



MASTER-/DIPLOMARBEIT

Musik- und Ballettschule in Banja Luka

Music and Ballet School in Banja Luka

ausgeführt zum Zwecke der Erlangung
des akademischen Grades eines
Diplom-Ingenieurs / Diplom-Ingenieurin
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ABSTRAKT

Banja Luka ist die zweitgrößte Stadt in Bosnien und Herzegowina und gleichzeitig die größte Stadt und das kulturelle Zentrum der Republika Srpska. Im Laufe ihrer Geschichte war sie für ihre Wertschätzung und ihren Beitrag zu Kultur und Kunst sowie für ihren starken Fokus auf die Bildung bekannt. Einer der wichtigsten Akteure der Kulturszene der Stadt ist sicherlich die Musikschule „Vlado Milosevic“, die derzeit um eine Ballettschule in ihrem Kursangebot erweitert wird.

Trotz ihrer enormen Bedeutung für die Stadt ist die Schule seit ihrer Gründung bis heute mit dem Mangel an adäquaten Bildungsräumlichkeiten konfrontiert. Dadurch wird die Qualität des dort angebotenen Unterrichts negativ beeinflusst, die Zahl der Studierenden stark begrenzt und damit der Zugang zu dieser Form der kulturellen Bildung auf wenige Interessenten beschränkt.

Die Lernbedingungen an der Musikschule während meines Besuchs persönlich miterlebt zu haben, hat die Zielsetzung dieses Projekts maßgeblich geprägt. Das Hauptaugenmerk liegt darauf, einen geeigneten Raum für verschiedene Unterrichtsformen zu schaffen, die für diese Art von Bildung erforderlich sind, sowie eine flexible Lösung zu entwickeln, die sich an die ständig ändernden Bedürfnisse der Schüler und des Lehrkörpers der Schule anpassen kann.

Darüber hinaus sollen durch die Einbeziehung des Außenraums in die Gebäudegestaltung Möglichkeiten für neuartige Unterrichtsformen geschaffen werden. Weiterhin soll das Projekt Raum für soziale Interaktion und Wissensaustausch bieten und auf diese Weise Ballett und klassische Musik den Bürgern von Banja Luka näher bringen und so die Kulturszene der Stadt weiterstärken.

ABSTRACT

Banja Luka is the second largest city in Bosnia and Herzegovina and at the same time the largest city in and the cultural center of the Republic of Srpska. Throughout its history, it has been known for its appreciation of and contribution to culture and the arts, as well as its strong emphasis on education. One of the most important contributors to the cultural scene of the city is certainly the Music school „Vlado Milosevic“, which is currently undergoing an expansion to include a ballet school in its course offerings.

Despite its enormous significance for the city, the school has faced the issue of the deficit of adequate educational premises since its grounding until the present day. In this way a negative impact on the quality of the lessons provided there is created and the number of students is strongly limited and thereby the access to this type of cultural education is narrowed to only a small amount of interested candidates.

Having personally witnessed the studying conditions in the music school during my attendance of it has to a great extent shaped the objective of this project. Its main focus lies in creating a suitable space for various forms of lessons required for this type of education, as well as developing a flexible solution that is able to adapt itself to the continuously changing needs of the students and the faculty of the school.

Furthermore, through the inclusion of the outdoor space into the building design, the possibilities for new types of classes are set to be achieved. Moreover, the project seeks to provide space for social interaction and the exchange of knowledge and in this way bring ballet and classical music closer to the citizens of Banja Luka and further strengthen the city's cultural scene.

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1. INTRODUCTION

1.1 BOSNIA AND HERZEGOVINA



Fig. 1 The position of Bosnia and Herzegovina in Europe

Bosnia and Herzegovina is a country located in the southeast of Europe in the western part of the Balkan peninsula with the population of 3.26 million inhabitants. It comprises a territory of 51 129 km², bordering with Croatia in the North, West and South, Serbia in the East and Montenegro in the South-East. The capital city is Sarajevo with around 350 000 inhabitants.

The country itself is composed of two ethnicities, Federation of Bosnia and Herzegovina consisting of the central, southern and western parts of the country and the Republic of Srpska consisting of the northern and eastern territories.

The Federation of Bosnia and Herzegovina is further divided into ten cantons. In addition, Brčko District is located in the North-East of the country and is a self-government area, which is not a part of either of the two ethnicities. However it still falls under the sovereignty of Bosnia and Herzegovina.

Due to a very heterogeneous relief, characterized by both mountains and valleys, as well as the proximity to the sea and its own short coastline, the climate in the country varies between the temperate continental climate in the North, the alpine climate in the mountain regions and the Mediterranean climate in the South.¹

1.2 THE CITY OF BANJA LUKA



Fig. 2 The position of Banja Luka in Bosnia and Herzegovina

1.2.1 GEOGRAPHICAL CHARACTERISTICS

Banja Luka is a city in the North-West of the Republic of Srpska. With an area of 1239 m² and the population of approximately 199 191 inhabitants it is its largest city and at the same time its political, financial and administrative center. The city is located in a basin 164 m above sea level and characterized by a temperate continental climate with mild winters and warm summers.

It lies on the banks of the river Vrbas and is surrounded mostly by woodlands and acre fields.² Numerous green spaces are one of Banja Luka's most well-known characteristics, they include multiple parks, green avenues and recreational areas, both on the banks of Vrbas and on the nearby hills.



Fig. 3 The map of the city

1.2.2 HISTORY OF BANJA LUKA

The first historical traces

The oldest archaeological findings on the territory of today's city can be dated back to the Paleolithic era and contain tools and weapons made of stone. Furthermore, the remains of houses made of wooden construction and mud and ceramics point to the existence of an Eneolithic settlement in this area.³

Banja Luka during the Roman period

The Roman settlements on the territory of today's Banja Luka date to the first years of the Common Era. Their origin was a fortress „Castrum“ around which a civil settlement was also formed. A Roman road connecting the current territories of cities Split and Gradiska passed through the settlement increasing its importance in that period. The Romans also discovered the thermal springs near the city and their therapeutic potential. After the fall of the Roman Empire, the area was being populated by Slavic tribes. The city was first mentioned under its current name in 1494.⁴ The aforementioned fortress from the Roman period is a vital part of the city's life even today, hosting numerous concerts, festivals and various cultural events.



Fig. 4 Ferhadija Mosque



Fig. 5 Houses from the Ottoman period



Fig. 6 Kastel Fortress



Fig. 7 The main Street in the Austro-Hungarian period



Fig. 8 Realgymnasium in Banja Luka



Fig. 9 The city train station

Banja Luka during the Ottoman Empire

Banja Luka became a part of the Ottoman Empire in 1528. The period from 1579. until 1587. is marked by rapid development of the town through the efforts of Ferhad pasa Sokolovic. It was a time of financial and cultural expansion and trade played a significant role in this process. In this period, 216 public buildings, as well as numerous bridges over the Vrbas river were built. The remains of the oriental architecture of this time can still be seen in certain parts of the city. One of the most famous buildings of the Ottoman period is the Ferhadija mosque, which was destroyed during the civil war and rebuilt afterward.⁵

Banja Luka during the Austro-Hungarian Empire

In 1878 the governance of the Austro-Hungarian Empire over Banja Luka began. Consequently, an economic expansion takes place and the city becomes a craft and an industrial center. The development started with a mill, a brewery, a brick factory and a textile factory being built in a Monastery at the edge of the city and furtherly continued with the construction of a hydropower plant, and industrial plants for food production. At the same time roads and bridges were being constructed.

ors were developed with the city's first Realgymnasium being grounded in 1895. Attention was also paid to nature in the city, resulting in green alleys and boulevards Banja Luka is known for to this day.⁶

Banja Luka during the Kingdom of Yugoslavia

After the end of the Austro-Hungarian governance in Bosnia and Herzegovina, the country and consequently also, Banja Luka became a part of the Kingdom of Yugoslavia, resulting in a strong cultural development of the city. At this time, Banja Luka was known for its progressive youth and female movements, as well as for trade unions. Significant public institutions such as the National Theatre, Banski Dvor Cultural Center, Palace of the Republic and the Building of the City Administration were all constructed during this time period.⁷

Banja Luka from the Socialist Federal Republic of Yugoslavia until the present day

The process of industrialization in the second half of the 20th century was a catalyst for an

intensive urban development of the city which ended with the breakup of Yugoslavia.

This process of urbanization was characterized by homogenous urban zones, with administrative and cultural functions being located in the center of the city, public services in its residential parts and the industry at the outskirts of the city.⁸

However, in 1969. Banja Luka was struck by a destructive earthquake, which has completely demolished or severely damaged numerous educational, health and industrial premises, as well as residential buildings. The monument „Krivi Sat“ at the center of the city serves as a reminder of this occurrence. In the process of rebuilding following the destruction, most of the city obtained its current-day appearance and significant collective residential complexes were built. Furthermore, the building housing today's Museum of the Republic of Srpska and the Library was built, as well as the Gymnasium, and the Boska Shopping Mall, all of which are the symbols of the city. In 1975. with the establishment of the University of Banja Luka further development of the educational sector is achieved.⁹



Fig. 10 Banski Dvor Cultural Center



Fig. 11 Collective residential complex



Fig. 12 Boska Shopping Mall



Fig. 13 University of Banja Luka



Fig. 14 „Krivi sat“ Monument



Fig. 15 Banja Luka today

1.2.3 MUSICAL AND BALLET TRADITION IN BOSNIA AND HERZEGOVINA

The history of music in Bosnia and Herzegovina is a direct reflection of numerous political and social changes throughout its history and is therefore a testimony of the different states and the development of its society. In this sense, the following periods can be distinguished: ancient music, music in the medieval Bosnia, music during the Ottoman period, music during the Austro-Hungarian governance, music between the world wars, music between 1945 and 1992 and music from 1992 to the present day.¹⁰

The musical tradition in Bosnia and Herzegovina can be traced back to the antic times, with archaeological artifacts such as a tube made of a bone with holes in it, witnessing the existence of musical instruments in this period.

In medieval Bosnia music was present in religious ceremonies, as well as on the court. During this period music was exclusive to the elite and less accessible to common people.

The records about the musical development in Bosnia during the rule of the Ottoman Empire are scarce. However, there are writings stating that every third city in Bosnia in this time had military musicians and military music of this time had a significant influence on future Bosnian music.



Fig. 16 Sarajevo Philharmonic Orchestra in 1932

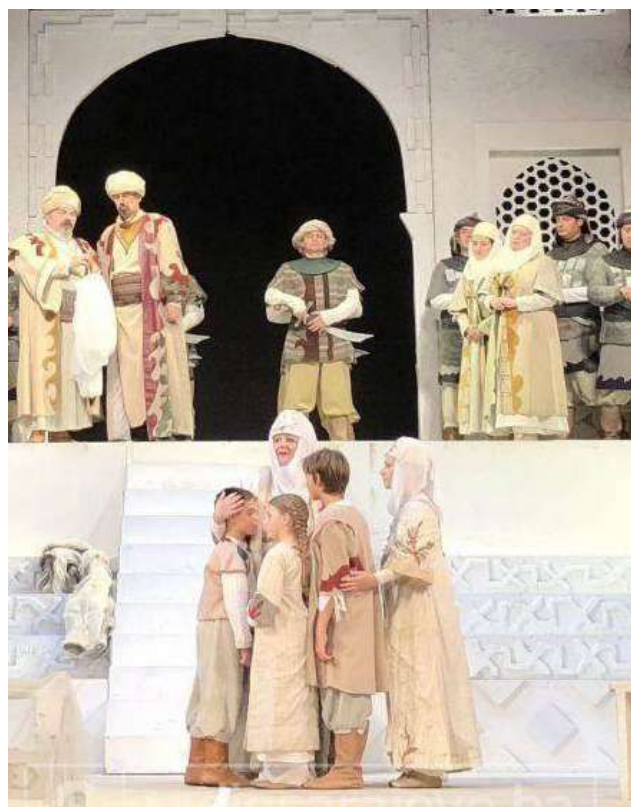


Fig. 17 „Hasanaginica“, the first Bosnian Opera



Fig. 18 The National Theatre in Sarajevo

In this period, one of the most famous musical forms in Bosnia, „sevdalinka“ was born. At the same time, Christian religious music was undergoing its further development and Bosnian music was enriched by the elements of the Osmanic and Jewish cultures.

During the Austro-Hungarian rule in Bosnia and Herzegovina, the music becomes more connected to the institutions, theaters were being opened and the first public concert was held in 1881. in Sarajevo. A significant role in this period belongs to the numerous singing clubs being grounded at this time, which served not only as catalysts of the cultural expansion, but were also political instruments used for strengthening the national consciousness.

The period between the two world wars was particularly important for the development of music in Bosnia and Herzegovina. With the grounding of the National Theatre in Sarajevo in 1920. the performance practice comes to life, and numerous plays and concerts are held there. Soon after, in 1923. the Sarajevo Philharmonic Orchestra was grounded.

After the Second World War the development continued with the 70s and the 80s being the most important years in the 20th century when it comes to musical and cultural development. This time was characterized by a high number of composers resulting in a variety of original works

from this period.¹¹ Ballet is a relatively new art form in Bosnia and Herzegovina, which is currently undergoing an intensive expansion in different cities of the country.

The beginnings of ballet tradition in Bosnia can be traced back to its capital Sarajevo, which is still the only city with a professional ballet studio, as a part of the National Theatre. The Sarajevo Ballet was grounded in 1946. and its first performance was held on the 25th of May 1950, where the first Bosnian Ballet piece „Zetva“ was performed.

This Ballet consisting of three acts and inspired by folklore elements from different parts of the country marks the beginning of the ballet tradition in Bosnia and Herzegovina.¹²

Nowadays, the expansion of this art form can be seen in the grounding of Ballet schools in various cities, including Banja Luka. As none of these cities have professional ballet studios yet, it is precisely these schools that will play the crucial role in the further development and popularization of this dance form in Bosnia and Herzegovina.



Fig. 19 „Zetva“, the first Bosnian Ballet

2. SITE ANALYSIS

2.1 ART SCHOOL „VLADO MILOSEVIC“

The art school Vlado Milosevic consists of a music school and a ballet school. It was founded in 1934 in Banja Luka. In addition to teaching activities, the school is also involved in the organization of competitions, workshops and concerts and works in close cooperation with the cultural centers in the city. This makes it an important source of inspiration for the local and regional art and culture scene.

The need for sufficient and adequate workspaces has shaped the existence of the music school from its foundation to the present day. Today's school building used to be part of a construction company and was then made available to the music school. The classrooms were created by redesigning the property,

but most of them do not meet modern requirements. An insufficient number of rooms, inflexible design and unsatisfactory acoustic conditions are just some of the problems that negatively affect students and lessons.

However, the biggest challenge for the school at the moment is the lack of space, which severely limits the number of students that can be accommodated. In an attempt to solve this problem, part of the teaching takes place in the premises of an elementary school in the city. This often leads to misunderstandings, delays and complicated scheduling. In addition to this, the necessary premises for successful school operation, such as a sports hall and reading rooms do not exist at the moment.



Fig. 20 The biggest concert hall in the school



Fig. 21 Ballet classroom



Fig. 22 The Art School „Vlado Milosevic“

2.2 BUILDING SITE: POSITION IN THE CITY AND CURRENT STATE

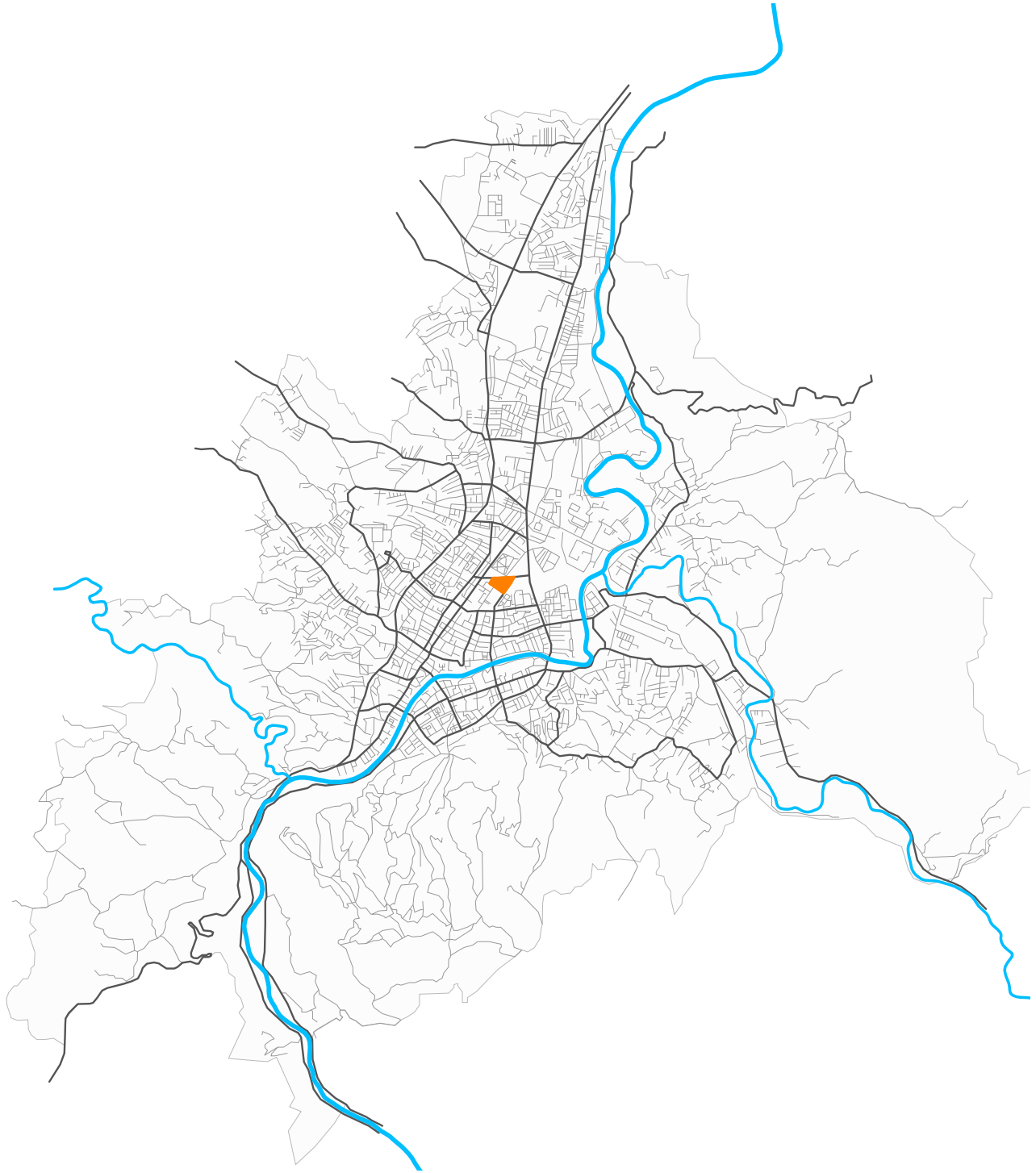


Fig. 23 The position of the building site in the city

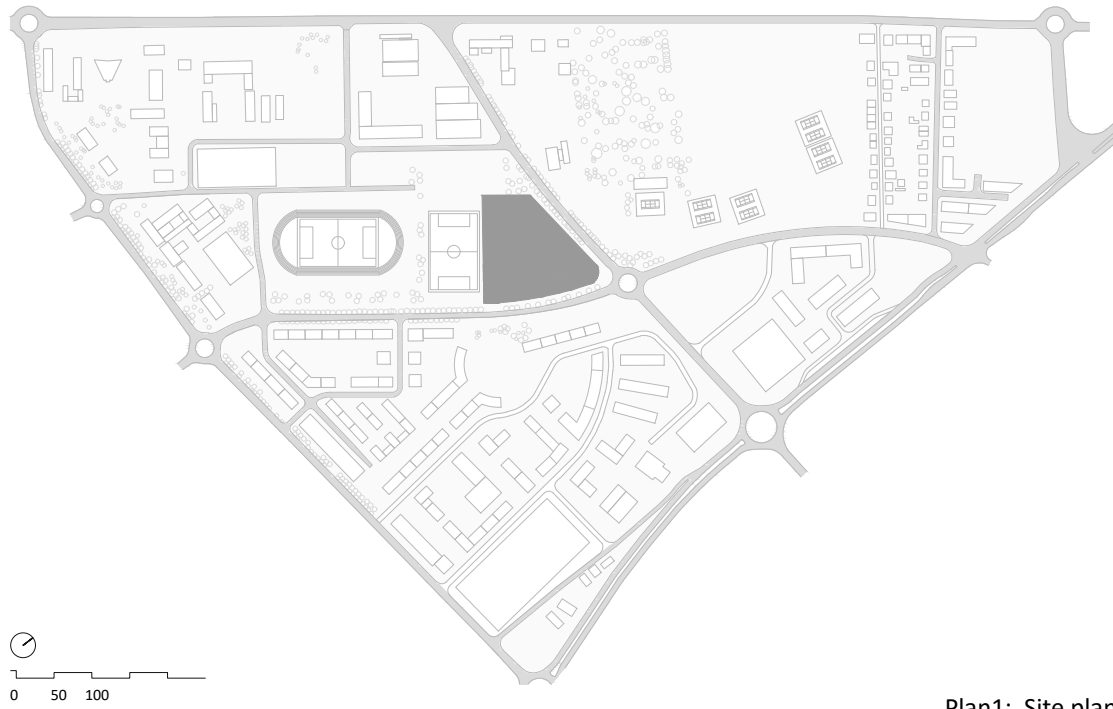


Fig. 24 Building site



Fig. 25 Building site

2.3 SITE PLAN



Plan1: Site plan

2.4 ANALYSIS OF THE SITE SURROUNDINGS: TRAFFIC

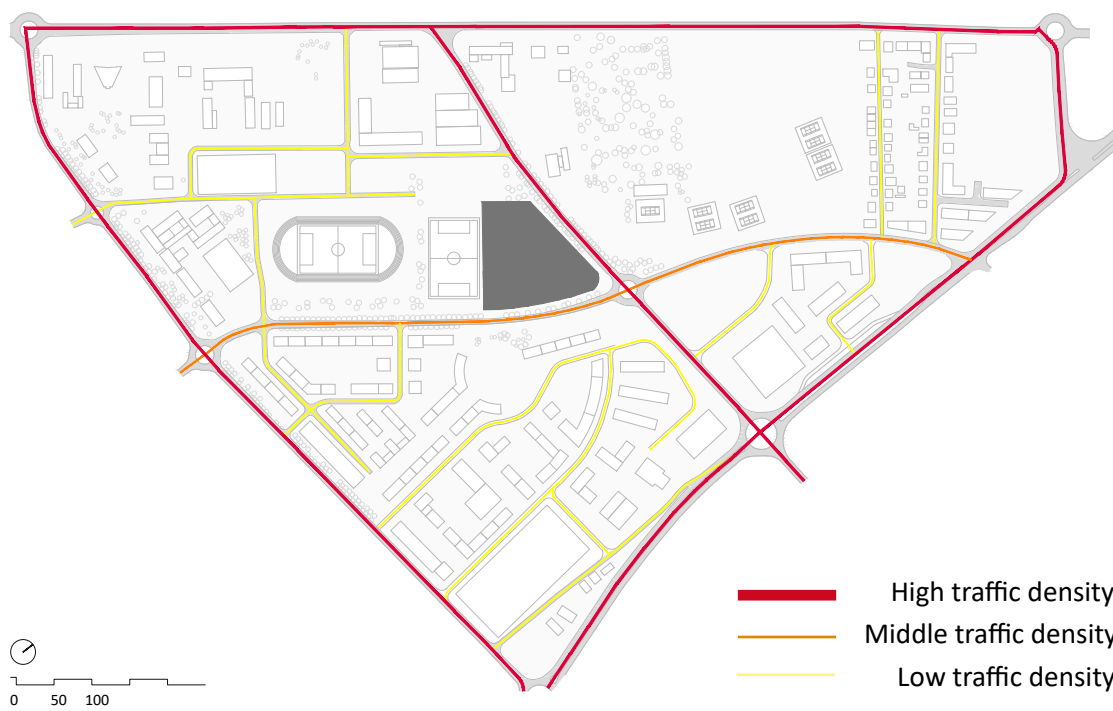


Fig. 26 Roads and traffic density

3. PROJECT GOALS

The existing art school in Banja Luka has been undergoing an expansion in the recent few years. While in the past classical music and ballet have been seen as a sort of elite art forms only understood and attended by a small number of people, through various workshops and events this picture has been rapidly changing. Consequently the interest in attending the school has been on a constant rise among the inhabitants of Banja Luka.

The main objective of this project therefore is to provide a space which is not only suitable for this kind of a development, but also plays an active role in it. Since the nature of music and dance lessons is very dynamic and the group sizes are often changing, it was important to provide flexible spaces, able to adapt themselves to the changing needs of the students. Furthermore, in addition to learning and practicing rooms, it was important to also create more informal spaces which allow the exchange of the knowledge and experiences between students in a different type of setting.

Moreover, through the placement of certain contents and lessons in the outdoor space a connection of the school and its students with their surroundings should be achieved. This displacement has the goal of making the school more open and inviting to the citizens of Banja Luka.

In conclusion, the focus of the project lies in creating a Music and Ballet School which on one side fulfills the technical requirements that exist for this type of educational institutions today and on the other side provides a dynamic learning space which will bring classical music and ballet closer to the inhabitants of the city.

4. METHODOLOGY

4.1 SCHOOL TYPOLOGY AND ROOM REQUIREMENTS

Our society's perception of learning in the recent years has been constantly changing and evolving, bringing with it new challenges and requirements for school design. Modern schools provide space for different ways and perspectives on learning, allowing for learning types that used to be considered secondary in the past to establish themselves in the contemporary school system.

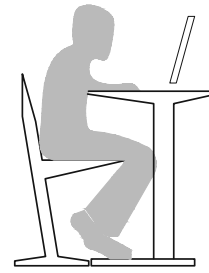


Fig.27 Self-teaching

Strictly frontal teaching method has seen a decline in relevance, as individual and group studying, as well as the individualization of learning have proven to be very effective ways for students to gather and retain knowledge. Furthermore, as the method of informal learning continues to gain significance, spaces which allow for an uncomplicated change between different types of activities such as presentations, individual or group work and instruction are needed.

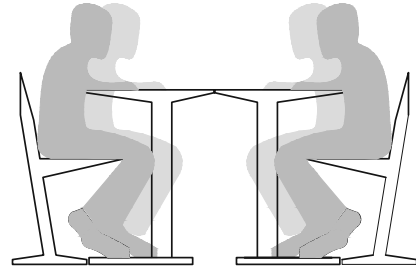


Fig.28 Small group learning

With the development of the concept of All-day Schools, there was a transformation of previous perspective regarding schools as strictly educational facilities to the new point of view, recognizing them as places of various activities in addition to learning. Consequently, the importance of social and rest areas is the design of school buildings has increased.

As a result of above mentioned processes, contemporary schools can be seen as „houses of learning“ focusing on being as diversely used as

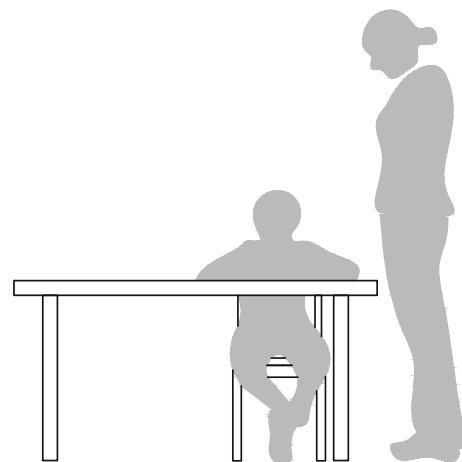


Fig.29 Individual teaching

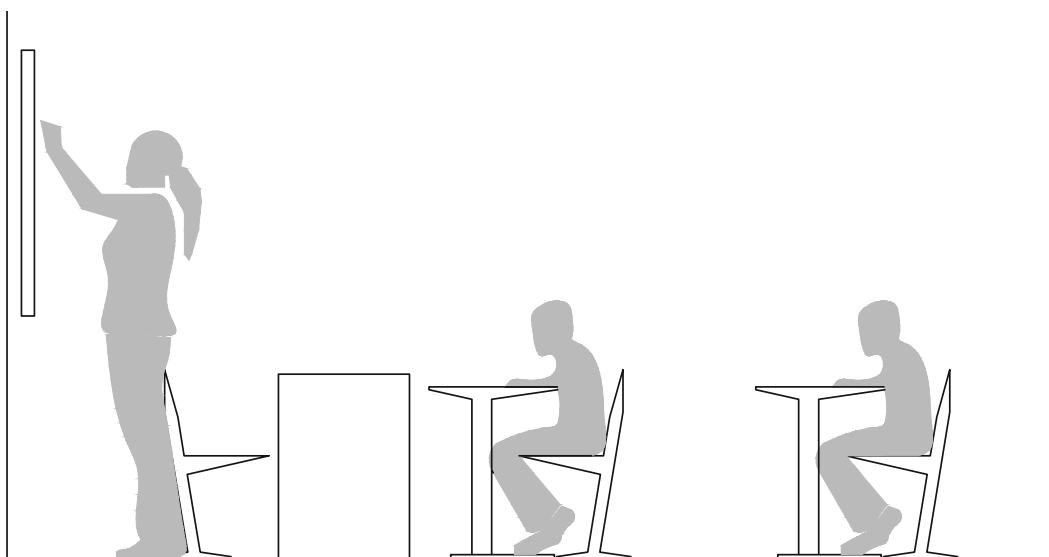


Fig.30 Frontal Teaching

possible. Among others, the results of this development include a less strict division between teaching and social spaces, as well as between learning and circulation spaces.¹³

Commonly, the room program of a school can be divided into following categories:

- general learning and teaching space
- specialized learning and teaching space
- common areas
- team and staff areas
- further functional areas

The organization of the above mentioned space can follow the principles of a number of different models, some of which include:

- an additive model-with separate functional areas
- partially integrated model- with functional areas integrated in general learning and teaching spaces
- integrated model- various functional areas are a part of a learning landscape
- classroom plus model- additional area is provided for classrooms, often through moveable walls
- cluster model- more classrooms are grouped around a certain area
- open landscape model- open spaces which can contain other functional areas inside¹⁴

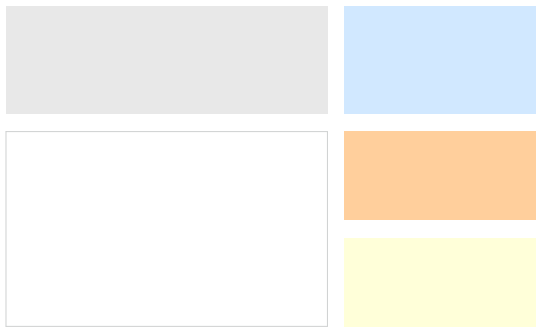


Fig.31 Additive model

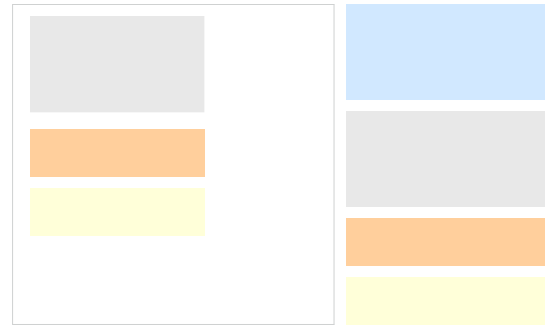


Fig.32 Partially integrated model

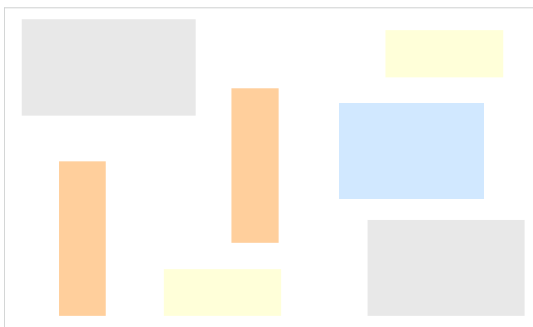


Fig.33 Integrated model

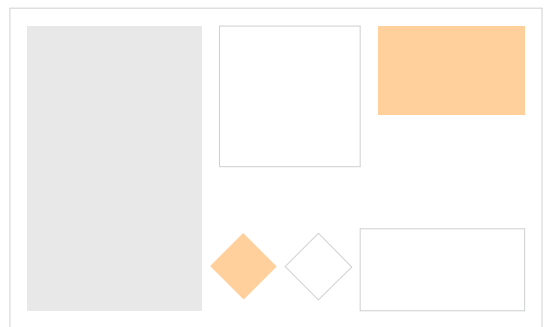


Fig.34 Open landscape model

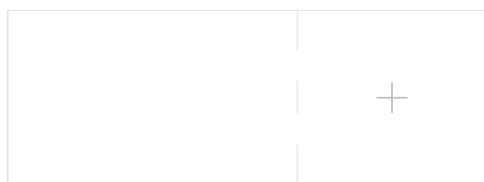


Fig.35 Classroom plus model

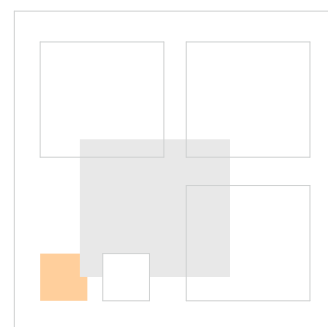


Fig.36 Cluster model

4.2 MOVEMENT ANALYSIS BY RUDOLF LABAN

Rudolf Laban was a dance artist, choreographer and dance theorist, who is considered to be one of the founders of modern dance in Europe. Some of his most notable achievements include Labanotation, a system of dance notation still used today and choreology, the research of the art of movement. His philosophy was grounded on the belief that dance should be made available to everyone.¹⁵

An essential part of Laban's movement analysis are the scales which provide a language to describe and analyze human movement. The term Laban scales refers to a „series of directions, creating pathways through space around the body, as if one were in the center of a crystalline solid. The center of the body always faces the Forward Middle direction while one moves the body along the subsequent directions of the selected Scale, generally led by one of the arms, thus connecting all directions of the Scale through movement“.¹⁶

Depending on the shape of the solid we can differentiate between a Diagonal scale of a cube, where the movement occurs along the diagonals of the solid, Dimensional scale of an octahedron, where the lines connect the vertices of the body, and Axis, Girdle, Primary and A and B scales of an icosahedron.

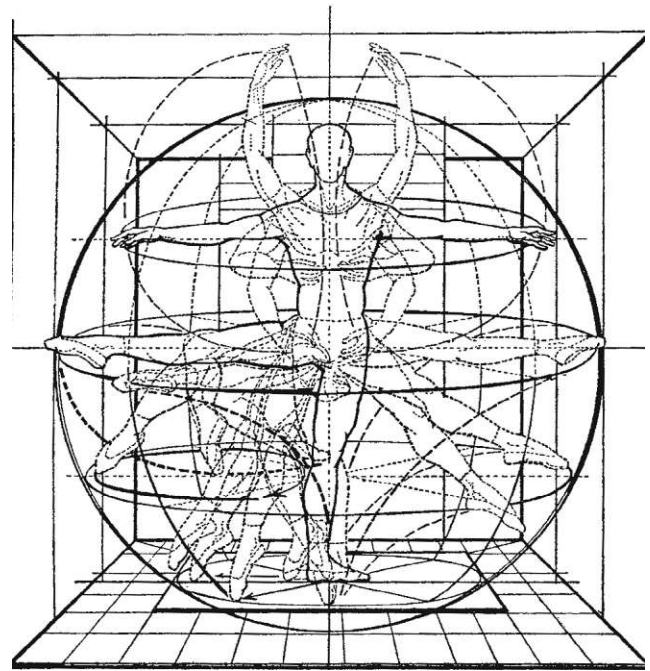


Fig.37 Rudolf Laban's Kinesphere

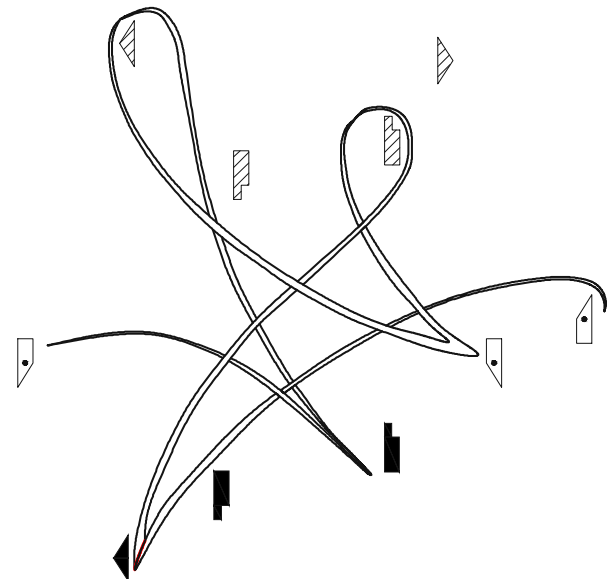


Fig.38 Notated movement along the A scale

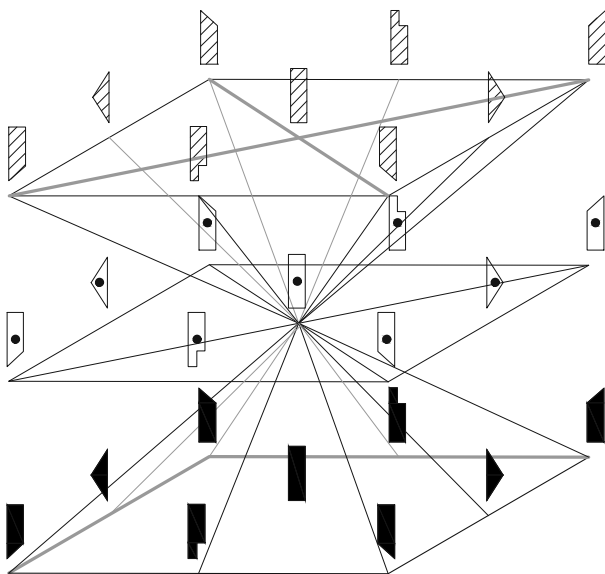


Fig.39 Directional symbols of points in Laban's cube

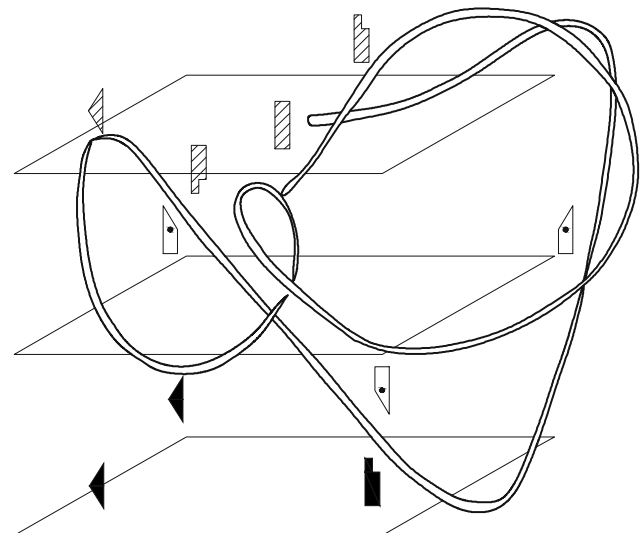


Fig.40 Three-dimensional movement along the A scale

4.3 CONCEPT

The concept of the building form is based on the following of the movement of a dancer's body along the Laban's A scale.

The floor plan was generated by connecting the points marking single movements along the horizontal pathway of the scale while the vertical

movement of the dancer is reflected through the sloping of the roof and vertical positions of the terraces.

In this sense the entire building can be seen as a reflection of a dance movement.

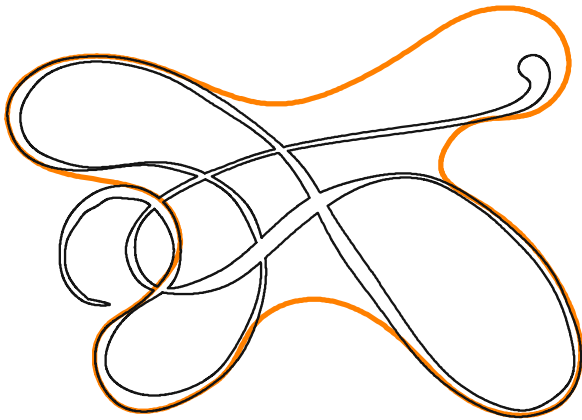


Fig.41 Horizontal Pathway along the A Scale



Fig.42 Vertical Pathway along the A Scale

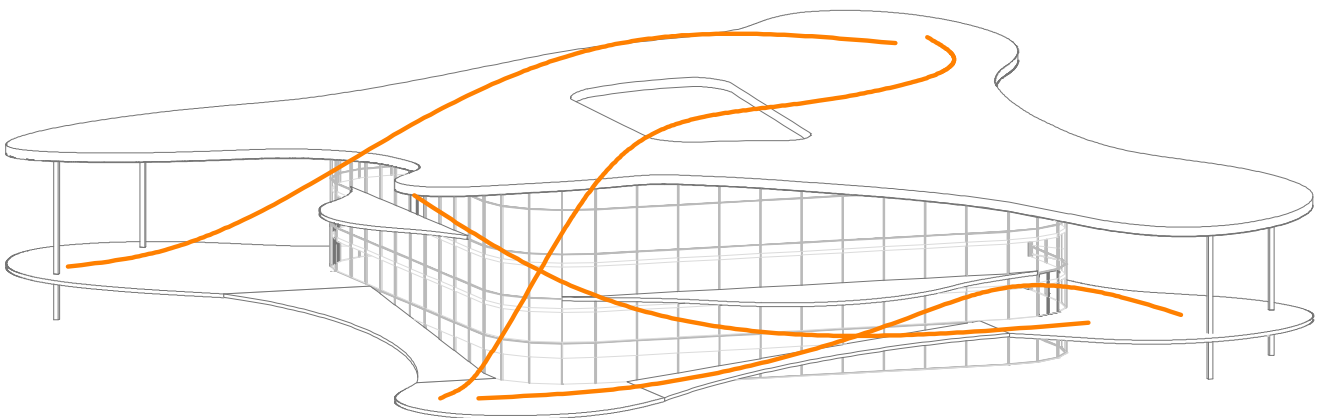


Fig.43 Vertical Pathway along the A Scale in the building

4.4 FORM DEVELOPMENT

1. Variant

The outline of the building follows the boundary of the building site. The shape of the terraces varies in different floors to enable suitable lighting in different levels.

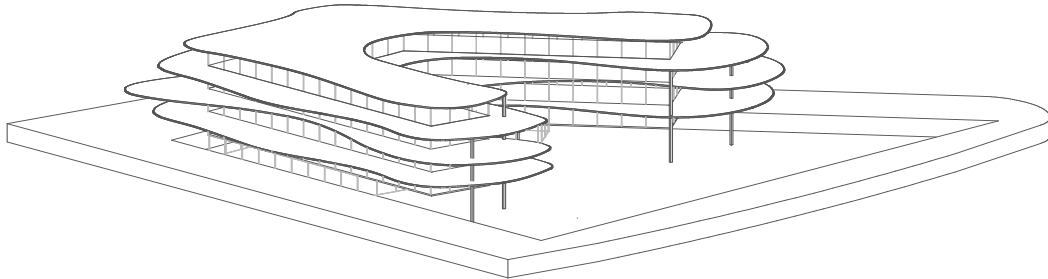


Fig.44 Form Variant 1

2. Variant

The Inner space of the building is located in the middle and surrounded by the terraces in every floor. The shape of the terraces differs floorwise and reduces in size in higher levels.

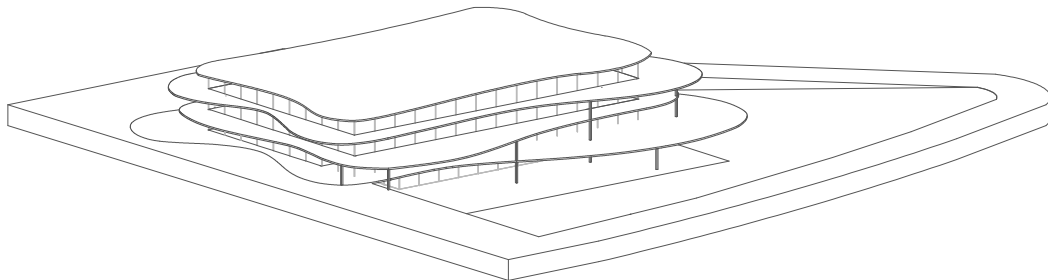


Fig.45 Form Variant 2

3. Variant

The floor plan of the terrace in the 1. floor is based on the movement scale of Rudolf Laban. The roof follows the scale in the vertical dimension. The learning and teaching spaces are located in the middle.

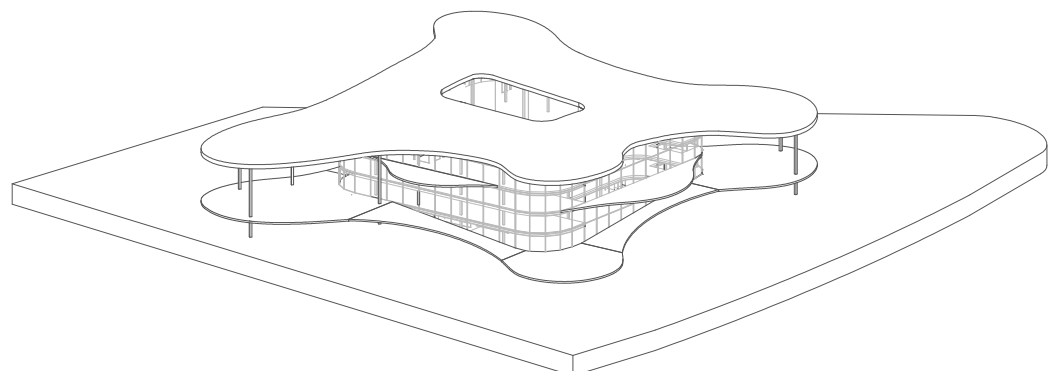


Fig.46 Form Variant 3

4.5 FORM FINDING

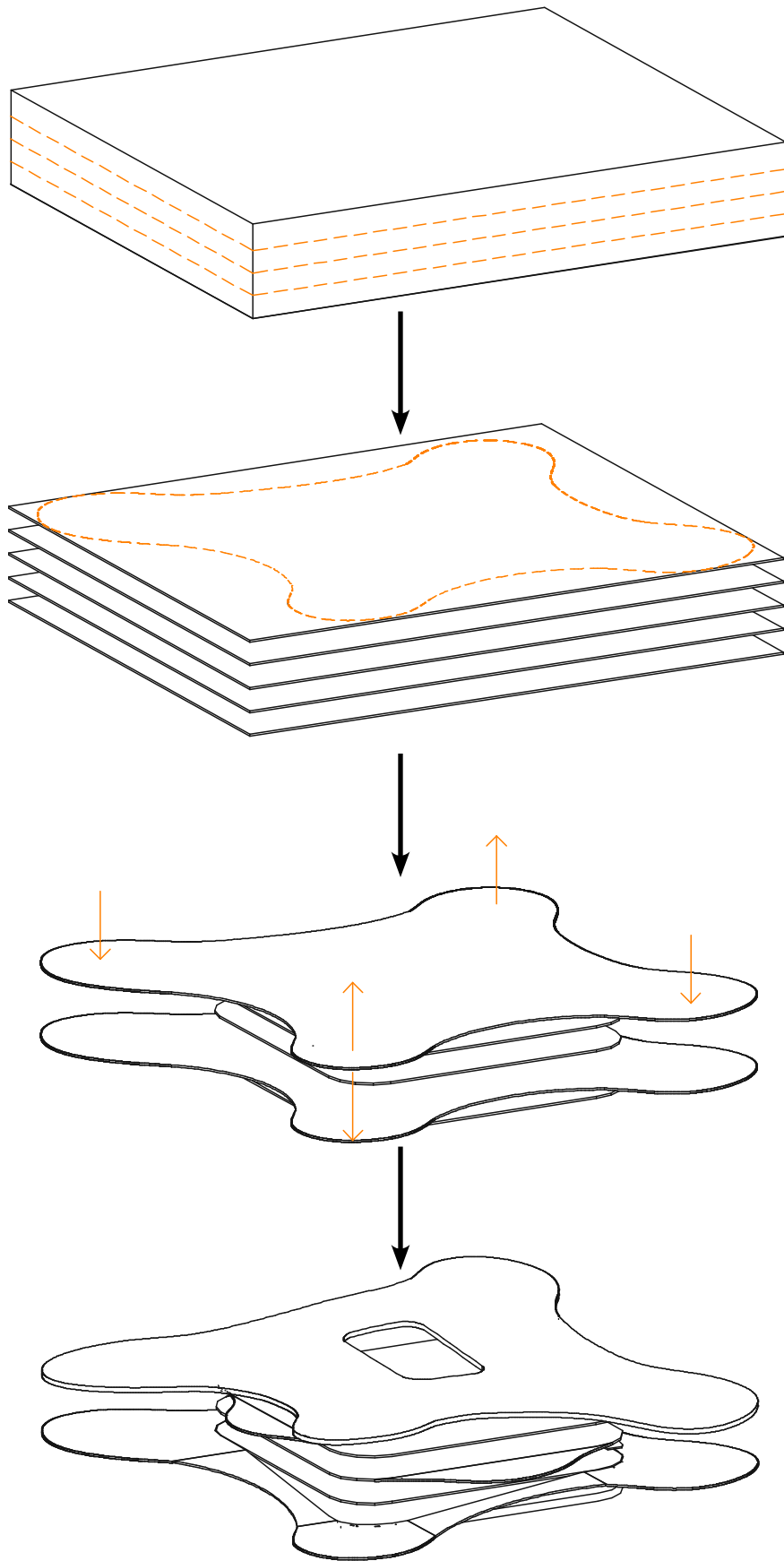


Fig.47 Form genesis

4.6 ROOM PROGRAM

Offices and Administrative rooms

Principal Office
 Secretariat and Administration
 Teacher's room
 Meeting room
 Librarian Office

Library

Learning Spaces

Classrooms
 Practice Rooms
 Free Dancing Area
 Free Study Area

Social and Pause Areas

Support rooms

Technical Rooms
 Archive
 Storage Room
 Garbage Room

Concert Hall

Circulation Spaces

Sanitary Rooms

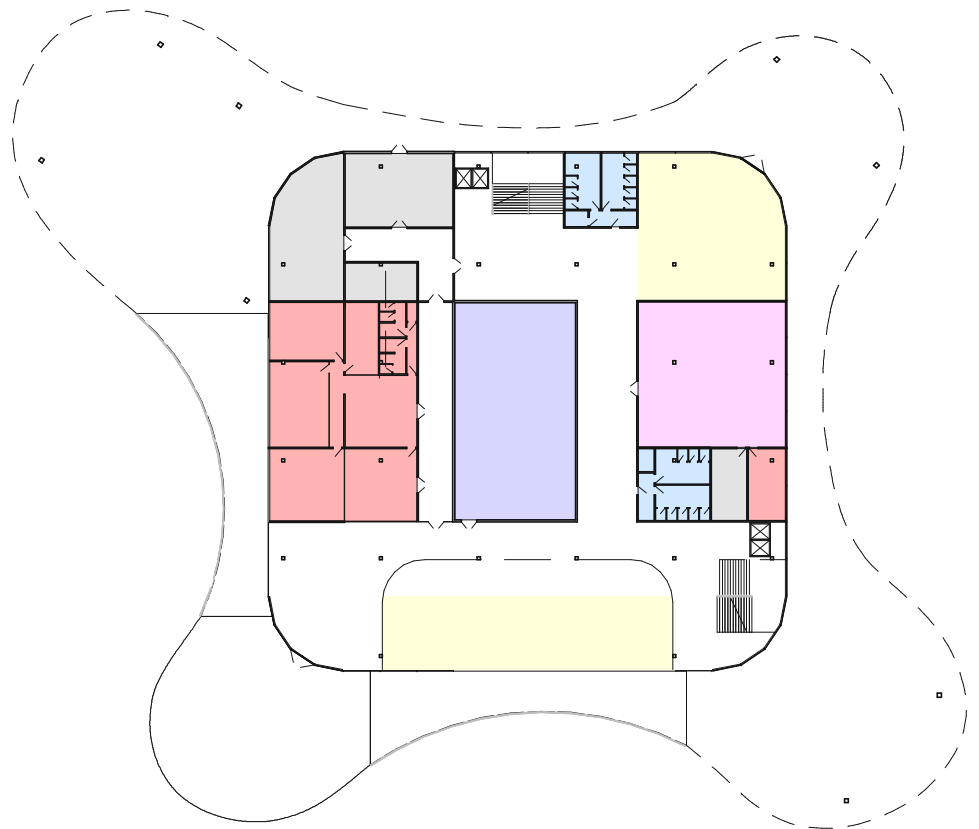


Fig.48 Room Program Ground Floor

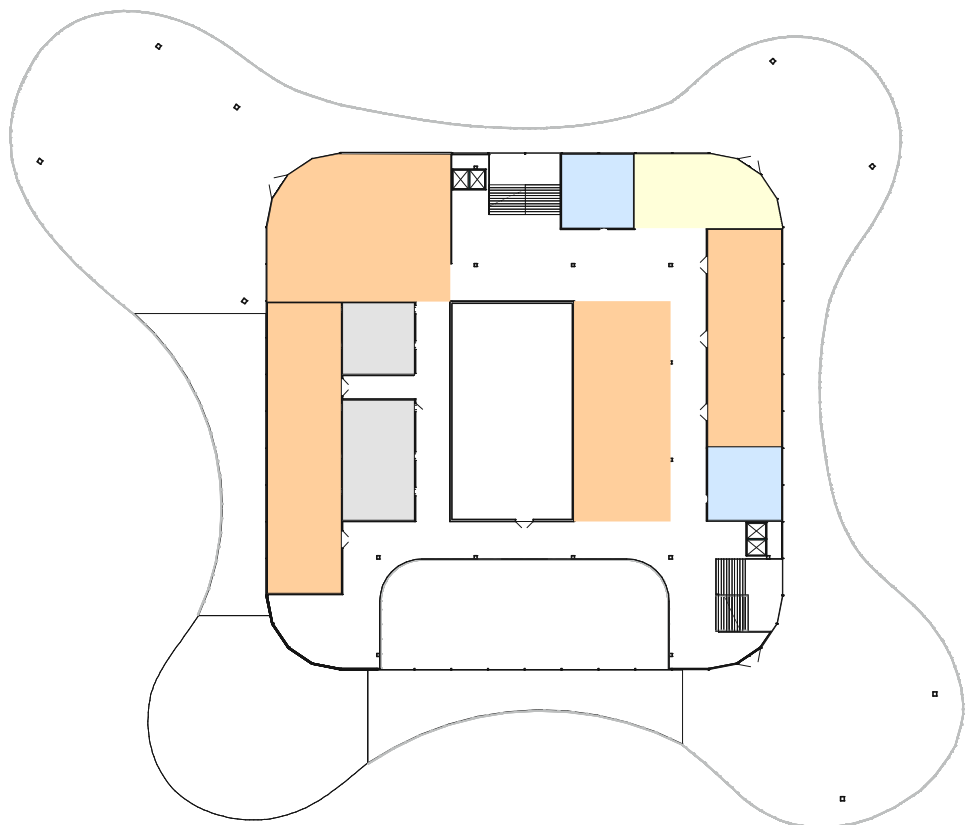


Fig. 49 Room Program 1. Floor

Offices and
Administrative rooms

Principal Office
Secretariat and
Administration
Teacher's room
Meeting room
Librarian Office

Library

Learning Spaces

Classrooms
Practice Rooms
Free Dancing Area
Free Study Area

Social and Pause Areas

Support rooms

Technical Rooms
Archive
Storage Room
Garbage Room

Concert Hall

Circulation Spaces

Sanitary Rooms

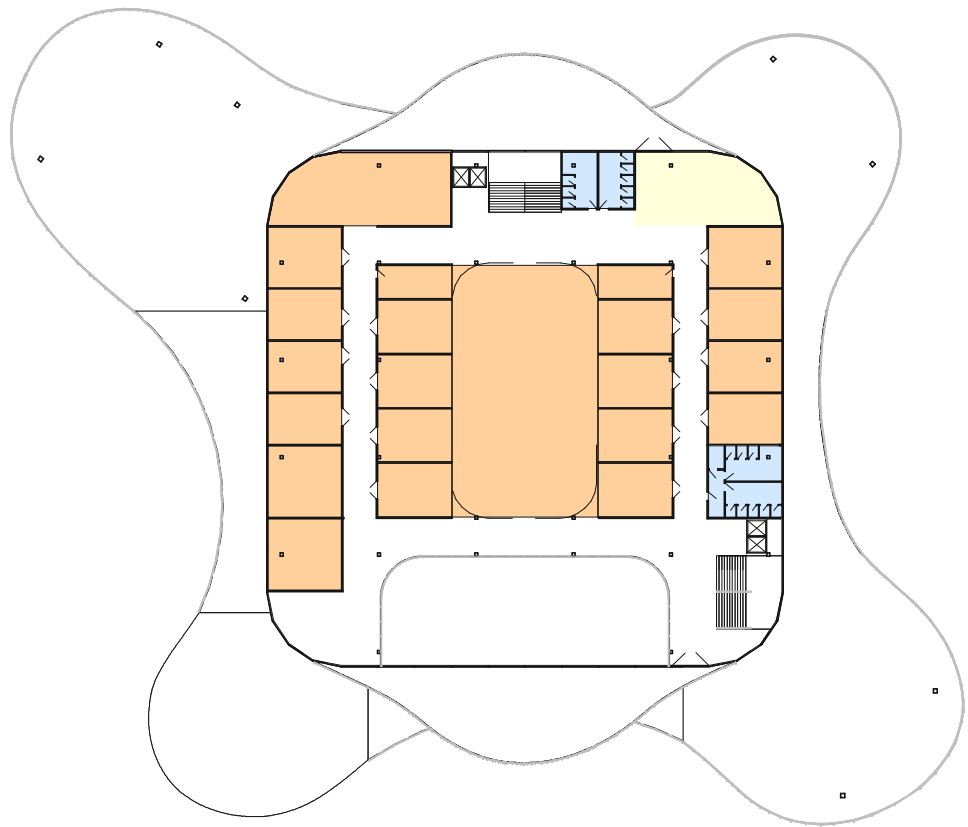


Fig.50 Room Program 2. Floor

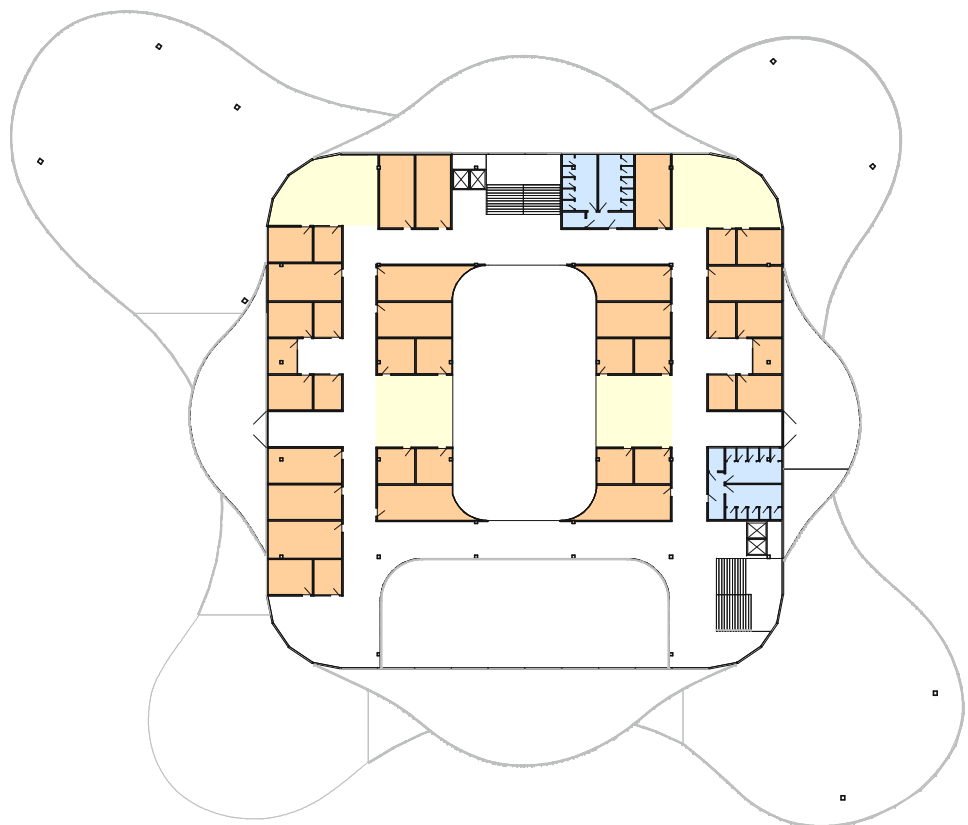


Fig. 51 Room Program 3. Floor

4.7 STATIC CONCEPT

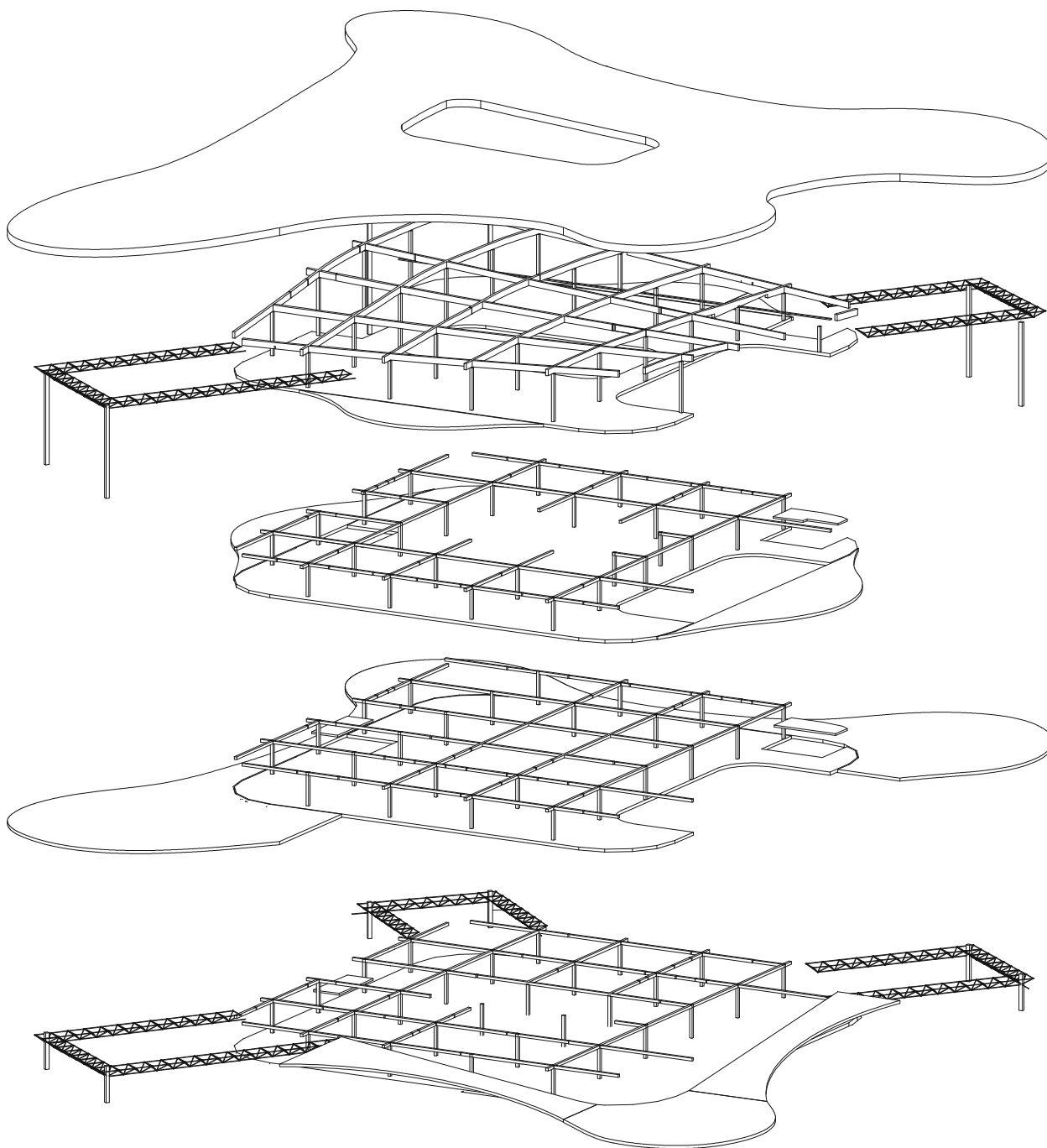


Fig. 52 Axonometry of the static system

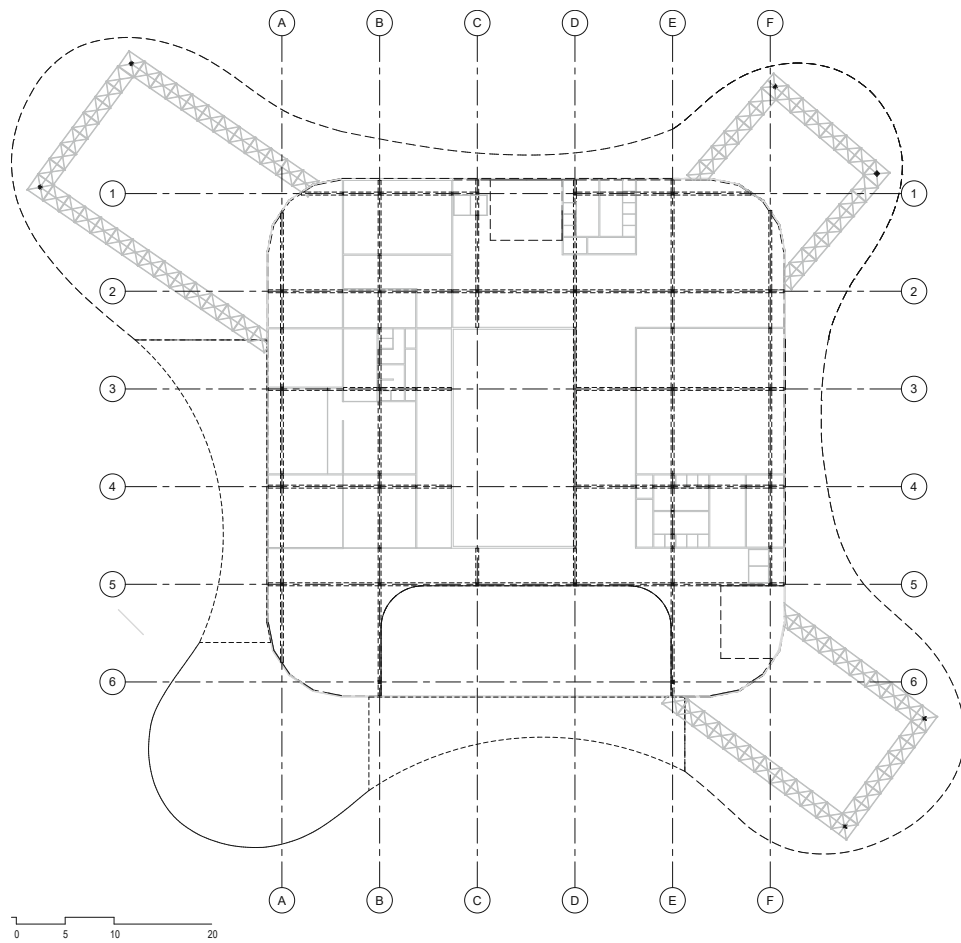


Fig. 53 Static concept Ground Floor

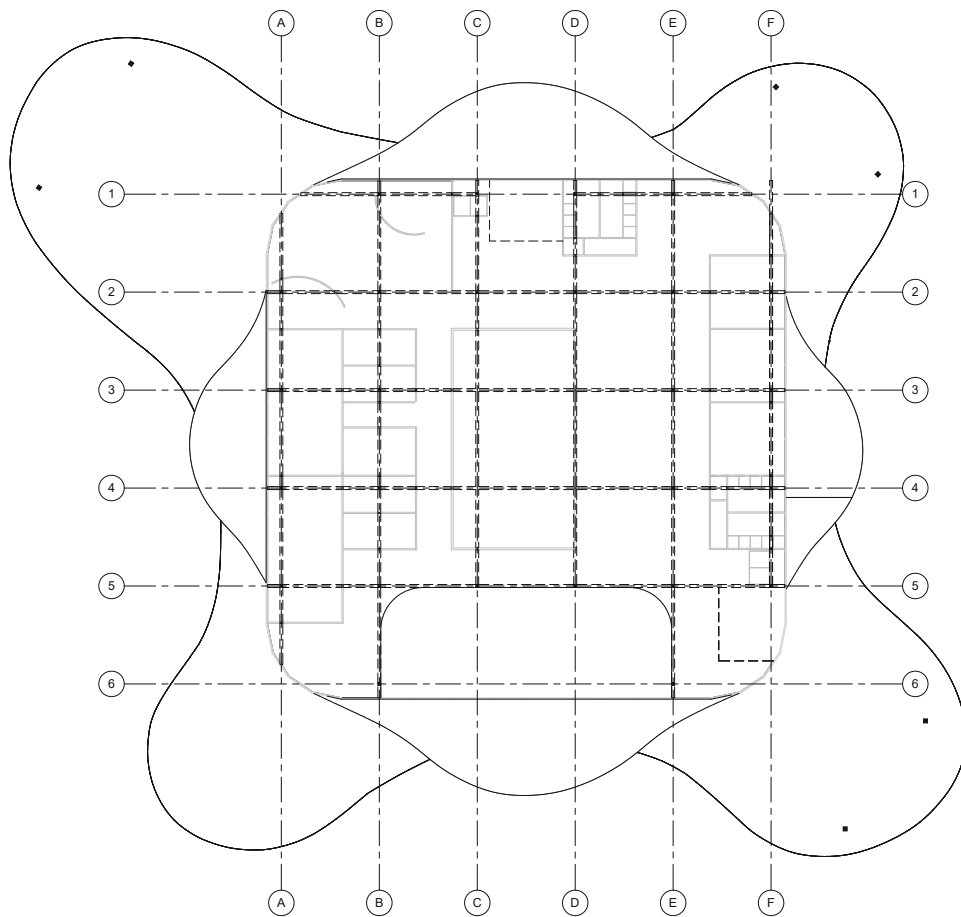


Fig. 54 Static concept 1. Floor

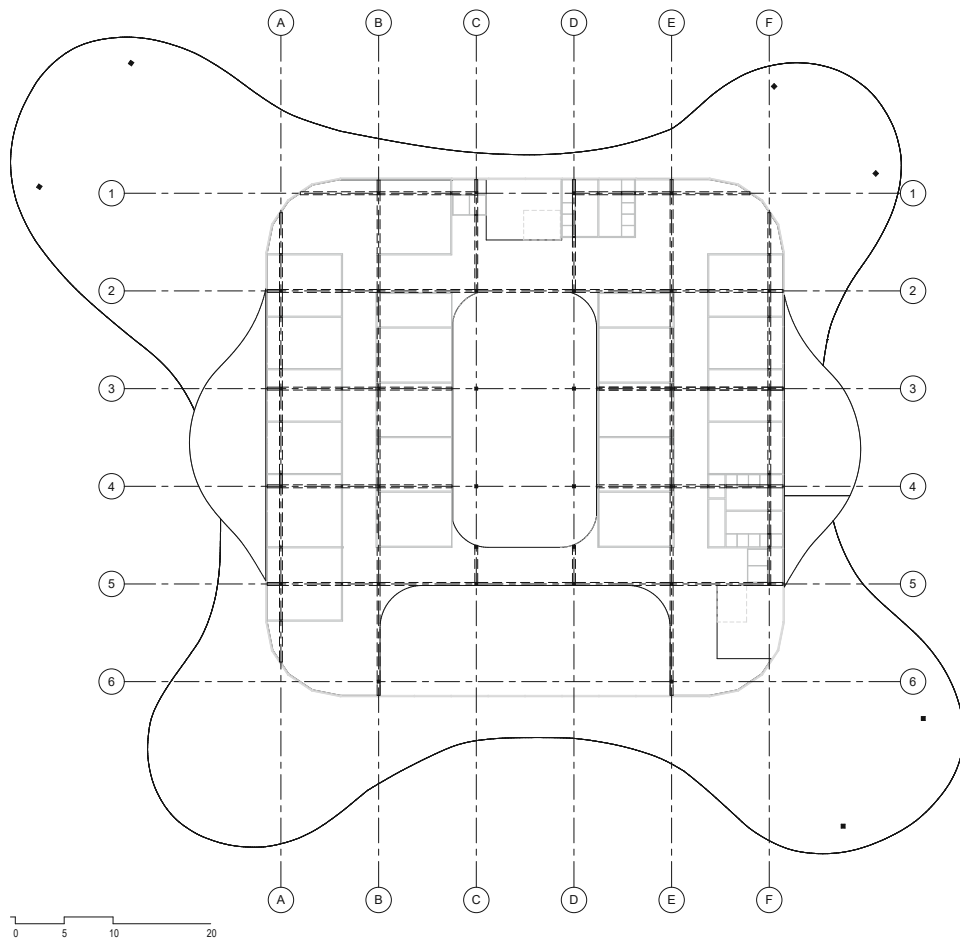


Fig. 55 Static concept 2. Floor

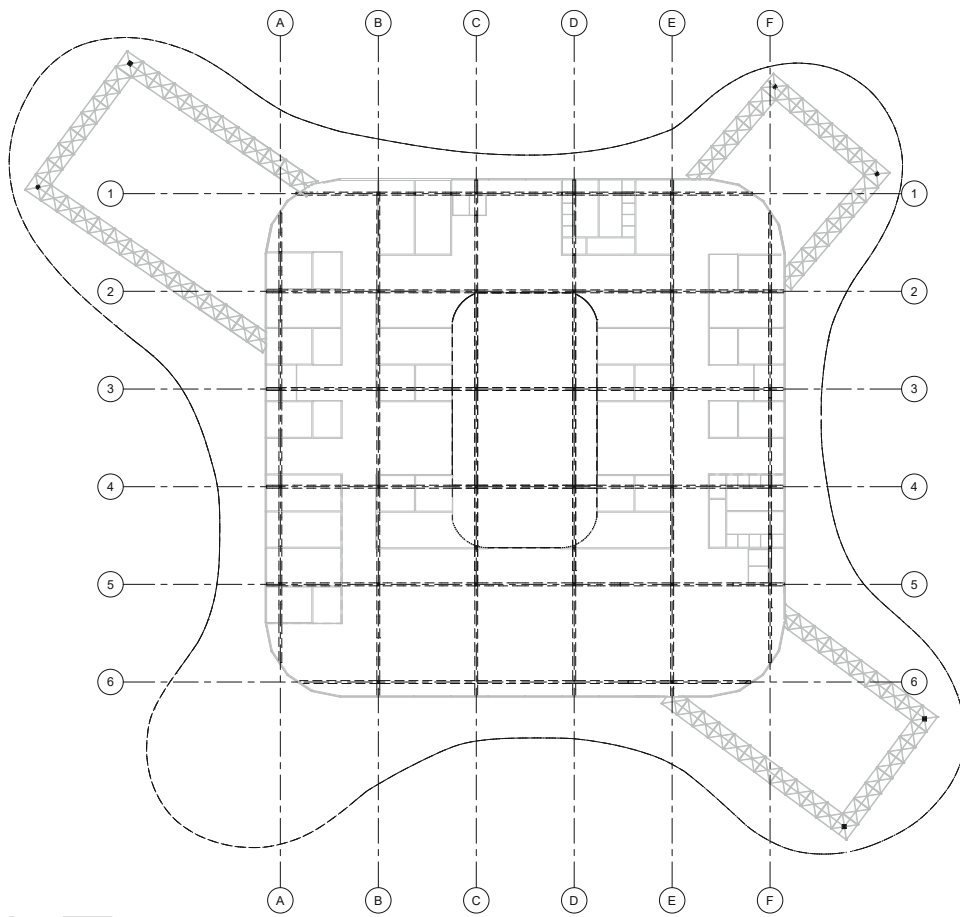


Fig. 56 Static concept 3. Floor

4.8 SOLAR SHADING

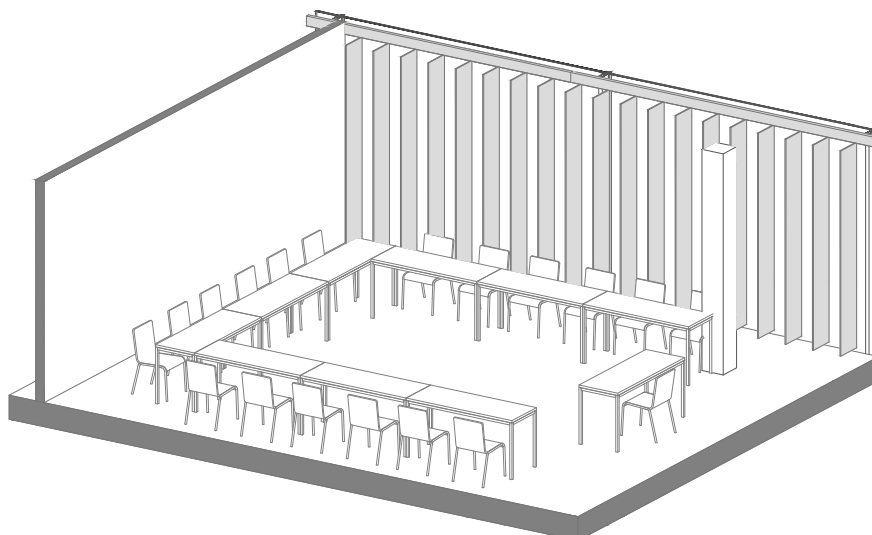


Fig. 57 Light conditions in a classroom with open blinds

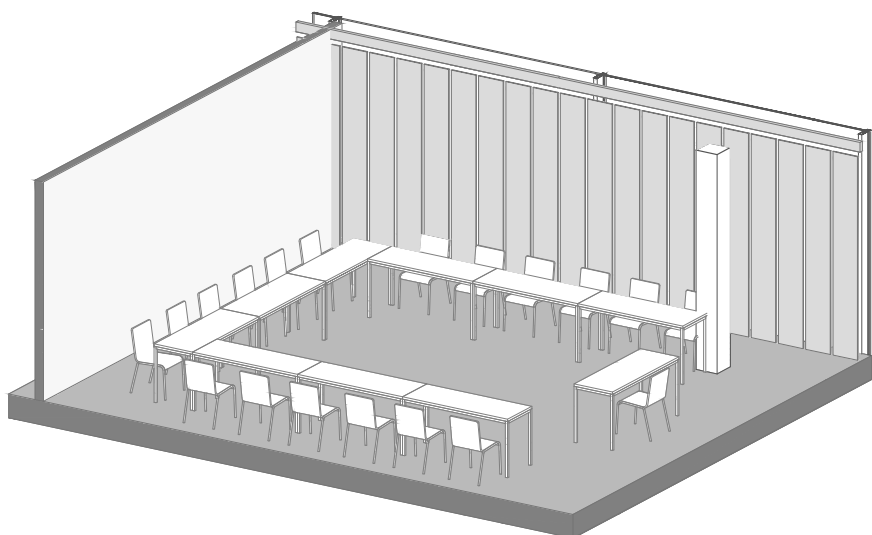


Fig. 58 Light conditions in a classroom with closed blinds

Due to the fact that the majority of the building shell consists of the curtain wall facade, resulting in large glass surfaces with a potential for overheating, a solar shading system is required in order to enable the comfortable and undisturbed use of the school.

Solar shading has the objective of minimizing heat gain and the glare effect during sunny days, enabling the even diffusion of natural light in contrast to the direct light rays falling on light-colored surfaces and allowing the view through the glass surfaces to be as unaltered as possible.¹⁷

When deciding on the type of solar shading, a distinction was made between the learning and working spaces inside of the school and the social and informal spaces as these two categories have diverse sunlight requirements due to the differences in their functions.

4.8.1 Solar shading in classrooms and offices

The control of the incoming sunlight in classrooms and offices is achieved through the vertical blinds. This system was chosen because it enables quick and individual control of the lighting conditions in the room. They are easily operated and well-suited for the shading of the large glass surfaces. An additional benefit of this system is that it does not require additional maintenance and is easily replaced when damaged.

Furthermore, through the adjustments of the stripe angles, various lighting situations can be achieved depending on the needs of the class. In contrast to some other types of shading, vertical blinds do not darken the room unless they are fully closed and when fully open they allow an uninterrupted view of the outside space.

4.8.2 Solar shading in social and informal spaces

In social areas and informal spaces the shading is achieved through a green facade. This system was chosen due to its numerous practical and ecological advantages, as well as a visual connection to the nature.

Advantages of Green Facades

Green Facades are a concept whose relevance has been steadily increasing during the last decade due to its various positive effects, both on the building on which they are installed, as well as on their surrounding.

They offer multiple benefits including the reduction of urban temperatures, better temperature regulation inside of the building, they can remove air pollutants and with a specific choice of plants improve the biodiversity in the area. Furthermore, the noise coming from the surroundings is also reduced by this facade type, which is especially significant for a music and ballet school.

In addition to ecological improvements, significant enhancements in the quality of the user's experience of the building can be noted, as green facades increase the sense of well-being, improve creativity and productivity and have positive effects on human health.¹⁸

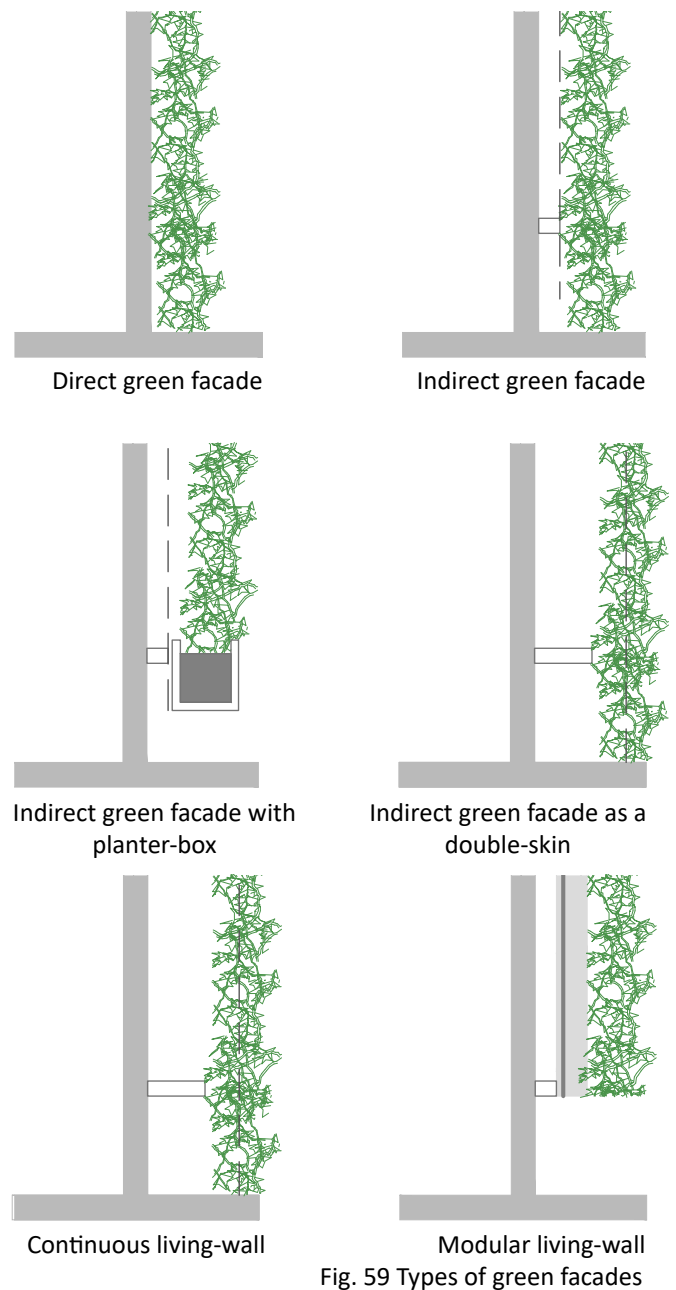


Fig. 59 Types of green facades

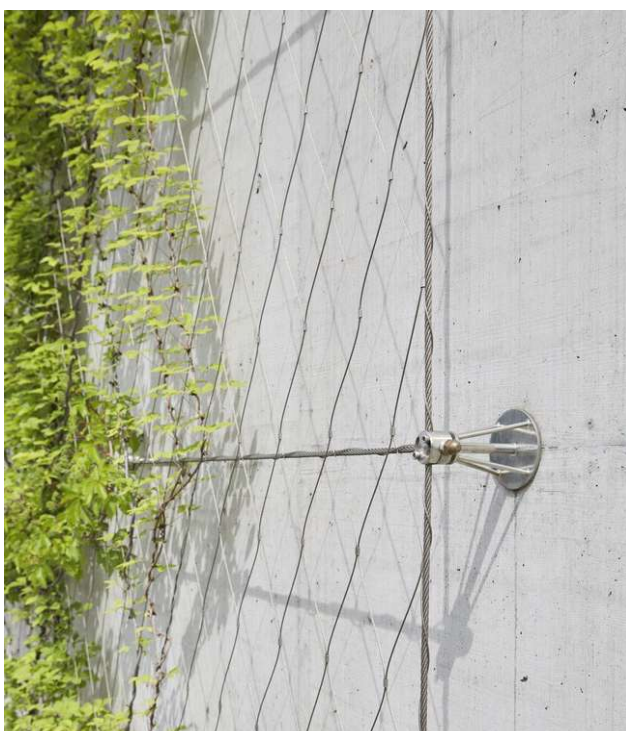


Fig. 60 Indirect Green Facade System

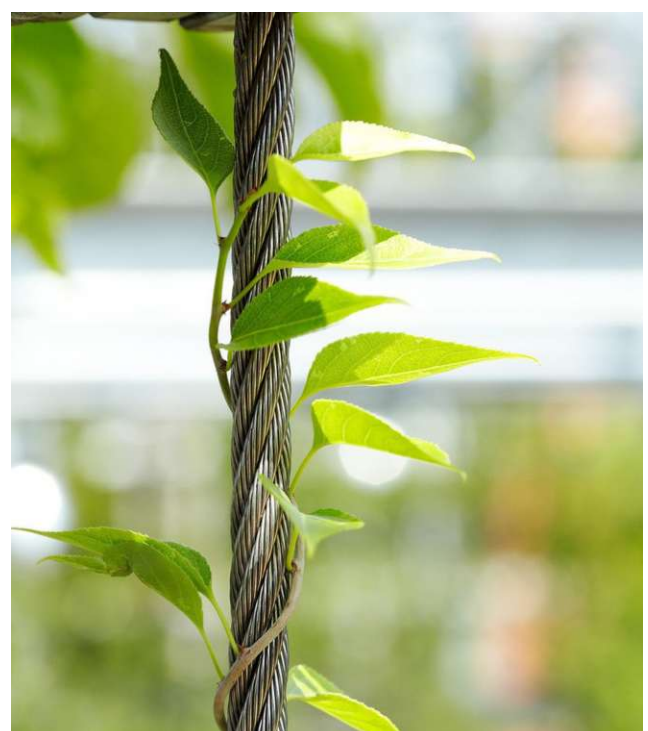


Fig. 61 Plant guides in an indirect system

An additional advantage of the green facades is that they are light and easy to install and work in a way of supporting the natural development of the plants. They can be further divided into direct and indirect facades. In direct systems the plants are attached directly to the wall, whereas an additional supporting system is needed for the indirect systems, consisting mainly of tensile cables and grids as guides.

The grids have a function of creating a gap between the facade and the plants, providing structure for the plants to grow and keeping them from falling, as well as increasing the resistance against snow wind and similar weather elements.¹⁹

In the project, the green facade is used in social and informal spaces to provide protection from the direct sunlight and the connection to the nature. It will also have positive effects on the well-being of the students, creating a relaxed and welcoming atmosphere while allowing enough sunlight to enter the building.

The natural process of the changing of the plant leaves throughout the seasons creates a dynamic facade which has a different appearance during different times of the year. In summer the leaves prevent overheating and provide natural cooling of the building, whereas the reduction in quantity or complete absence of leaves in winter allows the maximal amount of warmth from the sun to be absorbed by the building.

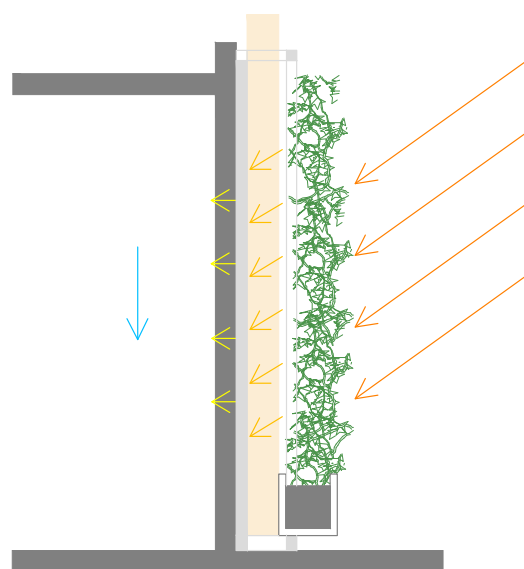
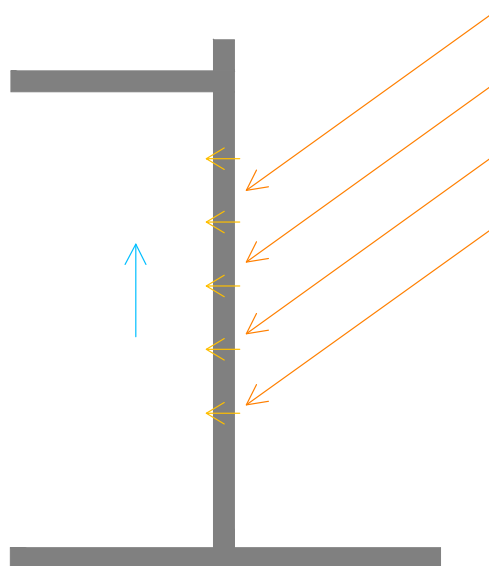


Fig. 62 Thermal regulation through green facades

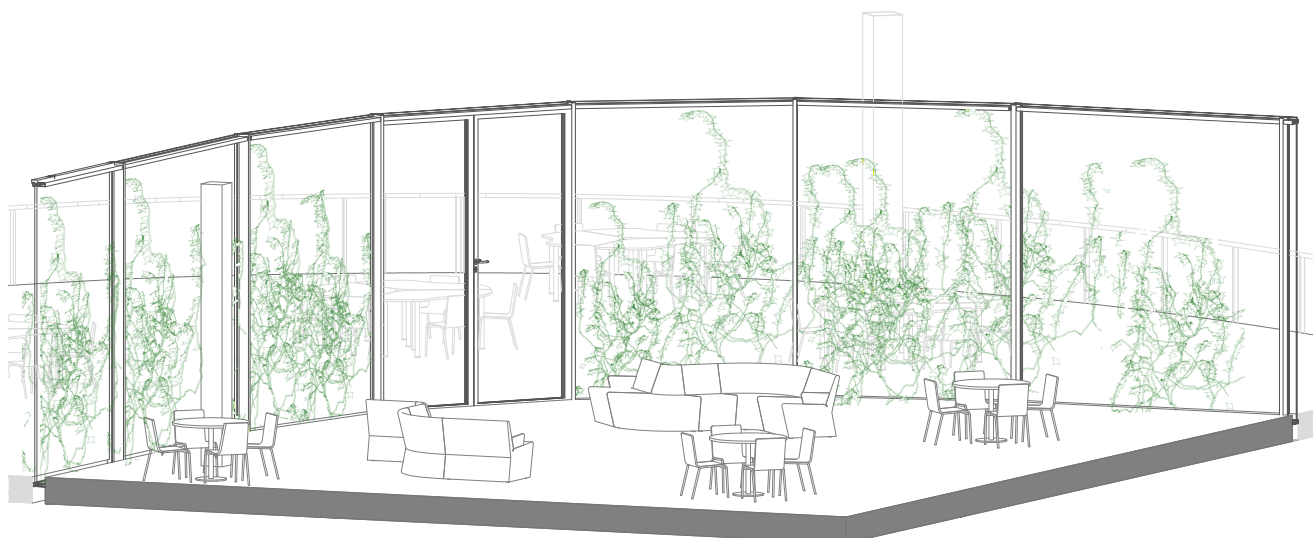


Fig. 63 Example of solar shading in a social area

4.9.1 Open space classrooms

It is well known that teaching and learning spaces have a great effect on the students' productivity and class participation. While the standard classroom model might still be best suited for certain types of lessons, there are multiple subjects and forms of learning that might benefit from more flexible rooms, where students are able to choose the type of place they will sit in based on their tasks and activities in the given lesson.

Especially the quality of classes which require greater communication between the lecturers and the attendees, as well as between the students themselves can be enhanced by this type of spaces.

While the standard classroom model is based on an almost linear communication where all attention is directed towards the lecturer, flexible rooms encourage cooperation and communication between the students and peer-to-peer learning. Furthermore, the communication between the lecturer and the students becomes less linear and classes with higher pupil participation are created.

Moreover, different people have different styles of learning. Flexible classrooms allow for every individual to adjust their learning space in order to reach the highest level of comfort and productivity. As a single lecture can have different space requirements depending on the topics it is dealing with, the flexible spaces

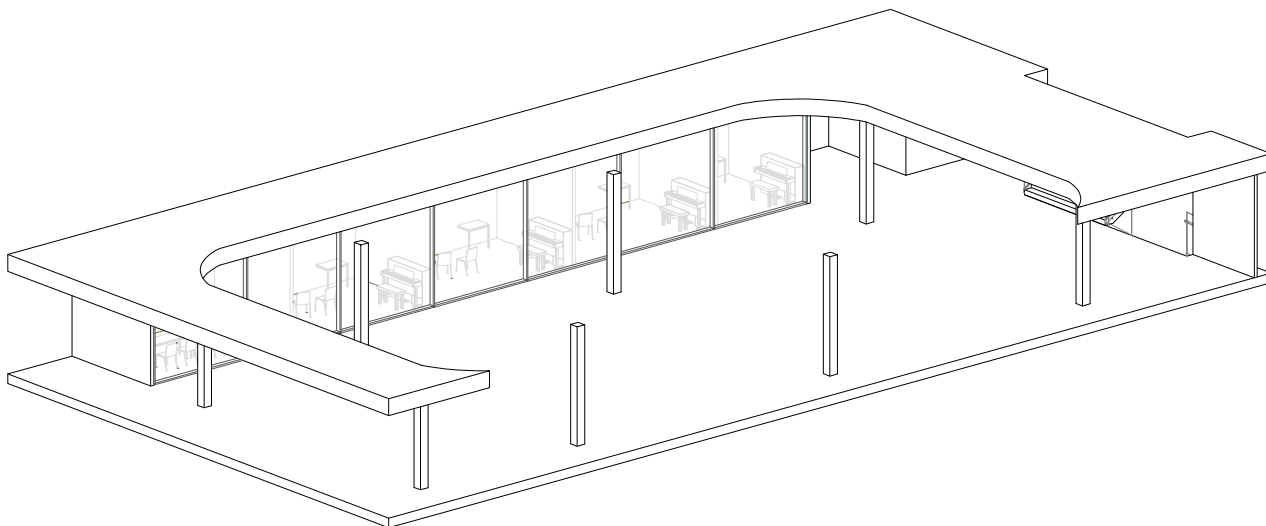


Fig. 64 Open space classroom

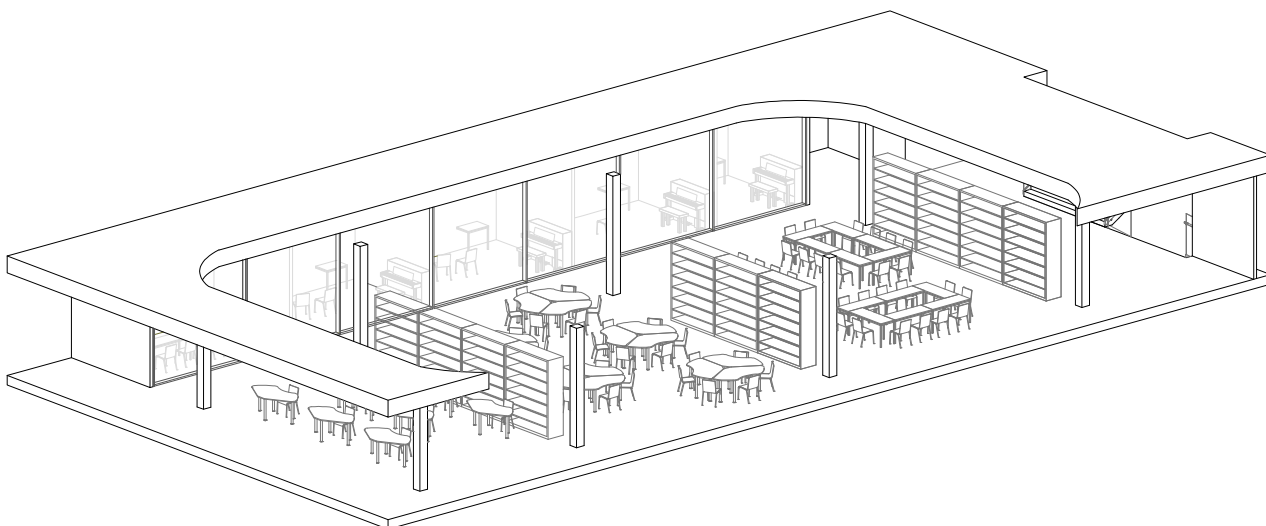


Fig. 65 Division by the type of lessons

accommodate the changing needs that arise, as they can be made suitable for the majority of learning forms, including big groups, smaller groups, pair work, individual work and the mixture of the abovementioned cases.²⁰

In the project, two large open space classrooms are planned, one in the first and the other one in the second floor. These spaces are not enclosed by walls, their outlines are merely implied by the furniture. In this way they are connected to the surrounding circulation and social spaces. Depending on the student's needs, they can be arranged in a way to provide space for individual and group work, as well as for large lectures.

4.9.2 Flexibility through moveable walls

The third floor of the school is meant to provide

spaces for individual and group music lessons, as well as practice rooms. However the necessity of these rooms changes on the daily basis. Depending on the day numerous single practice rooms can be needed and less rooms for large group lessons, and vice versa.

For this reason, the assemblage of the classrooms in this floor is organized in such a way that, through the rearranging of moveable walls bigger classrooms can be created out of smaller practice rooms in a quick and effective way.

For this purpose, moveable walls with acoustic finish coverings need to be used in order to preserve the necessary acoustic properties of the classrooms.

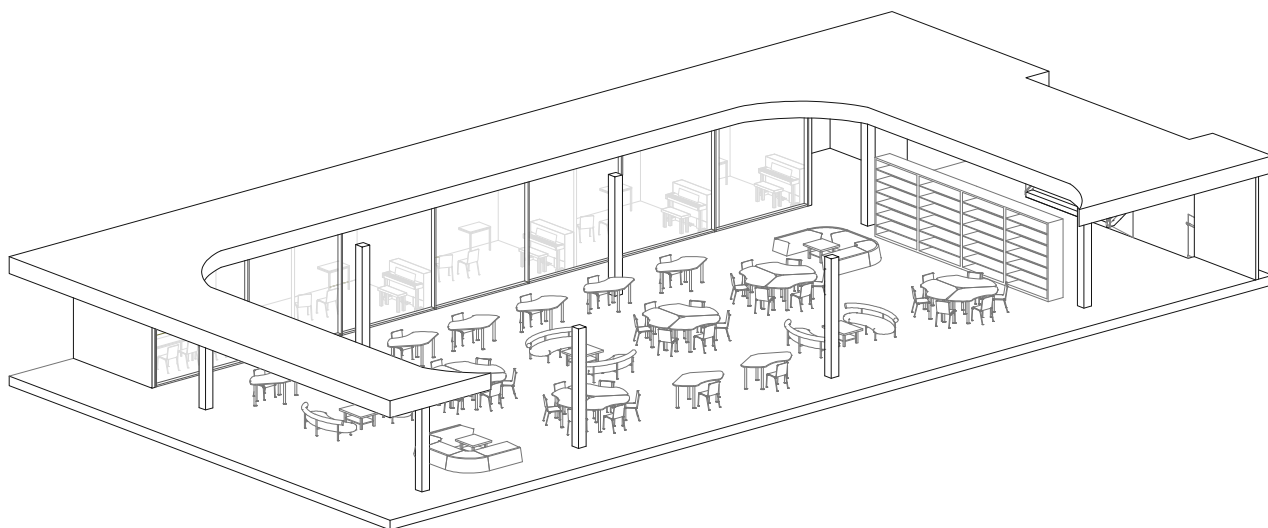


Fig. 66 Mixed types of learning

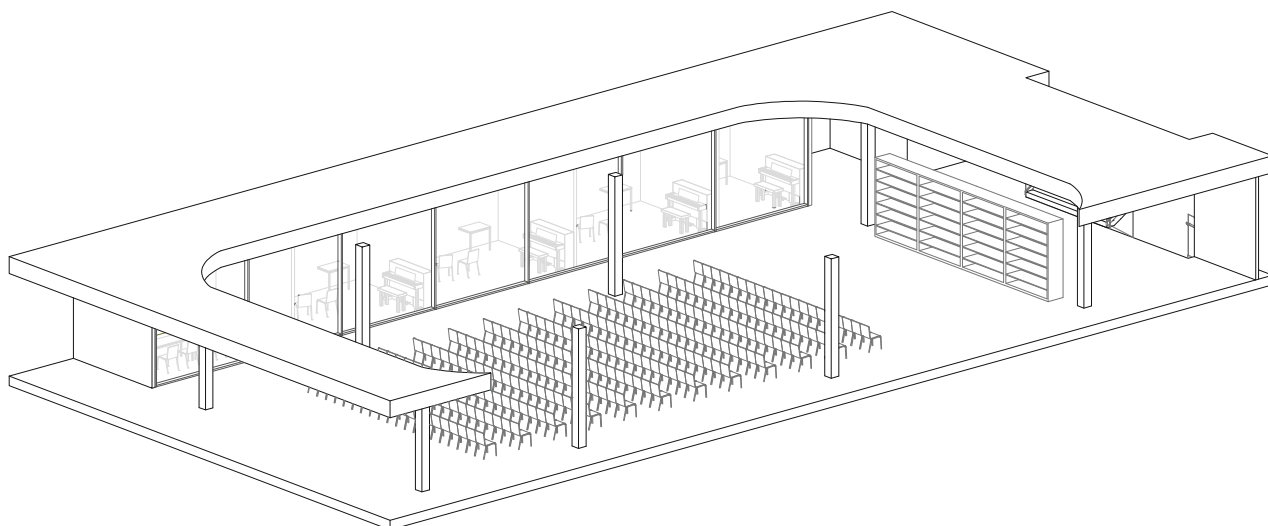


Fig. 67 Space for big lectures

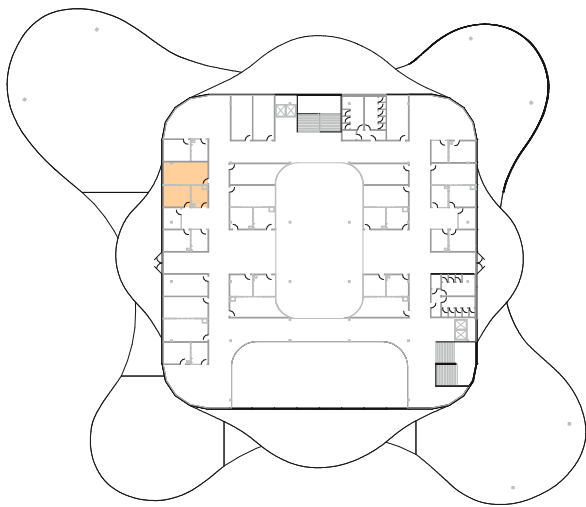


Fig. 68 Third Floor Overview Plan

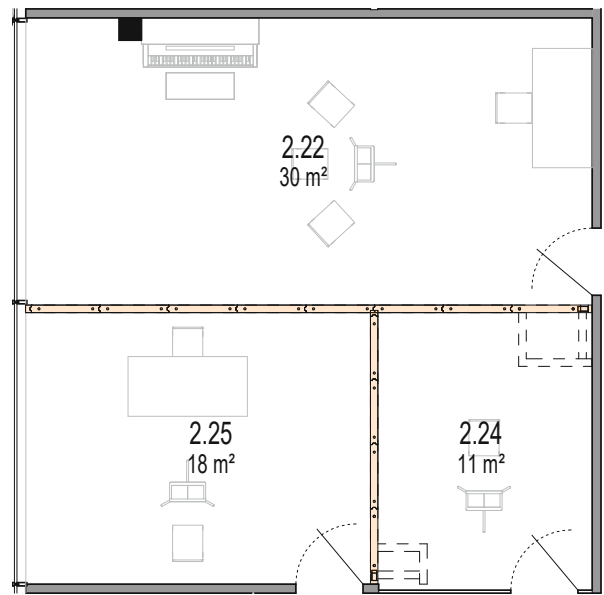


Fig. 69 Flexible classrooms with closed moveable walls-floorplan

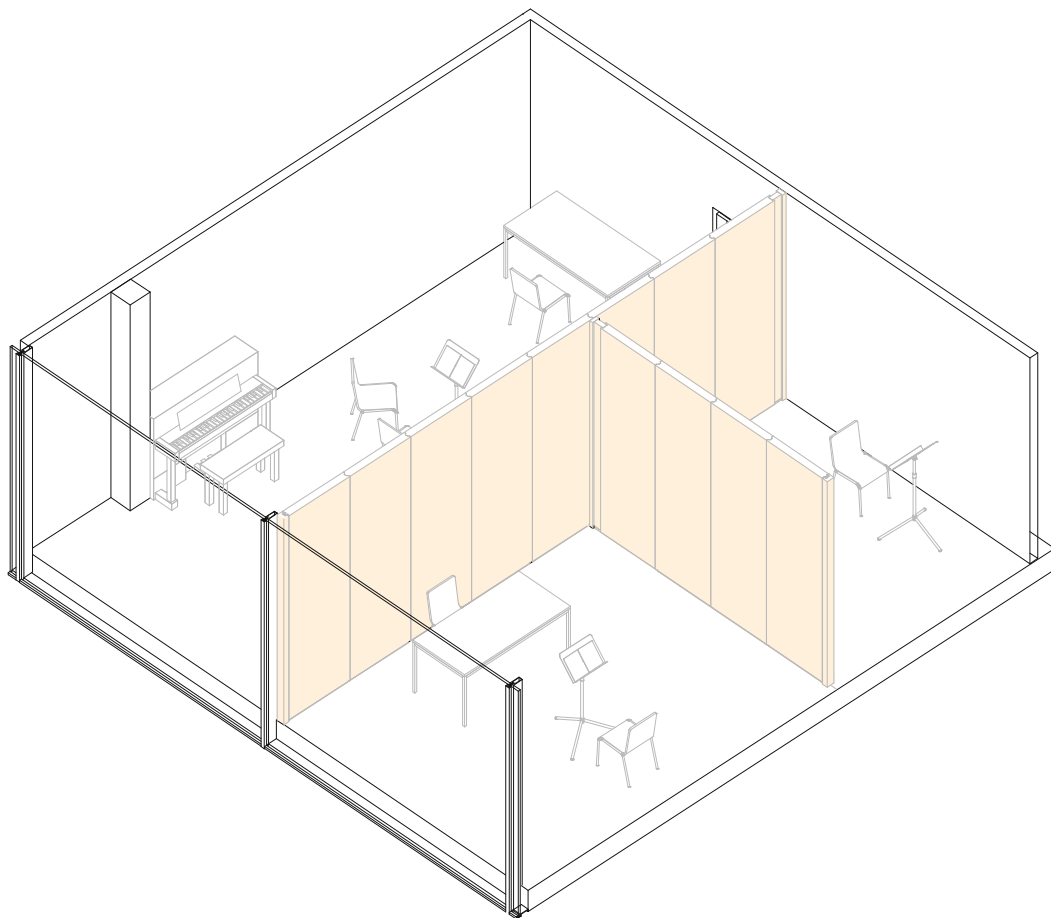


Fig. 70 Flexible classrooms with closed moveable walls-axonometry

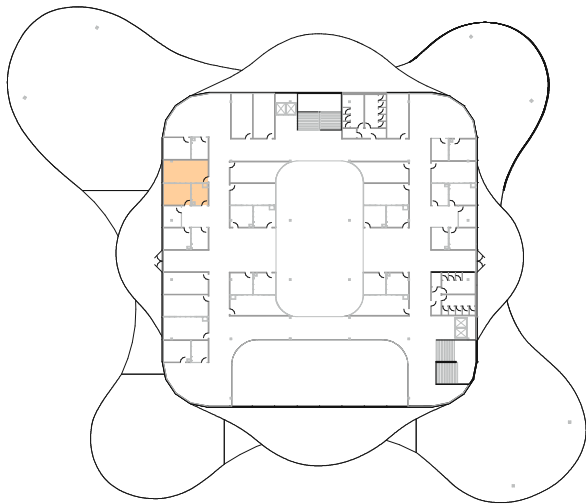


Fig. 71 Third Floor Overview Plan

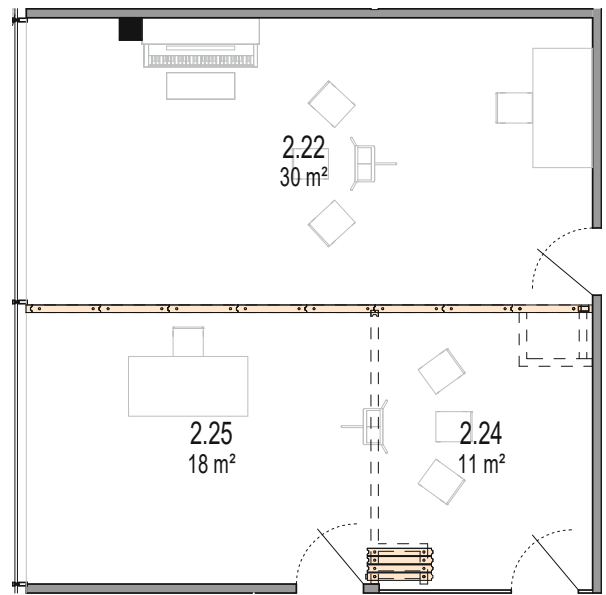


Fig. 72 Flexible classrooms with partially open moveable walls-floorplan

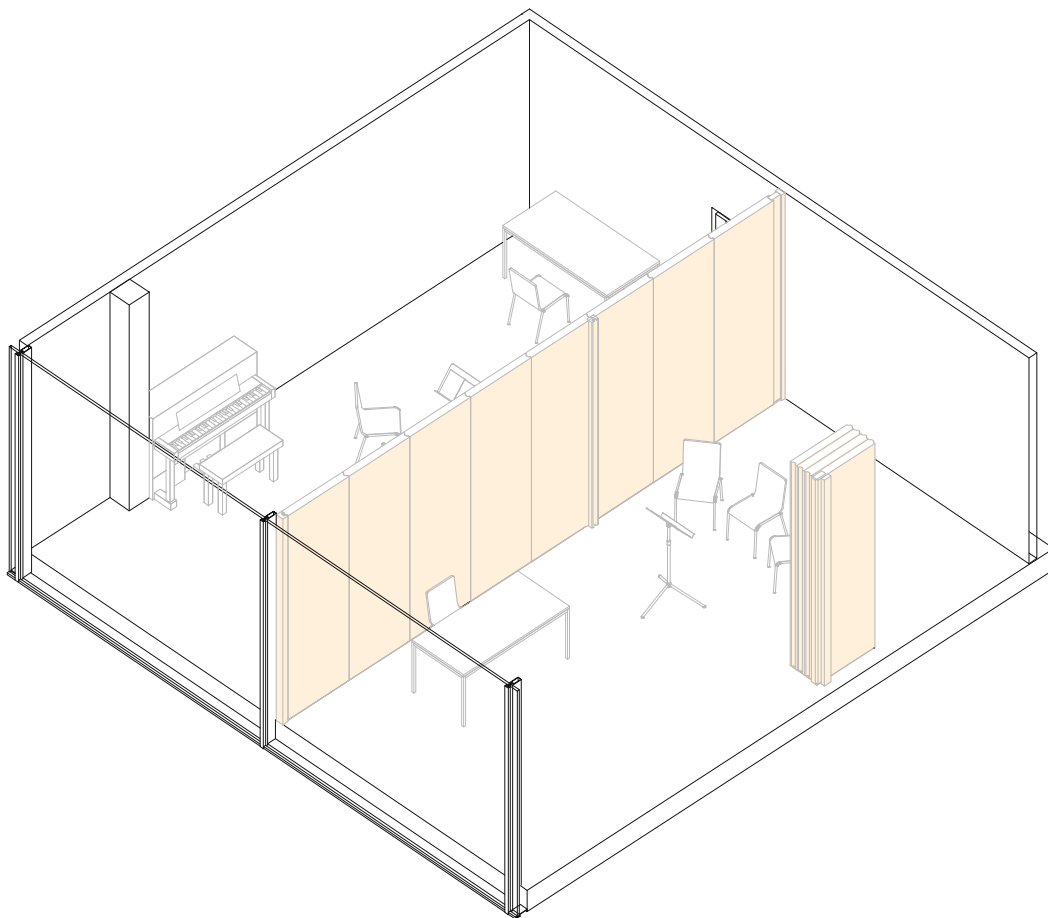


Fig. 73 Flexible classrooms with partially open moveable walls- axonometry

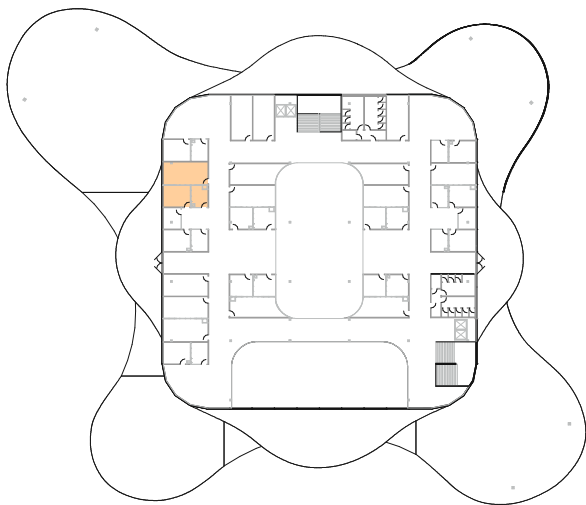


Fig. 74 Third Floor Overview Plan

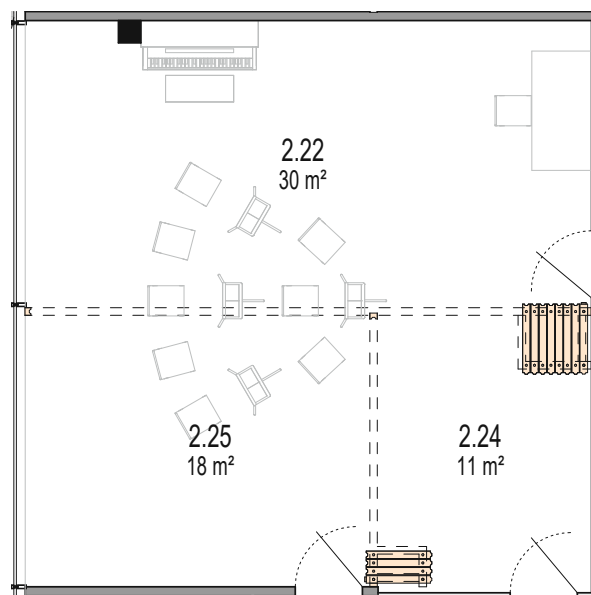


Fig. 75 Flexible classrooms with open moveable walls-floorplan

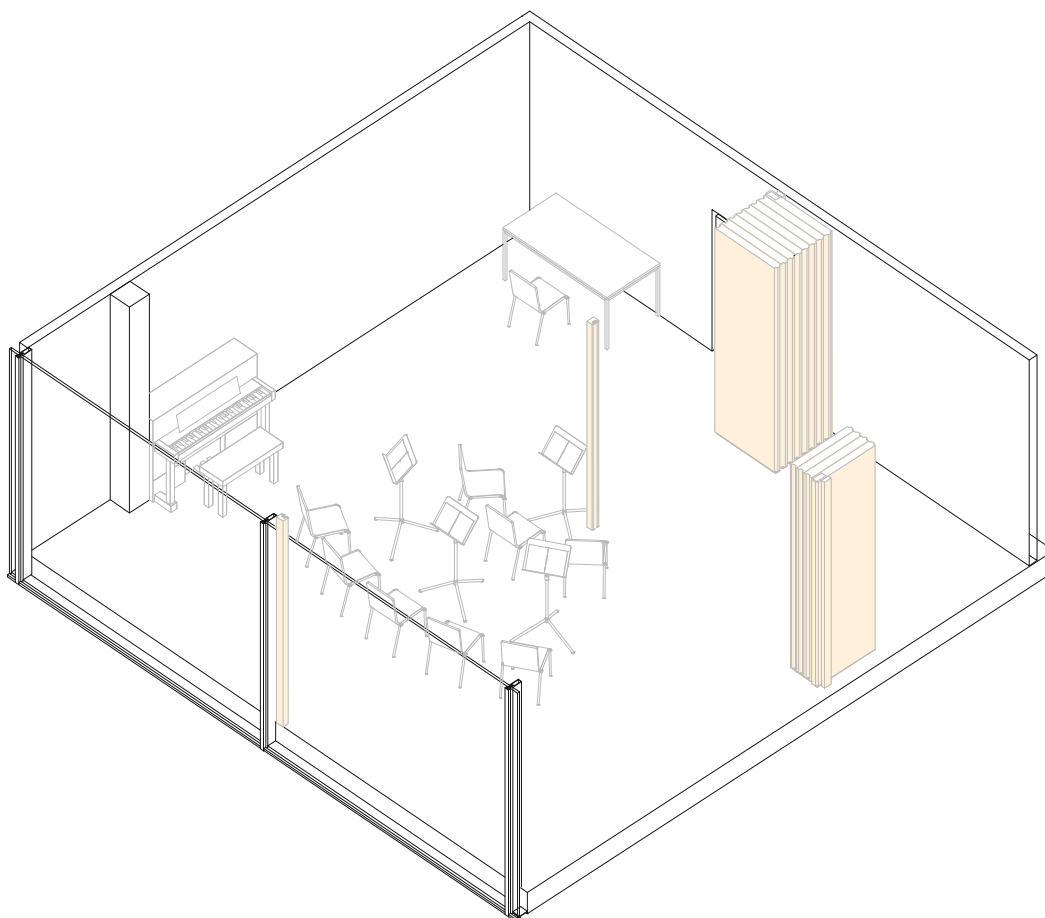


Fig. 76 Flexible classrooms with open moveable walls- axonometry

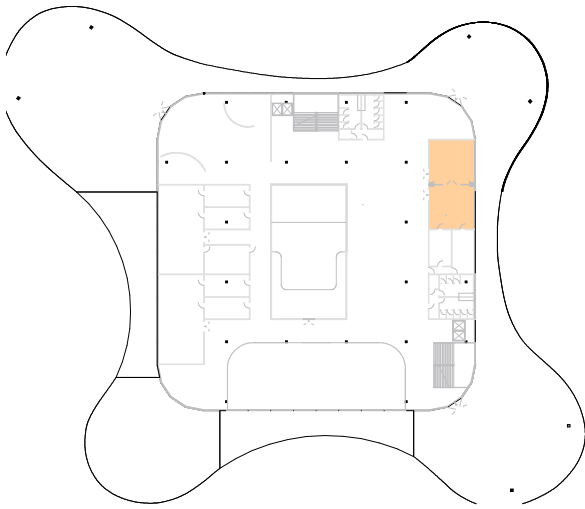


Fig. 77 First Floor Overview Plan

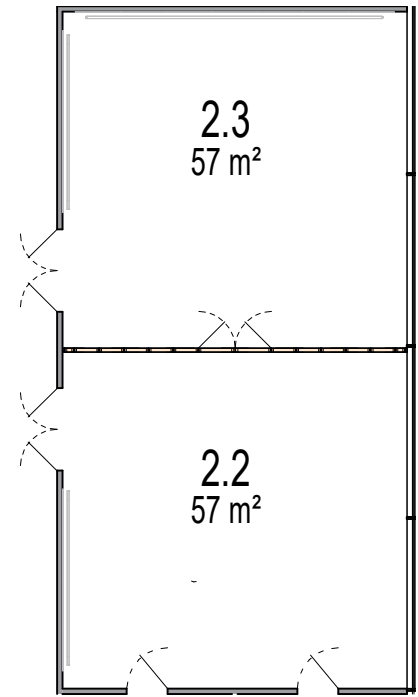


Fig. 78 Flexible dance halls with closed moveable walls-floorplan

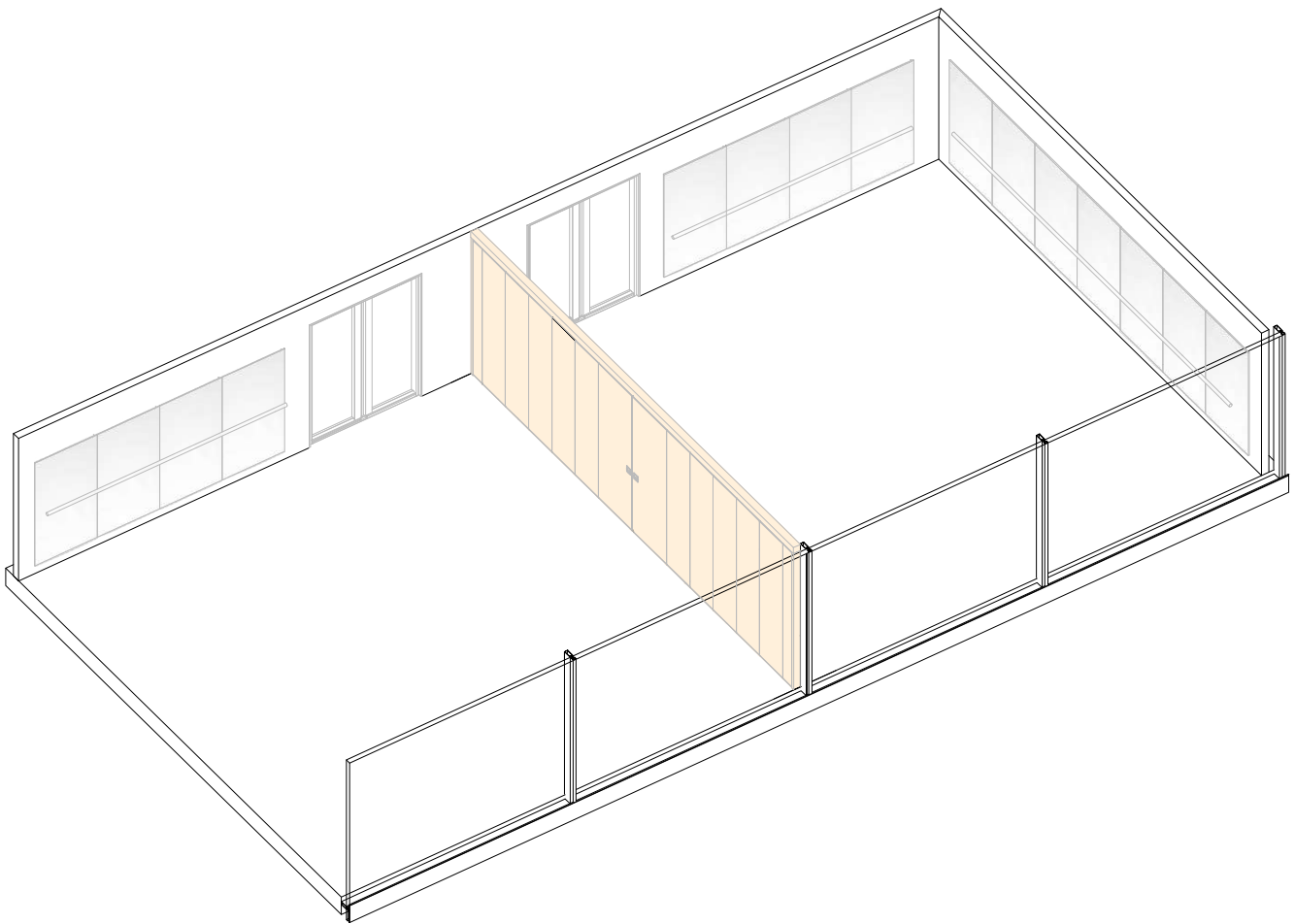


Fig. 79 Flexible dance halls with closed moveable walls- axonometry

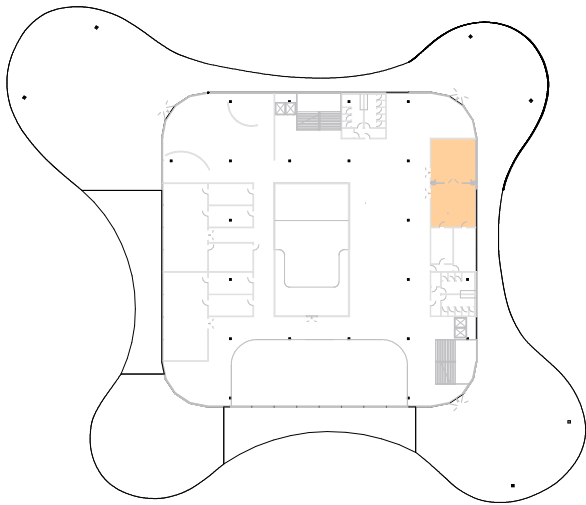


Fig. 80 First Floor Overview Plan

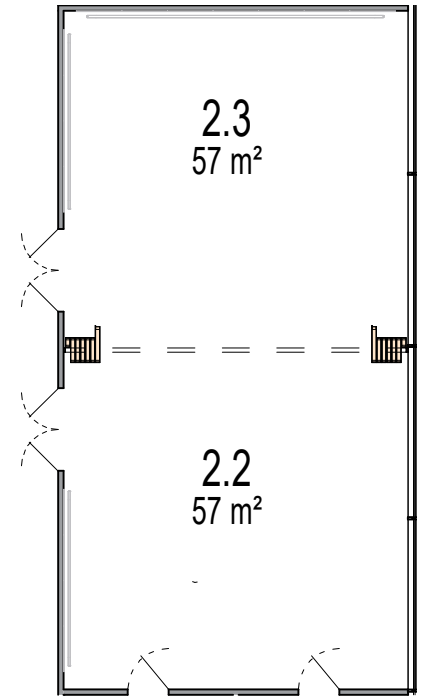


Fig. 81 Flexible dance halls with open moveable walls-floorplan

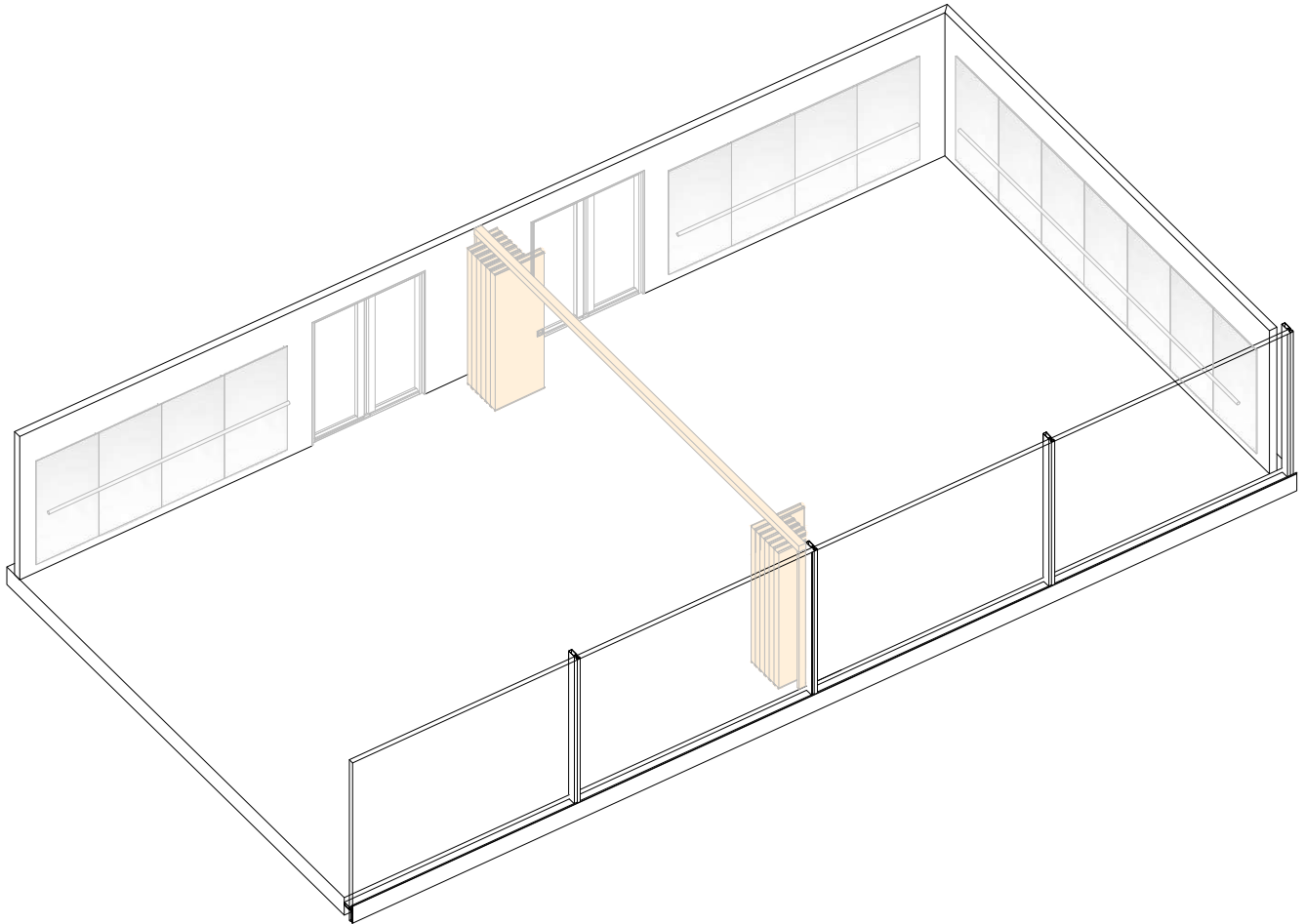


Fig. 82 Flexible dance halls with open moveable walls- axonometry

4.10 ROOM ACOUSTICS

Music rooms in schools require special consideration when it comes to room acoustics. They can range from small practice rooms, to bigger ensemble classrooms to performance halls and need to be suitable for a range of activities including playing, listening to and composing music.²¹

The necessary measures for the improvement of the room acoustics depend primarily on the dimensions and the shape of the room, as well as the materials used in its design.

The term reverberation time refers to the number of seconds necessary for the reverberant sound energy to be reduced to one millionth (or 60dB) of its original value from the instant that the sound signal ceases.²² Longer reverberation times are required for rooms for musical performances and lessons than for rooms where the primary activity is speech. Reverberation time is directly dependent on the volume of the room, the bigger the volume, the longer the reverberation time. Consequently, music rooms need to be larger than the standard classrooms as insufficient volume negatively affects the acoustics of the room, even with an appropriate reverberation time.²³

In the case of a too small room volume, the time in which the first sound reflections return to the musicians' ears is too short, resulting in high sound-pressure levels, loud and unresponsive rooms which can furthermore also be damaging to the musician's hearing.²⁴

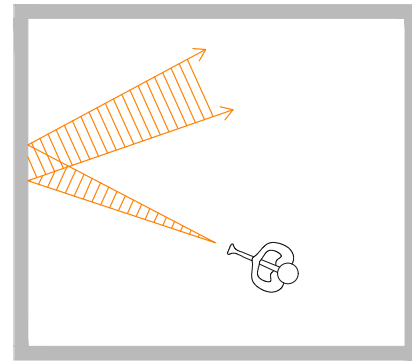


Fig. 83 Echo in an acoustically untreated room

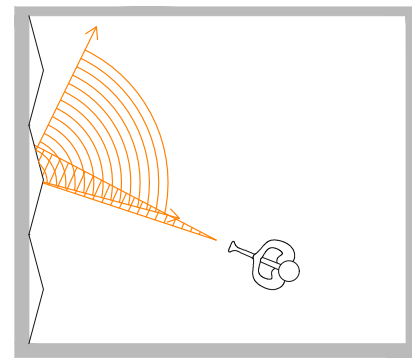


Fig. 84 Sound diffusion by acoustic panels

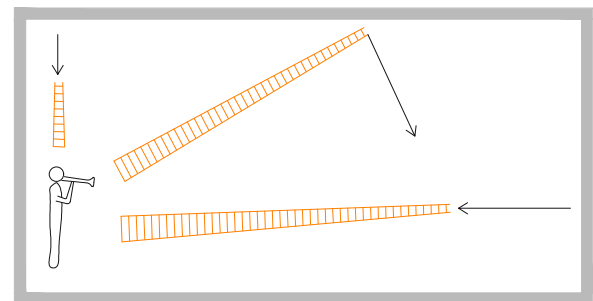


Fig. 85 Echo in a small classroom

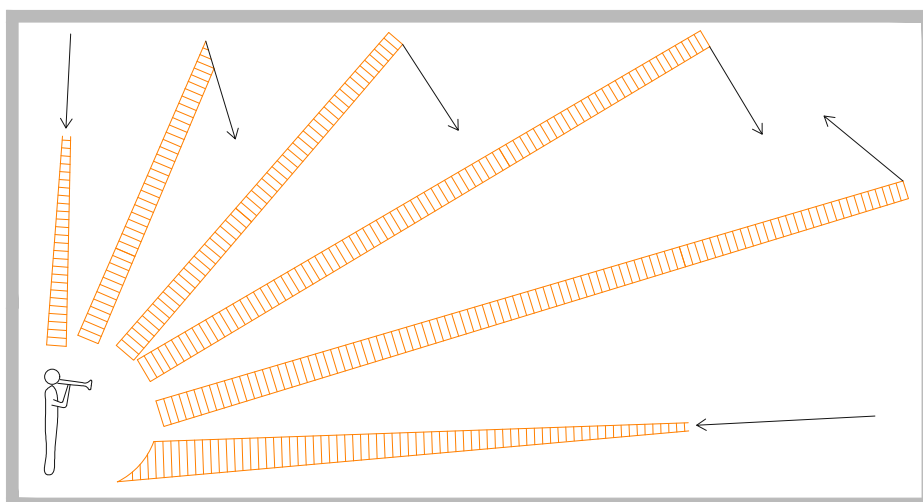


Fig. 86 Sound trajectory in a big classroom

For this reason practice rooms commonly have a minimal area of 8 m², ensemble rooms around 20 m², Second teaching rooms 65 m² and Large performance/teaching rooms approximately 85 m². The room height in concert halls should not be less than 6 m and the minimal required height of the music classrooms is 3 m. The above mentioned values can naturally vary, but these areas depict a possible scale of functional classrooms for music lessons.²⁵

Furthermore, the geometry of the rooms plays a significant role in their acoustics. The results of various research show that rooms with a rectangular floor plan tend to have the best acoustic properties, provided that the other factors affecting the acoustics are taken into consideration, whereas the rooms with round, hexagonal,

octagonal and square-shaped floor plans should be avoided.

However, the dimensions of the room are an essential contributor to its auditory qualities. It is crucial that they are not in simple ratios, meaning that the division of any of the two dimensions of the room should not have a whole number as a result. The ratio of 1.25:1:1.6, also known as the „golden ratio“, is considered ideal, but there is a number of other ratios which can achieve equally satisfying acoustic results.

Finally, in order to make a room echo-free, it might be necessary to employ diffusing hard surfaces, such as angled or convex surfaces with the goal of scattering the sound.²⁶

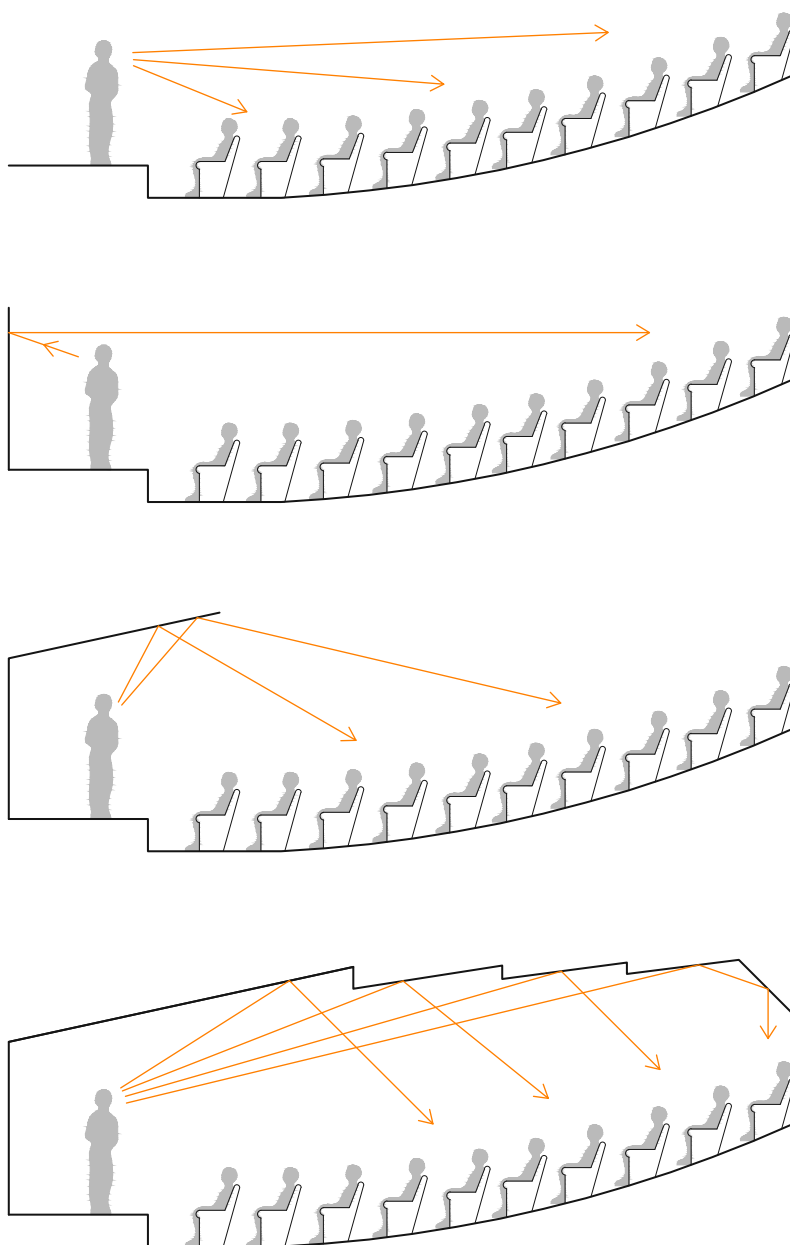


Fig. 87 The relation between room geometry and acoustics

4.11 OUTDOOR LEARNING

4.11.1 Open air schools

The concept of open air schools dates back to the 1900s, when they were used in order to combat the onset and spread of tuberculosis in children. The benefits of fresh air, combined with nutrition and medical attention had the goal of improving the health conditions of the students.

The first school of this type was founded in 1904 in Charlottenburg near Berlin by Dr. Bernhard Bendix and pedagogue Hermann Neufert. It was soon followed by its counterparts in other European countries such as Italy, France, England, Belgium, Hungary and Sweden, as well as in the USA.

Open air schools were often situated in the woods, or the outskirts of the cities and close to the nature. The lessons took place outside or in tents and open structures. If the classes took place in actual buildings, they were characterized by large openable windows and the direct access to the outdoors.²⁷

Although this typology of schools largely lost its significance with the discovery of antibiotics and the improvement of hygienic conditions, some ideas from this concept are being applied even today.

4.11.2 Outdoor learning today

It cannot be stated that transferring all the lessons from a school curriculum outside would be beneficial for the students, particularly because some forms of learning can only take place indoors due to their technical and acoustic requirements. However, numerous schools offer outdoor classes in the areas where this format of lessons is suitable and various positive effects of this concept have been recorded.

Studies have shown that acute doses of nature have positive effects on attention and memory, nature-based learning has been linked to an increase in motivation and interest in learning and the contact with nature has been proven to reduce stress both in children and adults. Greener schools and classrooms have been proven to also lead to better academic achievements.



Fig. 88 Open air school in Amsterdam



Fig. 89 Open air classroom in Bosnia and Herzegovina

Additionally, a recent study has derived a conclusion, that the engagement of students increases after an outdoor lesson compared to an indoor one.²⁸

For above mentioned reasons, a part of the school terraces in the project are meant to be used as teaching premises. Certain group and dance classes should take place outside, in this way strengthening the bond of the school with its surroundings and offering a dynamic learning atmosphere for the students. The terraces on the first floor are meant to serve this purpose, whereas the smaller outdoor spaces on the upper floors can provide a place for smaller groups, as well as an access to nature during the breaks.

Furthermore through outdoor lessons, the music and dance students can get accustomed to playing outdoors, which is a valuable skill for their future performances.

One of the most common issues mentioned when talking about outdoor classrooms is the concern that the students will be unable to focus but also the danger of them wandering off in the nature and whether the teachers will be able to lead the class in a less formal environment.

The fact that the classes in the project would take place in the school terraces would combine the positive effects of nature-based learning with an understanding that it is still a school lesson,

as the premise is not as informal as having a lesson in a nearby park. Furthermore, the risk of students wandering off would also be eliminated. As the terraces are covered by the school roof, the acoustics of these spaces is superior to completely open places in the nature.

In Bosnia and Herzegovina some schools are already taking first steps into exploring the potential of outdoor classrooms. Starting from very simple structures with benches and small podiums placed outside, the development of this concept is expected to be seen in the next couple of years, especially considering the majorly positive reactions from both the students and the staff to this form of lessons.

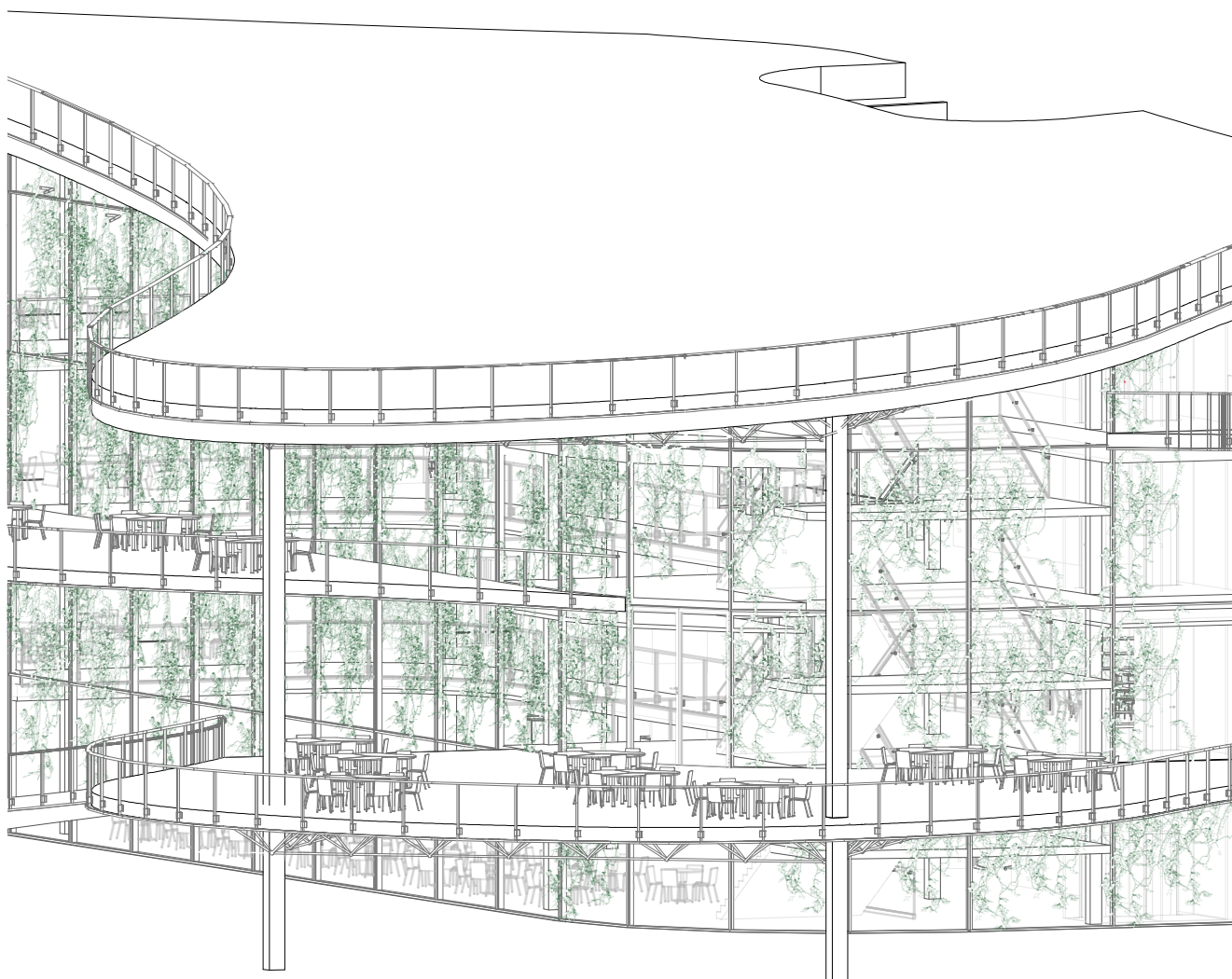
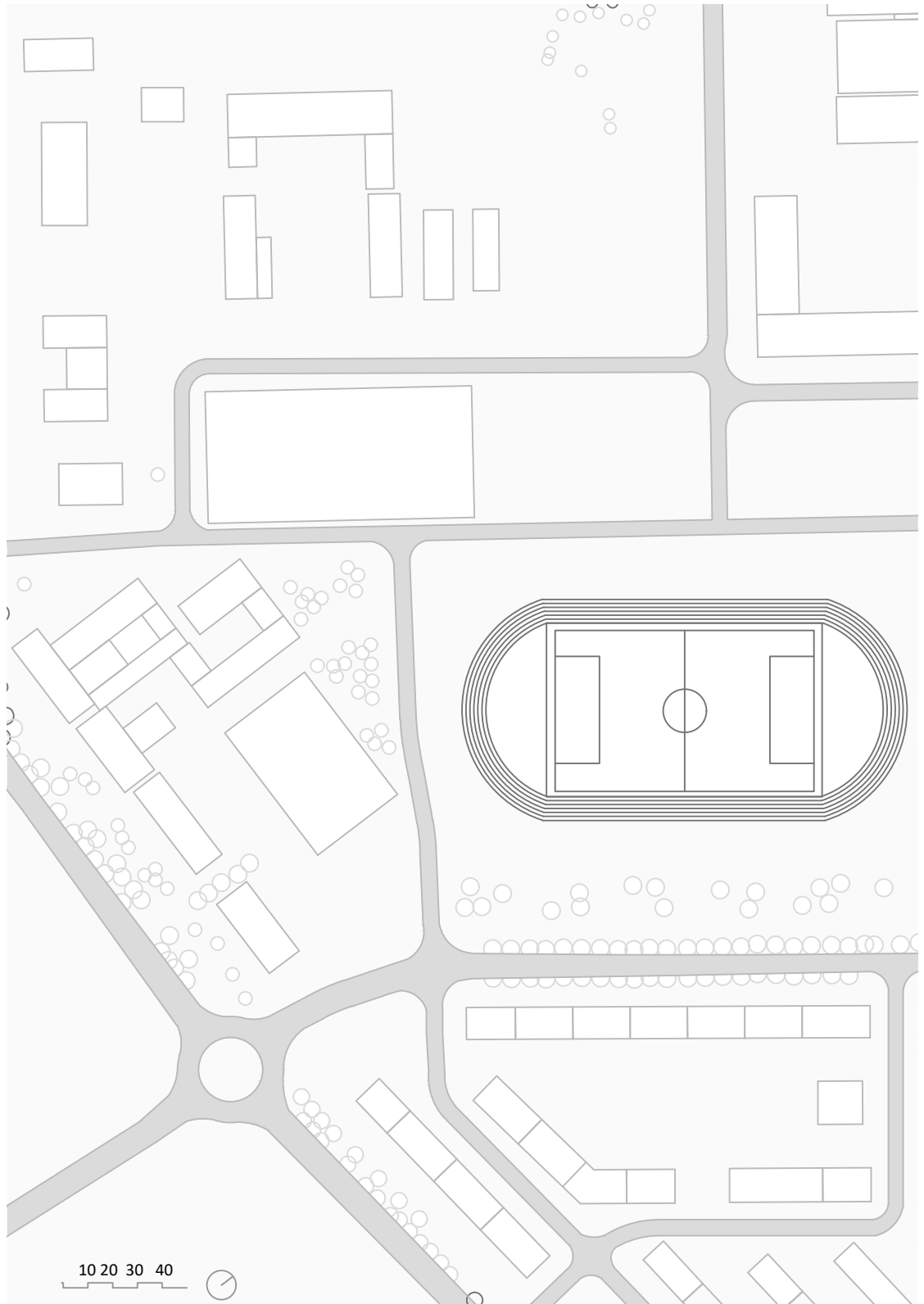


Fig. 90 Outdoor learning space

5. RESULTS

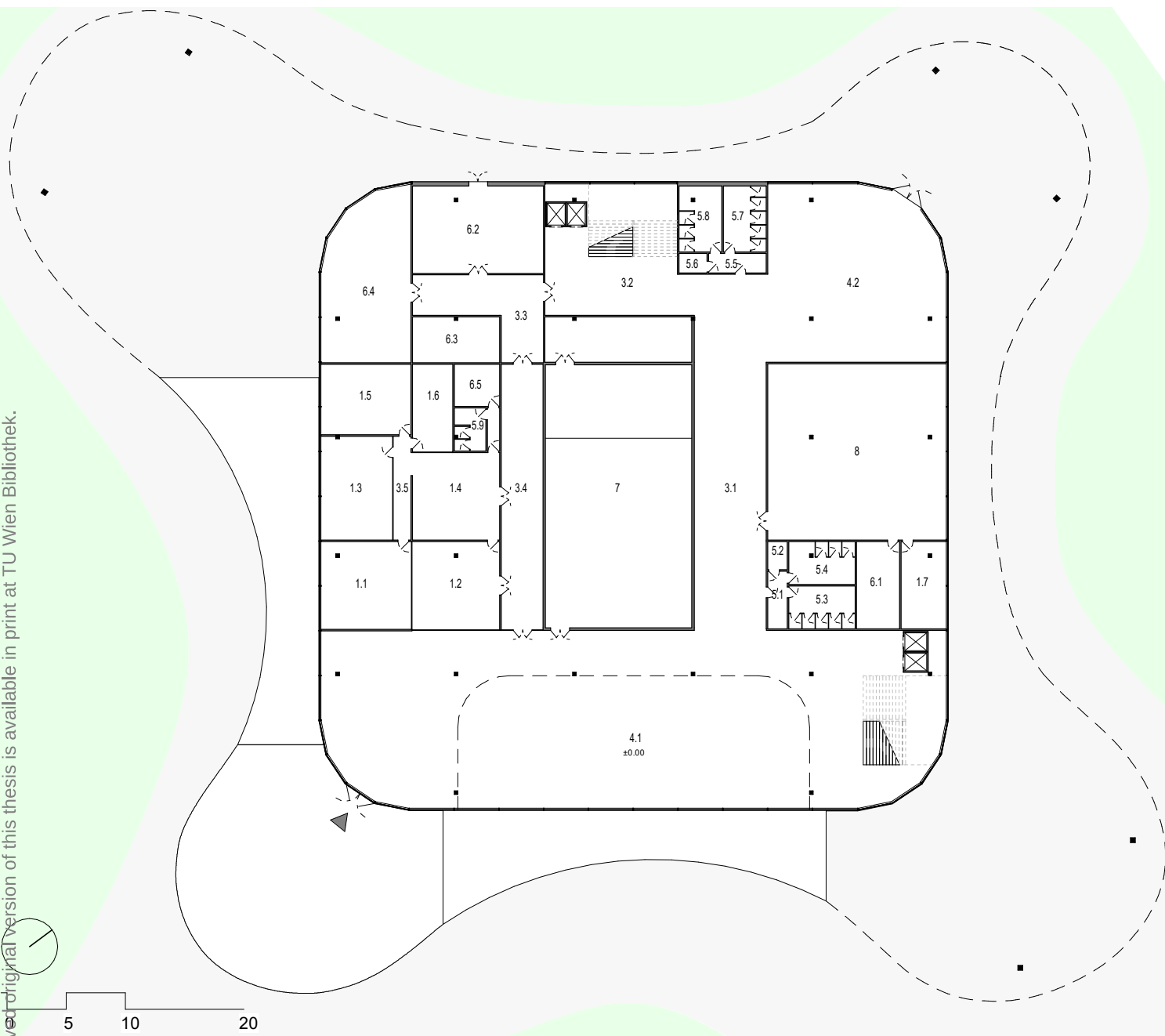
5.1 SITE PLAN





Plan 2: Site Plan

5.2 FLOOR PLANS



Plan 3: Ground Floor 1:500

1. Offices and Administrative Spaces

- 1.1 Teachers Room 57 m²
- 1.2 Meeting Room 55 m²
- 1.3 Secretariat and Administration 54 m²
- 1.4 Sitting and Waiting Area 55 m²
- 1.5 Principal's Office 46 m²
- 1.6 Tea Kitchen 25 m²
- 1.7 Librarian's Office 29 m²

3. Circulation Spaces

- 3.1 Hallway 162 m²
- 3.2 Stair Hall 144 m²
- 3.3 Hallway 52 m²
- 3.4 Gang 79 m²
- 3.5 Hallway 13 m²

4. Social and Pause Areas

- 4.1 Foyer/Cafeteria 770 m²
- 4.2 Group and Study Area 218 m²

5. Sanitary Rooms

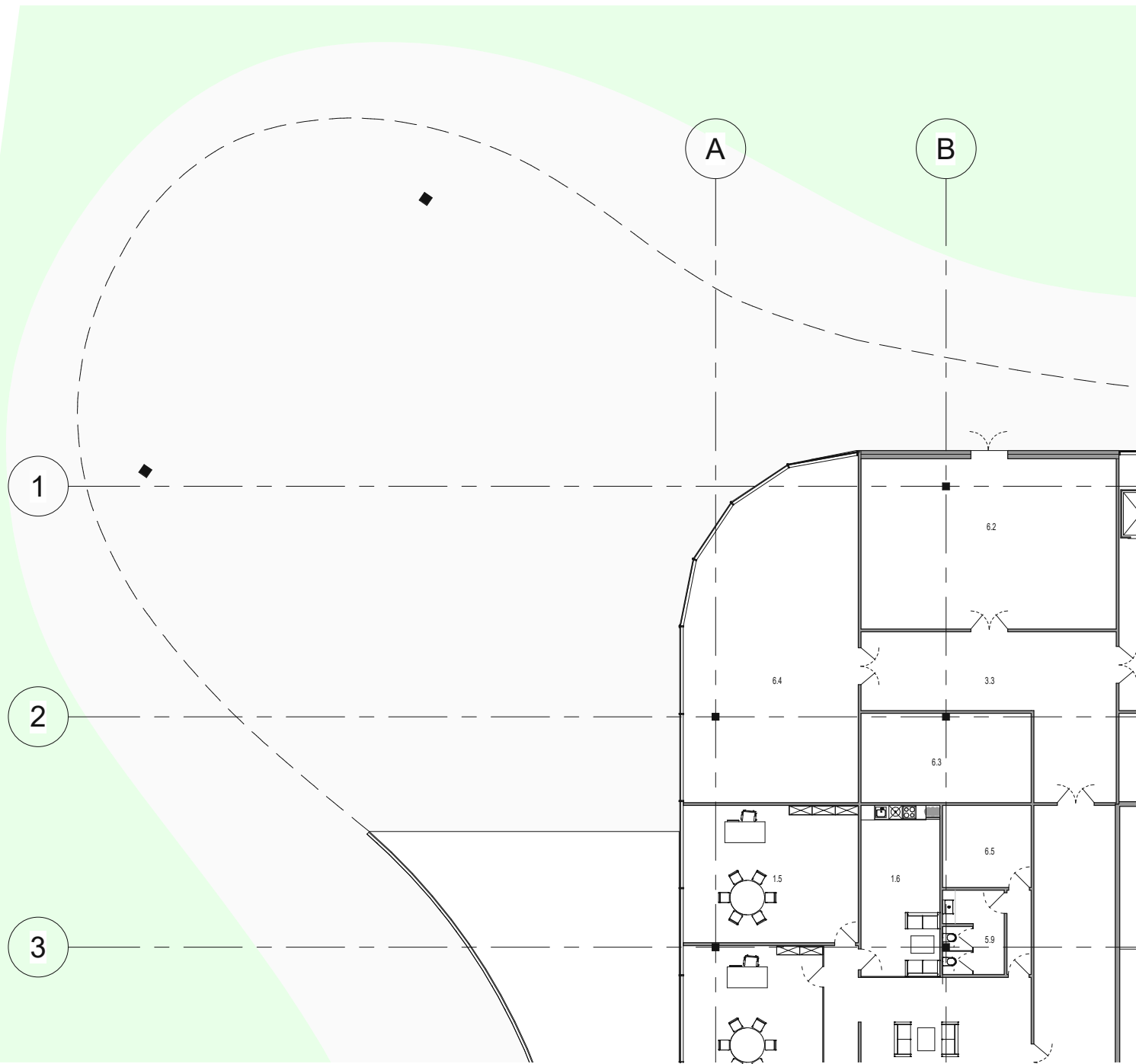
- 5.1 VR 8m²
- 5.2 WC 4 m²
- 5.3 WC Female 20 m²
- 5.4 WC Male 20 m²
- 5.5 VR 8m²
- 5.6 WC. 4 m²
- 5.7 WC Female 20 m²
- 5.8 WC Male 20 m²
- 5.9 WC Staff 10 m²

6. Support Rooms

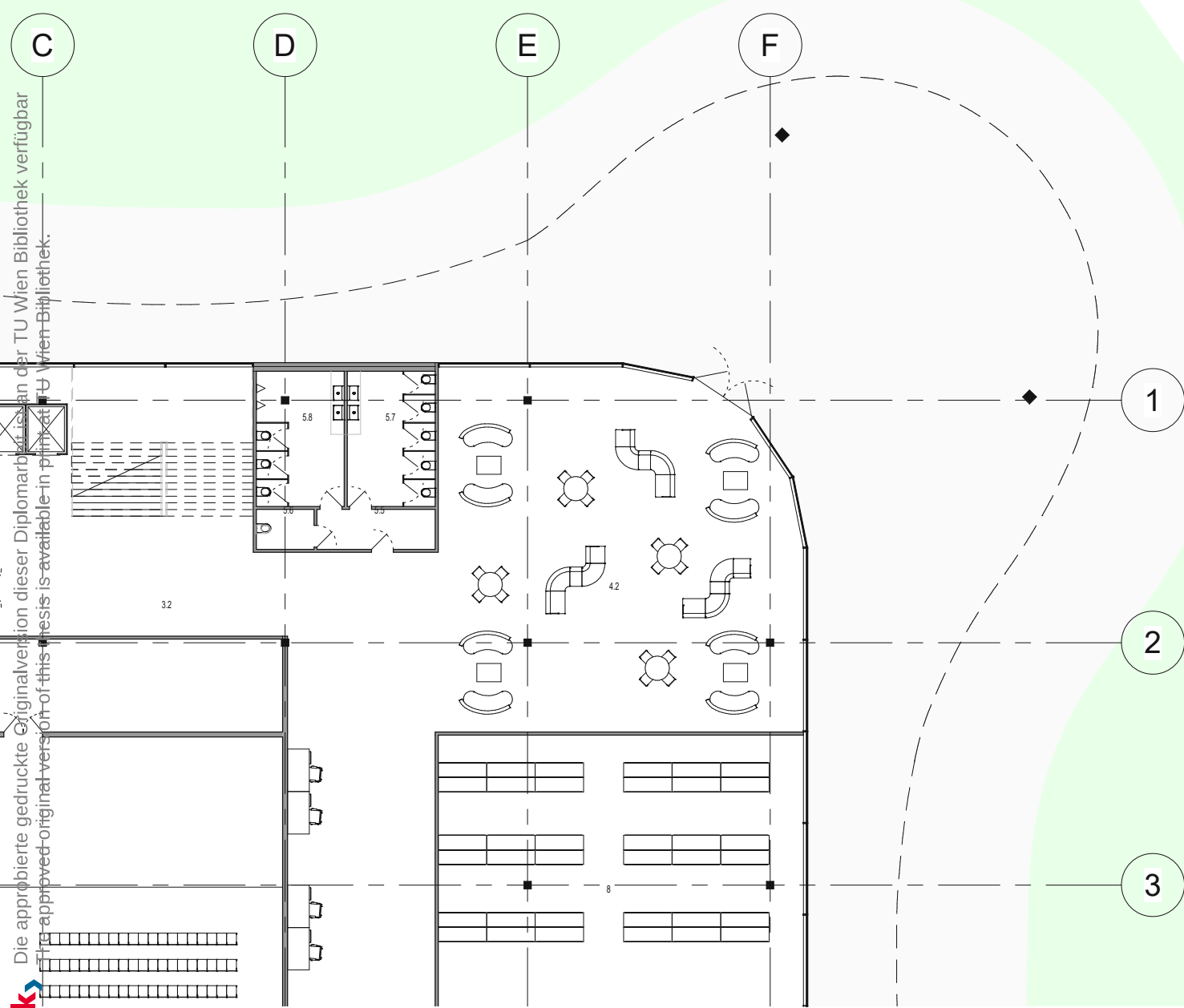
- 6.1 Archive 27 m²
- 6.2 Garbage Room 83 m²
- 6.3 Technical Room 29 m²
- 6.4 Storage Room 104 m²
- 6.5 Staff Storage and Archive 14 m²

7. Concert Hall 275 m²

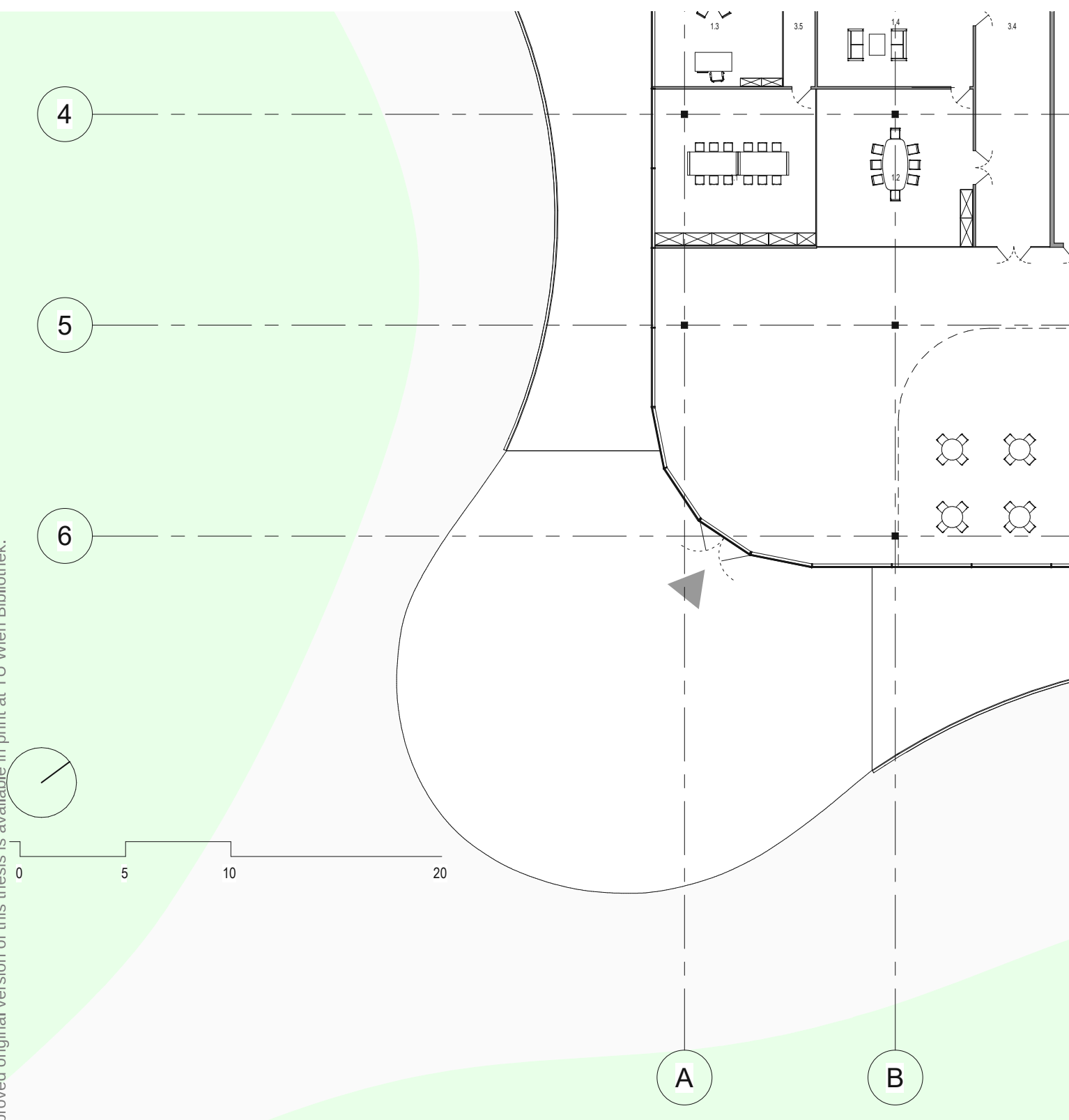
8. Library 225 m²



Plan 4: Ground Floor 1:250 Part 1



Plan 5: Ground Floor 1:250 Part 2



Plan 6: Ground Floor 1:250 Part 3

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- 1.1 Teachers Room 57 m²
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- 5.8 WC Male 20 m²
- 5.9 WC Staff 10 m²

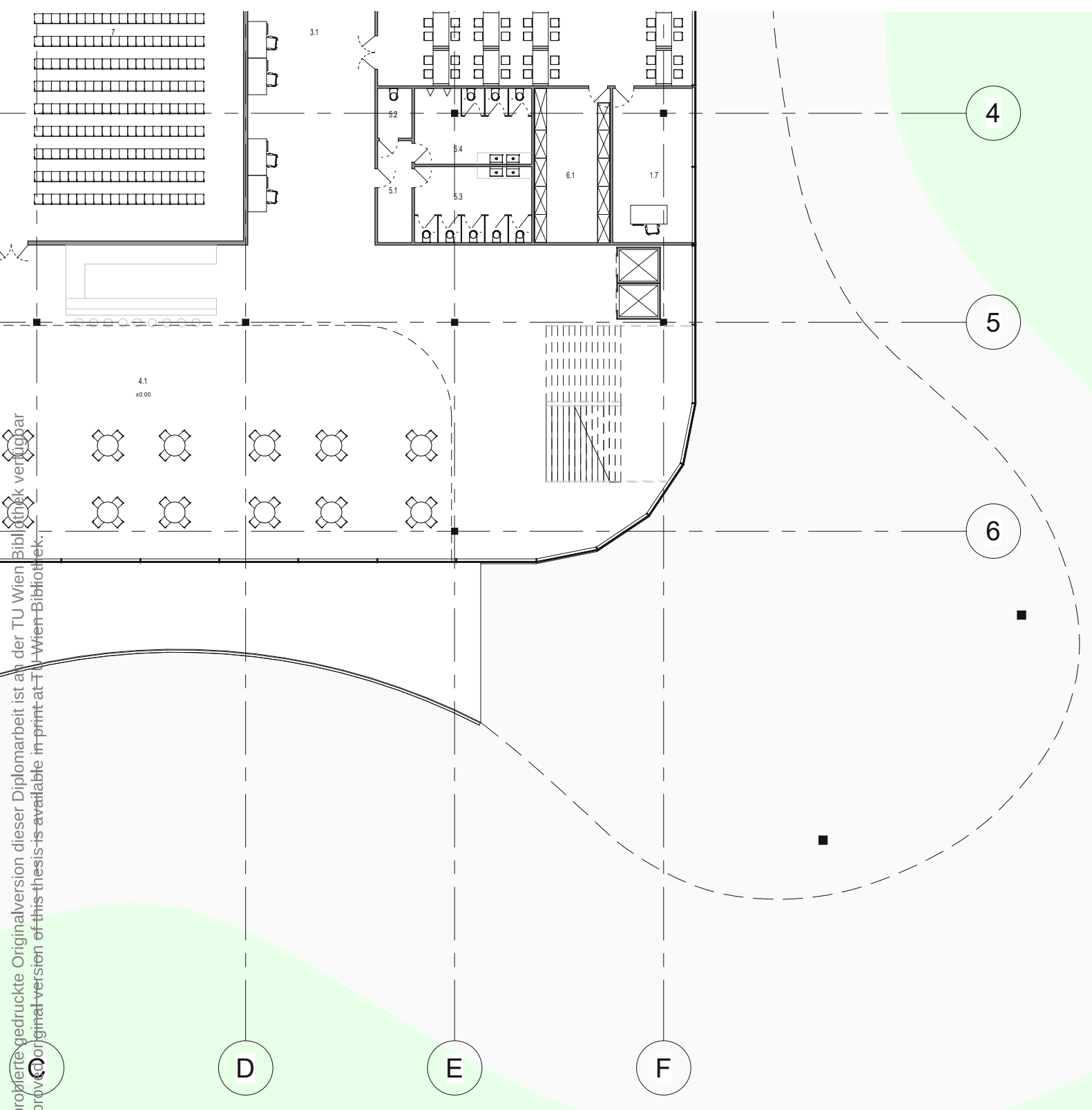
6. Support Rooms

- 6.1 Archive 27 m²
- 6.2 Garbage Room 83 m²
- 6.3 Technical Room 29 m²
- 6.4 Storage Room 104 m²
- 6.5 Staff Storage and Archive 14 m²

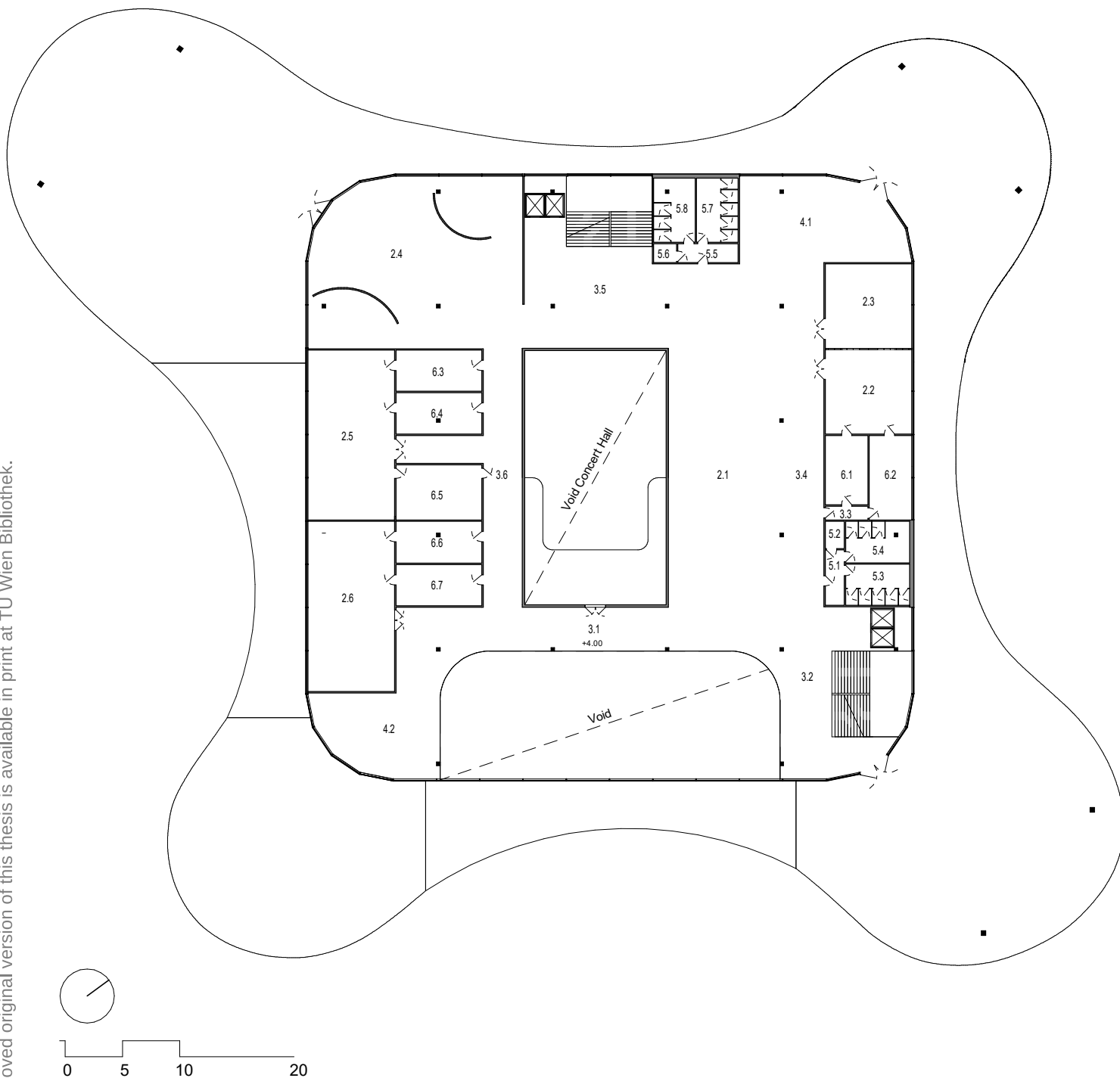
7. Concert Hall 275 m²

8. Library 225 m²

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Plan 7: Ground Floor 1:250 Part 4



Plan 8: First Floor, 1:500

2. Learning Spaces

- 2.1 Open Classroom 223 m²
- 2.2 Classroom 57 m²
- 2.3 Classroom 57 m²
- 2.4 Open Dance Area 271 m²
- 2.5 Dance Hall 115 m²
- 2.6 Dance Hall 115 m²

3. Circulation Spaces

- 3.1 Hallway 152 m²
- 3.2 Stair Hall 158 m²
- 3.3 Hallway 4 m²
- 3.4 Hallway 194 m²
- 3.5 Stair Hall 163 m²
- 3.6 Hallway 98 m²

4. Social and Break Areas

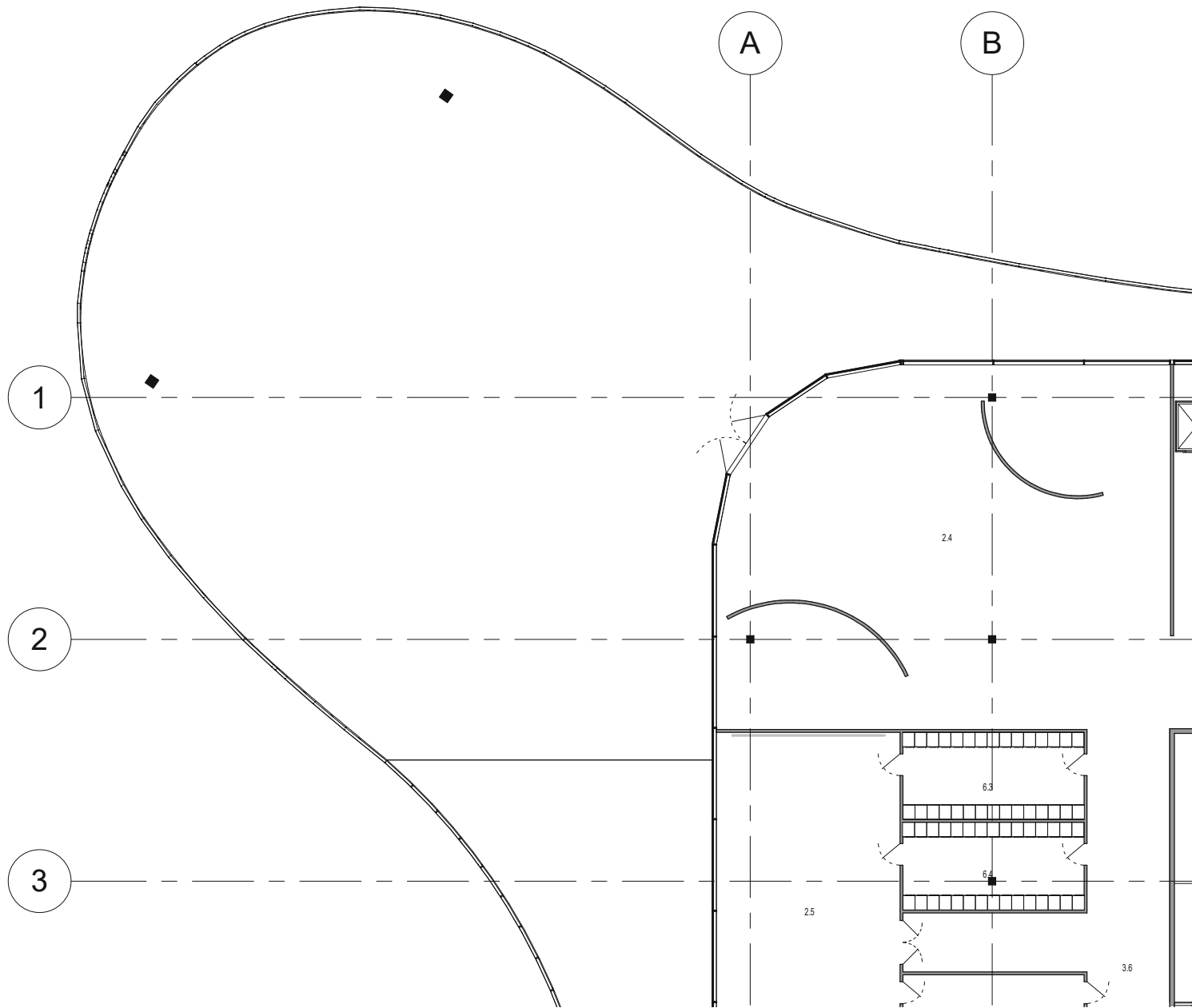
- 4.1 Social and Break Area 105 m²
- 4.2 Social and Break Area 77 m²

5. Sanitary Rooms

- 5.1 VR 8m²
- 5.2 WC 4 m²
- 5.3 WC Female 20 m²
- 5.4 WC Male 20 m²
- 5.5 VR 8m²
- 5.6 WC 4 m²
- 5.7 WC Female 20 m²
- 5.8 WC Male 20 m²

6. Support Rooms

- 6.1 Dressing Room 23 m²
- 6.2 Dressing Room 29 m²
- 6.3 Dressing Room 27 m²
- 6.4 Dressing Room 27 m²
- 6.5 Dance Hall Storage 36 m²
- 6.6 Dressing Room 27 m²
- 6.7 Dressing Room 27 m²



Plan 9: First Floor 1:250 Part 1

C

D

E

F

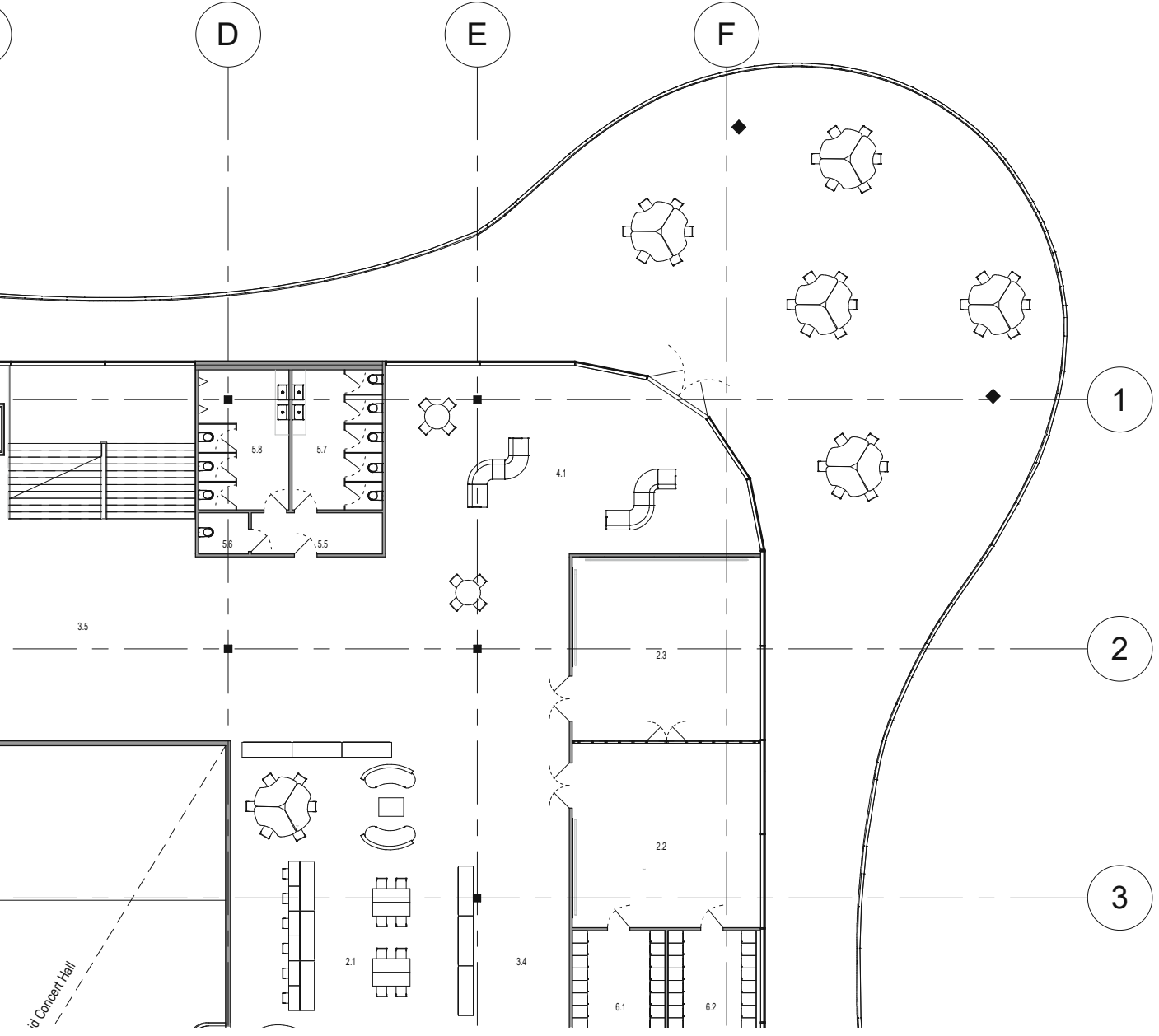
1

2

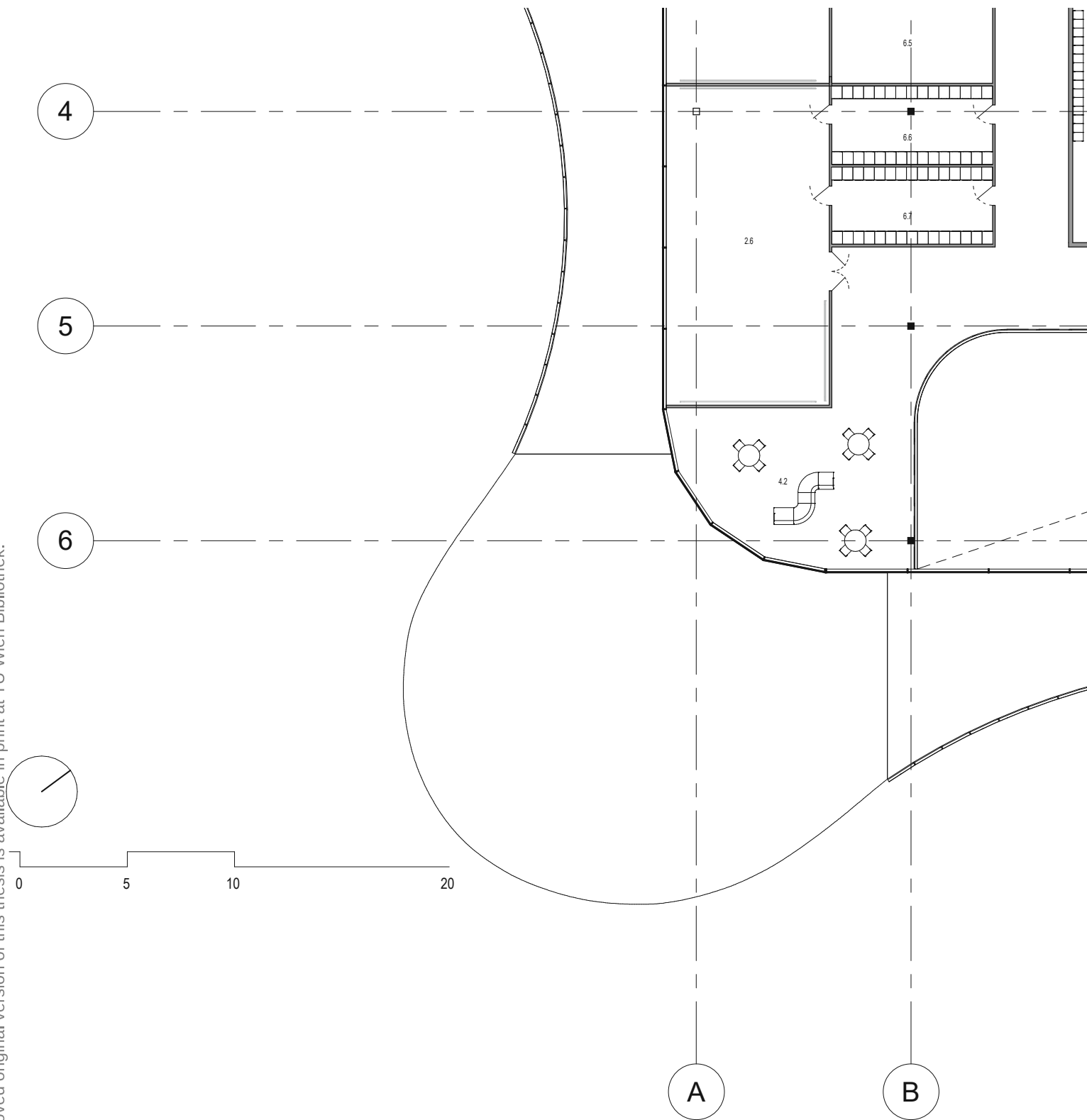
3

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Concert Hall



Plan 10: First Floor 1:250 Part 2



Plan 11: First Floor 1:250 Part 3

2. Learning Spaces

- 2.1 Open Classroom 223 m²
- 2.2 Classroom 57 m²
- 2.3 Classroom 57 m²
- 2.4 Open Dance Area 271 m²
- 2.5 Dance Hall 115 m²
- 2.6 Dance Hall 115 m²

3. Circulation Spaces

- 3.1 Hallway 152 m²
- 3.2 Stair Hall 158 m²
- 3.3 Hallway 4 m²
- 3.4 Hallway 194 m²
- 3.5 Stair Hall 163 m²
- 3.6 Hallway 98 m²

4. Social and Break Areas

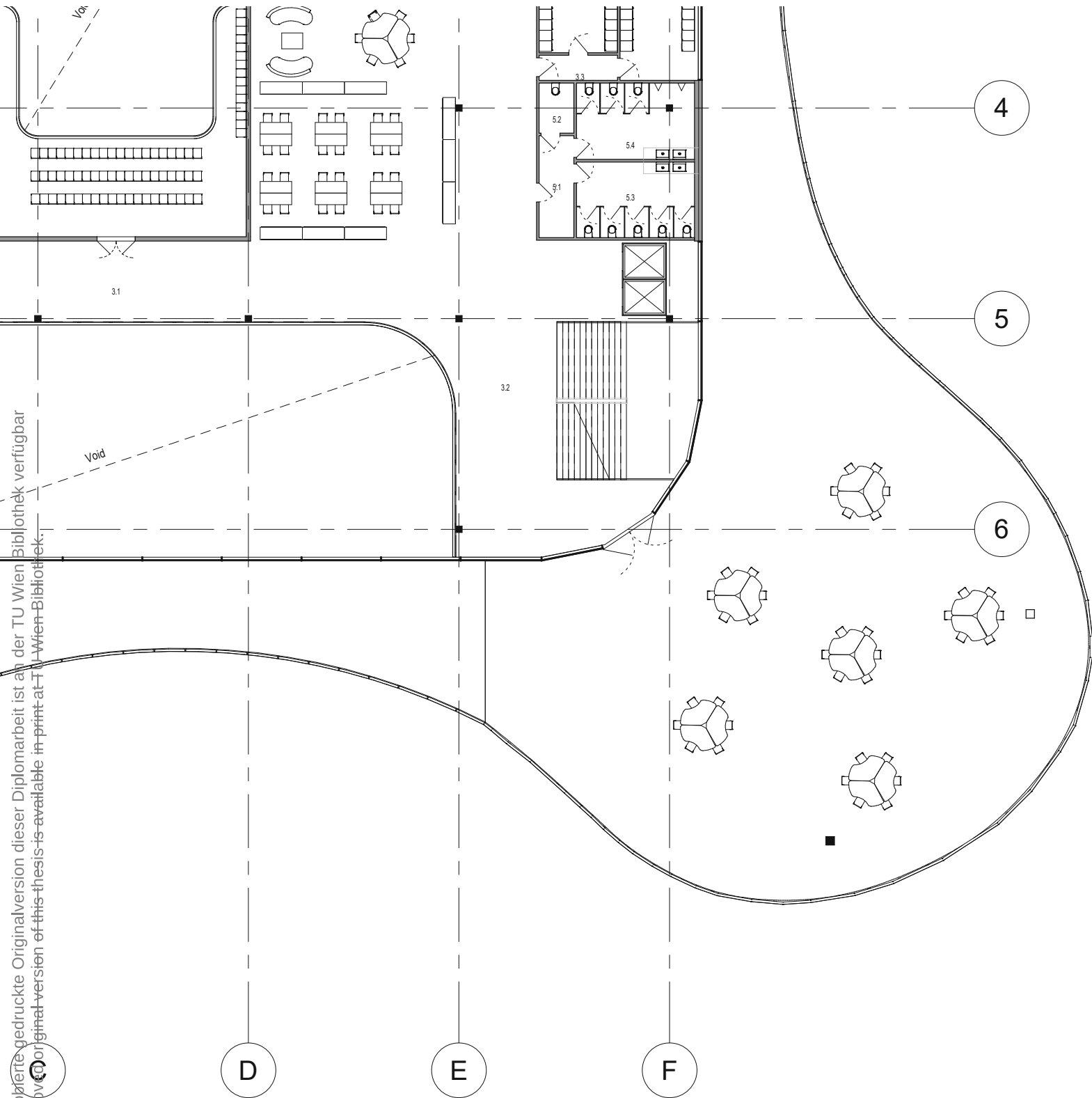
- 4.1 Social and Break Area 105 m²
- 4.2 Social and Break Area 77 m²

5. Sanitary Rooms

- 5.1 VR 8m²
- 5.2 WC 4 m²
- 5.3 WC Female 20 m²
- 5.4 WC Male 20 m²
- 5.5 VR 8m²
- 5.6 WC 4 m²
- 5.7 WC Female 20 m²
- 5.8 WC Male 20 m²

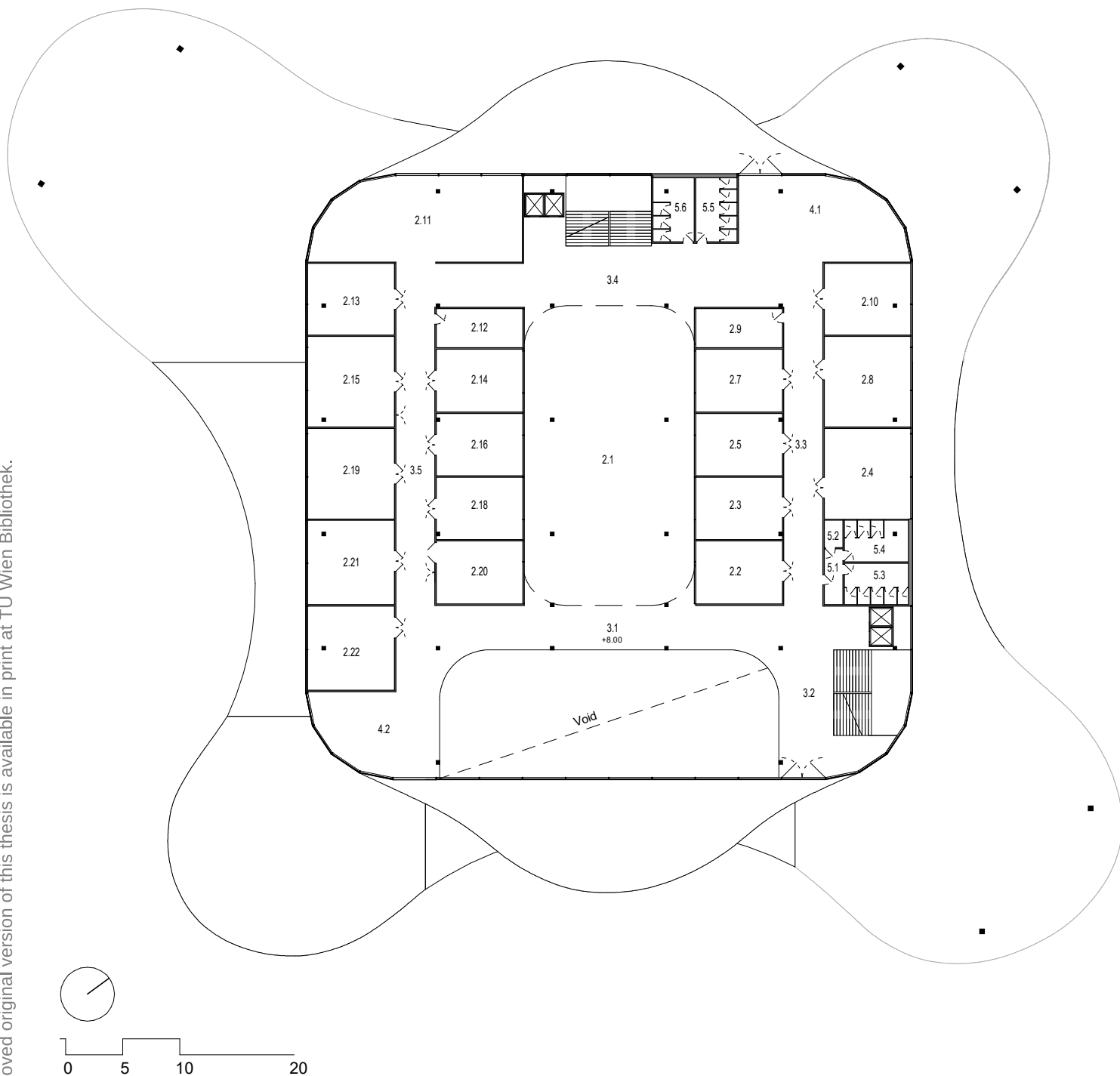
6. Support Rooms

- 6.1 Dressing Room 23 m²
- 6.2 Dressing Room 29 m²
- 6.3 Dressing Room 27 m²
- 6.4 Dressing Room 27 m²
- 6.5 Dance Hall Storage 36 m²
- 6.6 Dressing Room 27 m²
- 6.7 Dressing Room 27 m²



Plan 12: First Floor 1:250 Part 4

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Plan 13: Second Floor 1:500

2. Learning Spaces

- 2.1 Open Classroom 390 m²
- 2.2-2.8 Classroom 41 m²
- 2.9 Classroom 26 m²
- 2.10 Classroom 48 m²
- 2.11 Open Learning Space 130 m²
- 2.12 Classroom 26 m²
- 2.13 Classroom 48 m²
- 2.14-2.20 Classroom 41 m²
- 2.21 Classroom 57 m²
- 2.22 Classroom 57 m²

3. Circulation Spaces

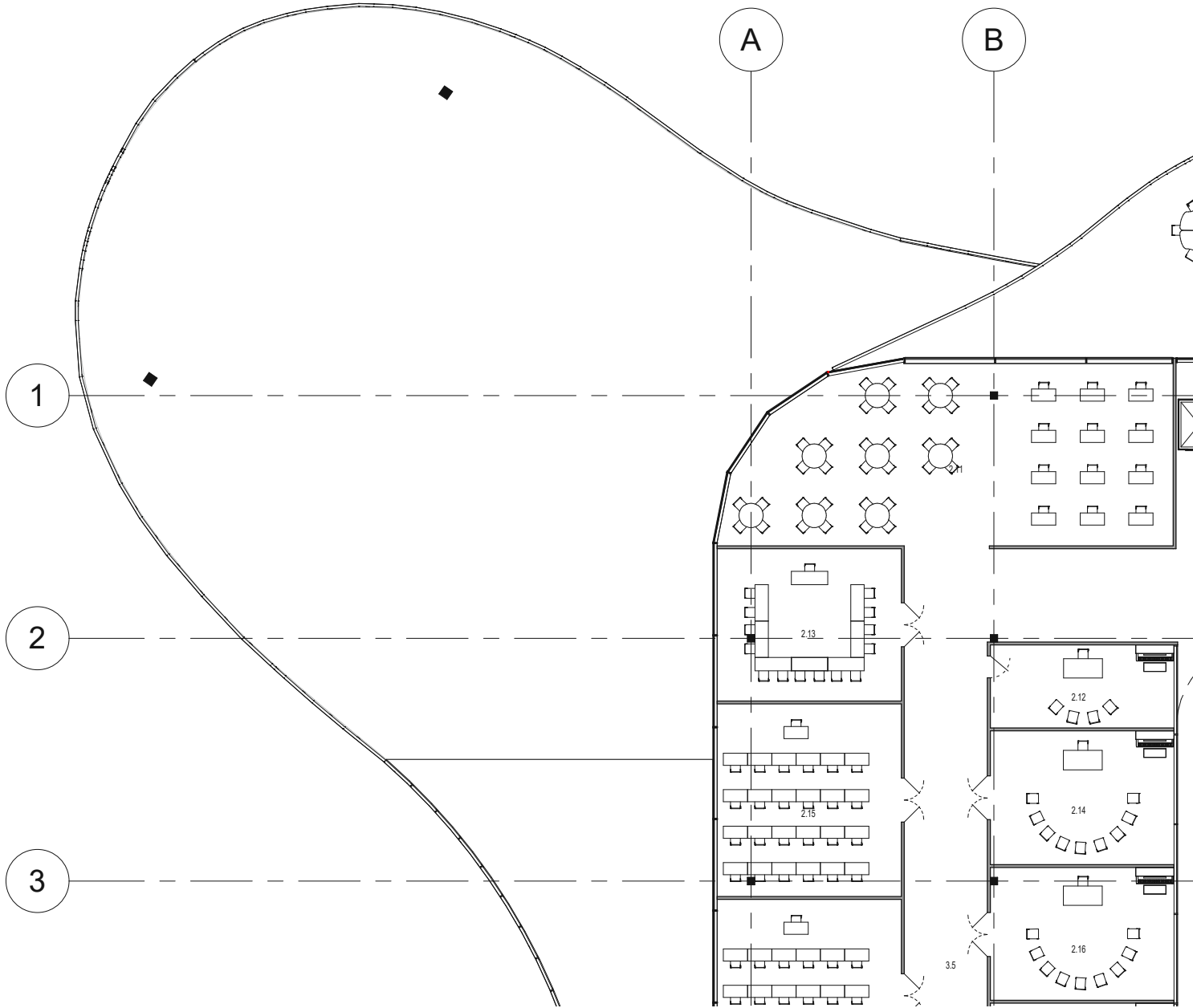
- 3.1 Hallway 153 m²
- 3.2 Stair Hall 157 m²
- 3.3 Hallway 118 m²
- 3.4 Stair Hall 166 m²
- 3.5 Hallway 133 m²

4. Social and Break Areas

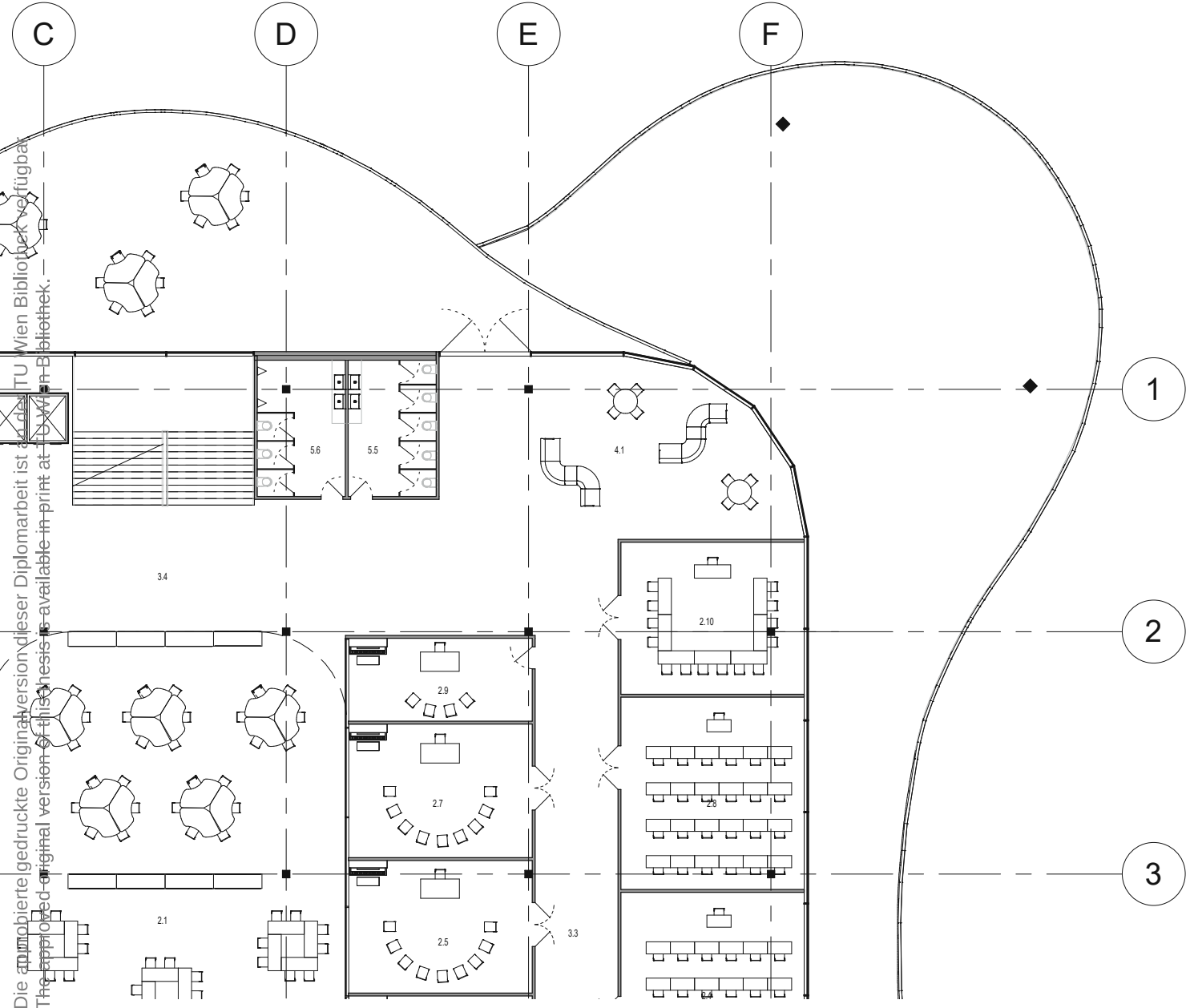
- 4.1 Social and Break Area 105 m²
- 4.2 Social and Break Area 77 m²

5. Sanitary Rooms

- 5.1 VR 8m²
- 5.2 WC 4 m²
- 5.3 WC Female 20 m²
- 5.4 WC Male 20 m²
- 5.5 WC Female 20 m²
- 5.6 WC Male 20 m²

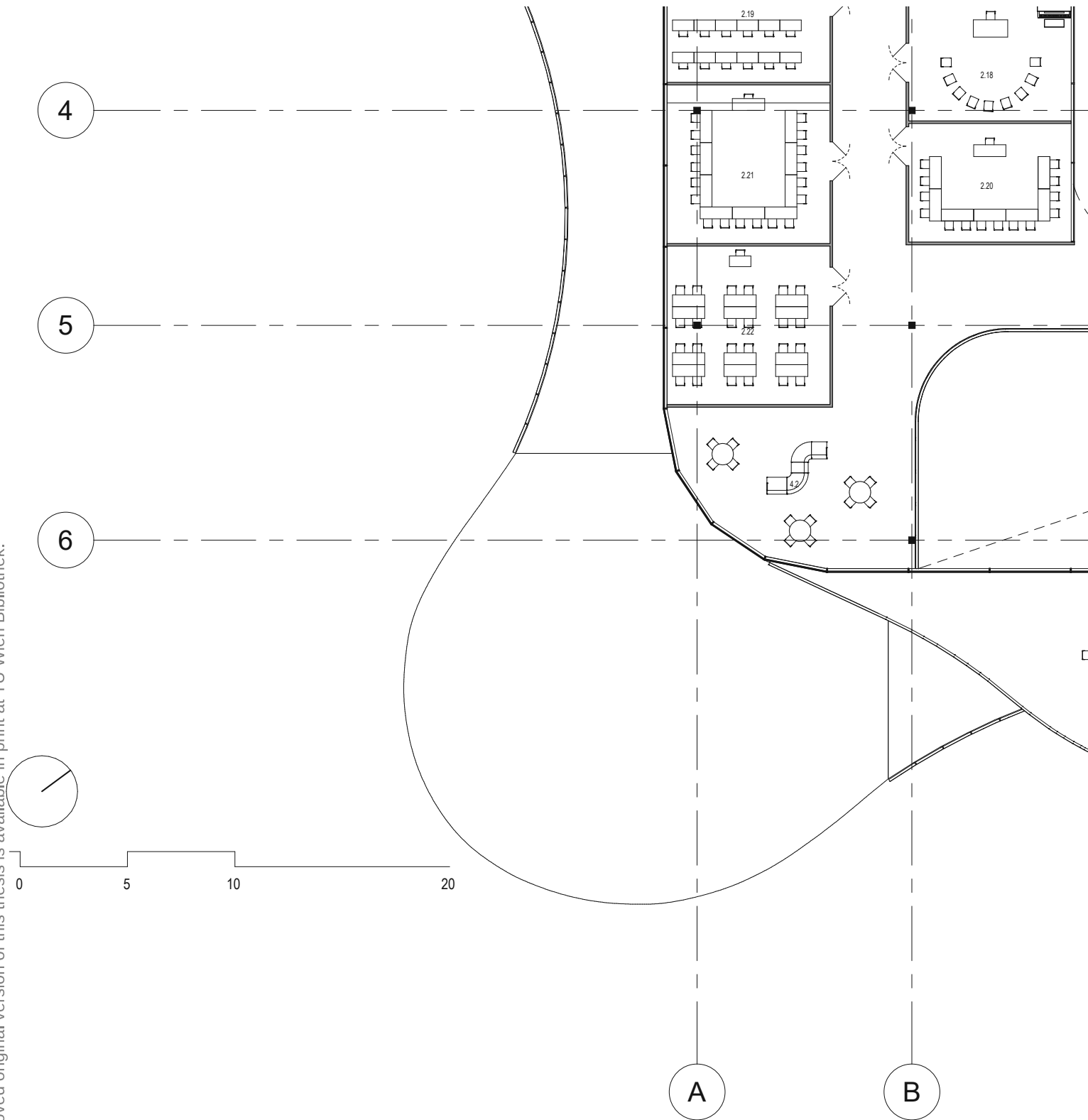


Plan 14: Second Floor 1:250 Part 1



Plan 15: Second Floor 1:250 Part 2

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Plan 16: Second Floor 1:250 Part 3

2. Learning Spaces

- 2.1 Open Classroom 390 m²
- 2.2-2.8 Classroom 41 m²
- 2.9 Classroom 26 m²
- 2.10 Classroom 48 m²
- 2.11 Open Learning Space 130 m²
- 2.12 Classroom 26 m²
- 2.13 Classroom 48 m²
- 2.14-2.20 Classroom 41 m²
- 2.21 Classroom 57 m²
- 2.22 Classroom 57 m²

3. Circulation Spaces

- 3.1 Hallway 153 m²
- 3.2 Stair Hall 157 m²
- 3.3 Hallway 118 m²
- 3.4 Stair Hall 166 m²
- 3.5 Hallway 133 m²

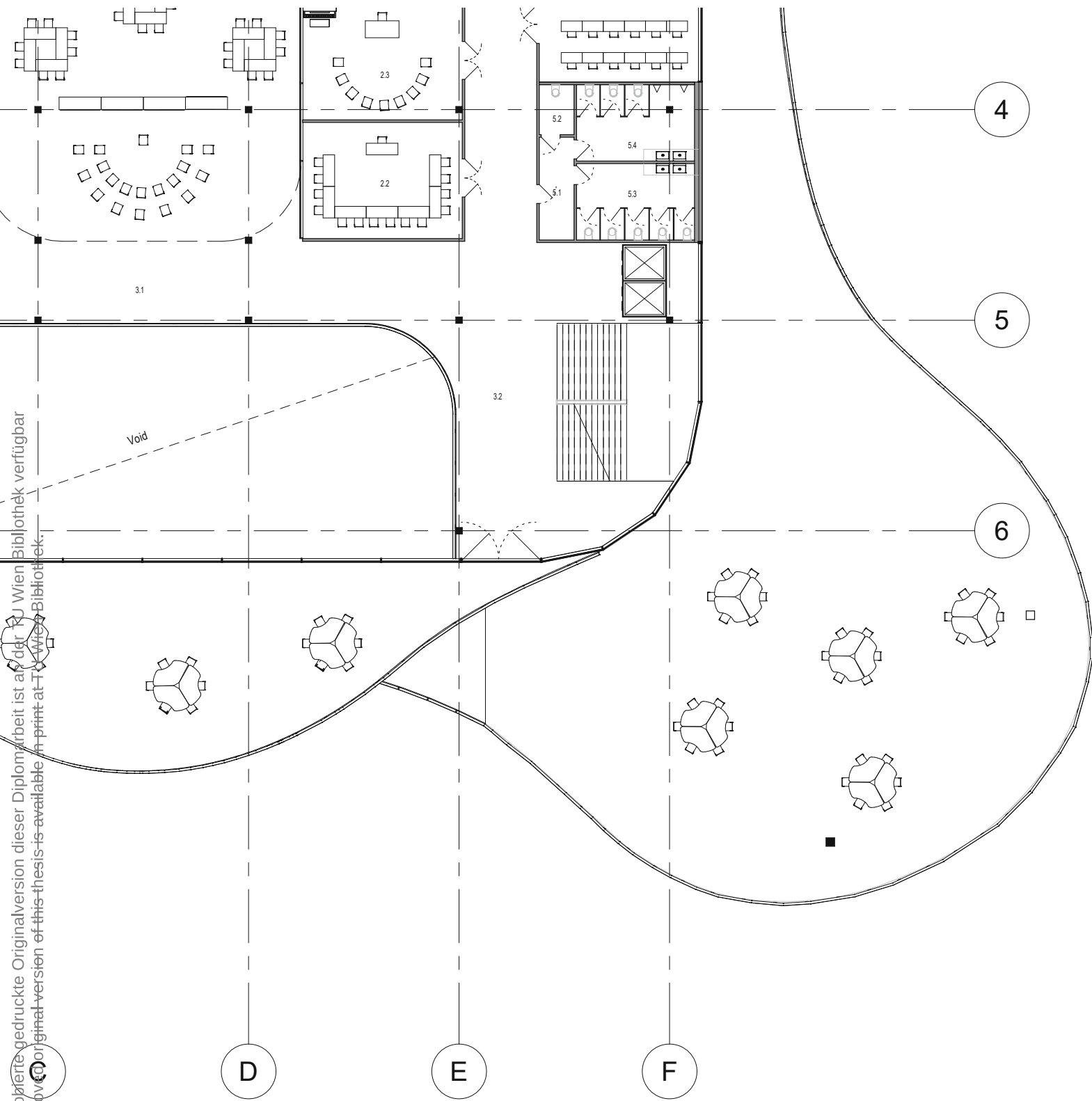
4. Social and Break Areas

- 4.1 Social and Break Area 105 m²
- 4.2 Social and Break Area 77 m²

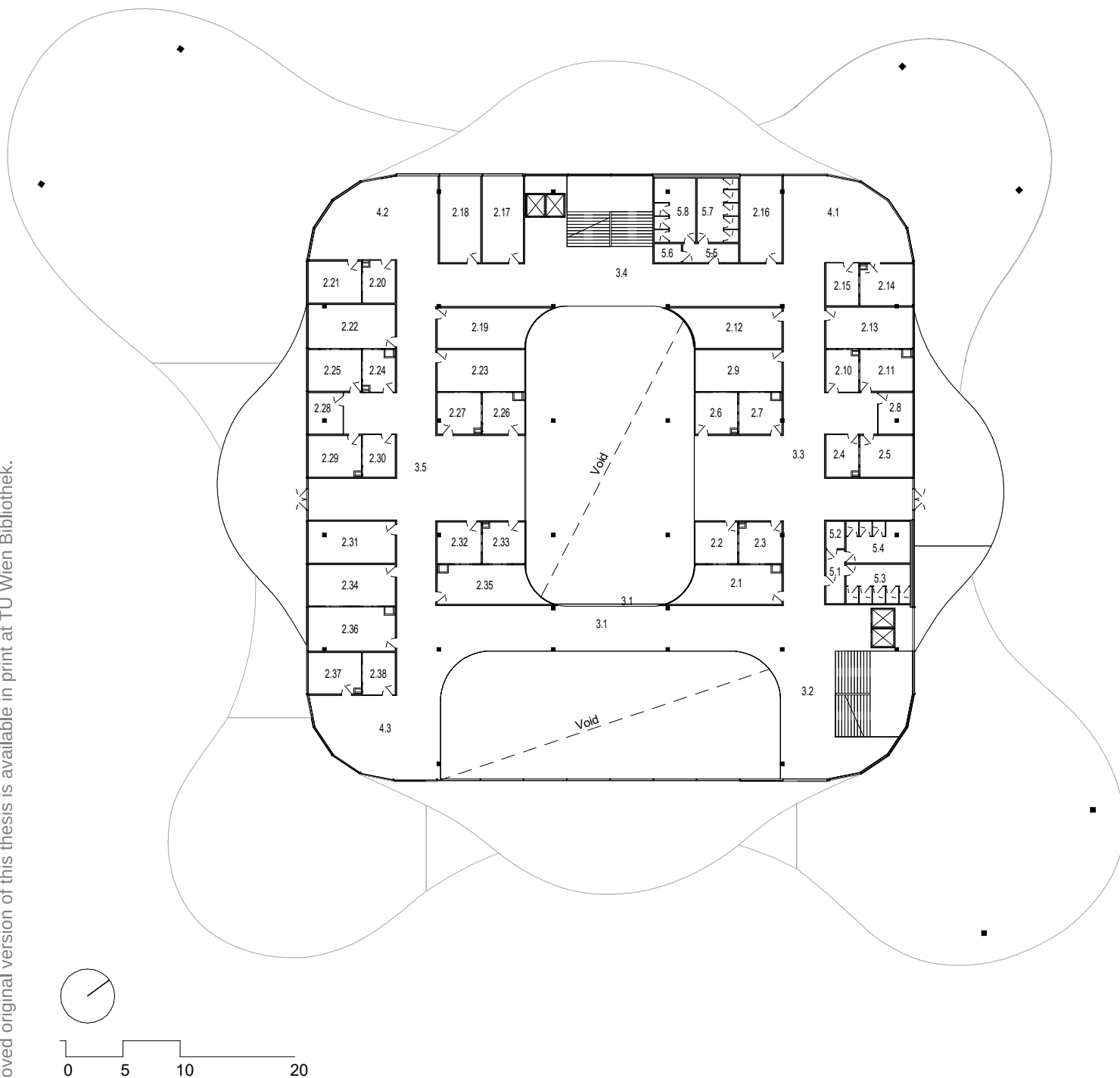
5. Sanitary Rooms

- 5.1 VR 8 m²
- 5.2 WC 4 m²
- 5.3 WC Female 20 m²
- 5.4 WC Male 20 m²
- 5.5 WC Female 20 m²
- 5.6 WC Male 20 m²

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Plan 17: Second Floor 1:250 Part 4



Plan 18: Third Floor 1:500

2. Learning Spaces

2.4, 2.8, 2.10, 2.15, 2.20, 2.24, 2.28,
 2.30, 2.38- Classroom 11 m²
 2.2, 2.3, 2.6, 2.7, 2.26, 2.27, 2.32,
 2.33- Classroom 14 m²
 2.5, 2.11, 2.14, 2.21, 2.25, 2.29, 2.37
 Classroom 17 m²
 2.1, 2.9, 2.12, 2.13, 2.16, 2.17, 2.18,
 2.23, 2.31, 2.34, 2.35
 Classroom 28 m²

3. Circulation Spaces

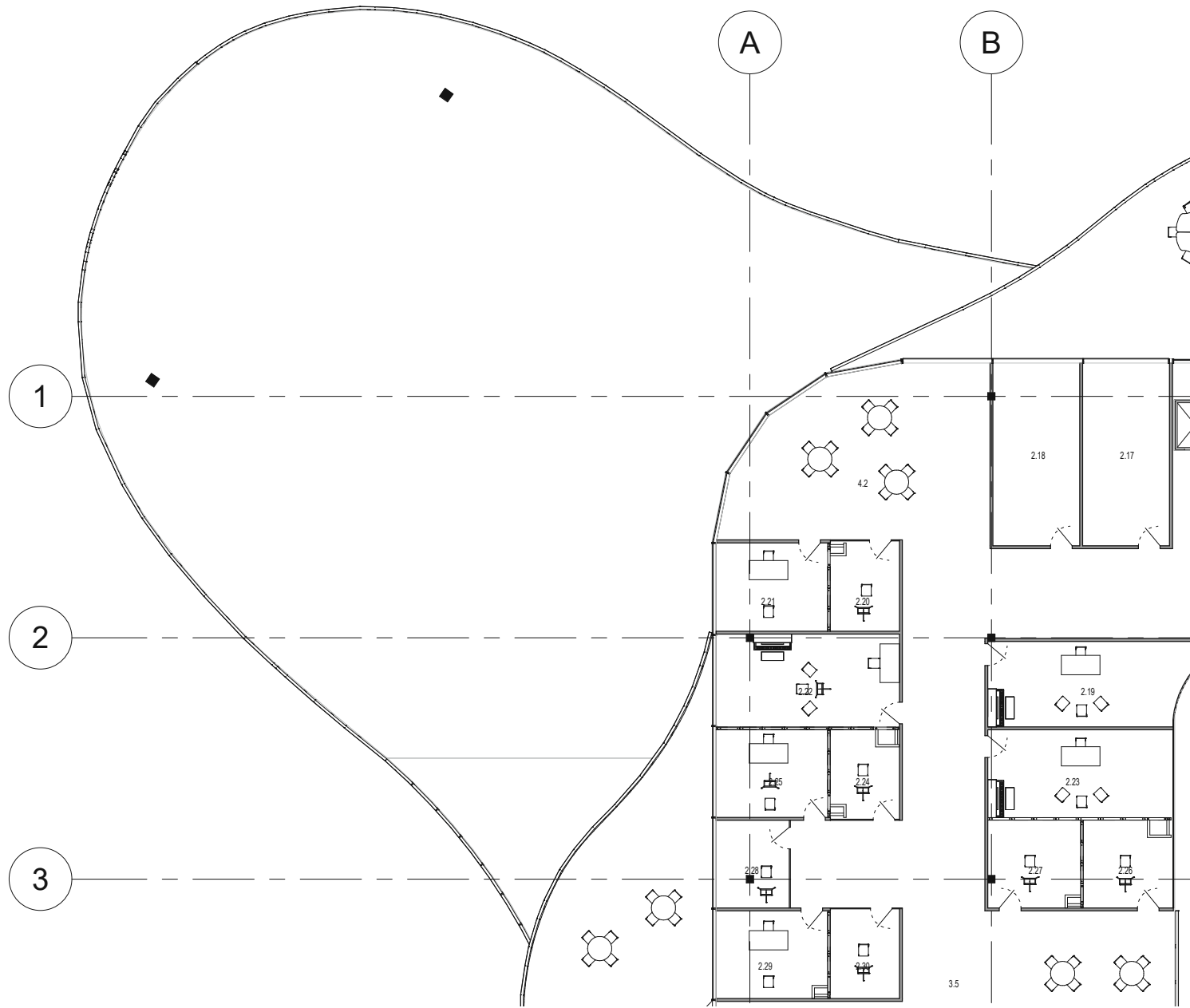
3.1 Hallway 151 m²
 3.2 Stair Hall 159 m²
 3.3 Hallway 210 m²
 3.4 Stair Hall 164 m²
 3.5 Hallway 235 m²

4. Social and Break Areas

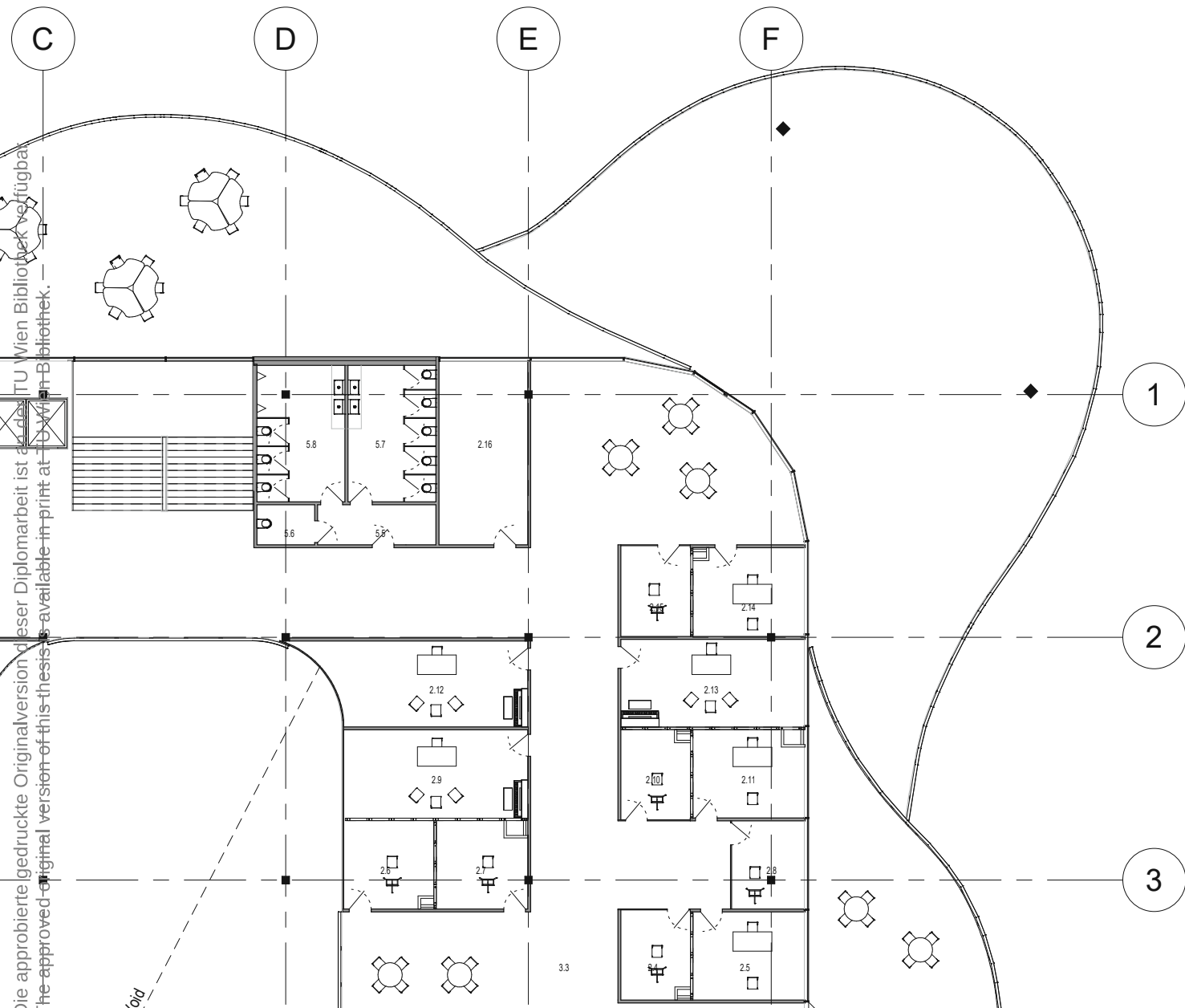
4.1 Social and Break Area 105 m²
 4.2 Social and Break Area 77 m²

5. Sanitary Rooms

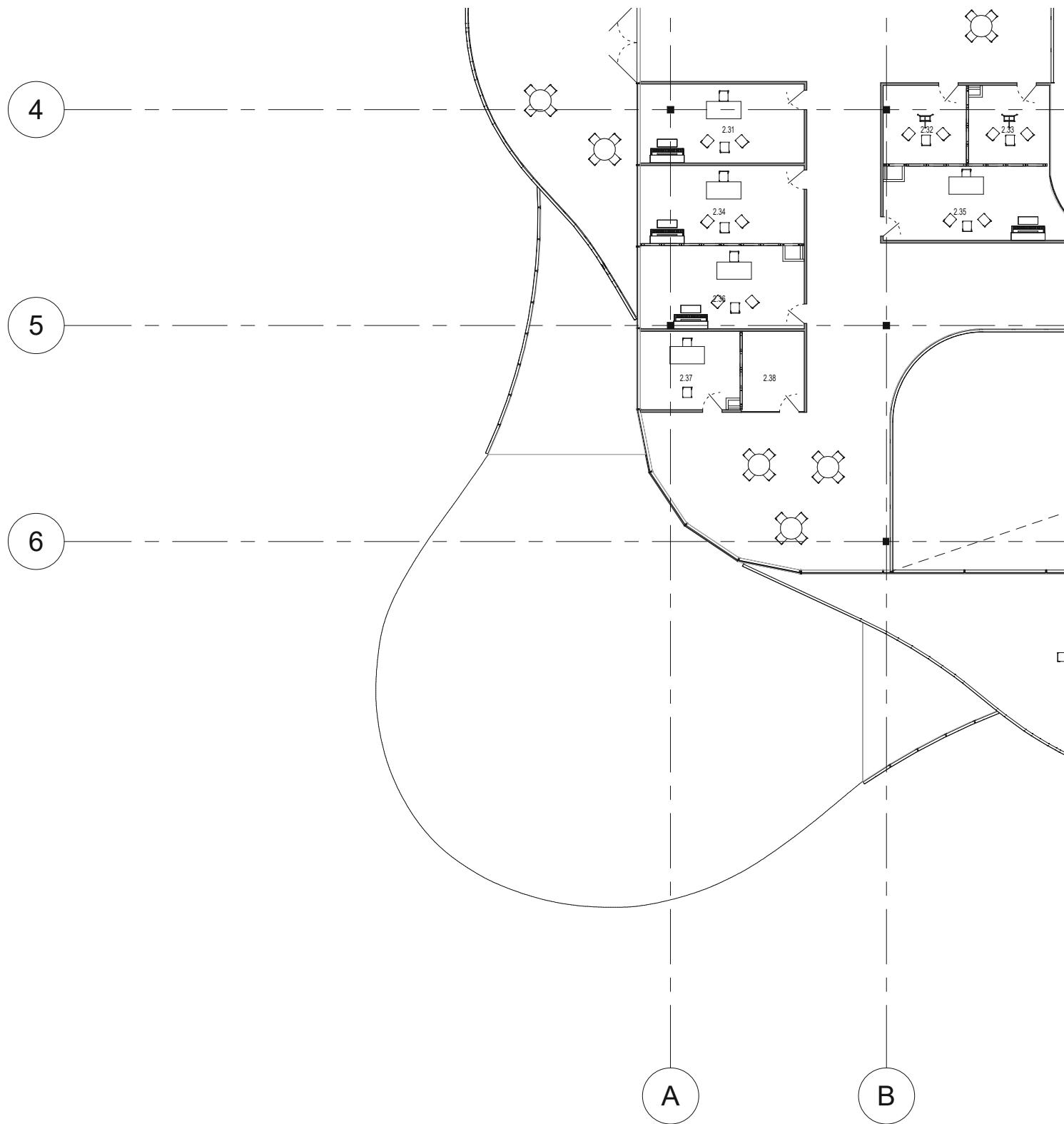
5.1 VR 8m²
 5.2 WC 4 m²
 5.3 WC Female 20 m²
 5.4 WC Male 20 m²
 5.5 VR 8m²
 5.6 WC 4 m²
 5.7 WC Female 20 m²
 5.8 WC Male 20 m²



Plan 19: Third Floor 1:250 Part 1



Plan 20:Third Floor 1:250 Part 2



Plan 21: Third Floor 1:250 Part 3

2. Learning Spaces

- 2.4, 2.8, 2.10, 2.15, 2.20, 2.24, 2.28, 2.30, 2.38- Classroom 11 m2
- 2.2, 2.3, 2.6, 2.7, 2.26, 2.27, 2.32, 2.33- Classroom 14 m2
- 2.5, 2.11, 2.14, 2.21, 2.25, 2.29, 2.37 Classroom 17 m2
- 2.1, 2.9, 2.12, 2.13, 2.16, 2.17, 2.18, 2.23, 2.31, 2.34, 2.35 Classroom 28 m2

3. Circulation Spaces

- 3.1 Hallway 151 m2
- 3.2 Stair Hall 159 m2
- 3.3 Hallway 210 m2
- 3.4 Stair Hall 164 m2
- 3.5 Hallway 235 m2

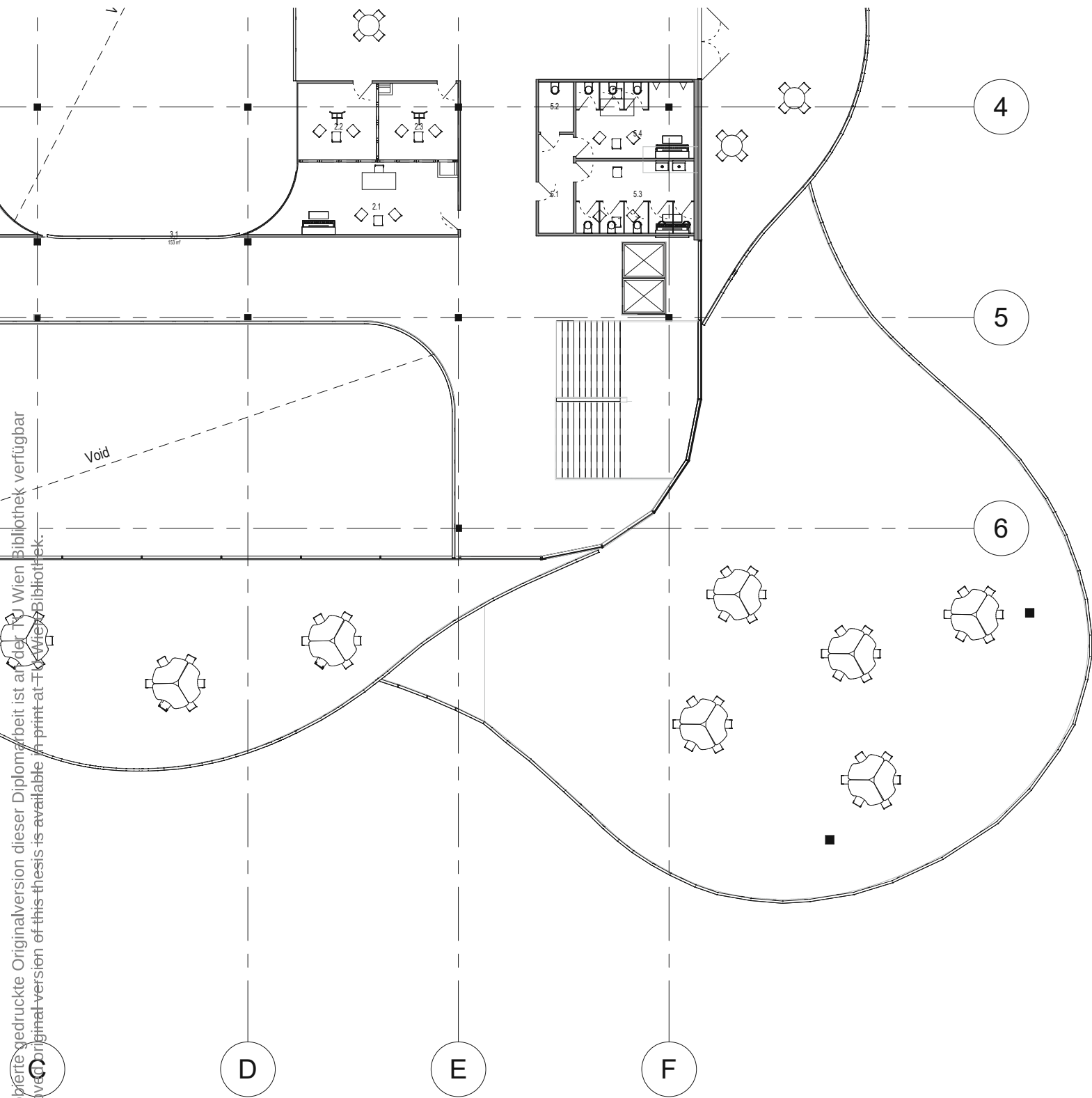
4. Social and Break Areas

- 4.1 Social and Break Area 105 m2
- 4.2 Social and Break Area 77 m2

5. Sanitary Rooms

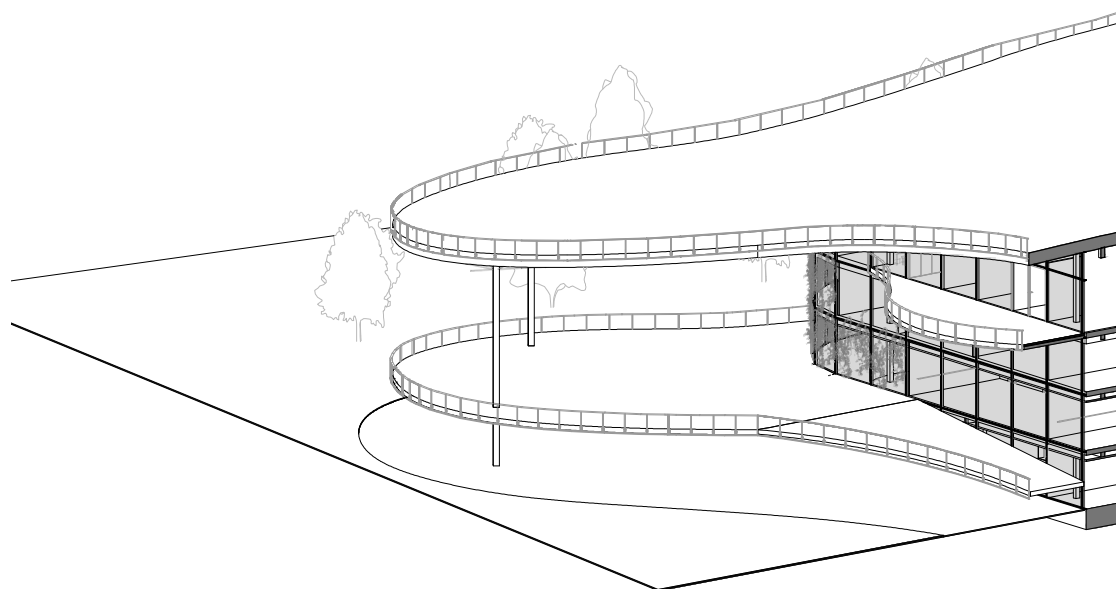
- 5.1 VR 8m2
- 5.2 WC 4 m2
- 5.3 WC Female 20 m2
- 5.4 WC Male 20 m2
- 5.5 VR 8m2
- 5.6 WC 4 m2
- 5.7 WC Female 20 m2
- 5.8 WC Male 20 m2

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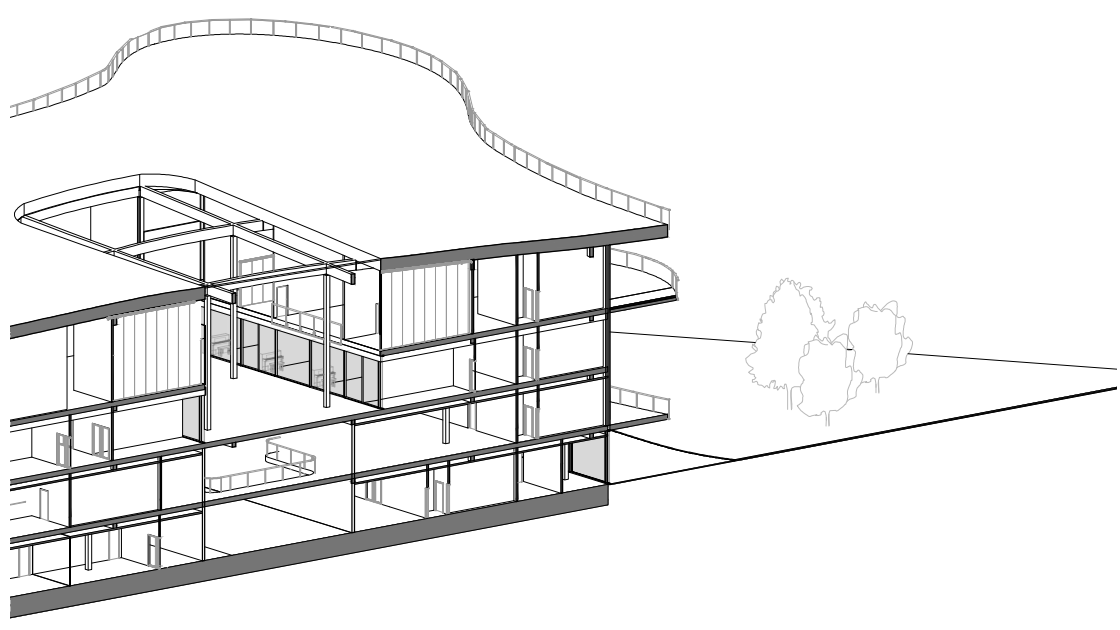


Plan 22: Third Floor 1:250 Part 4

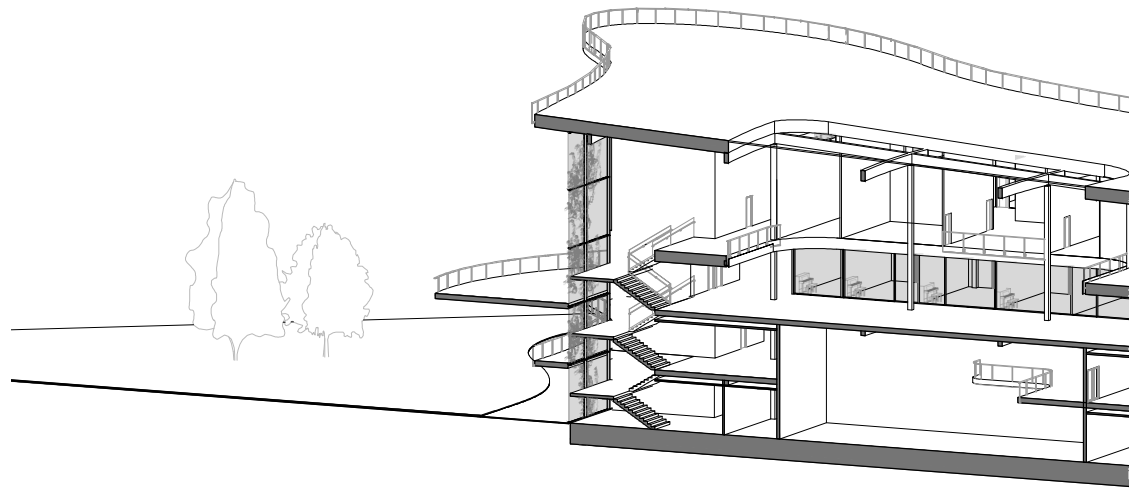
5.3 SECTIONS

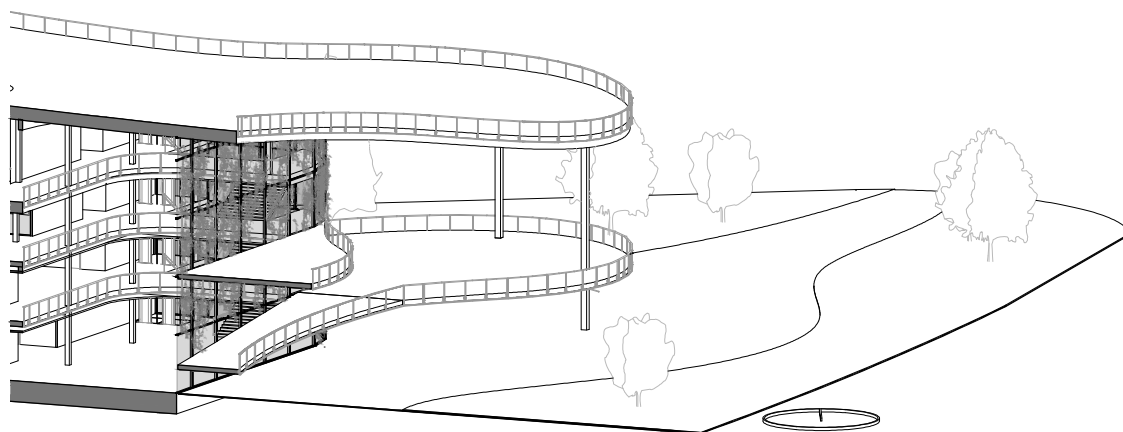


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Plan 23: Section 1 1:500





Plan 24: Section 2 1:500



Fig. 91 3D Section



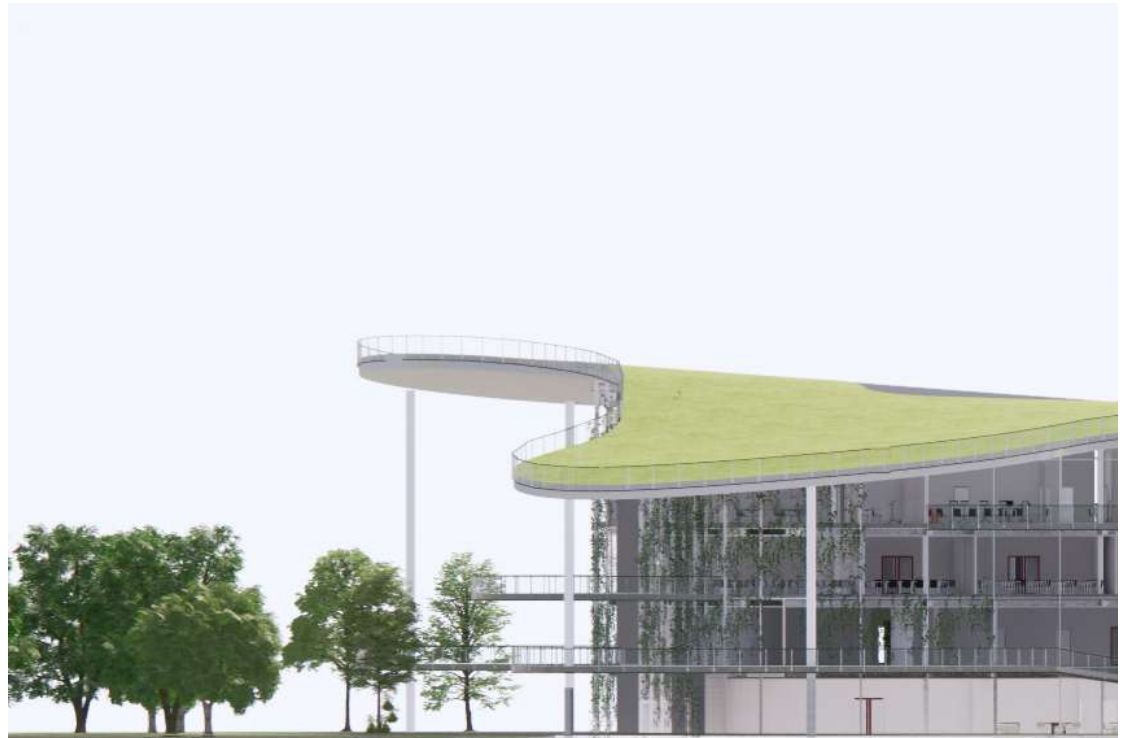
Fig. 92 3D Section

5.4 ELEVATIONS





Fig. 93 Elevation 1



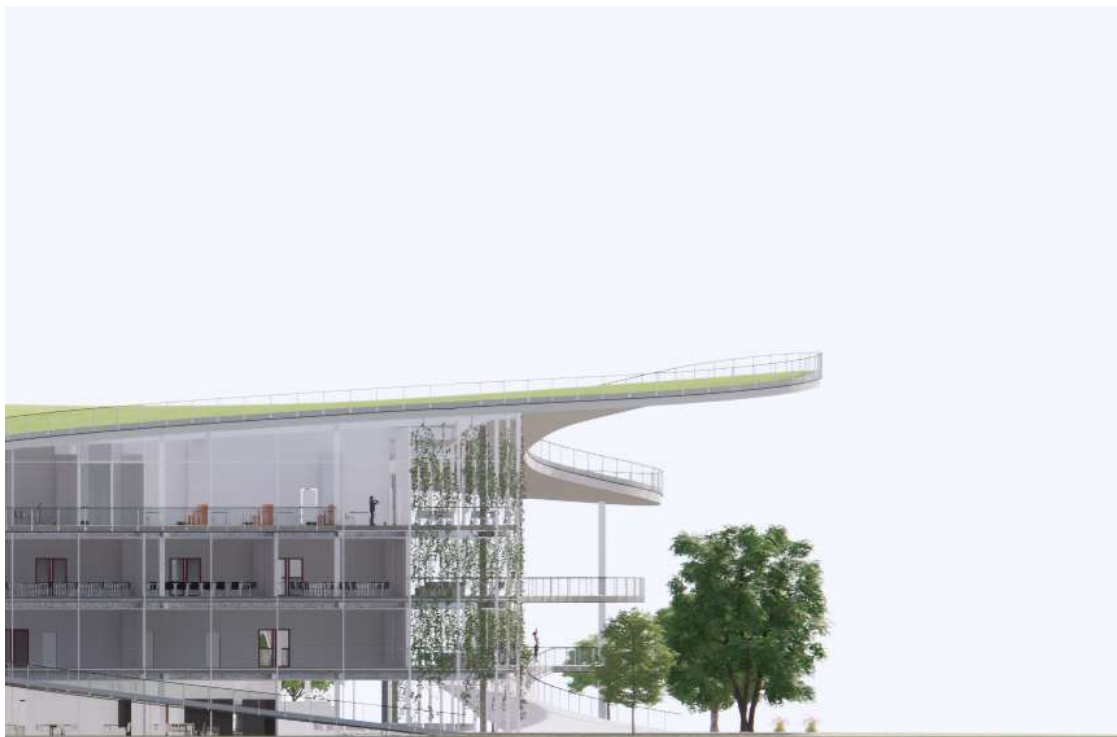


Fig. 94 Elevation 2





Fig. 95 Elevation 3

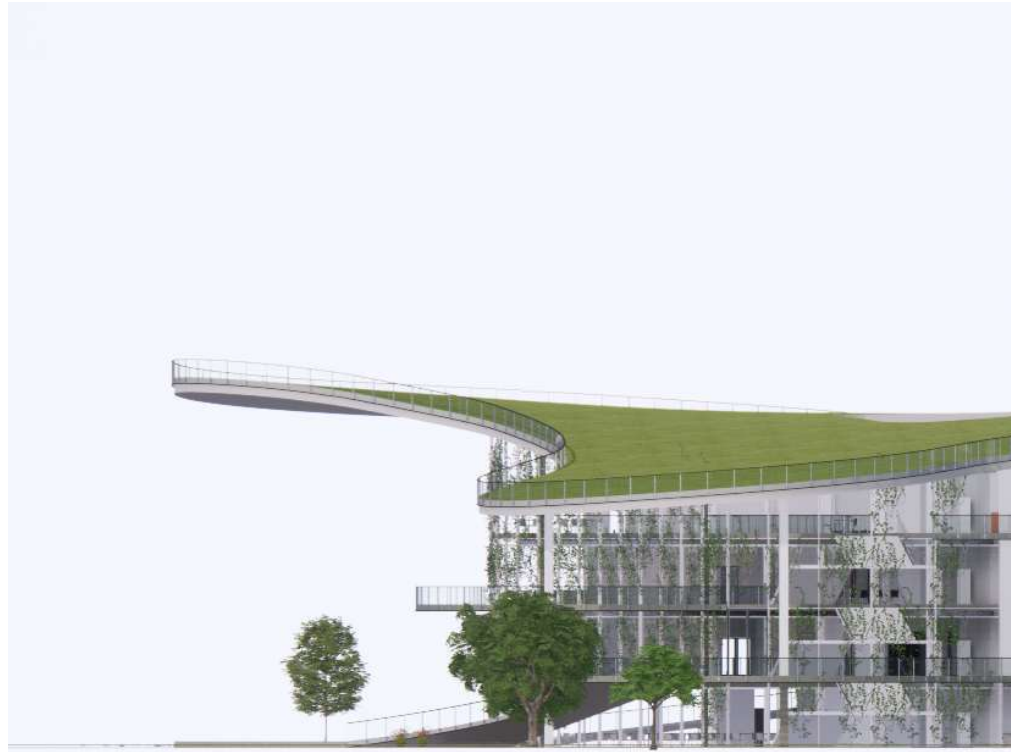
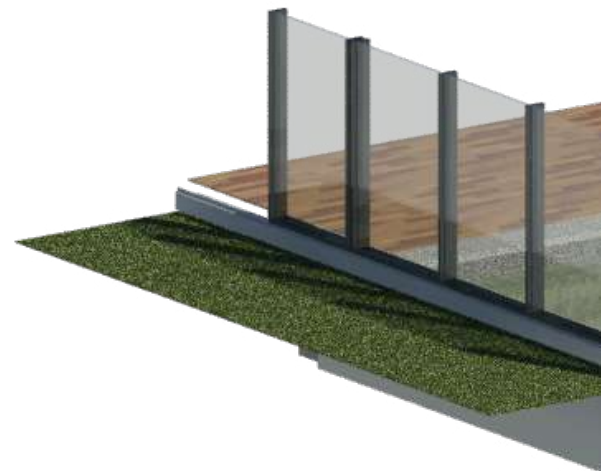
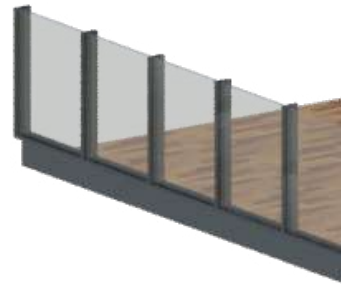
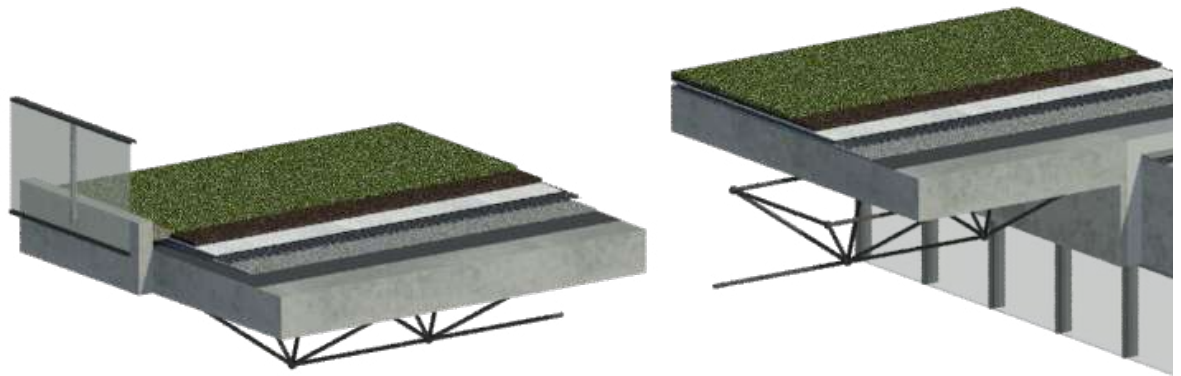




Fig. 96 Elevation 4

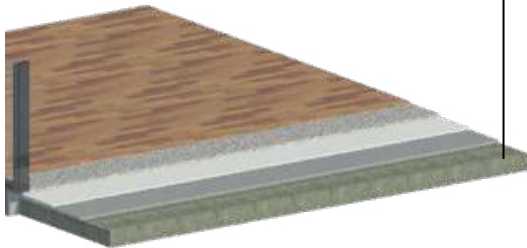
5.5 DETAILS



Vegetation 5,00 cm
 Filter fleece 1,00 cm
 Drainage element
 Protective coating 2,00 cm
 2-ply waterproofing
 Thermal insulation 20,00 cm
 Primer layer
 Reinforced concrete slab 52cm



Parquet 2,00 cm
 Screed 5,00 cm
 Separating layer 0,20 cm
 Impact sound insulation 3,00 cm
 Reinforced concrete slab 20,00 cm



Parquet 2,00 cm
 Screed 7,00 cm
 Embankment 4,00 cm
 Reinforced concrete slab 90,00 cm
 Protective concrete 6,00 cm
 2-ply waterproofing 1,00 cm
 Underpinning 10,00 cm
 Separating layer 0,20 cm
 XPS 10,00 cm
 Blinding layer 10 cm

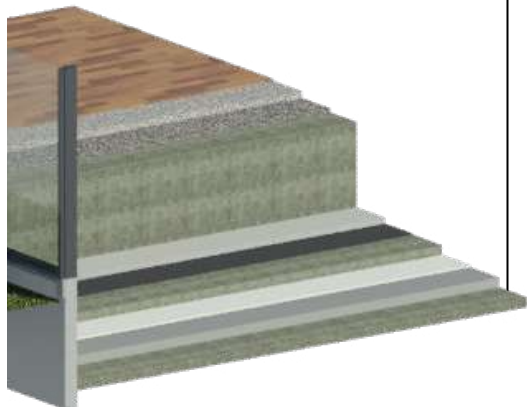
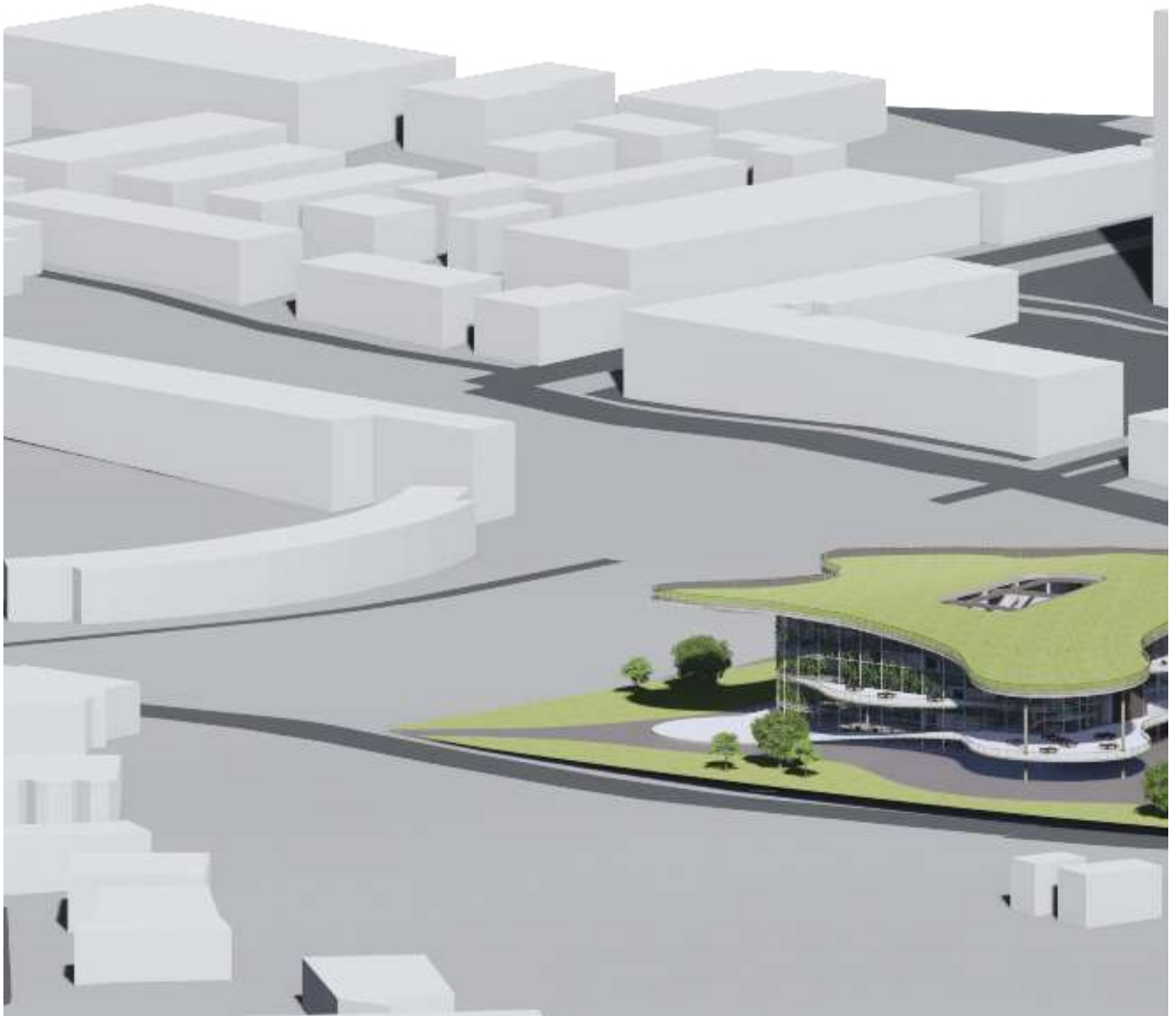


Fig. 97 Details

5.6 RENDERINGS



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Fig. 98 The school in the urban setting





Fig. 99 Entrance area





Fig. 100 Outdoor class





Fig. 101 Entrance Hall





Fig. 102 Hallway and the break area





Fig. 103 Open space classroom





Fig. 104 Dance hall

5.7 MODEL PHOTOS

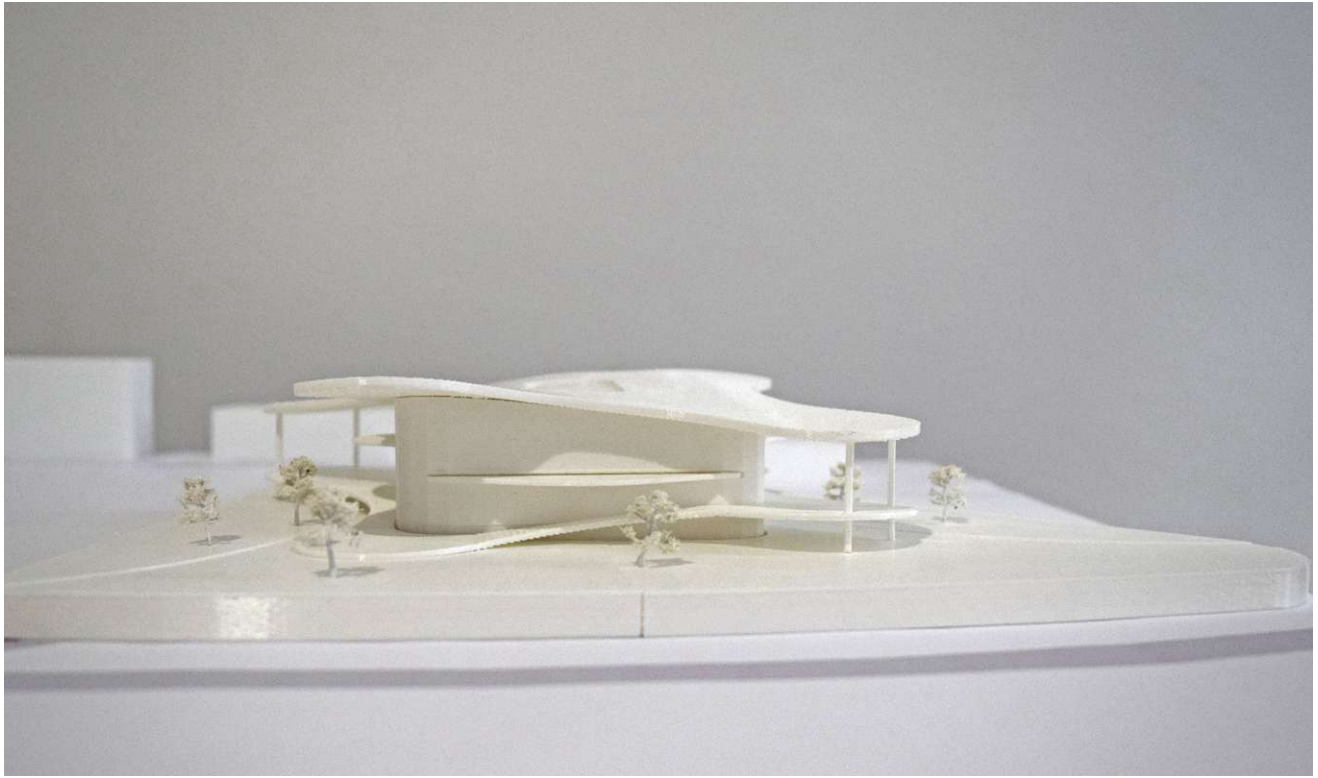


Fig. 105 Model photo 1

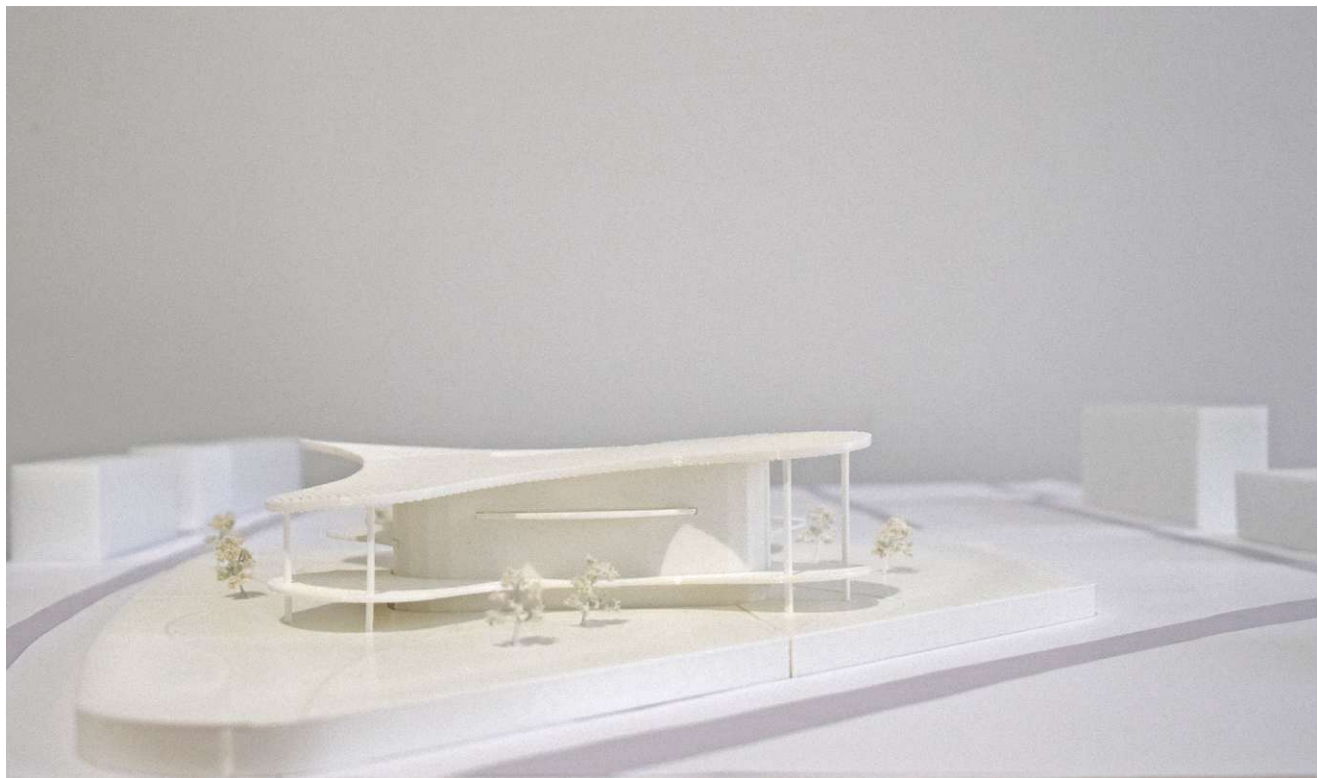


Fig. 106 Model photo 2

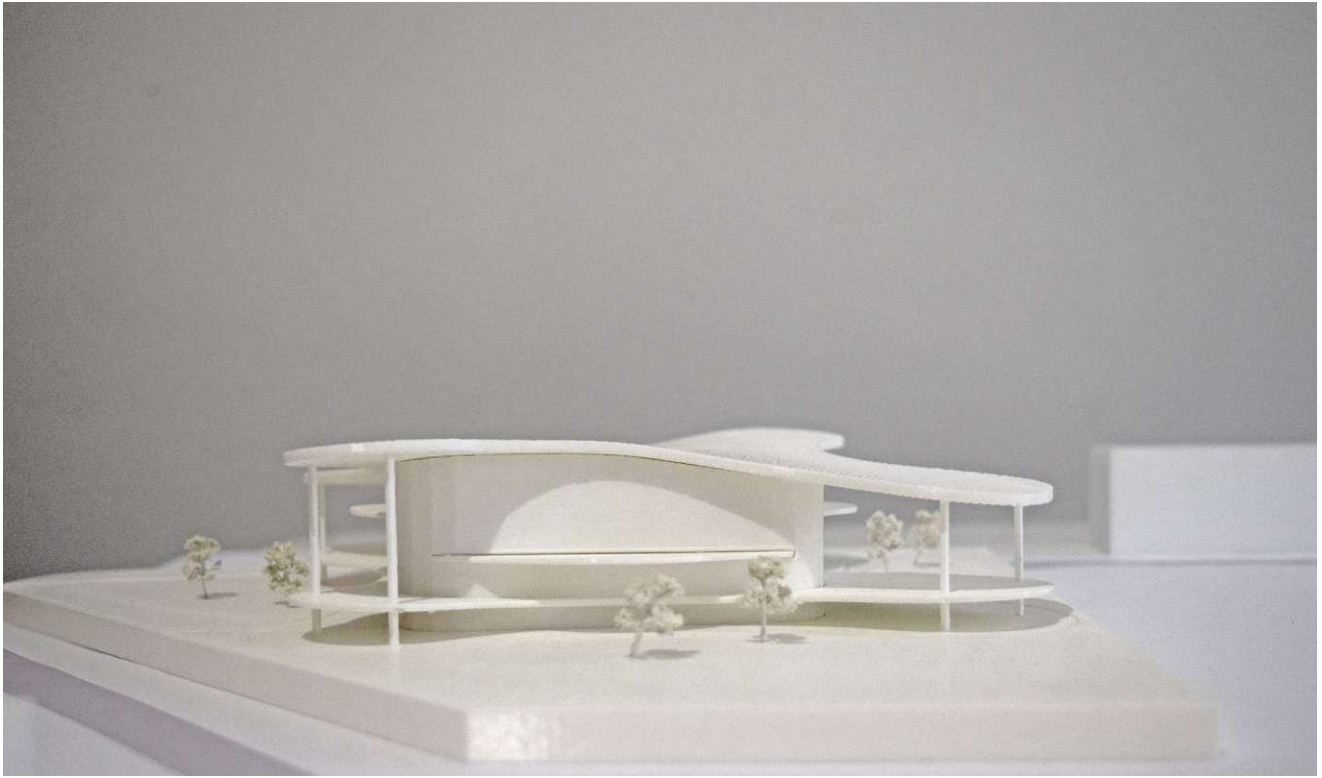


Fig. 107 Model photo 3

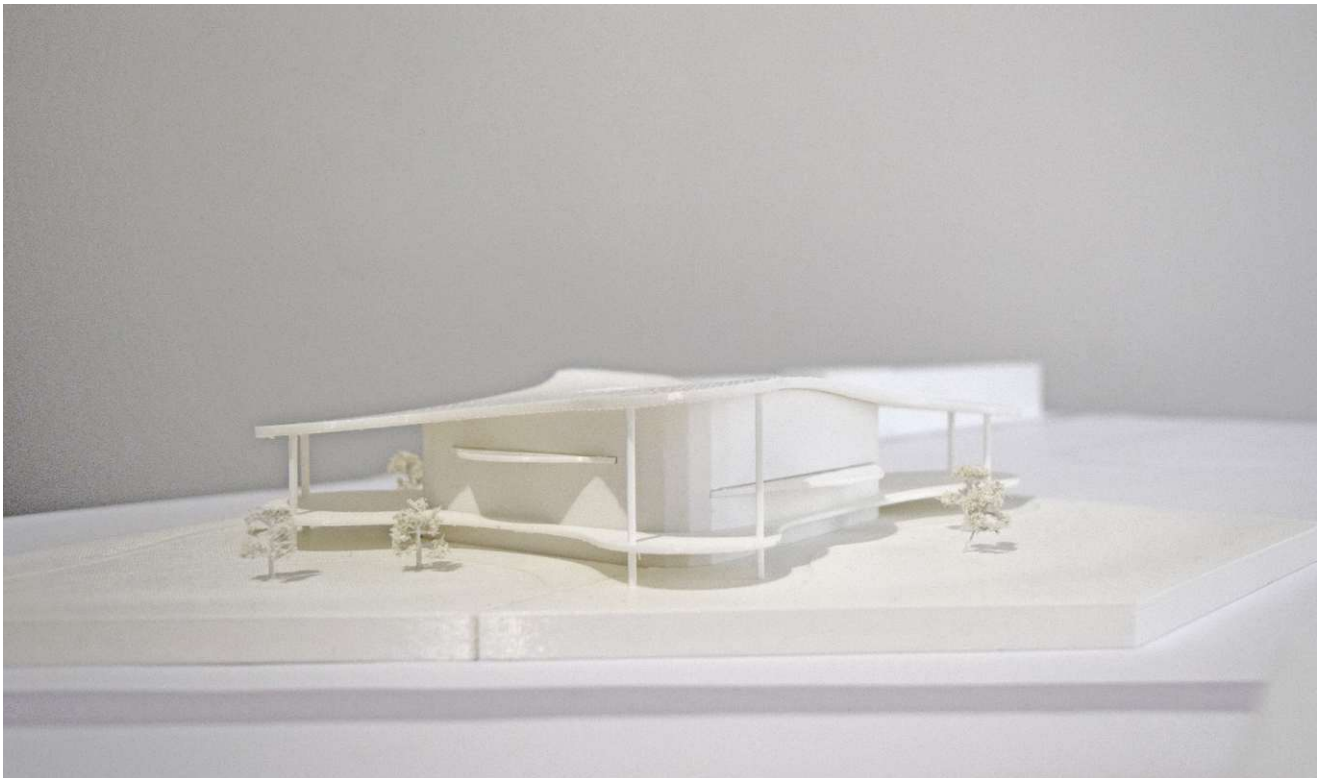
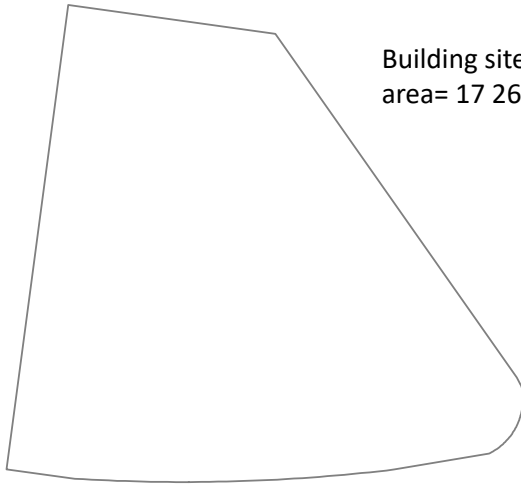
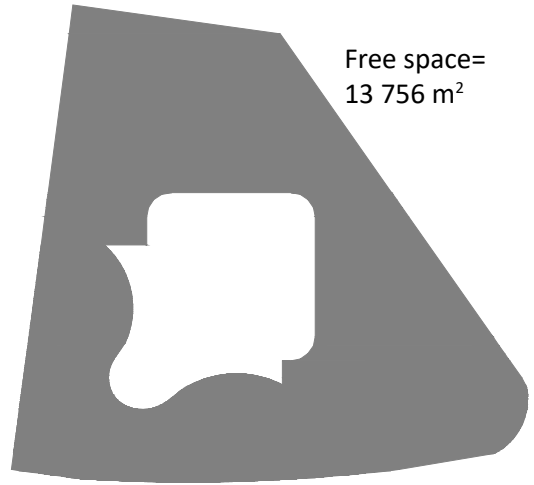


Fig. 108 Model photo 4

5.8 ASSESSMENT

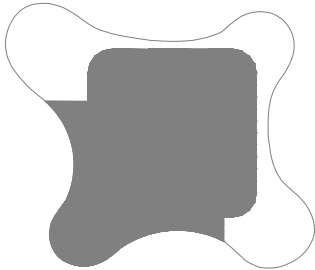


Building site
area= 17 266 m²

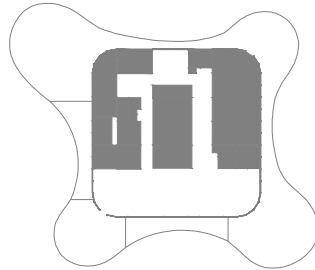


Free space=
13 756 m²

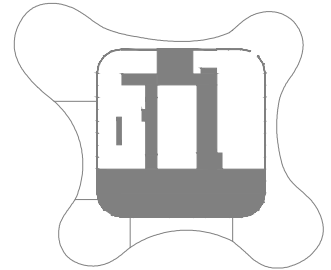
Ground floor



Gross floor area= 3 510 m²

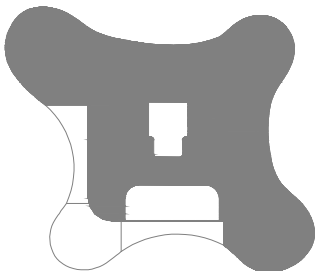


Effective area= 1 400 m²
40% of GFA

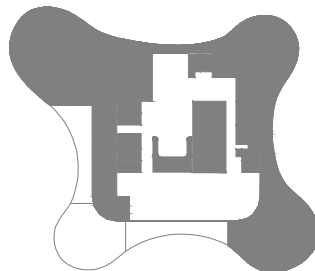


Circulation area=1 998 m²
56% of GFA

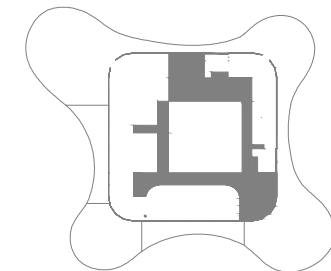
1. Floor



Gross floor area= 4 111 m²

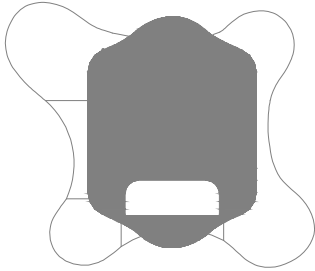


Effective area= 3 253 m²
79% of GFA

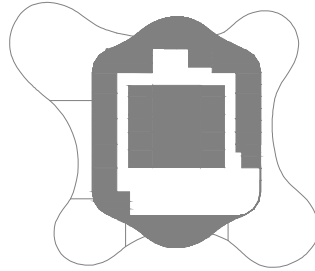


Circulation area=779 m²
19% of GFA

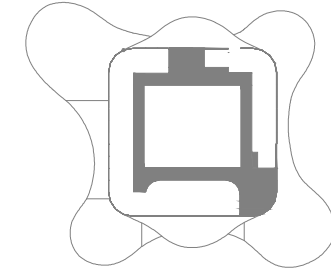
2. Floor



Gross floor area= 2 908 m²

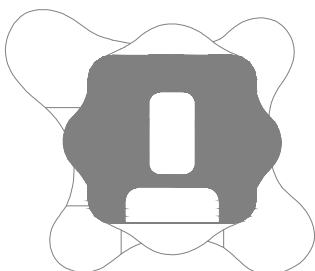


Effective area= 2 075 m²
71% of GFA

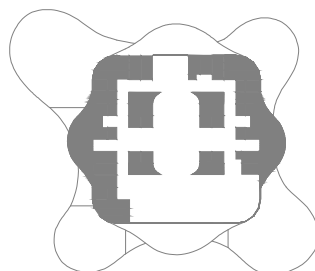


Circulation area=734 m²
25% of GFA

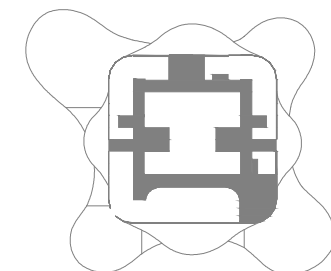
3. Floor



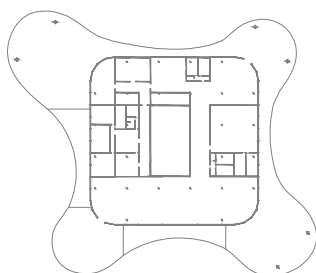
Gross floor area= 2 332 m²



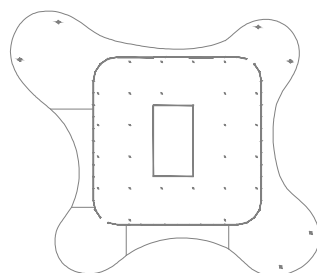
Effective area= 1 295 m²
55% of GFA



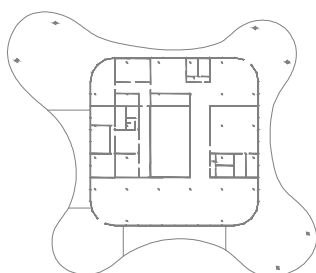
Circulation area=950 m²
40% of GFA



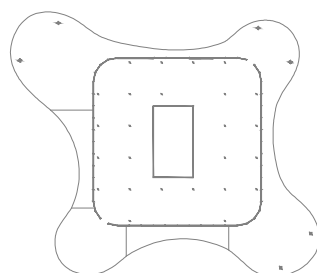
Construction area=112 m²
3% of GFA



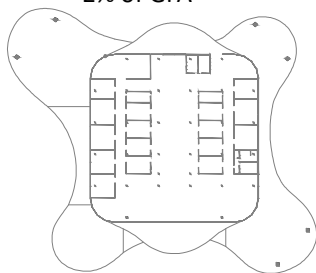
Load bearing construction area= 25 m²
0.71% of GFA



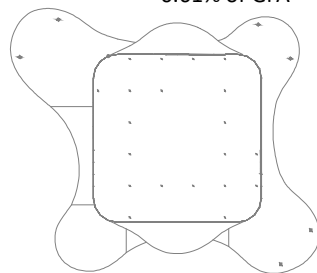
Construction area=79 m²
2% of GFA



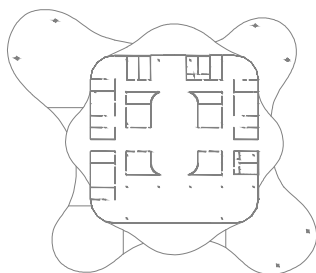
Load bearing construction area= 25 m²
0.61% of GFA



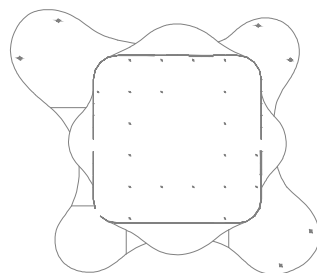
Construction area=99 m²
3% of GFA



Load bearing construction area= 11 m²
0.38% of GFA



Construction area=87 m²
4% of GFA



Load bearing construction area= 11 m²
0.47% of GFA

6. CONCLUSION

One of the important objectives of an art school in a city is to bring the art forms it teaches closer to the wider audiences. Through the outdoor learning activities, this school aims to establish a close connection to its surroundings and awake the curiosity of the city's habitants, thus emphasizing the idea that classical music and ballet are not reserved exclusively for concert halls and formal events but can also be enjoyed in new and innovative ways.

Through a variety of informal and flexible learning areas it aims to provide a space for students, where in addition to attending lessons, they can also pursue individual learning and practicing as well as the social exchange of knowledge. Furthermore, the flexibility of space allows the teaching staff to test different forms of tuition and find the ones most suitable for their lessons.

The common use of space by the musicians and the dancers aims to encourage the communication and exchange between the students which is beneficial for their further professional development.

7. DIRECTORIES

2. LITERATURE DIRECTORY

1. Bosnia and Herzegovina - a brief geographical overview < <http://geografija.pmf.unsa.ba/o-odsjeku/o-bosni-i-hercegovini/#1623668639888-93b33d15-8245>>, viewed on 28.11
2. <https://web.archive.org/web/20100815215526/http://www.banjaluka.rs.ba/front/category/139/>, viewed on 29.11
3. Urbanisticki razvoj Banje Luke, Ljiljana Sevo, Opština Banja Luka i Zavod za zaštitu spomenika kulture i prirode Banja Luka, 1996, p.13-14
4. History, < <https://www.znanje.org/i/i27/07iv06/07iv0621/bl-istorija.htm>>, viewed on 29.11
5. History, < <https://www.znanje.org/i/i27/07iv06/07iv0621/bl-istorija.htm>>, viewed on 29.11
6. History, <https://www.banjaluka.rs.ba/posjetioci/istorija-grada/?sr_pismo=lat>, viewed on 29.11
7. Banja Luka in the Times of Kingdom of SHS/Yugoslavia, Goran Duran, published 22.04.2013, viewed on 30.11.2022, <<https://www.glassrpske.com/lat/plus/istorija/banjaluka-za-vrijeme-kraljevine-shsjugoslavije/116370>>
8. Postsocijalistička urbana transformacija Banja Luke, Mira Mandić, Univerzitet u Banjoj Luci, Prirodno-matematički fakultet, 04.06.2019., P. 2, viewed on 30.11.2022, < <https://pmf.unibl.org/wp-content/uploads/2020/11/Mandic-srp.-2019.pdf>>
9. Banja Luka za vrijeme socijalističke Jugoslavije, Goran Djuran, 02.12.2013, viewed on 30.11.2022 < <https://www.glassrpske.com/cir/plus/istorija/banjaluka-za-vrijeme-socijalisticke-jugoslavije/140522>>
10. Historija muzike u Bosni i Hercegovini, Ivan Cavlović, Muzička Akademija u Sarajevu, 2011, P. 352, viewed on 30.11.2022 < <http://mas.unsa.ba/sites/default/files/pdf%20sadrzaj1/Historija%20muzike%20u%20BiH-sadrzaj.pdf>>
11. Historija muzike u Bosni i Hercegovini, Ivan Cavlović, Muzička Akademija u Sarajevu, 2011, P. 299-301, viewed on 30.11.2022 <https://iis.unsa.ba/wp-content/uploads/2019/08/42-prilozi_-Prikazi-IvanCavlović.pdf>
12. Veliki poeci profesionalnog baleta u BiH, Jovana Milosavljević, 27.05.2020, viewed on 03.01.2023, < <https://kaleidoskop-media.com/teatar/veliki-poeci-profesionalnog-baleta-u-bih>>
13. Leitlinien für Leistungsfähige Schulbauten in Deutschland, Montag Stiftung Jugend und Gesellschaft, Bonn; Bund Deutscher Architektinnen und Architekten BDA, Berlin; Verband Bildung und Erziehung (VBE), Berlin, p. 9-10, < https://issuu.com/montagstiftungen/docs/mon_lls_brosch_komplett_46rz_3teauf>, viewed on 25.12.2022
14. Leitlinien für Leistungsfähige Schulbauten in Deutschland, Montag Stiftung Jugend und Gesellschaft, Bonn; Bund Deutscher Architektinnen und Architekten BDA, Berlin; Verband Bildung und Erziehung (VBE), Berlin, p. 20-29, < https://issuu.com/montagstiftungen/docs/mon_lls_brosch_komplett_46rz_3teauf>, viewed on 25.12.2022
15. Rudolf Laban, viewed on 01.12.2022, <https://www.newworldencyclopedia.org/entry/Rudolf_Laban>
16. Rudolf Laban Scales, viewed on 01.12.2022, <<https://www.labanlabs.org/scales/>>
17. Principles of solar shading, Stephenson, D. G., Canadian Building Digest, Division of Building Research, National Research Council Canada, 1964, P.2, viewed on 09.12.2022, < <https://nrc-publications.canada.ca/eng/view/object/?id=9111dfc1-169a-4f83-a786-faa6335daae0>>
18. Integrated Benefits of Outdoor Living Walls, < <https://www.biotope.uk.com/benefits/benefits-of-exterior-living-walls/>>, visited on 10.12.2022
19. Green Wall systems: where do we stand?, S. A. Palermo, M. Turco, IOP Conference Series Earth and Environmental Science, 2020, p.4, < https://www.researchgate.net/publication/338808990_Green_Wall_systems_where_do_we_stand#pf4>, viewed on 10.12.2022
20. Flexible Seating Impact on Classroom Environment, K. Cole, K. Schroeder, M. Bataineh, A. Al-Bataineh, TOJET: The Turkish Online Journal of Educational Technology – April 2021, volume 20 issue 2, p.65, < <https://files.eric.ed.gov/full-text/EJ1304613.pdf>>, viewed on 11.12.2022
21. Acoustics of Schools: a design guide, Institute of Acoustics, Association of Noise Consultants, 2015, p. 49, < https://www.ioa.org.uk/sites/default/files/Acoustics%20of%20Schools%20-%20a%20design%20guide%20November%202015_1.pdf> viewed on 25.12.2022
22. <https://www.acousticalsurfaces.com/acoustic_IOI/reverberation.htm> viewed on 25.12.2022

23. Acoustics of Schools: a design guide, Institute of Acoustics, Association of Noise Consultants, 2015, p. 51, <https://www.ioa.org.uk/sites/default/files/Acoustics%20of%20Schools%20-%20a%20design%20guide%20November%202015_1.pdf> viewed on 25.12.2022
24. Planing guide for school music facilities, Wenger Corporation 2008, p. 10 <<https://www.wengercorp.com/Construct/docs/Wenger%20Planning%20Guide.pdf>>, visited on 26.12.2022
25. Acoustics of Schools: a design guide, Institute of Acoustics, Association of Noise Consultants, 2015, p. 52, <https://www.ioa.org.uk/sites/default/files/Acoustics%20of%20Schools%20-%20a%20design%20guide%20November%202015_1.pdf> viewed on 25.12.2022
26. Acoustics of Schools: a design guide, Institute of Acoustics, Association of Noise Consultants, 2015, p. 53, <https://www.ioa.org.uk/sites/default/files/Acoustics%20of%20Schools%20-%20a%20design%20guide%20November%202015_1.pdf> viewed on 25.12.2022
27. Open Air School Movement, <<http://www.faqs.org/childhood/Me-Pa/Open-Air-School-Movement.html>>, viewed on 11.12.2022
28. Do Lessons in Nature Boost Subsequent Classroom Engagement? Refueling Students in Flight, M. Kuo, M. H. E. M. Browning, M. L. Penner, *Frontiers in Psychology*, 2018, <<https://www.frontiersin.org/articles/10.3389/fpsyg.2017.02253>>, viewed on 11.12.2022

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Fig. 22 The Art School „Vlado Milosevic“, viewed on 30.11.2022, < <https://banjaluka.net/wp-content/uploads/2016/08/muzicka-skola-vlado-milosevic.jpg>>

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15. Plan 15: Second Floor 1:200 Part 2, Mirjana Duragic, 22.12.2022
16. Plan 16: Second Floor 1:200 Part 3, Mirjana Duragic, 22.12.2022
17. Plan 17: Second Floor 1:200 Part 4, Mirjana Duragic, 22.12.2022
18. Plan 18: Third Floor 1:500, Mirjana Duragic, 22.12.2022
19. Plan 19: Third Floor 1:200 Part 1, Mirjana Duragic, 22.12.2022
20. Plan 20: Third Floor 1:200 Part 2, Mirjana Duragic, 22.12.2022
21. Plan 21: Third Floor 1:200 Part 3, Mirjana Duragic, 22.12.2022
22. Plan 22: Third Floor 1:200 Part 4, Mirjana Duragic, 22.12.2022
23. Plan 23: Section 1, 1:500, Mirjana Duragic, 22.12.2022
24. Plan 24: Section 2, 1:500, Mirjana Duragic, 22.12.2022



Name: Mirjana Duragic

Adresse: [REDACTED]

Telefonnummer: [REDACTED]

E-Mail: [REDACTED]

Geschlecht: weiblich

Geburtsdatum: [REDACTED]

Staatsbürgerschaft: [REDACTED]

Ausbildung/Studium

Technische Universität Wien (Masterstudium Architektur)	seit 2020
Technische Universität Wien (Bachelorstudium Architektur)	2013-2020
Grazer Vorstudienlehrgang (Deutschkurs)	2011-2012
International Baccalaureate Diploma Programm	2008-2010
Gymnasium Banja Luka	2006-2008

EDV-Kenntnisse

MS Office	sehr gute Kenntnisse
AutoCAD Architecture	sehr gute Kenntnisse
Adobe Photoshop	sehr gute Kenntnisse
Revit	gute Kenntnisse
Adobe InDesign	gute Kenntnisse
PointCab	Grundkenntnisse
Scene	Grundkenntnisse

Sprachkenntnisse

Deutsch	C1
Englisch	C1
Kroatisch	Muttersprache

Berufserfahrung

Architekt Kopf	2018-2022
F+P Architekten	seit 2022