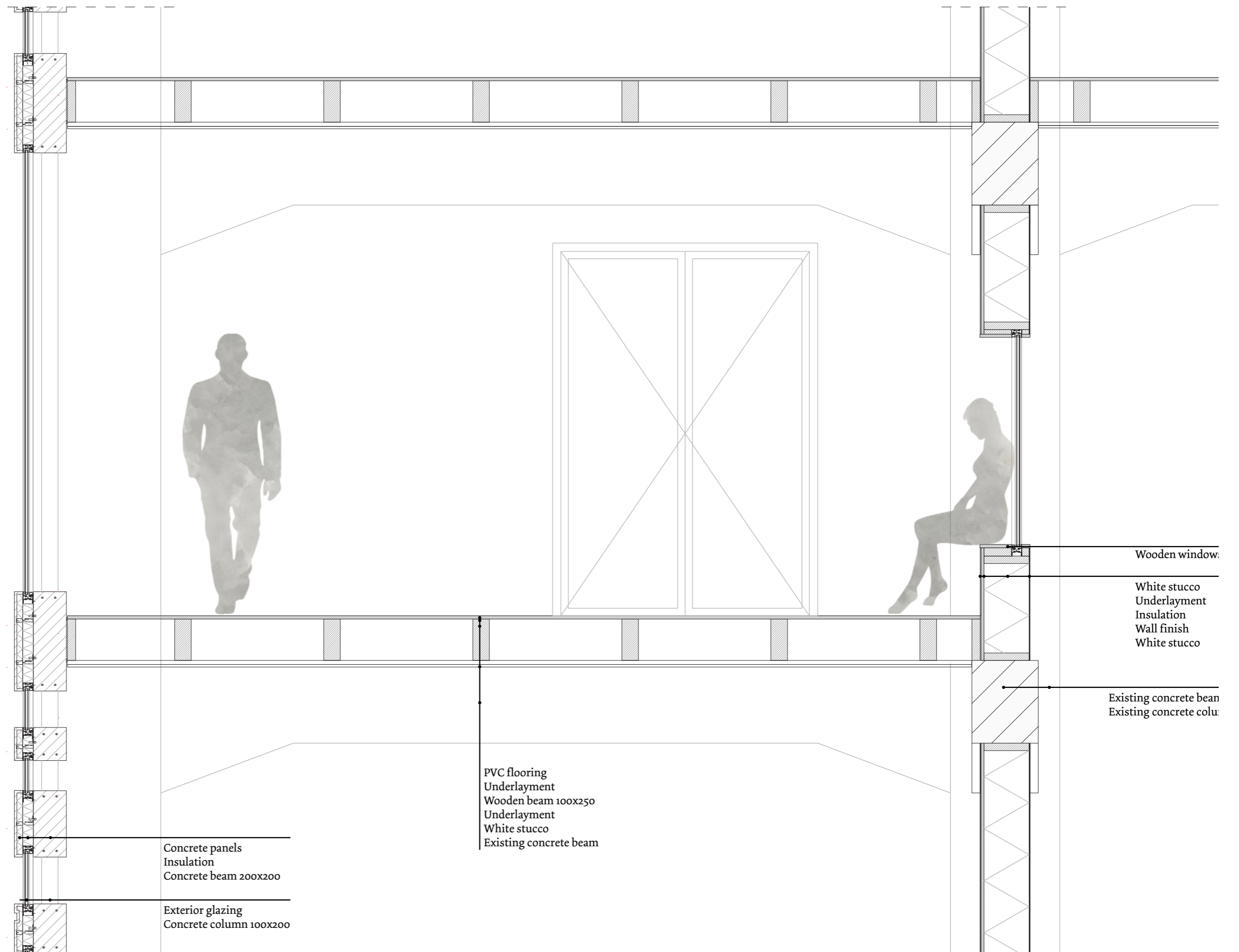
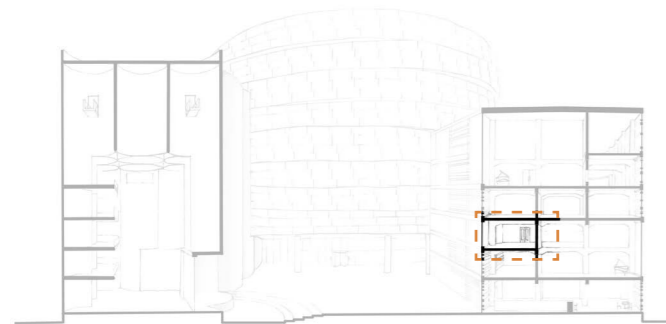
Figure 6.42



Because the columns and beams of the existing buildings remain, the new floors and walls will be placed in between the existing construction, these floors are, just like in the original building, made of a wood structure, shown in figure 6.44. The new floors are clad with grey pvc flooring. The walls which are placed underneath the existing beams are plastered white.

The dance rehearsal rooms are at least 6 meters high. The walls which separate the hallways from these rehearsal rooms need insulation, so that there is no noise disturbance between the two rooms. Furthermore, to prevent noise disturbance through the openings, the windows which provide the connection between the hallway and the rehearsal rooms are also insulated. The framework of the same windows is made of oak wood.

The horizontal lines of the façade are made of white concrete beams. These beams are carried by the existing columns and new smaller columns which are placed in between the existing columns on the same location the previous window beams were located. The exterior elements, which are attached to the beams, are made of white concrete cladding with insulation.



Wooden window.

White stucco  
Underlayment  
Insulation  
Wall finish  
White stucco

Existing concrete beam  
Existing concrete colu

PVC flooring  
Underlayment  
Wooden beam 100x250  
Underlayment  
White stucco  
Existing concrete beam

Concrete panels  
Insulation  
Concrete beam 200x200

Exterior glazing  
Concrete column 100x200



REHEARSAL ROOM

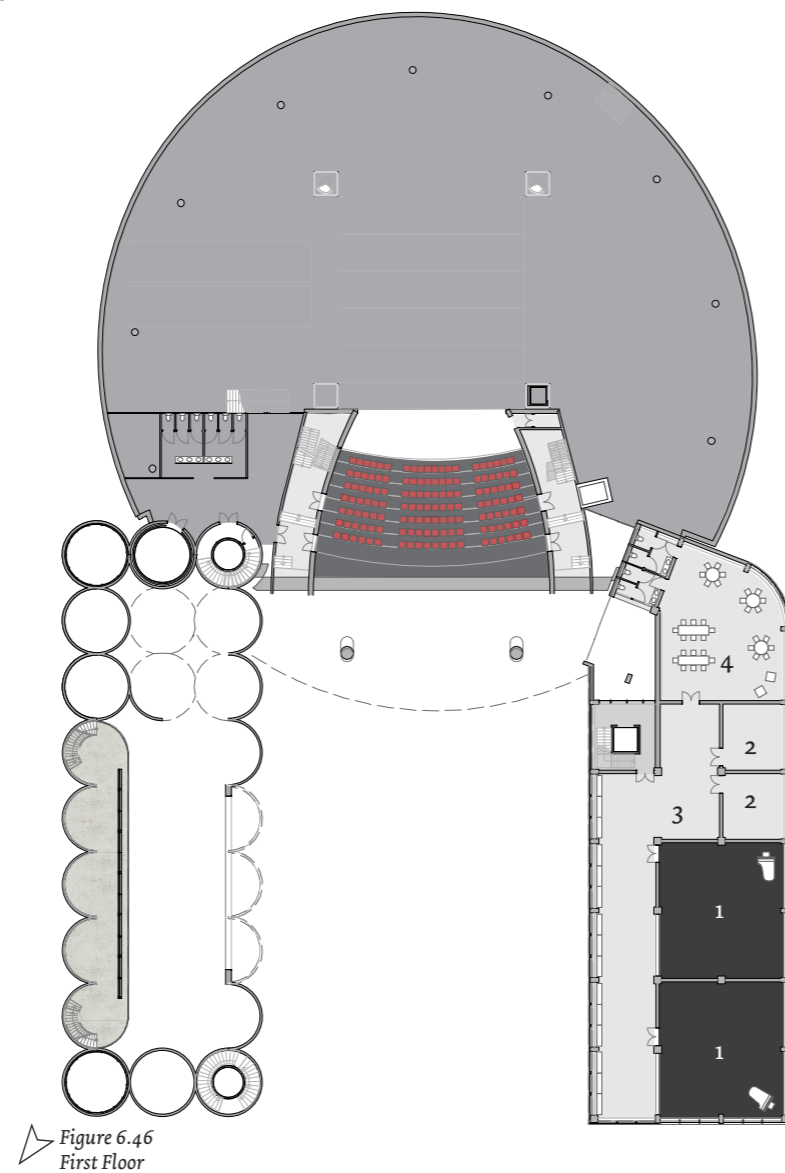
## EDUCATION

As explained before, the different types of education will be separated. The four rehearsal studios for the physical dance education are located on the first and fourth floor. Three out of the four rehearsal rooms have the same size and are 100 sqm; the rehearsal room at the front of the building on the fourth floor is the larger rehearsal room and is also used by the performers of the public theatre and ballet and opera theatre. All four of the rehearsal rooms are located high enough above the ground floor to create a certain privacy for the dancers, but are open enough to make a connection with the ground floor.

The rehearsal rooms of the dance school are very spacious rooms with all the elements of the building visible. The concrete columns and beams are highlighted by the plastered white walls which lie just a bit back. The large window frames show a nice view over the square or show the connection with the front side of the building.

The first floor is shown in figure 6.46 and also has, apart from the two rehearsal rooms, two dressing rooms for the students and a silence study.

1. Normal rehearsal room
2. Dressing room
3. Hallway
4. Silence study
5. Study
6. Classroom
7. Meeting room
8. Open office
9. Large rehearsal room



Because it is a fulltime curriculum, there is also need of 'normal' classrooms; these classrooms are located on the third floor which is presented in figure 6.47. In these classes the students will follow basic courses and courses specified for their future profession.

On the same floor there is a space where they can study the material; this is located in the curved part of the building. From this study the students can look outside over the harbor and inside the opera and ballet theatre building.

The teachers have an open office and dressing room on the sixth floor, which is shown in figure 6.48. For the more private meetings, the teachers can use the meeting room on the third floor. The sixth floor also provides a view inside two of the rehearsal studios, this can be used to grade or analyze students.

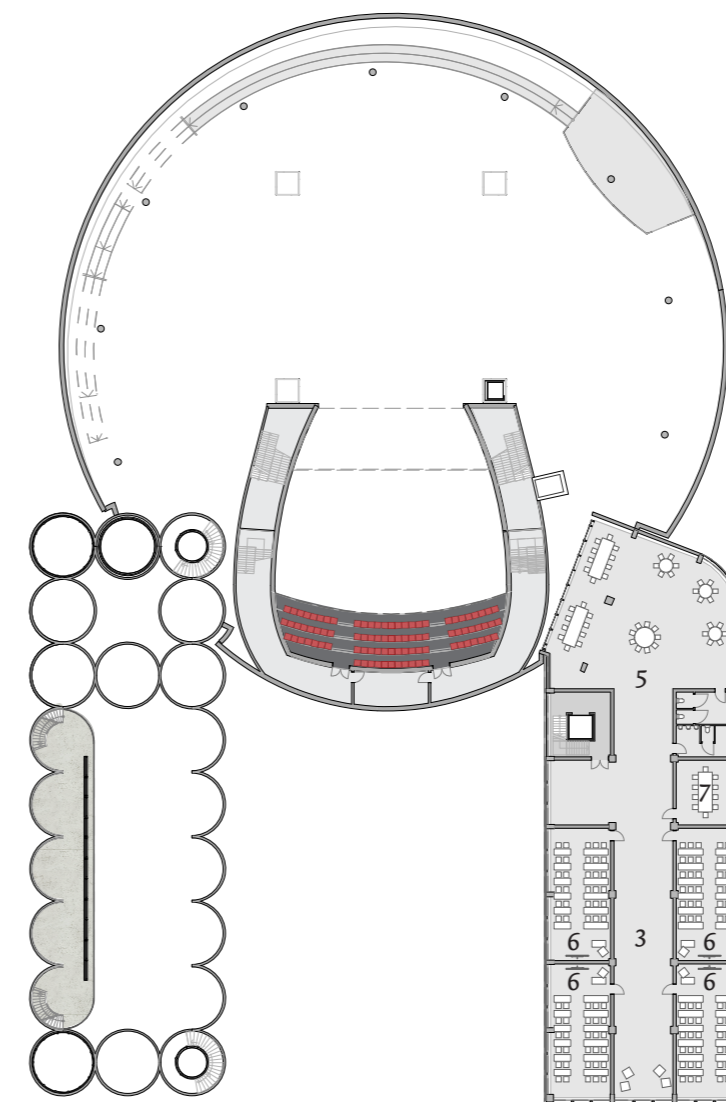


Figure 6.47  
Third Floor

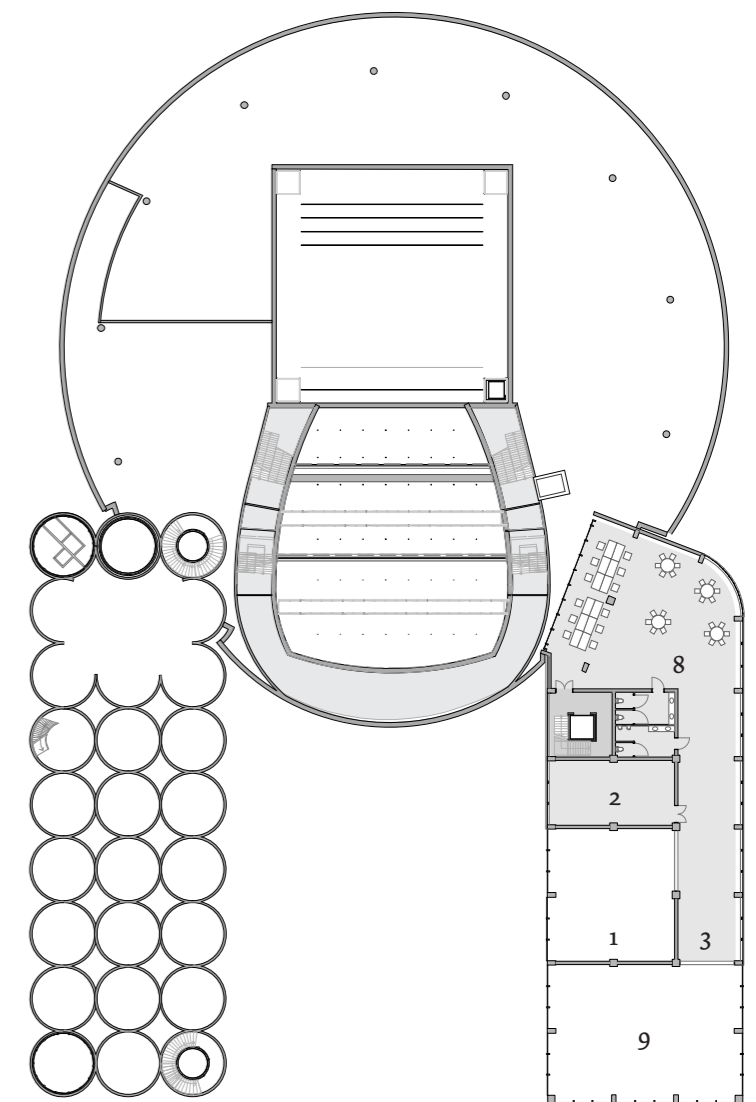


Figure 6.48  
Fifth Floor

## MATERIALS

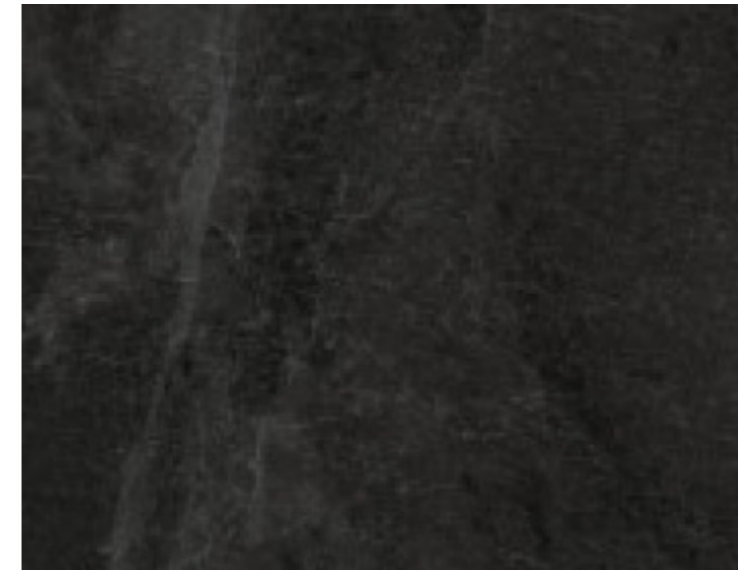
The building consist of some materials that emphasize the contrast between old and new. Throughout the whole building new white stucco walls are placed directly on the old raw concrete beams and columns.

The flooring of the rehearsal rooms is made out of black pvc, which is a resilient floor in order to prevent injuries to the dancers. The flooring of the hallways is made of grey pvc.

To frame the view towards the rehearsal studios, the frames of the windows in between the hallways and rehearsal rooms are cladded with oak wood.



Oak wood tiles  
Interior window frames



Black pvc flooring  
Rehearsal room floor



Grey pvc flooring  
Floors hallway



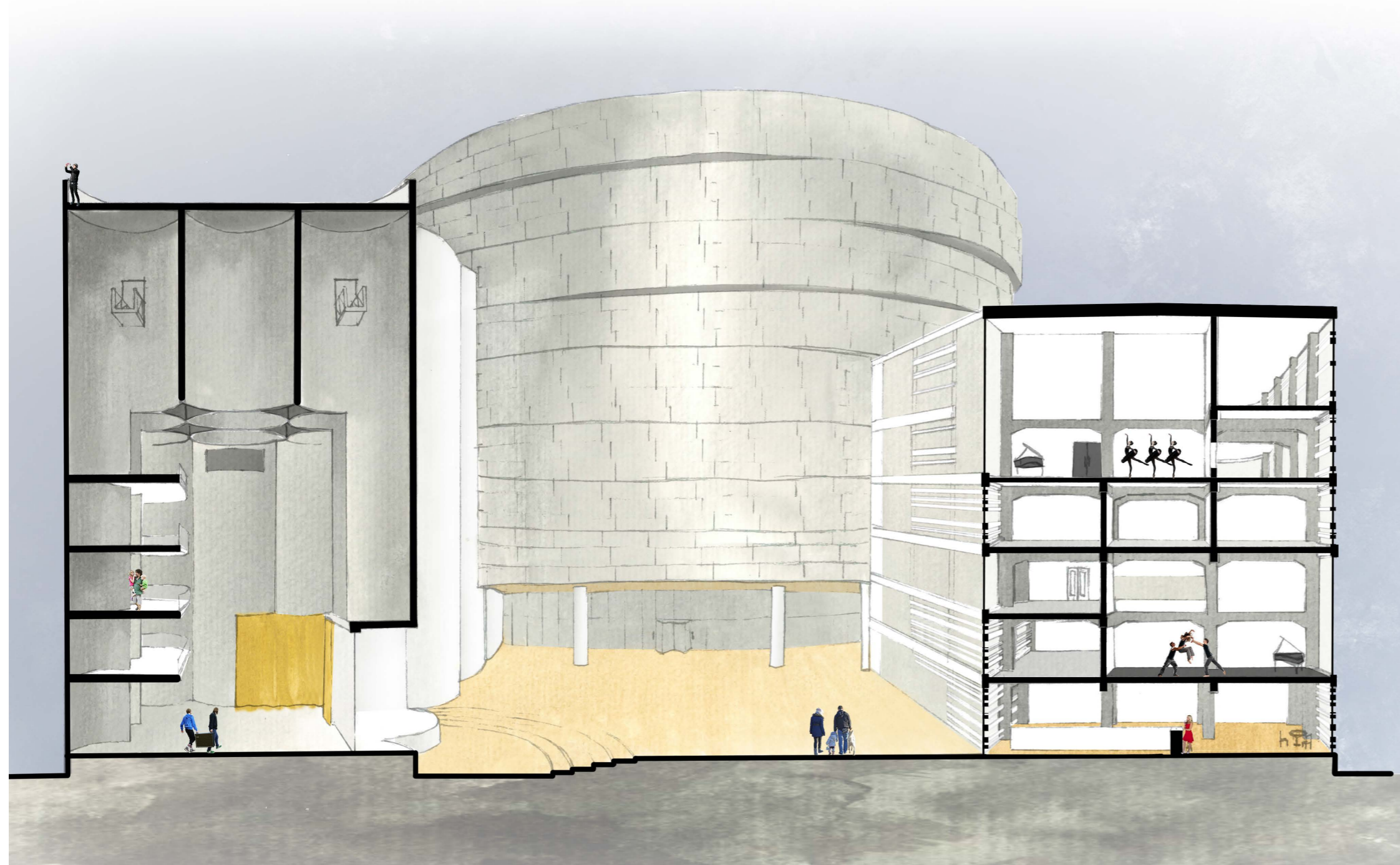
White Stucco  
Interior walls



6.5

PUBLIC THEATRE





The public theatre is located inside the silos with the existing silo structure still visible. In order to create the theatre, many silos have been partly demolished, the final opening is shown in figure 6.54. Although many silos have been partly demolished, the exterior façade still exists out of the original silos.

The public theatre also has a direct connection with the square, which is schematically shown in figure 6.55. This connection is made by an opening in the silos and an auditorium in the square. Because of this opening, and of the stage which is a flat floor, the orientation of the stage can be turned 180° during summer. In summer the spectators are watching the performance from the square, which transforms the public theatre into an open air theatre. During the rest of the year, the spectators are seated on the balconies in the silos.

When the public theatre is inside, the spectators have a relatively vertical seating, therefore the performers need to be creative in performing in such a way all spectators can watch the show. Because of the vertical seating, the spectators in the top row, will probably not sit during the performance, but stand and lean forward towards the stage.

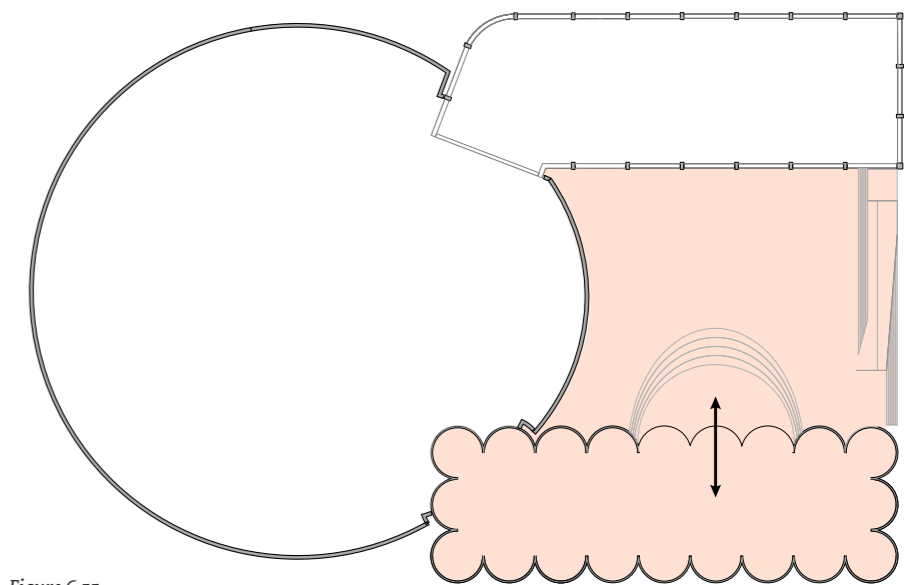


Figure 6.55

Because many silos will be partly demolished, the existing structure is not stable anymore. Therefore, a new steel construction is made inside the silos. This steel construction will create stability and can be used for the lighting of the theatre, the diagram of this structure is shown in figure 6.56. The new construction consists of two large trusses; in one of these trusses the columns are used as elevators. The beams of both the trusses are placed as high as possible and are located right underneath the floor of the rooftop restaurant.

Besides creating stability, the trusses are also used for hanging up the floors and window frame of the sliding door at the square, for which steel wires with a diameter of approximately 5 cm are used.

The balconies are an exception and will not hang on the new steel structure, but will be fixated on the walls of the silos, which can be seen in the detail of figure 6.57. The balconies structure is made of steel, with concrete flooring, the ceilings are plastered white. The railings of the balconies which also have a structural function, are made of steel wires.

Because the silos were only made of 200mm thick concrete and there is a new function inside which needs heating, insulation is placed. In order to preserve the existing concrete look inside, the building is insulated at the exterior.

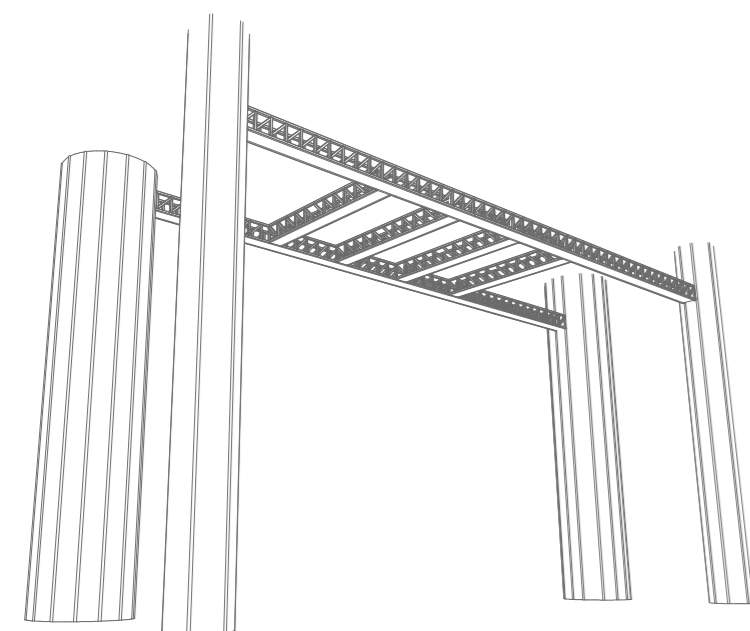
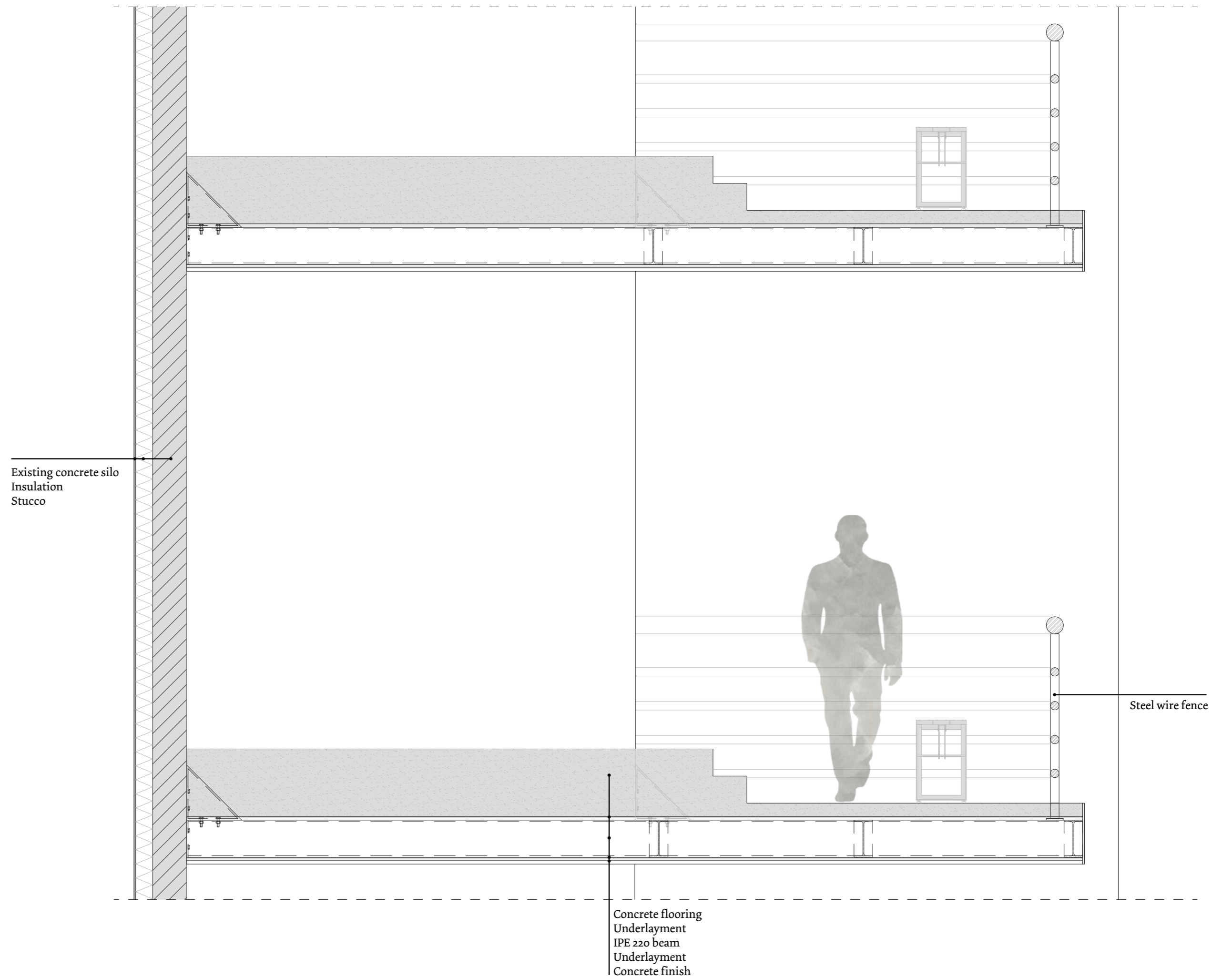


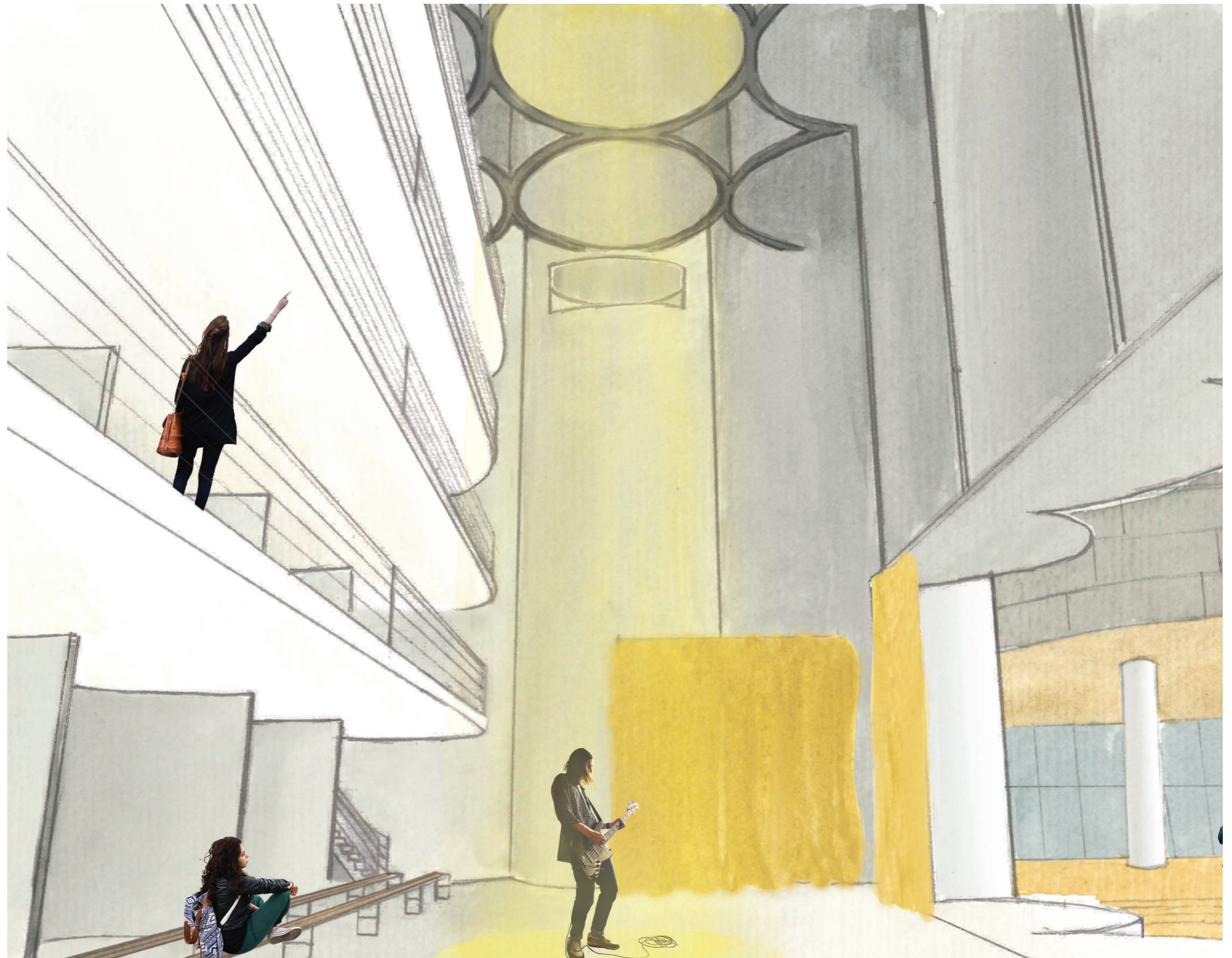
Figure 6.56



By cutting out a large proportion of the silos there is an open space which can be used for performances and seating. Because of the damaged concrete of the existing silos, the theatre will have a very raw look, which is emphasized by the steel wired fences and simple wooden benches as theatre seating. The atmosphere of the theatre is shown in figure 6.58. Apart from the interior construction the height remains unchanged. This is achieved by leaving the silos open as far as the rooftop terrace and creates an even more impressive theatre. The stabilizing steel structure is at the top of the theatre, but this is not visible because of the height. The lights for the theatre are hanging inside the silo openings.

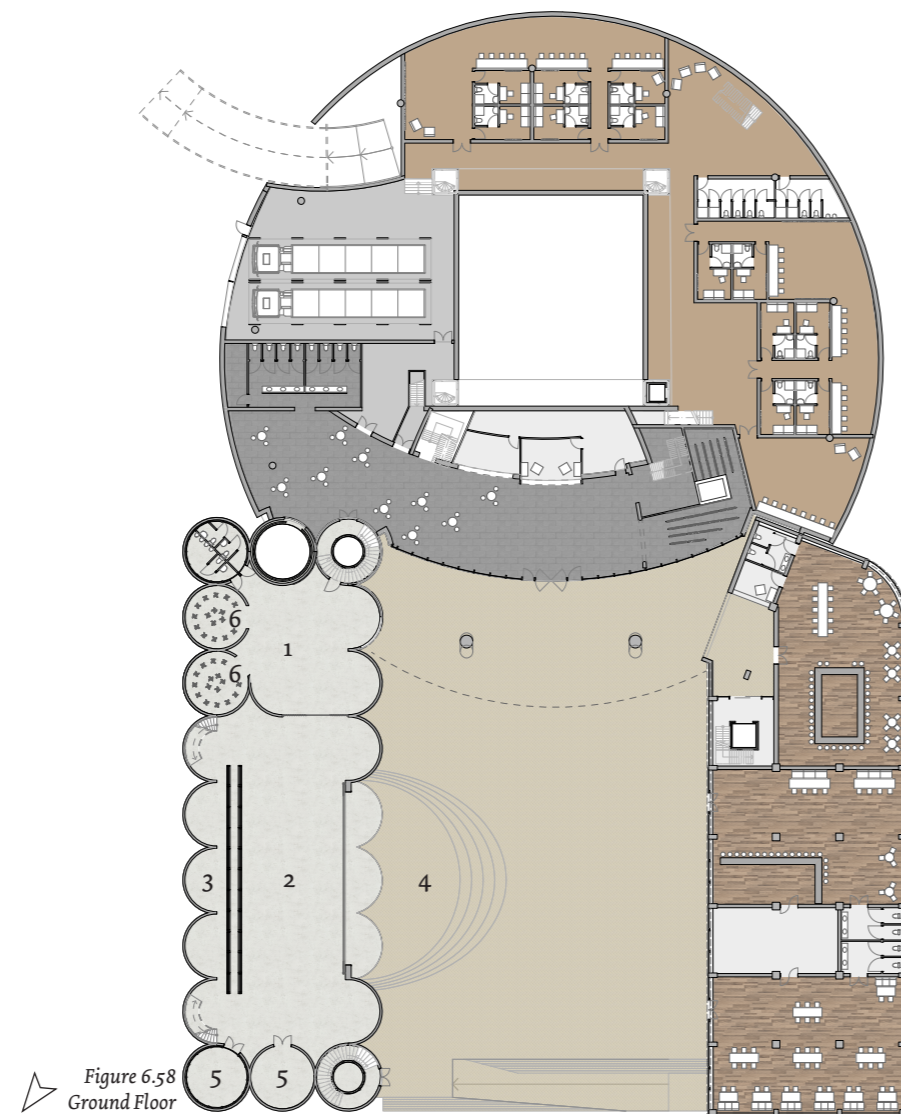
At the square side a large glass sliding door is located which allows a view over the square and daylight in the theatre. If the performers do not want to have the view of the square during the interior performance, there are curtains which can be closed. The curtains are also used as sound absorbing material.

In summer, the public theatre can also be turned into an open air theatre, this is done by the sliding door at the right, which can be opened during summer. The frame of the sliding door creates a proscenium and allows the performers to use the exterior. The only major change in that case is the rotation of speakers and the stage has more traditional dimensions.



In order to enter the public theatre, the visitors must first cross the square; the entrance of the theatre is at the left side of the opera and ballet theatre. When the visitors enter the public theatre, they can put their coats in the wardrobe and show their (online) purchased tickets at the small desk in the corner next to the entrance of the theatre. Then the visitors can enter the theatre through the curtains, and walk to their seats.

There are two rows on the ground floor and three balconies. People can get access to the balconies via the staircases at the side. During the break of the performance, a small mobile bar can be pulled on stage. The performers can stay there or go to their dressing rooms, which are located in the silos on top of the entrance.



1. Entrance
2. Stage
3. Audience seating
4. Summer seating
5. Storage
6. Wardrobe

## MATERIALS

As mentioned before, there are only some materials used for the silos. The interior walls are made of the existing damaged concrete; because the insulation is added at the exterior side of the silos, the exterior façade is cladded with white stucco.

The balconies are made of concrete, which is much lighter than the existing concrete. Furthermore, the balconies have steel wired fences.



Concrete  
Balconies



Steel Railing  
Balconies



White Stucco  
Exterior walls



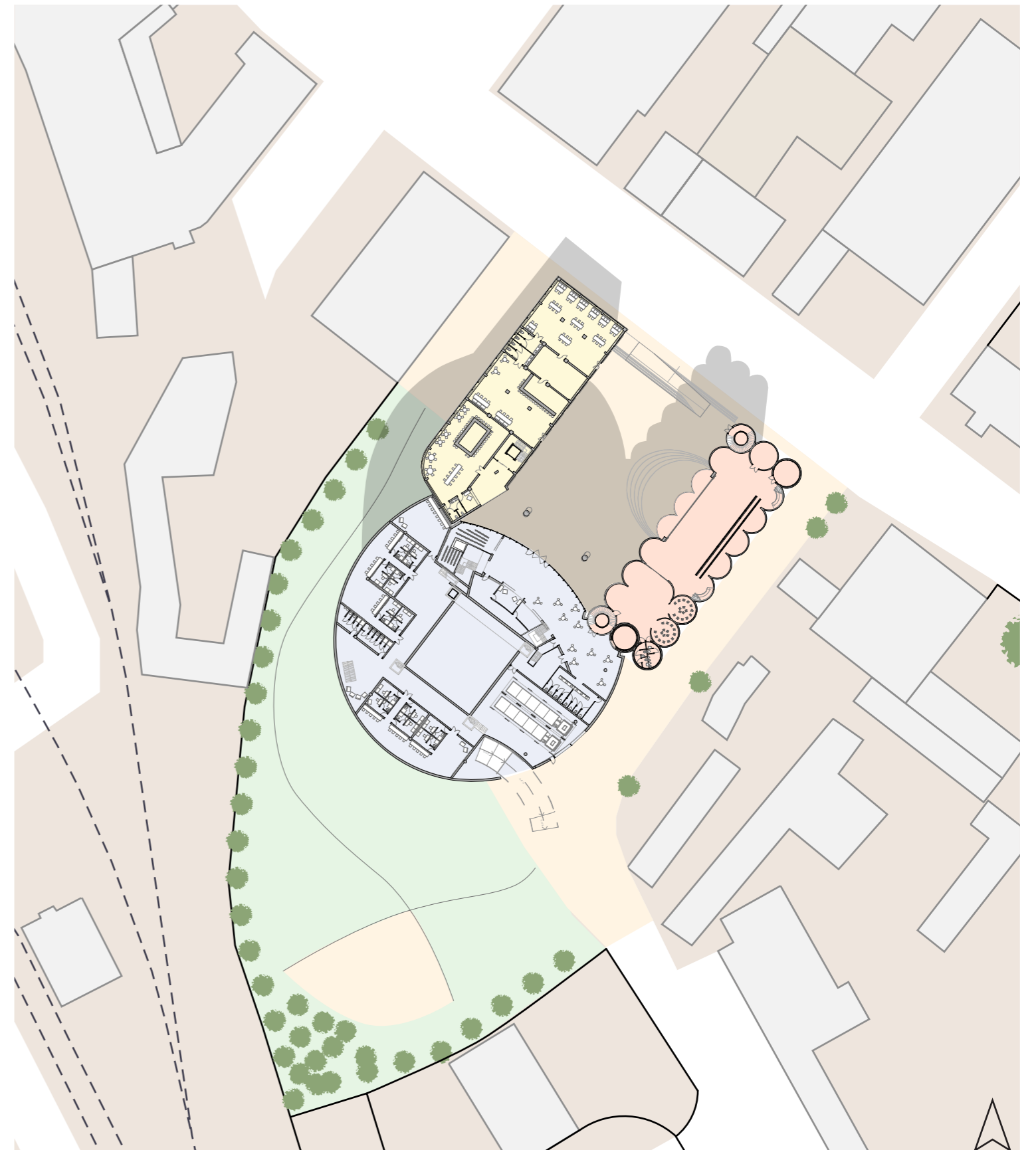


7  
DRAWINGS

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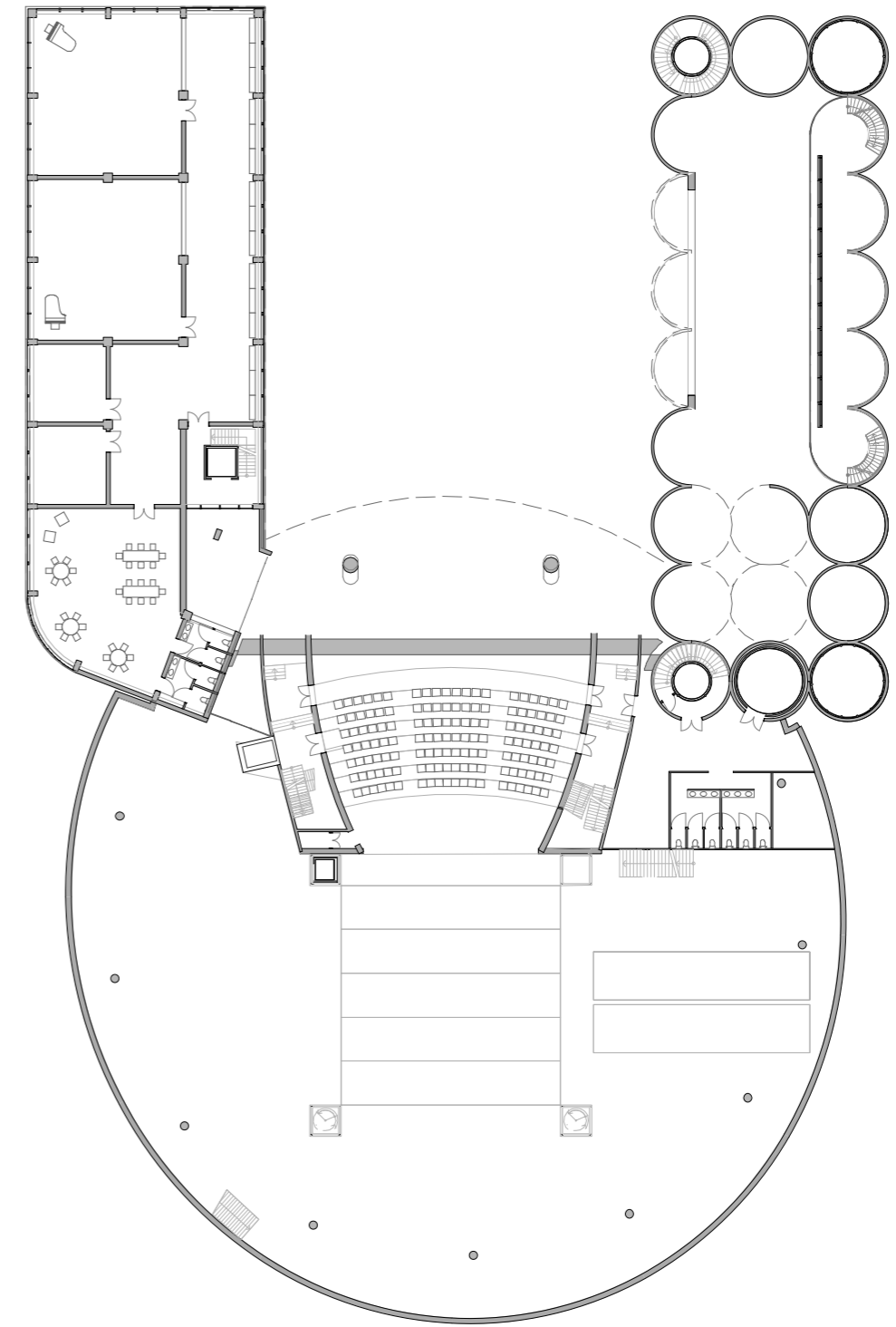
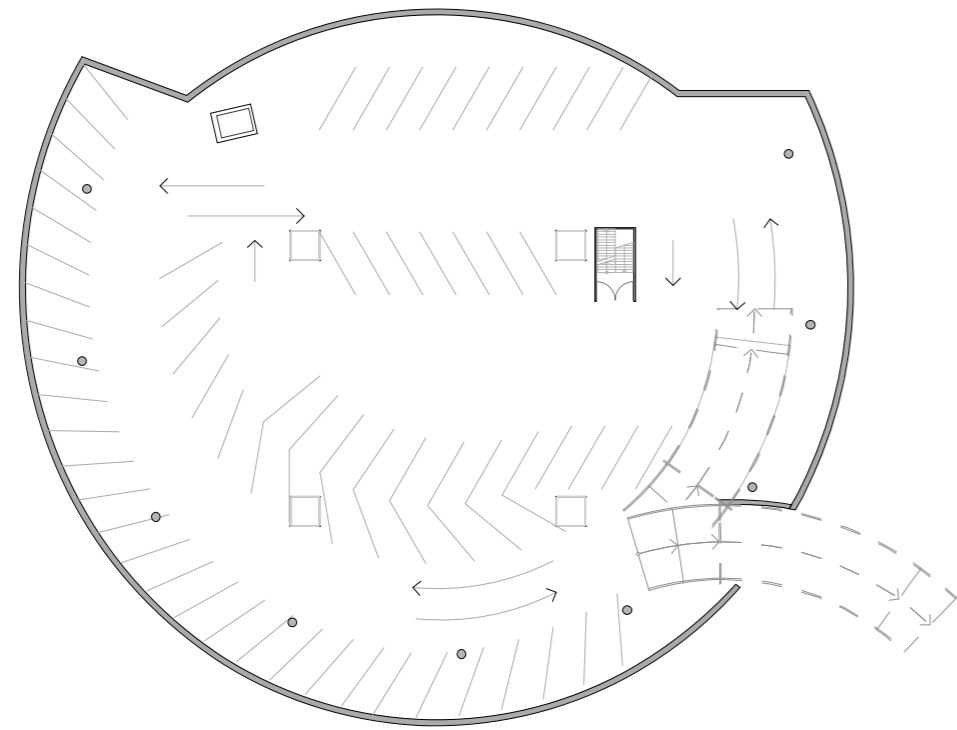
## 7.1 FLOORPLANS

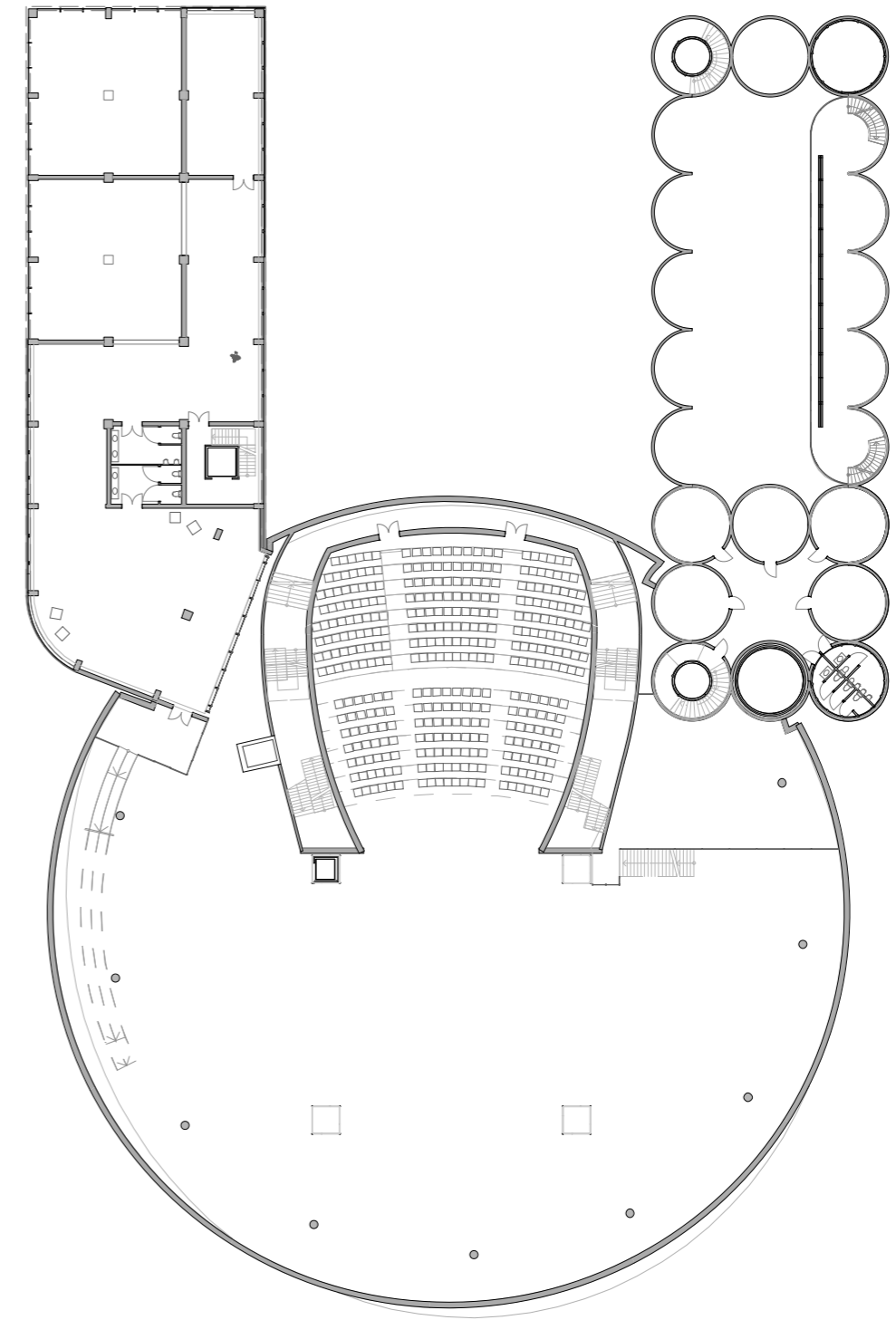
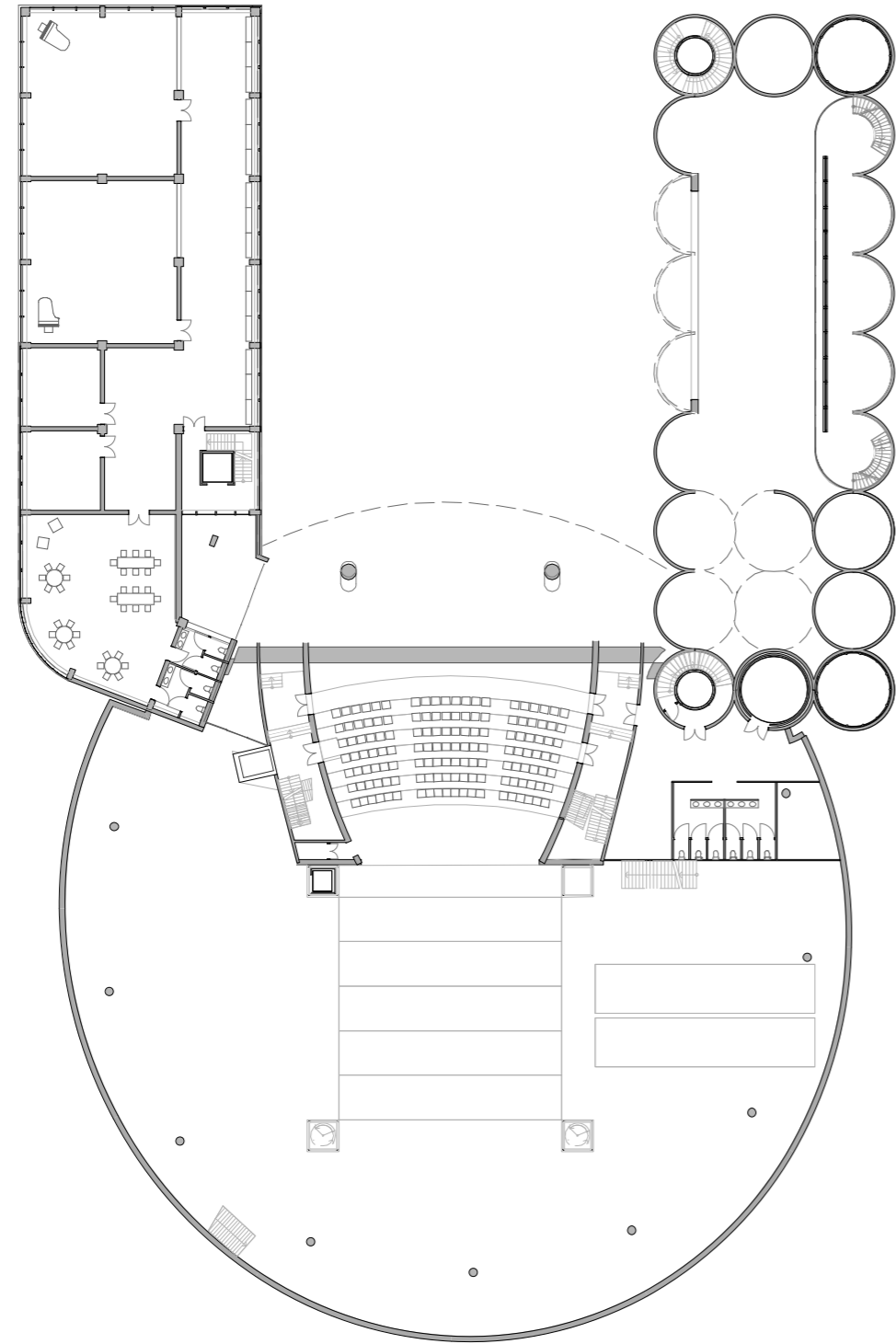


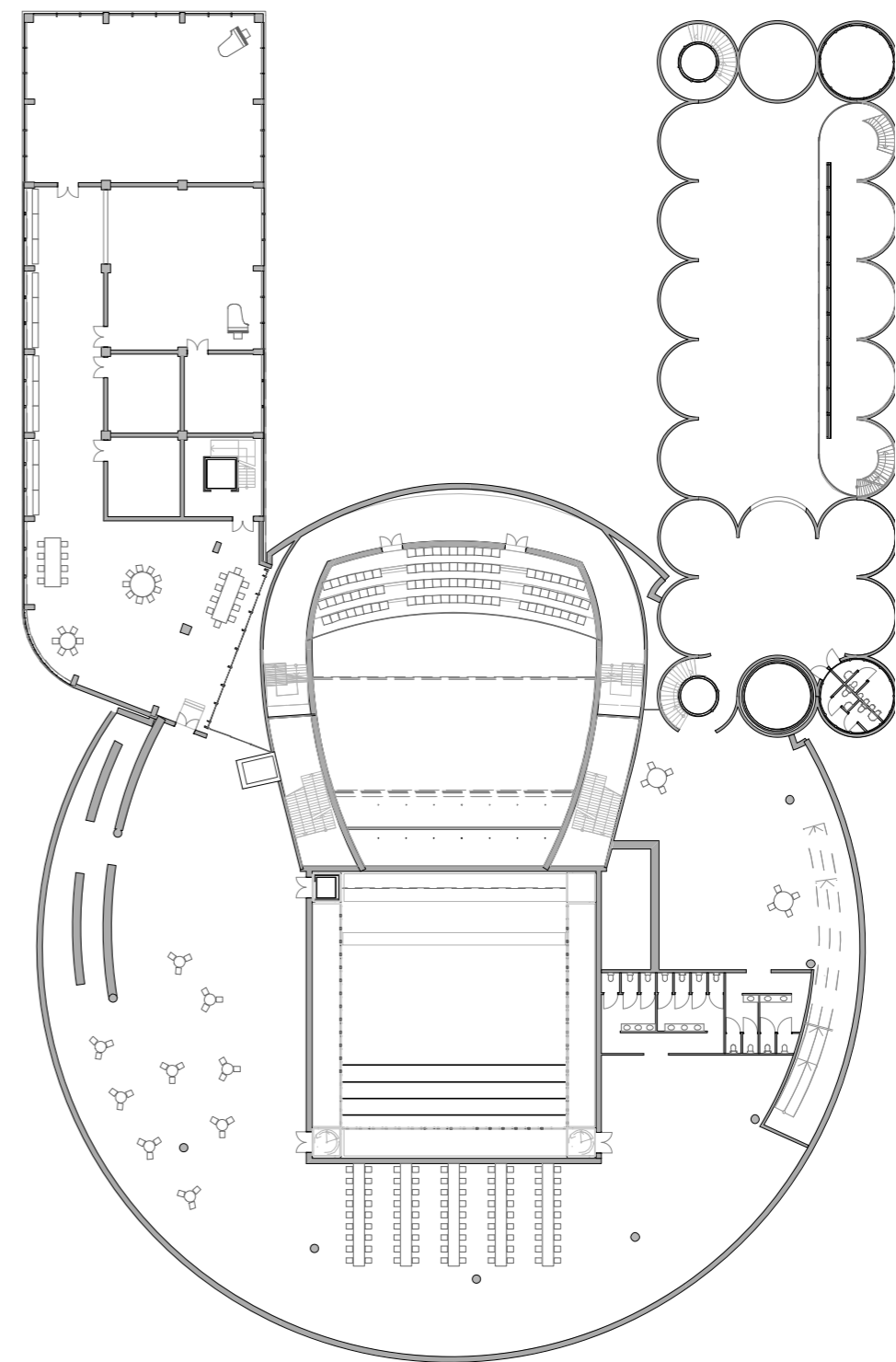
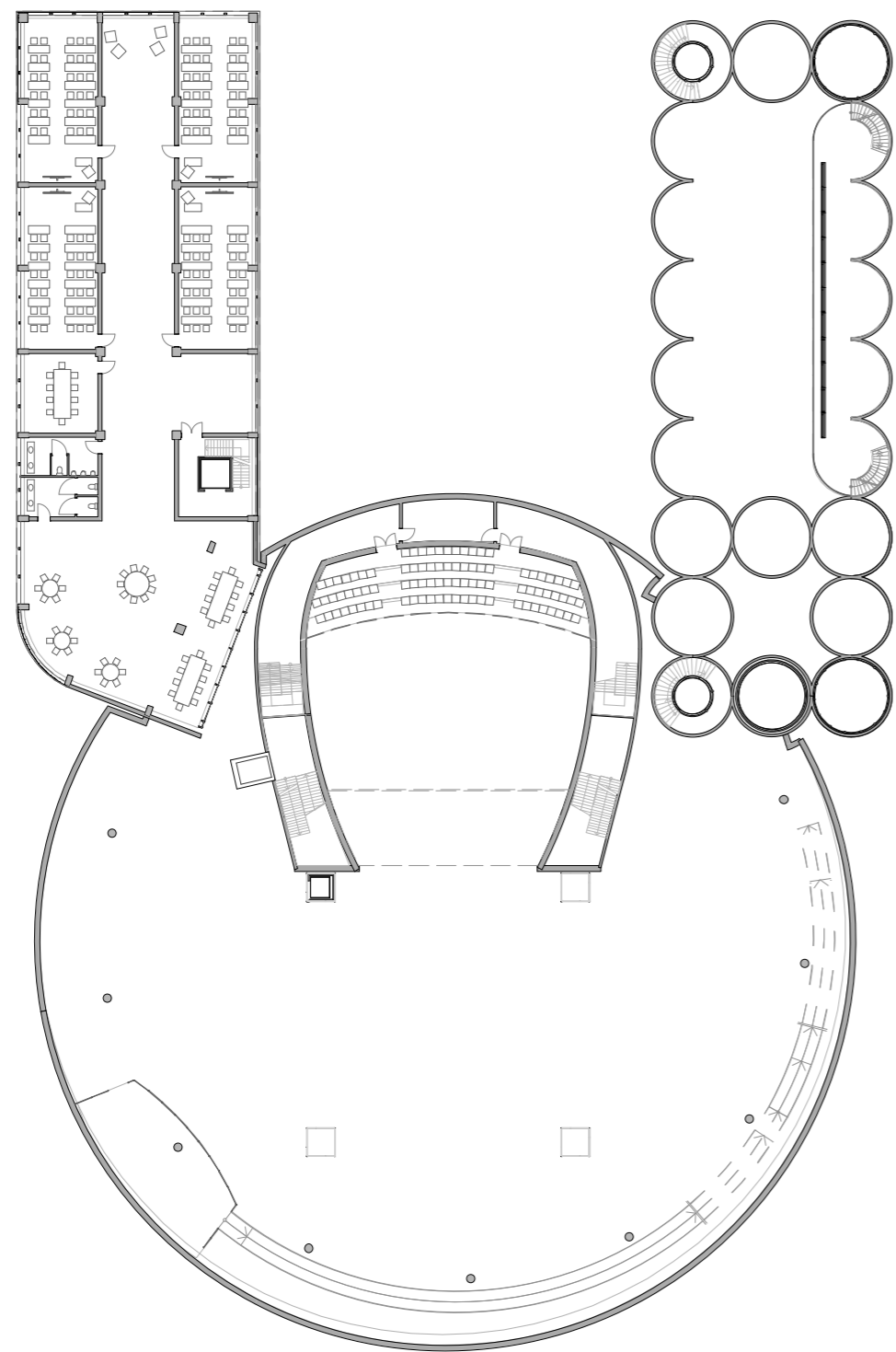
Ground floor, scale 1:1000

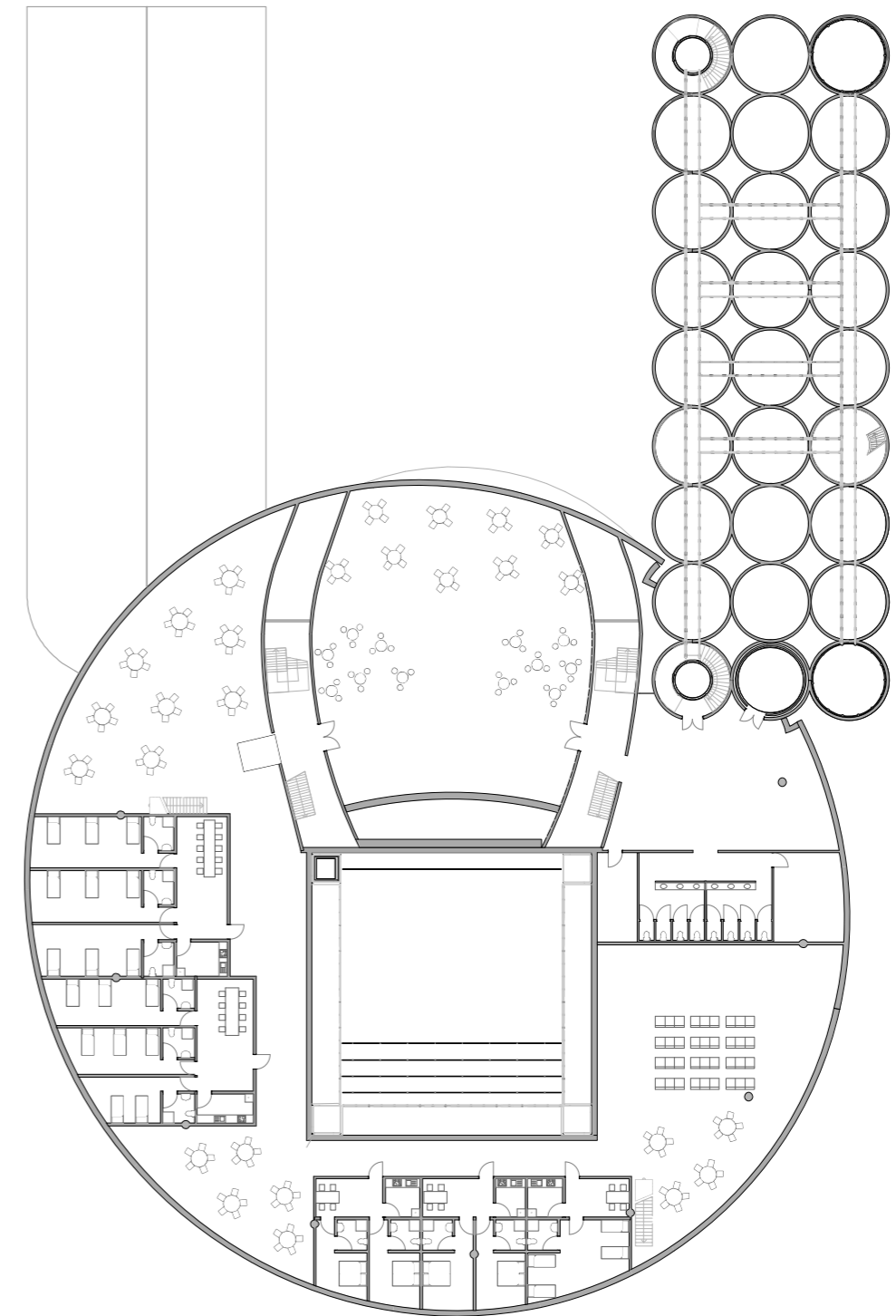
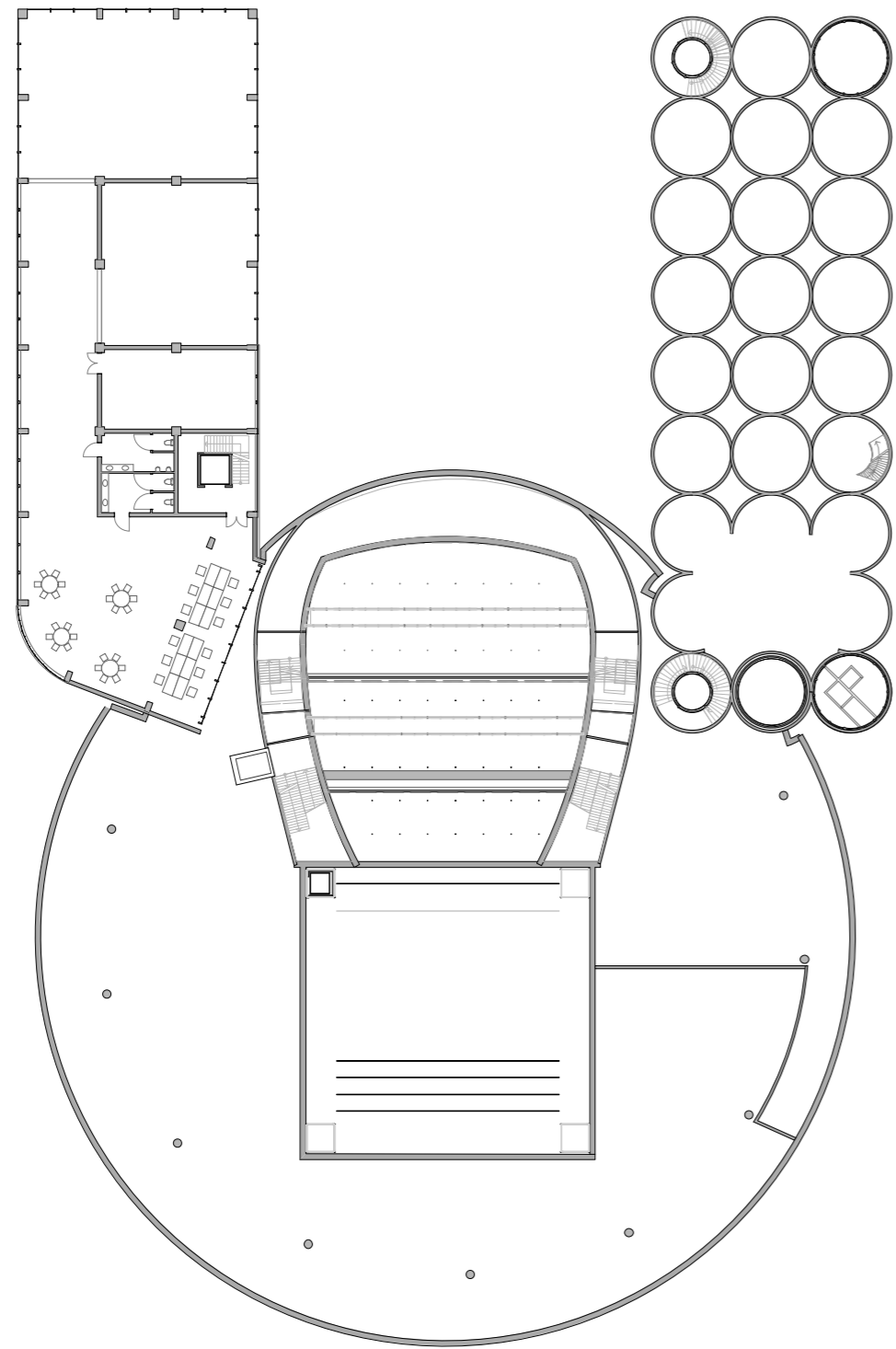
FLOORPLANS

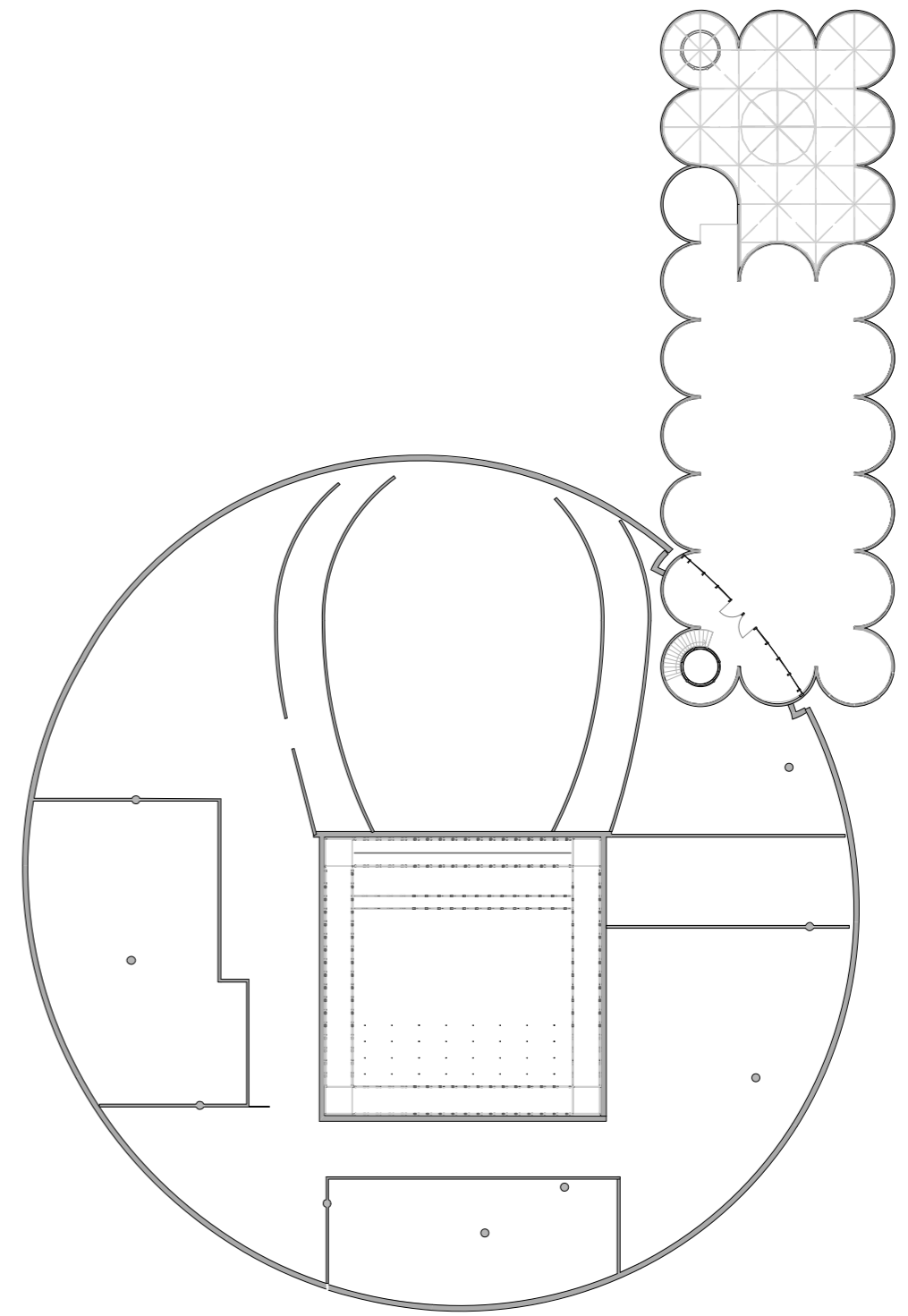
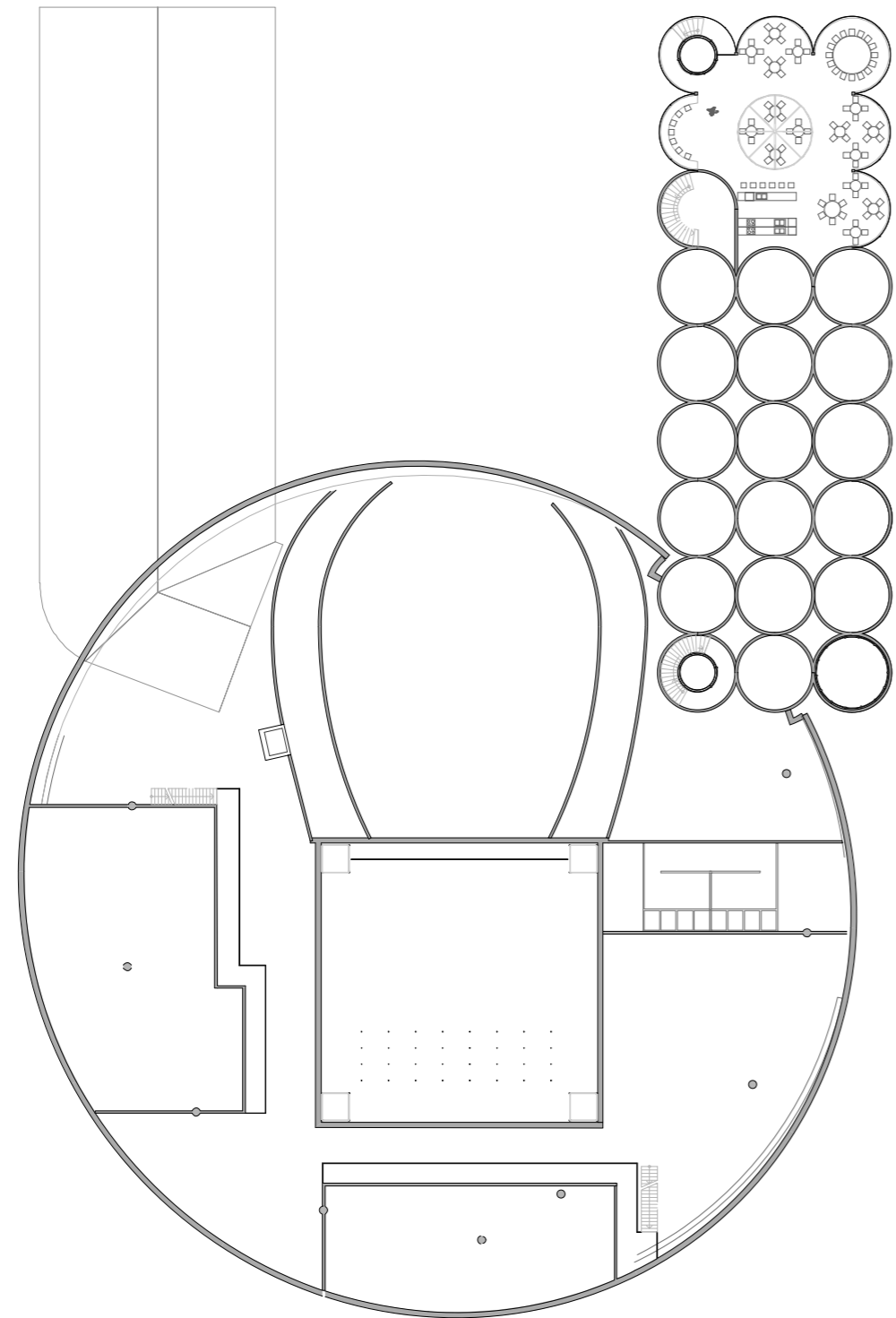
scale 1:500





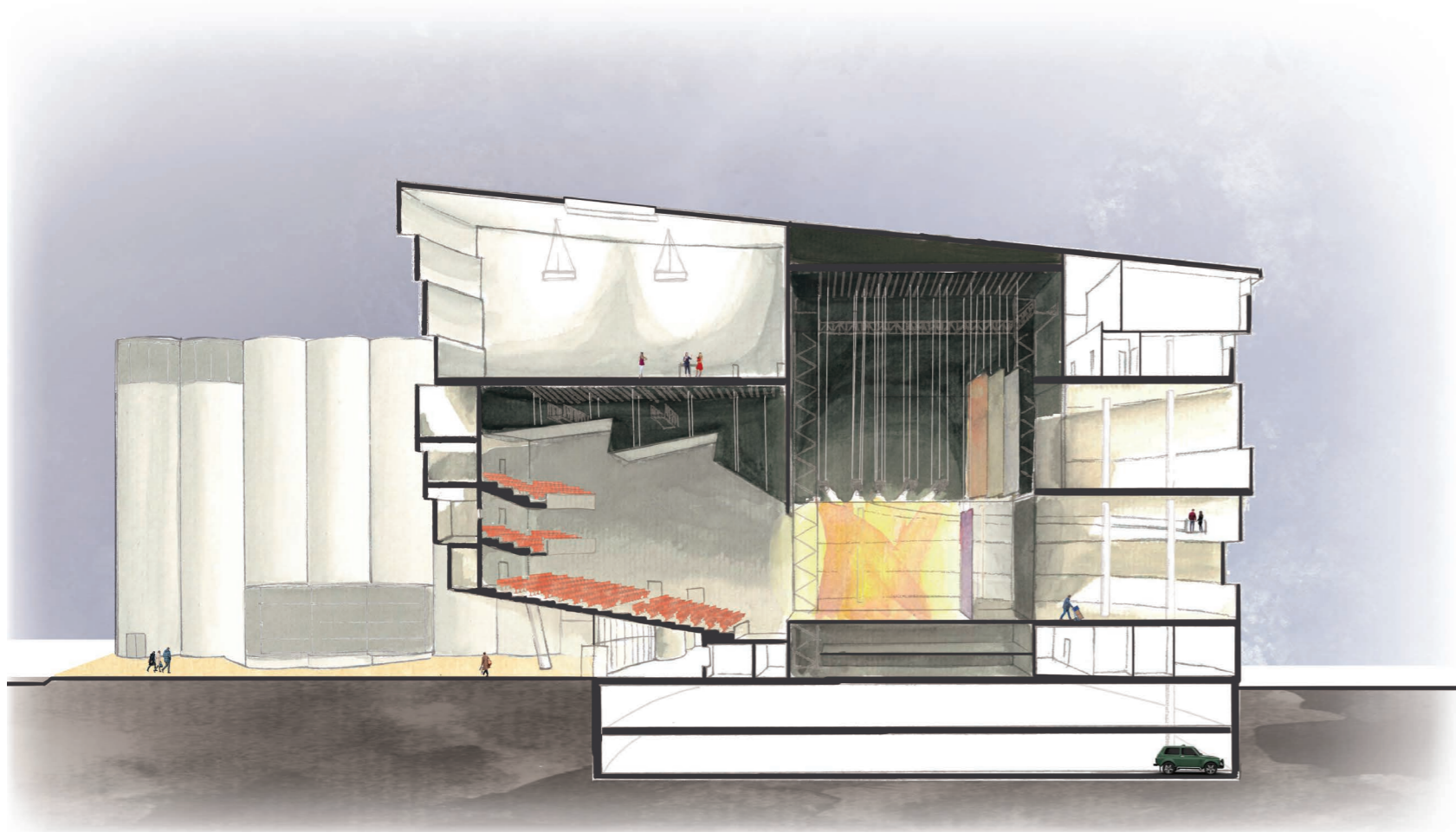
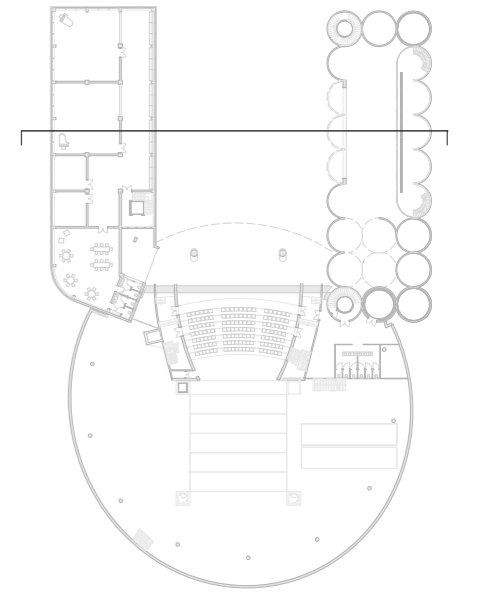
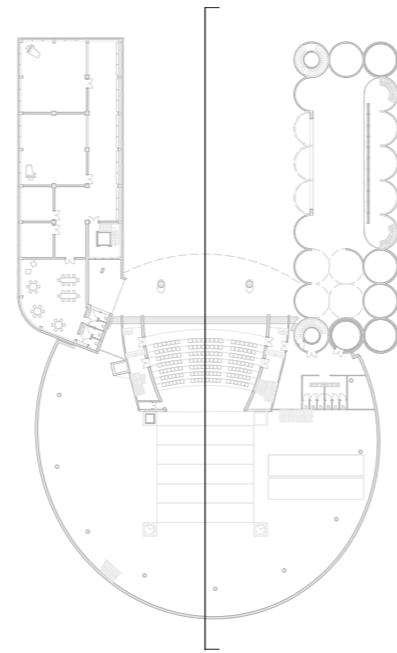




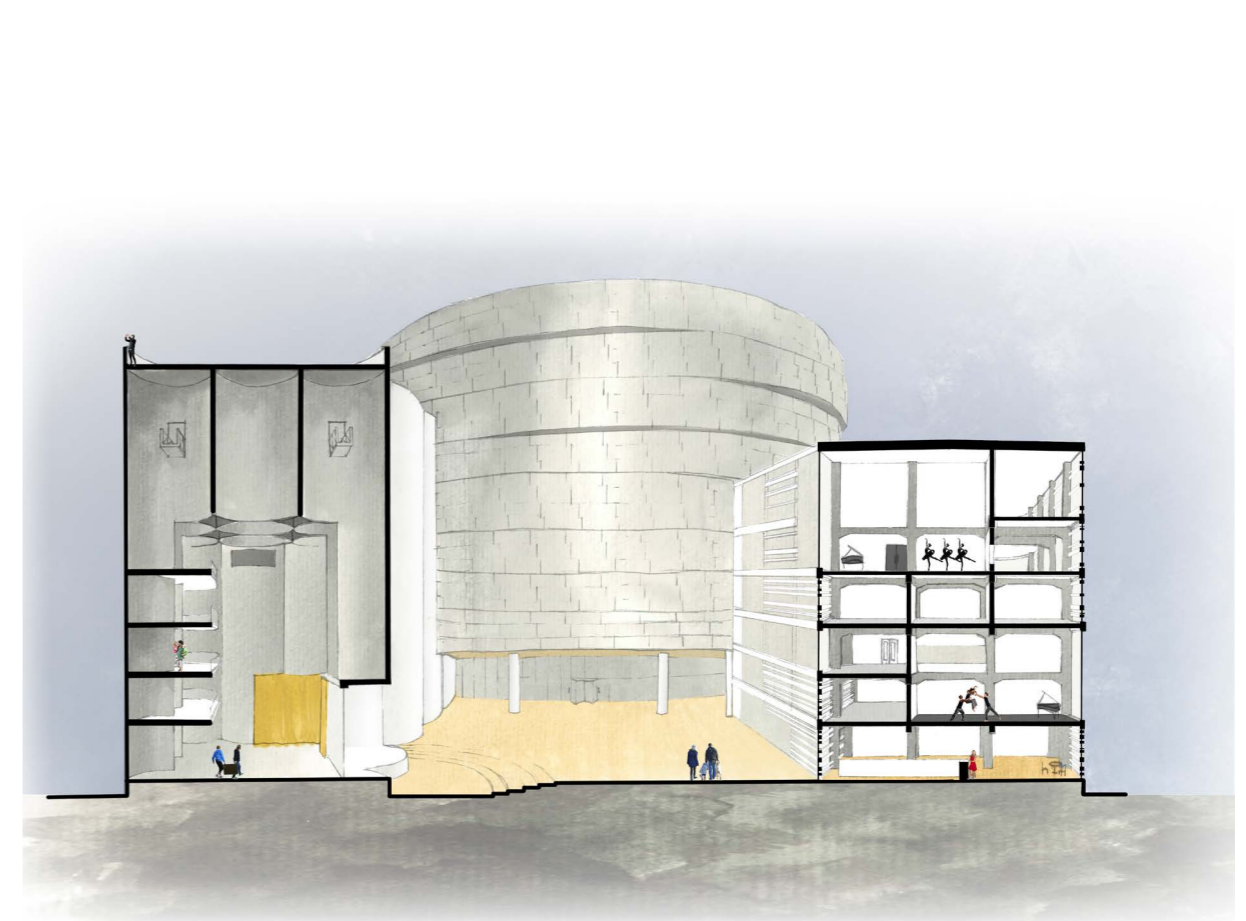


## 7.2 SECTIONS

scale 1:500



*Section Opera*



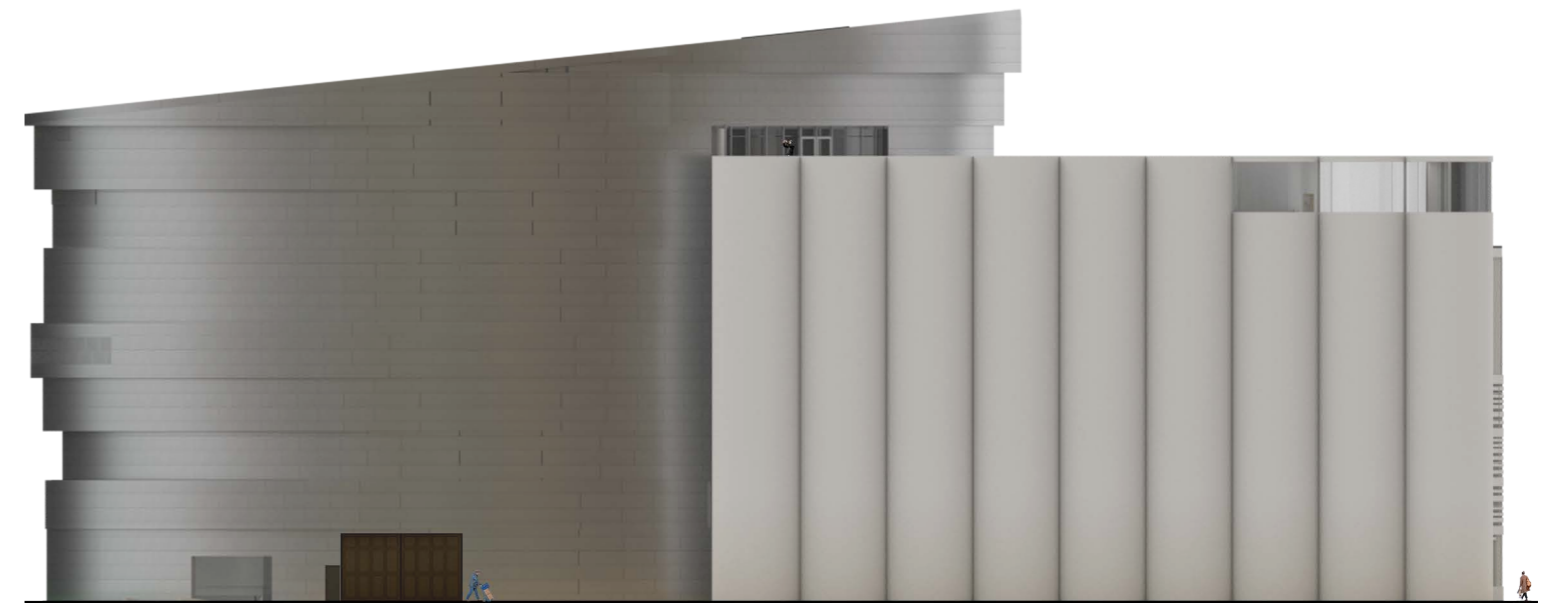
*Section public theatre and dance school*

### 7.3 ELEVATIONS

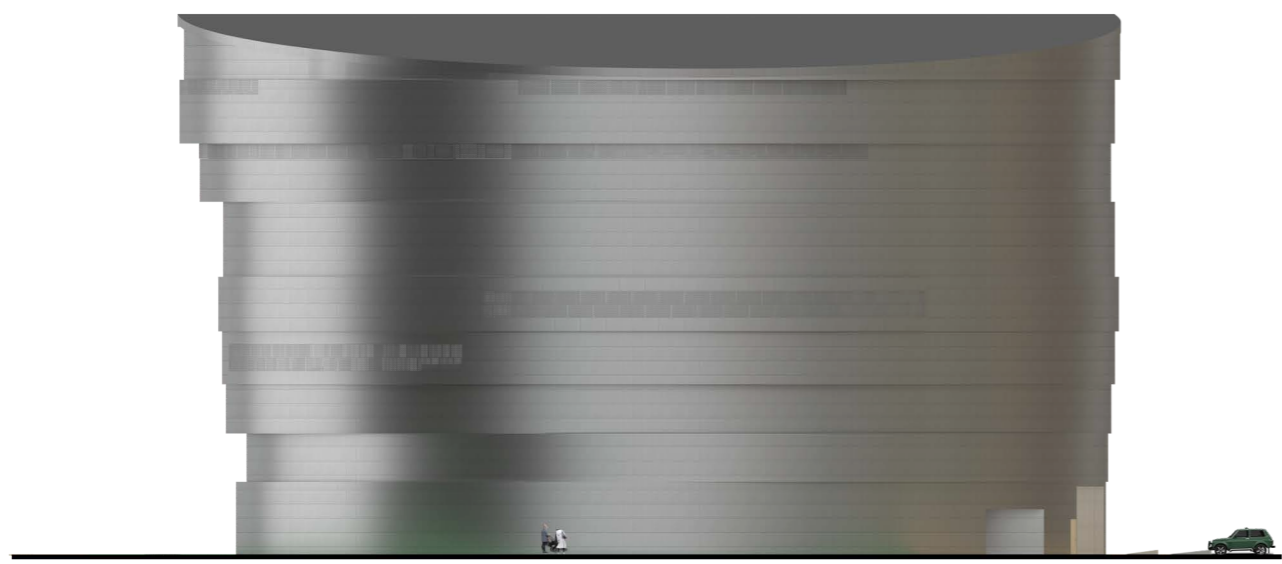
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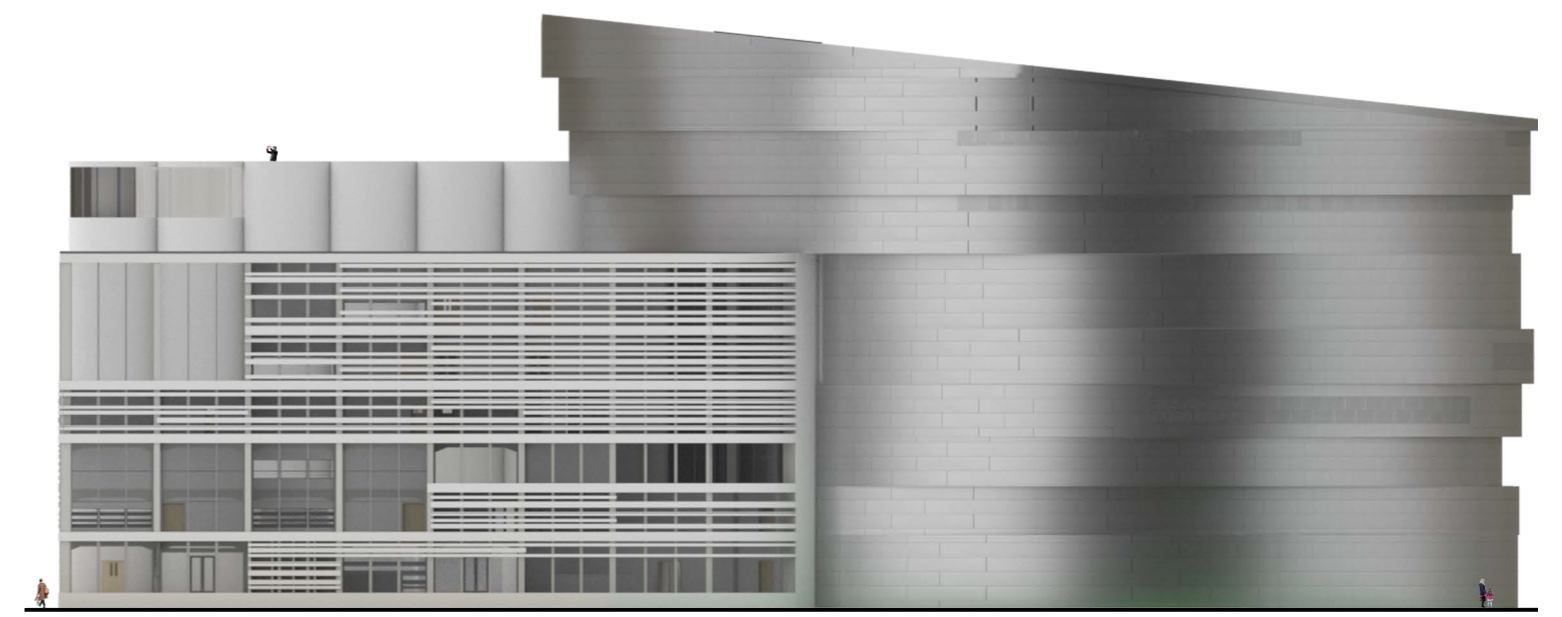
North-East view



South-East view



South-West view

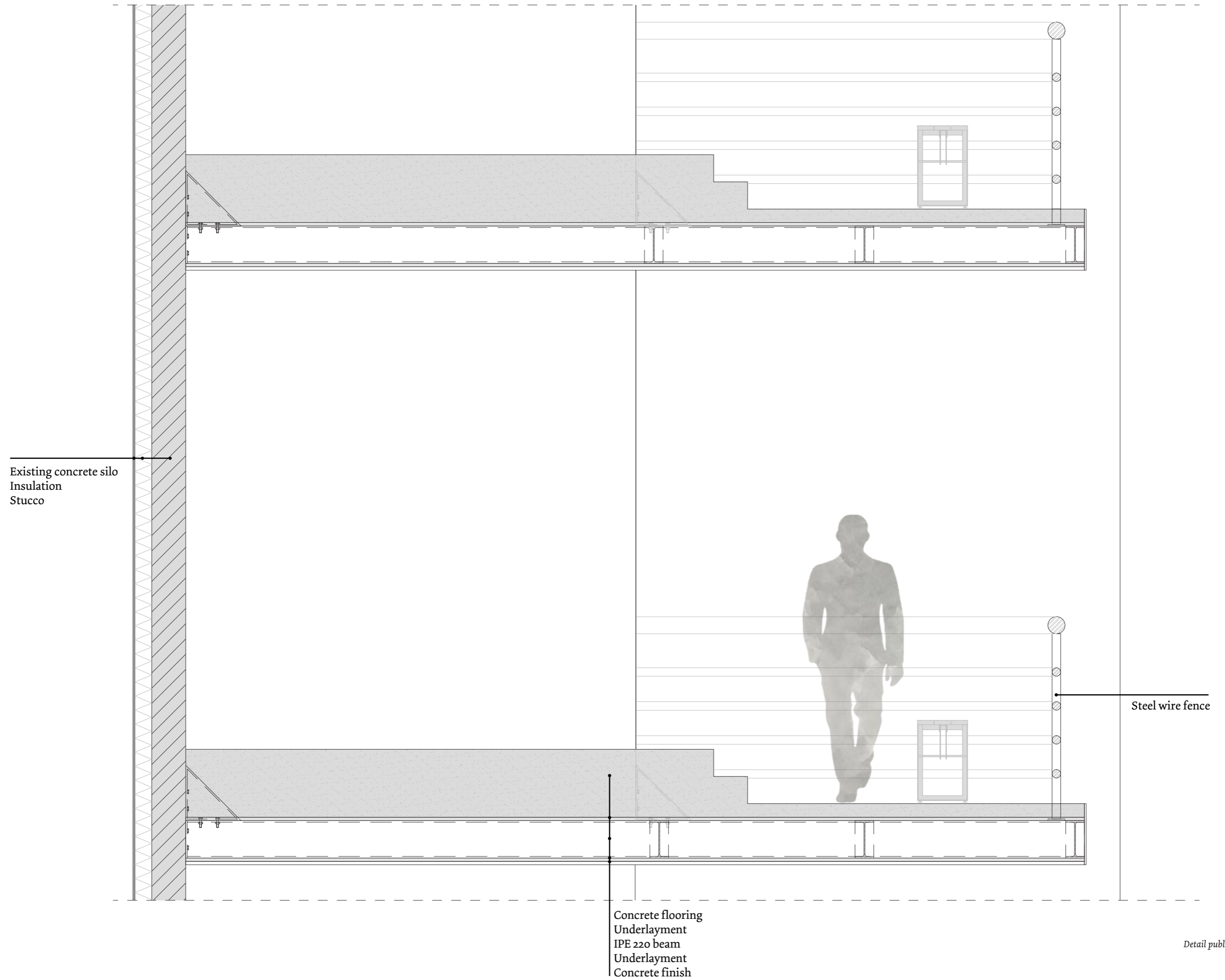


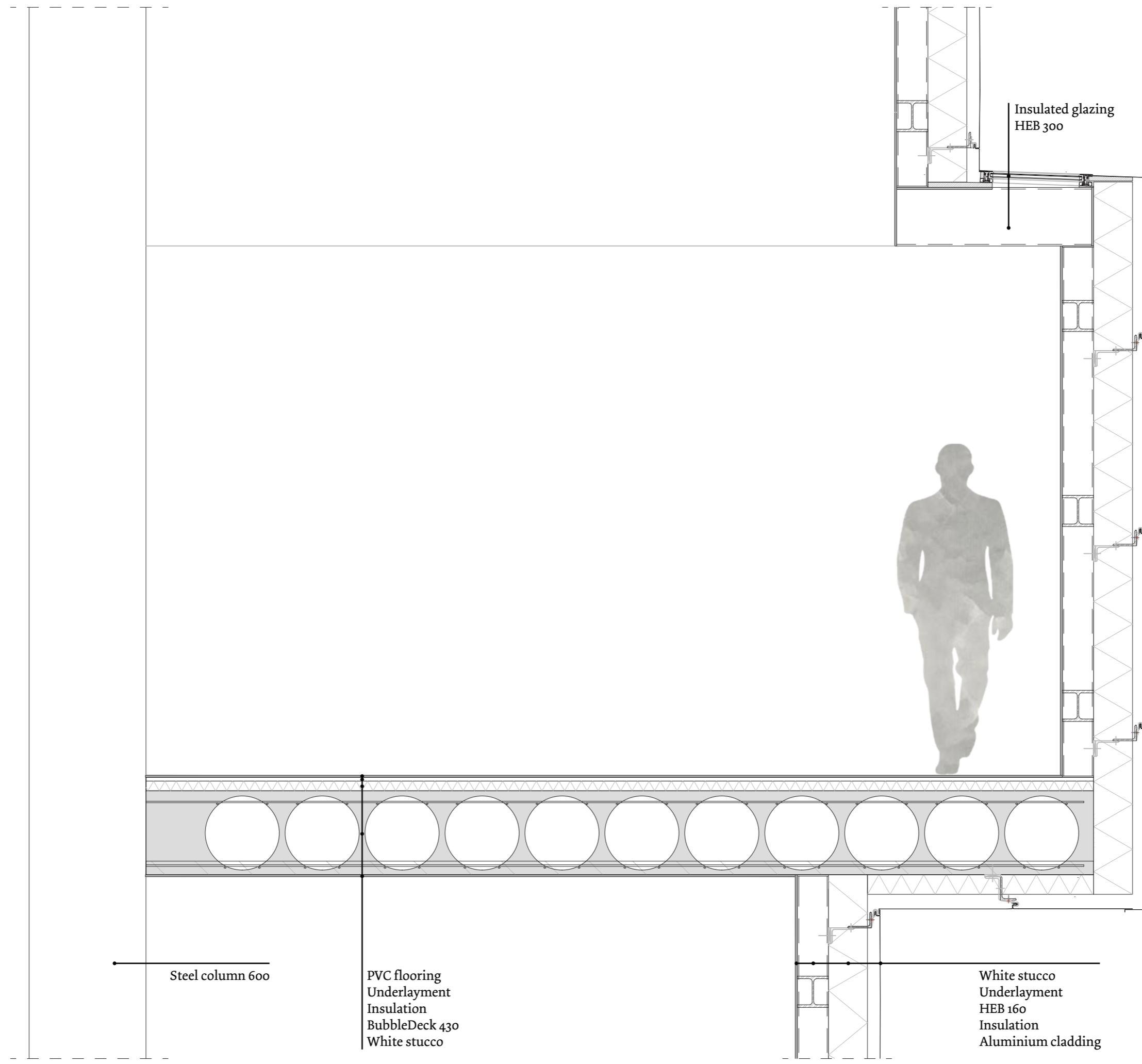
North-West view



# 7.4 DETAILS

scale 1:20



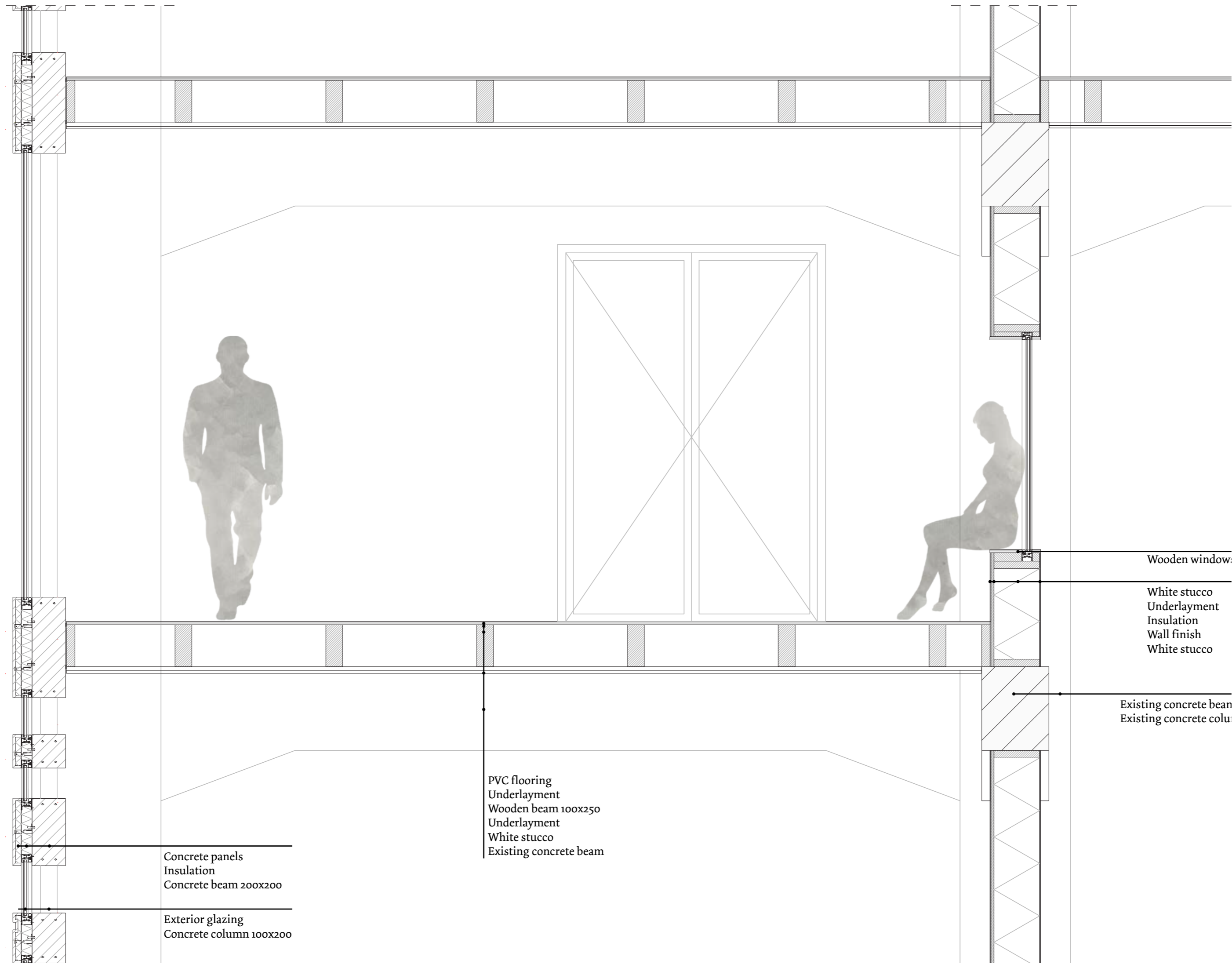


Steel column 600

PVC flooring  
Underlayment  
Insulation  
BubbleDeck 430  
White stucco

Insulated glazing  
HEB 300

White stucco  
Underlayment  
HEB 160  
Insulation  
Aluminium cladding



Concrete panels  
Insulation  
Concrete beam 200x200

Exterior glazing  
Concrete column 100x200

PVC flooring  
Underlayment  
Wooden beam 100x250  
Underlayment  
White stucco  
Existing concrete beam

Wooden window

White stucco  
Underlayment  
Insulation  
Wall finish  
White stucco

Existing concrete beam  
Existing concrete column

SOURCES



## 8.1 LITERATURE

### Chapter 2

Eskelinen, H., & Jukarainen, P. (2000). New crossings at different borders: Finland. *Journal of Borderlands Studies*, 255-279.

Municipality of Vyborg. (n.d.). ИСТОРИЯ РАЙОНА. Retrieved May 2016, from Municipal Union - Vyborg District: <http://vbglenobl.ru/raion/istoriya-raiona>

Neuvonen, P., Pöyhiä, T., & Mustonen, T. (1999). Viipuri opas kaupunkiin. Tampere: Rakennustieto Oy.

The Hermitage-Vyborg Exhibition Centre. (2016). Retrieved May 2016, from The state hermitage Museum: <https://www.hermitagemuseum.org/wps/portal/hermitage/explore/buildings/exhibition-center/vyborg/?lng=>

Vyborg District (Leningrad Region). (2015, 12 06). Retrieved May 2016, from Wikipedia, the free encyclopedia: [http://fi.wikipedia.org/w/index.php?title=Viipurin\\_piiri\\_\(Leningradin\\_alue\)&oldid=15377760](http://fi.wikipedia.org/w/index.php?title=Viipurin_piiri_(Leningradin_alue)&oldid=15377760)

Vyborg District (Leningrad Region). (2016, November 2). Retrieved May 2016, from Wikipedia, the free encyclopedia: <http://ru.wikipedia.org/?oldid=81659613>

World Weather Online. (n.d.). Eindhoven, North Brabant Monthly Climate Average, Netherlands. Retrieved June 2016, from World Weather Online: <https://www.worldweatheronline.com/eindhoven-weather-averages/north-brabant/nl.aspx>

World Weather Online. (n.d.). Saint Petersburg, city montly climate average, Russia. Retrieved June 2016, from World Weather Online: <https://www.worldweatheronline.com/saint-petersburg-weather-averages/saint-petersburg-city/ru.aspx>

### Chapter 3

Alho, O. (2010). A guide to Finnish Customs and Manners. Retrieved from this is Finland: <http://finland.fi/life-society/a-guide-to-finnish-customs-and-manners>

Corstius, J. B. (Director). (2012). Van Moskou tot Moermansk [Motion Picture].

Countries and Their Cultures. (2016). Russians. Retrieved from Every Culture: <http://www.everyculture.com/wc/Norway-to-Russia/Russians.html>

d'Hamecourt, P. (2007). Russen zien ze vliegen. Den Haag: Conserve.

Eskelinen, H., & Alanen, A. (2000). Economic gap at the Finnish-Russian border. Jyväskylä: SoPhi.

Eskelinen, H., & Jukarainen, P. (2000). New crossings at different borders: Finland. *Journal of Borderlands Studies*, 255-279.

Hirvonen, J. (2012). Cross-border cooperation in the field of social services and welfare: visions and future steps. Finland: Kymenlaakso University of Applied Sciences.

Hofstede, G. (2000). *Cultures and Organizations, Software of the Mind*. Amsterdam: Uitgeverij Contact.

Lewis, R. (1996). *When cultures collide; Managing successfully across cultures*. London: Nicholas Brealey.

Neuvonen, P., Pöyhiä, T., & Mustonen, T. (1999). Viipuri opas kaupunkiin. Tampere: Rakennustieto Oy.

Paranyushkin, D. (2015). Myths and Truths about Russia. Retrieved from Way to Russia: <http://waytorussia.net/WhatIsRussia/MythsAndTruth.html>

### Chapter 4

Arkkitehti. (1932). S.O.K. Viipurin Mylly. *Arkkitehti*, 41-43, 154-157.

Neuvonen, P., Pöyhiä, T., & Mustonen, T. (1999). Viipuri opas kaupunkiin. Tampere: Rakennustieto Oy.

Provoost, M. (1995). *Re-Arch*. Rotterdam: 010.

reg\_813. (2013, November). On the ruins of Vyborg. Part 60. Retrieved March 30, 2016, from livejournal: <http://reg-813.livejournal.com/16046.html?thread=26798>

### Chapter 5

ArchDaily. (2008). Oslo Opera House / Snohetta. Retrieved September 2016, from ArchDaily: <http://www.archdaily.com/440/oslo-opera-house-snohetta>

ArchDaily. (2009). Winspear Opera House / Foster + Partners. Retrieved October 2016, from ArchDaily: <http://www.archdaily.com/41069/winspear-opera-house-foster-partners>

ArchDaily. (2011). Guangzhou Opera House / Zaha Hadid Architects. Retrieved October 2016, from Archdaily: <http://www.archdaily.com/115949/guangzhou-opera-house-zaha-hadid-architects>

ArchDaily. (2011). Houston Ballet Center for Dance / Gensler. Retrieved July 2016, from ArchDaily: <http://www.archdaily.com/129307/houston-ballet-center-for-dance-gensler>

ArchDaily. (2013). Opera House Linz / Terry Pawson Architects. Retrieved October 2016, from Archdaily: <http://www.archdaily.com/415159/opera-house-linz-terry-pawson-architects>

ArchDaily. (2015). Ballet am Rhein / gmp Architekten. Retrieved August 2016, from ArchDaily: <http://www.archdaily.com/773368/ballet-am-rhein-gmp-architekten>

ArchDaily. (2015). Harbin Opera House / MAD Architects. Retrieved October 2016, from ArchDaily: <http://www.archdaily.com/778933/harbin-opera-house-mad-architects>

Ballet, N. O. (n.d.). Technical Information. Retrieved September 2016, from Dutch National Opera and Ballet: <http://www.operaballet.nl/en/institute/organisation/technical-information>

Bardi, L. B., Elito, E., & Corrêa, J. (1999). Teatro Oficina / Lina Bo Bardi. Lisboa: Instituto Lino Bo e P.M. Bardi.

Greve, N. (2014, July 28). V&A Waterfront commits further R1.5bn to Silo district development. Retrieved from Engineering News: <http://www.engineeringnews.co.za/article/va-waterfront-commits-further-r15bn-to-silo-district-development-2014-07-28>

Houston Ballet Center for Dance. (2016, July). Retrieved from Gensler: <http://www.gensler.com/projects/houston-ballet-center-for-dance>

Izenour, G., Knudson, V., & Newman, R. (1977). Theatre Design. London: McGraw-Hill.

MAD. (2015). Harbin Opera House. Retrieved October 2016, from mad: <http://www.i-mad.com/work/harbin-cultural-center/?cid=4>

Partners, F. +. (2009). Margot and Bill Winspear Opera House. Retrieved October 2016, from Foster + Partners: <http://www.fosterandpartners.com/projects/margot-and-bill-winspear-opera-house/>

Snohetta. (2008). Norwegian National Opera and Ballet. Retrieved September 2016, from Snohetta: <http://snohetta.com/projects/42-norwegian-national-opera-and-ballet>

Sydney Opera House. (n.d.). Joan Sutherland Theatre. Retrieved October 2016, from Sydney Opera House: [https://www.sydneyoperahouse.com/the\\_building/venues/joan\\_sutherland\\_theatre.aspx](https://www.sydneyoperahouse.com/the_building/venues/joan_sutherland_theatre.aspx)

Taylor-Foster, J. (2014). James Taylor-Foster. “Heatherwick to Transform Cape Town’s Grain Silo into Contemporary Art Museum”. Retrieved May 2016, from ArchDaily: <http://www.archdaily.com/486742/heatherwick-to-reimagine-cape-town-s-grain-silo-complex-for-the-zeitz-museum-of-contemporary-art>

Terry Pawson Architects. (2013). Opera House Linz. Retrieved October 2016, from Terry Pawson Architects: <http://www.terrypawson.com/b-projects/linz.html>

Zaha Hadid architects. (2010). Guangzhou Opera House. Retrieved October 2016, from Zaha Hadid architects: <http://www.zaha-hadid.com/architecture/guangzhou-opera-house/>

## Chapter 6

Izenour, G., Knudson, V., & Newman, R. (1977). Theatre Design. London: McGraw-Hill.

## 8.2 IMAGES

All images which are not sourced are created by the author

### Chapter 2

Figure 2.19:

World Weather Online. (n.d.). Eindhoven, North Brabant Monthly Climate Average, Netherlands. Retrieved June 2016, from World Weather Online: <https://www.worldweatheronline.com/eindhoven-weather-averages/north-brabant/nl.aspx>

World Weather Online. (n.d.). Saint Petersburg, city montly climate average, Russia. Retrieved June 2016, from World Weather Online: <https://www.worldweatheronline.com/saint-petersburg-weather-averages/saint-petersburg-city/ru.aspx>

### Chapter 3

Figure 3.1: Hofstede, G. (2000). Cultures and Organizations, Software of the Mind. Amsterdam: Uitgeverij Contact.

Figure 3.2: Hofstede, G. (2000). Cultures and Organizations, Software of the Mind. Amsterdam: Uitgeverij Contact.

Figure 3.3: Eskelinen, H., & Alanen, A. (2000). Economic gap at the Finnish-Russian border. Jyväskylä: SoPhi.

### Chapter 4

Figure 4.2.1938: reg\_813. (2013, November). On the ruins of Vyborg. Part 60. Retrieved March 30, 2016, from livejournal: <http://reg-813.livejournal.com/16046.html?thread=26798>

Figure 4.2.1941: SA-kuva, Finnish Wartime Photograph Archive. Retrieved March 30, 2016, from SA-kuva: <http://sa-kuva.fi/>

Figure 4.2.1942: SA-kuva, Finnish Wartime Photograph Archive. Retrieved March 30, 2016, from SA-kuva: <http://sa-kuva.fi/>

Figure 4.2.2015: reg\_813. (2013, November). On the ruins of Vyborg. Part 60. Retrieved March 30, 2016, from livejournal: <http://reg-813.livejournal.com/16046.html?thread=26798>

### Chapter 5

Figure 5.0: Opera National de Paris. (2013, August). Opera National de Paris. Retrieved November 18, 2016, from Google maps: <https://www.google.com/maps/@48.8722348,2.331751,3a,75y,190.94h,91.82t/data=!3m6!1e1!3m4!1s-S7LZJkY4VUYx83RZMcCKQ!2e0!7i13312!8i6656?hl=en>

Figure 5.2: ArchEyes. (2016, March 27). Teatro Oficina / Lina Bo Bardi. Retrieved from ArchEyes: <http://archeyes.com/teatro-oficina/>

Figure 5.4: ArchDaily. (2009). Winspear Opera House / Foster + Partners. Retrieved October 2016, from ArchDaily: <http://www.archdaily.com/41069/winspear-opera-house-foster-partners>

Partners, F. +. (2009). Margot and Bill Winspear Opera House. Retrieved October 2016, from Foster + Partners: <http://www.fosterandpartners.com/projects/margot-and-bill-winspear-opera-house/>

Figure 5.5: ArchDaily. (2011). Guangzhou Opera House / Zaha Hadid Architects. Retrieved October 2016, from Archdaily: <http://www.archdaily.com/115949/guangzhou-opera-house-zaha-hadid-architects>

Zaha Hadid architects. (2010). Guangzhou Opera House. Retrieved October 2016, from Zaha Hadid architects: <http://www.zaha-hadid.com/architecture/guangzhou-opera-house/>

Figure 5.6: ArchDaily. (2013). Opera House Linz / Terry Pawson Architects. Retrieved October 2016, from Archdaily: <http://www.archdaily.com/415159/opera-house-linz-terry-pawson-architects>

Terry Pawson Architects. (2013). Opera House Linz. Retrieved October 2016, from Terry Pawson Architects: <http://www.terrypawson.com/b-projects/linz.html>

Figure 5.7: Sydney Opera House. (n.d.). Joan Sutherland Theatre. Retrieved October 2016, from Sydney Opera House: [https://www.sydneyoperahouse.com/the\\_building/venues/joan\\_sutherland\\_theatre.aspx](https://www.sydneyoperahouse.com/the_building/venues/joan_sutherland_theatre.aspx)

Figure 5.8: ArchDaily. (2015). Harbin Opera House / MAD Architects. Retrieved October 2016, from ArchDaily: <http://www.archdaily.com/778933/harbin-opera-house-mad-architects>

MAD. (2015). Harbin Opera House. Retrieved October 2016, from mad: <http://www.i-mad.com/work/harbin-cultural-center/?cid=4>

Figure 5.14-5.17: ArchDaily. (2008). Oslo Opera House / Snohetta. Retrieved September 2016, from ArchDaily: <http://www.archdaily.com/440/oslo-opera-house-snohetta>

Figure 5.20: Izenour, G., Knudson, V., & Newman, R. (1977). Theatre Design. London: McGraw-Hill.

Figure 5.21: (n.d.). Retrieved September 2016, from the culture concept: <http://www.thecultureconcept.com/wp-content/uploads/2016/07/Swan-Lake-Best-1024x683.jpg>

Figure 5.22 – Figure 5.27: ArchDaily. (2011). Houston Ballet Center for Dance / Gensler. Retrieved July 2016, from ArchDaily: <http://www.archdaily.com/129307/houston-ballet-center-for-dance-gensler>

Figure 5.28 – Figure 5.32: Houston Ballet Center for Dance. (2016, July). Retrieved from Gensler: <http://www.gensler.com/projects/houston-ballet-center-for-dance>

Figure 5.33 – Figure 5.37: Bardi, L. B., Elito, E., & Corrêa, J. (1999). Teatro Oficina / Lina Bo Bardi. Lisboa: Instituto Lino Bo e P.M. Bardi.

Figure 5.38, Figure 5.39, Figure 5.41: Taylor-Foster, J. (2014). James Taylor-Foster. “Heatherwick to Transform Cape Town’s Grain Silo into Contemporary Art Museum”. Retrieved May 2016, from ArchDaily: <http://www.archdaily.com/486742/heatherwick-to-reimagine-cape-town-s-grain-silo-complex-for-the-zeitz-museum-of-contemporary-art>

Figure 5.40, Figure 5.41: Waddington, J. (2016). All you need to know about the 2016 zeitz mocaa gala. Retrieved August 2016, from ELLE South Africa: <http://www.elle.co.za/all-you-need-to-know-about-the-2016-zeitz-mocaa-gala/>

Figure 5.42: Dutch National Opera. (2016). Le Nozze di Figaro. Retrieved September 2016, from Dutch National Opera: <http://www.operaballet.nl/nl/operas/2016-2017/voorstelling/le-nozze-di-figaro>

## **Chapter 6**

Figure 6.25 – Figure 6.27: Izenour, G., Knudson, V., & Newman, R. (1977). Theatre Design. London: McGraw-Hill.



