

MASTER'S THESIS 2025

FROM TEMPLE TO HOUSE OF MOVEMENT AND DANCE

Adaptive reuse of redundant church in Copenhagen
to modern city needs

MARTA BINEROWSKA

Supervisor: Tina Wik
Examiner: Walter Unterrainer

Chalmers School of Architecture
Department of Architecture and
Civil Engineering



ABSTRACT

In the face of increasing secularization and a declining number of believers, many European churches are losing their original function and becoming redundant. These buildings are often buildings of great architectural and cultural value, and their reuse is of great importance in terms of both heritage preservation and social sustainability.

The subject of this thesis is the adaptive reuse of one of the redundant churches in Copenhagen into new functional spaces that meet the needs of modern cities. The thesis uses both research for design and research by design in order to achieve the best possible results. The work analyzes the needs of the local community and explores possible functional programs, ultimately proposing a new function that meets the requirements of contemporary users, which is the "House of Movement and Dance."

The design proposal integrates contemporary architectural interventions with the original structure of the building, respecting the cultural heritage, and creating sensory environments that enhance the spatial experience and support movement activities in the adapted space.

Keywords: Adaptive Reuse, Church Transformation, Sensory Architecture, Heritage



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Marta Binerowska
Master Thesis 2025

Examiner: Walter Unterrainer
Supervisor: Tina Wik

Chalmers School of Architecture
Department of Architecture and Civil Engineering
Architecture and Planning Beyond Sustainability

BEng Architect

Marta Binerowska



+41766221540
binerowska.marta@gmail.com
linkedin.com/in/marta-binerowska

EDUCATION

Chalmers University of Technology |
architecture & planning beyond sustainability
2023-2025
Göteborg, Sweden

Gdańsk University of Technology |
architecture & engineering
2019-2023
Gdańsk, Poland

PROFESSIONAL BACKGROUND

Nickl & Partner Architekten Schweiz |
junior architect
oct 2025 - present
Zürich, Switzerland

Nickl & Partner Architekten Schweiz |
intern
apr 2025 - sep 2025
Zürich, Switzerland

ArchDeco | junior architect
apr 2022 - jun 2023
Gdańsk, Poland

*„A building is like a sequence of spaces,
each with its own rhythm. The design should
allow for moments of quiet, intensity, and
transition, just like in a dance performance.
This sense of rhythm, of movement
through space, can give architecture a living,
performative quality.”*

- (Zumthor, 2006, p. 58)

I would like to dedicate this thesis to my mom, Magdalena Binerowska, my greatest inspiration in life. Her unwavering faith in me and constant support have propelled me forward through every challenge. Were it not for my mom, I would not be where I am today.

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I. INTRODUCTION

PROBLEM DESCRIPTION

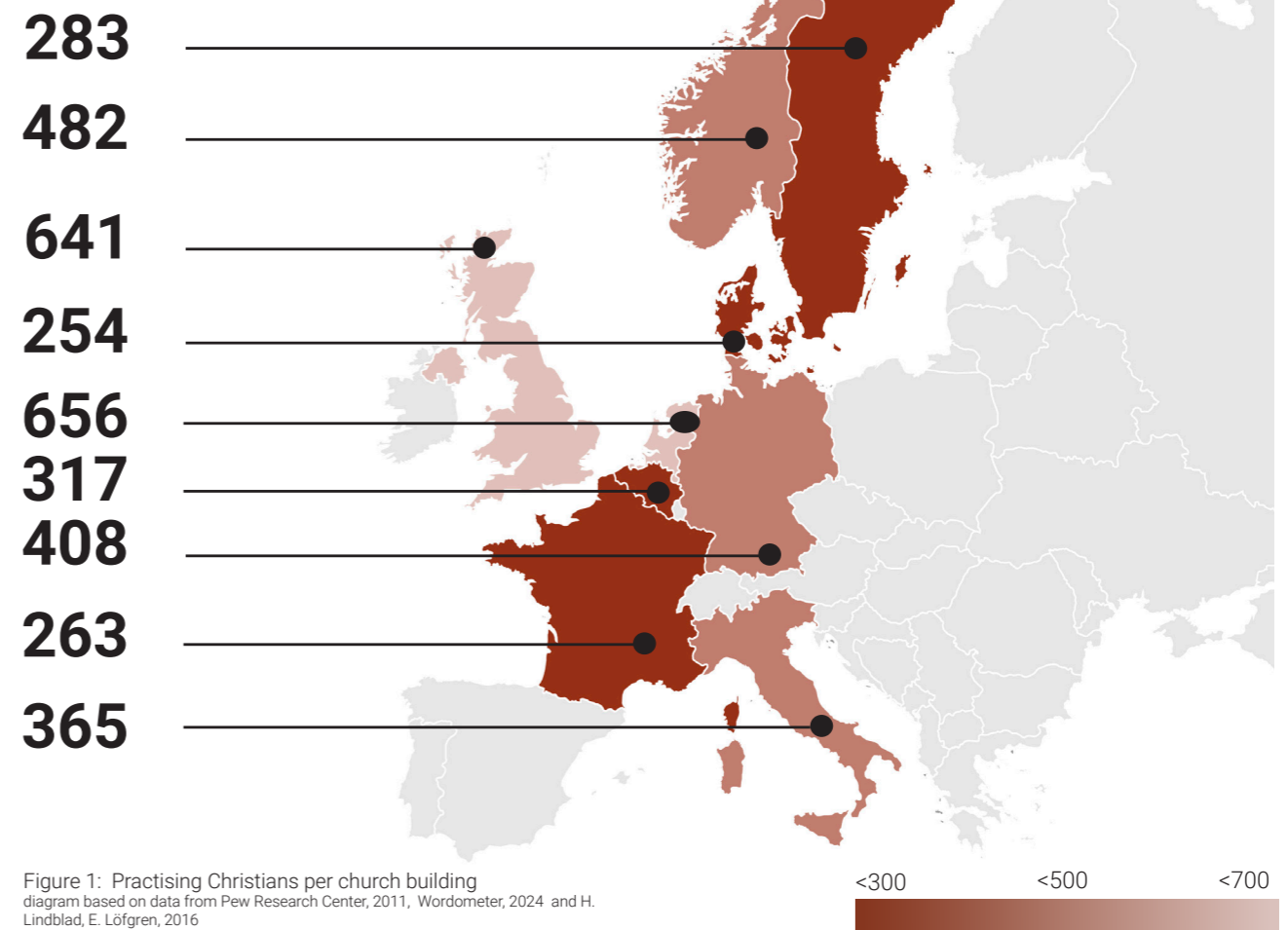
REDUNDANT CHURCHES

In Europe, the number of redundant churches is steadily increasing, posing a significant challenge for many countries, especially in Western Europe. While the growing secularization of society is the main factor behind this trend, the issue is far more complex. The situation varies between countries, but additional factors contributing to church closures include the declining number of priests, demographic challenges, immigration, and the spread of new religious movements. (Dimodugno, 2023)

Empty church buildings are gradually becoming a growing concern. But for us architects, this is an opportunity to repurpose these spaces and turn the problem into a chance to give new life to these structures through adaptive reuse.

The rise in empty churches directly reflects the changing religious dynamics across Europe. To better understand this transformation, let's examine the statistics on the state of Christianity both worldwide and in Europe.

In the past five years, 131 churches have been closed in Germany (Gaudium Press, 2024), while in the UK, 3,500 churches were closed over the past decade (Save the Parish, 2024). In France, 500 churches have been permanently shut, and by 2030, an additional 5,000 will need to be sold or demolished, many of which predate the 20th century (UCA News, 2022). Meanwhile, the Netherlands plans to close around 1,000 Catholic churches by 2025. (The Tablet, 2013)



PROBLEM DESCRIPTION
 AIM OF THE RPROJECT
 DELIMITATIONS
 RESEARCH QUESTIONS
 METHODS

CHRISTIANS' DISTRIBUTION

Christians are the largest religious group in the world. There are about 2.18 billion of them worldwide, which is roughly one-third of the world's population of 6.9 billion people. Moreover, Christians are scattered around the world, and no continent or country can unquestionably state it is the center of world Christianity. (Pew Research Center, 2011)

In its research, the Pew Research Center shows how the situation has changed over the past century. The most interesting observation is the number of Christians living in Europe. In 1910, 66% of all Christians lived in Europe, while in 2010, that number was already only 25.9%. A huge difference can also be seen in the number of Christians living in sub-Saharan Africa. In 1910, only 1.4% of the world's Christian population lived in these areas, while in 2010 it was as high as 23.6%.

Although Christians now make up a similar proportion of the world's population at this point (32%) as they did a century ago (35%), there is a clear decline in Christians living in Europe in favor of an increase in Christians living in sub-Saharan Africa and the Asia-Pacific region. (Pew Research Center, 2011)

It can be said, therefore, that this is a clear manifestation of the secularization of European countries and the decline in the importance of Christian churches in these regions.

EUROPEAN CONTEXT

Although many Western European countries still have a majority of people identifying as Christian, most of these individuals are non-practicing, with Italy being an exception. For instance, in Great Britain, 55% of the population identifies as non-practicing Christians, compared to only 18% who are actively practicing their faith. (Pew Research Center, 2018) This trend aligns with findings from Pew Research Center, which highlights a general decline across Europe in the number of people identifying as Christian compared to those raised as such. Many of those who have left the Christian faith now identify as religiously unaffiliated. (Pew Research Center, 2018)

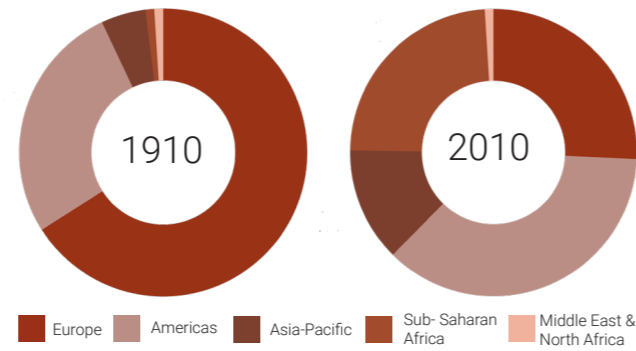


Figure 2: Christians' distribution diagram based on data from Pew Research Center, 2011

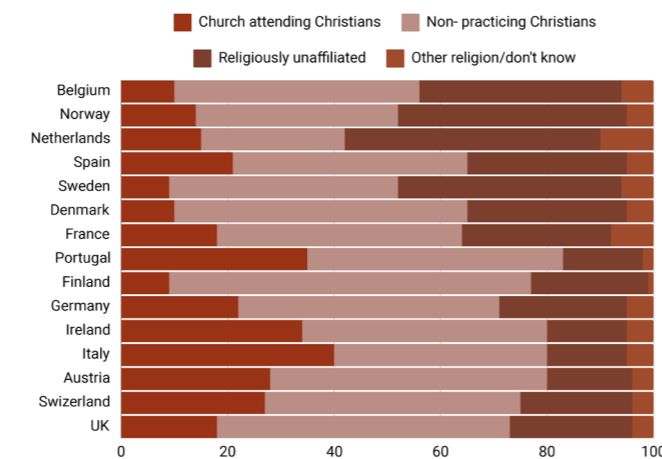


Figure 3: How many Christians are practicing diagram based on data from Pew Research Center, 2011

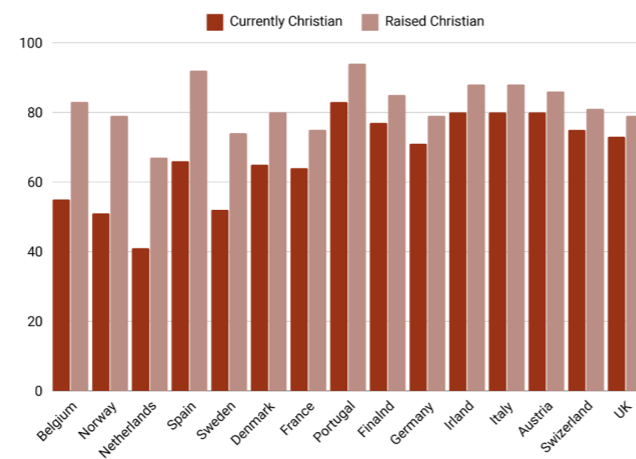


Figure 4: Currently Christians vs raised Christians diagram based on data from Pew Research Center, 2011

DANISH CONTEXT

Denmark mirrors these broader European trends, with 51% of the population never attending religious services and 36% participating only a few times annually. Additionally, 72% of Danes report that religion holds little importance in their lives, with 62% never engaging in prayer, and 18% praying rarely. Moreover, Denmark ranks lowest among Western European countries in terms of religious commitment. Around 60% of Danes do not see themselves as either religious or spiritual. (Pew Research Center, 2018)

In Denmark, the state church is Folkekirke. It is Evangelical Lutheran Church and is officially supported by the Danish government. It is funded mainly by church taxes, but also by public funds, as well as donations and local parish funds. The population belonging to Folkekirken has declined by about 154,000 people over the past 25 years. The biggest changes are seen in the diocese of the city of Copenhagen where, in some parishes, Folkekirke membership is less than 50% (in 1994, 87.4% of the Danish population were members of the Folk Church) (Vinding, N. V., 2019)

In the second half of the 20th century and the beginning of the 21st, Denmark began to see a marked increase in the presence of other religions at the expense of the previously dominant Lutheran religion. This phenomenon is most likely related to increasing immigration. According to demographic data, currently about 5.3% of the Danish population is Muslim.

60% not religious or spiritual
87% not attending religious services regularly
80% not praying regularly

→ **decreasing number of church members**

There has also been an increase in the Catholic Church, which in 2017 had about 47,600 members, an increase of more than 25% compared to 2008. The main reason for this growth is immigration from Poland, as well as from other European countries. (Vinding, N. V., 2019)

A reducing number of members also means less tax revenue for church operations. On top of this, demographic changes are also taking place in both urban and rural areas, resulting in a shrinking number of parishes. In response to this problem, about 200 churches in Denmark, including 16 in Copenhagen alone, have decided to close, in order to redistribute resources so that those churches that are needed and used can grow. (NY BRUG AF DANSKE KIRKEBYGNINGER, 2014)

As a result, many churches in Denmark, including those in the urban fabric, stand empty. This situation creates an opportunity to repurpose the churches for the benefit of the city's development and its residents.

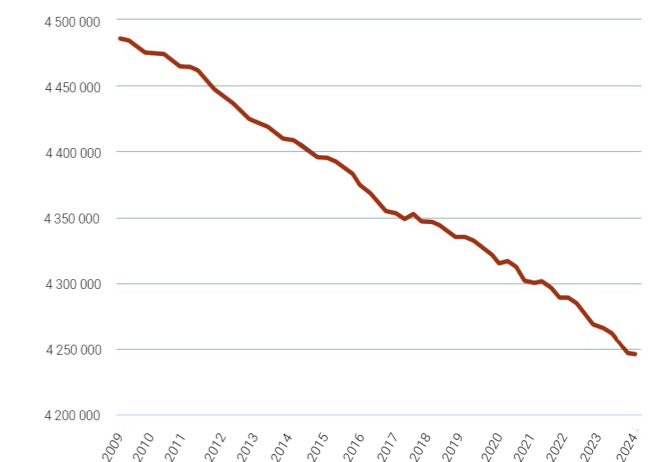


Figure 5: Number of Christians belonging to Folkekirken diagram based on data from Statistic Denmark

AIM OF THE PROJECT

This project aims to adapt one of Copenhagen's city churches, destined for closure in 2013, into a space that serves contemporary users while preserving its cultural and historical significance. The work aims to analyze the needs of the local community and explore possible functional programs, ultimately proposing a new function that meets the demands of contemporary users, which is a „House of Movement and Dance.“ The project aims to integrate contemporary architectural interventions with the building's original structure, ensuring a respectful dialogue between old and new, as well as creating sensory environments that enhance the spatial experience and support movement activities in the adapted space.

DELIMITATIONS

THESIS WILL:

- Focus specifically on the reuse of closed church within the urban fabric of Copenhagen.
- Center on church that is structurally sound.
- Focus on architectural, spatial and functional aspects of adaptive reuse of the church.
- Touches on social aspects.
- Focus on preserving the character of the building while proposing a new function.
- Focus on creating sensory experience of the building.

THESIS WILL NOT:

- Focus on exploring the possibilities of reusing churches around the world or in rural areas
- Center on churches that are in a state of ruin
- Focus on economic aspects.
- Address operational emissions or energy optimization.
- Address the legal process of repurposing religious buildings, such as property ownership issues.

Research Question I / How can the spatial features of the Sankt Pauls Kirke be used to support a “House of Movement and Dance” that fosters physical activity, while respecting the existing heritage of the building?

Research Question II / How new architectural elements can interact with the historic structure of the church, creating a space that promotes movement and sensory exploration of the building?

SUB-QUESTIONS:

- I. What spatial changes are necessary for the building to fulfill its new function?*
- II. What materials can best integrate contemporary architectural interventions into the existing church structure to support the sensory perception of the space?*

METHODS

This thesis uses both quantitative and qualitative data to obtain comprehensive results. The methods of investigation were research for the design and research by design. The beginning of the work is research for design, to provide a solid foundation for the next phase of the project. The next phase is research by design, which builds on previous findings and acquired theoretical knowledge. The research has been partly linear and partly circular, involving a continuous expansion of knowledge through a review of relevant literature.

Qualitative data:

Literature studies: To understand how the problem of redundant churches is perceived, what are the views of the public on it, to understand challenges and opportunities, to gain knowledge about the theory of adaptive reuse, as well as other theories needed in the design process.

Urban analysis: To properly understand the building's surroundings, and the possibilities it offers, to make the right decision regarding the new function that will serve the residents, support program finding, as well as to make design decisions that support the development of the district and fit into its character.

Building analysis: To understand the building's capabilities, possibilities and challenges. Analyzing history, understanding and respecting cultural heritage.

Case studies: Analyzing existing examples of reused churches as well as buildings with a function similar to the designed functional program, to draw inspiration for the design proposal.

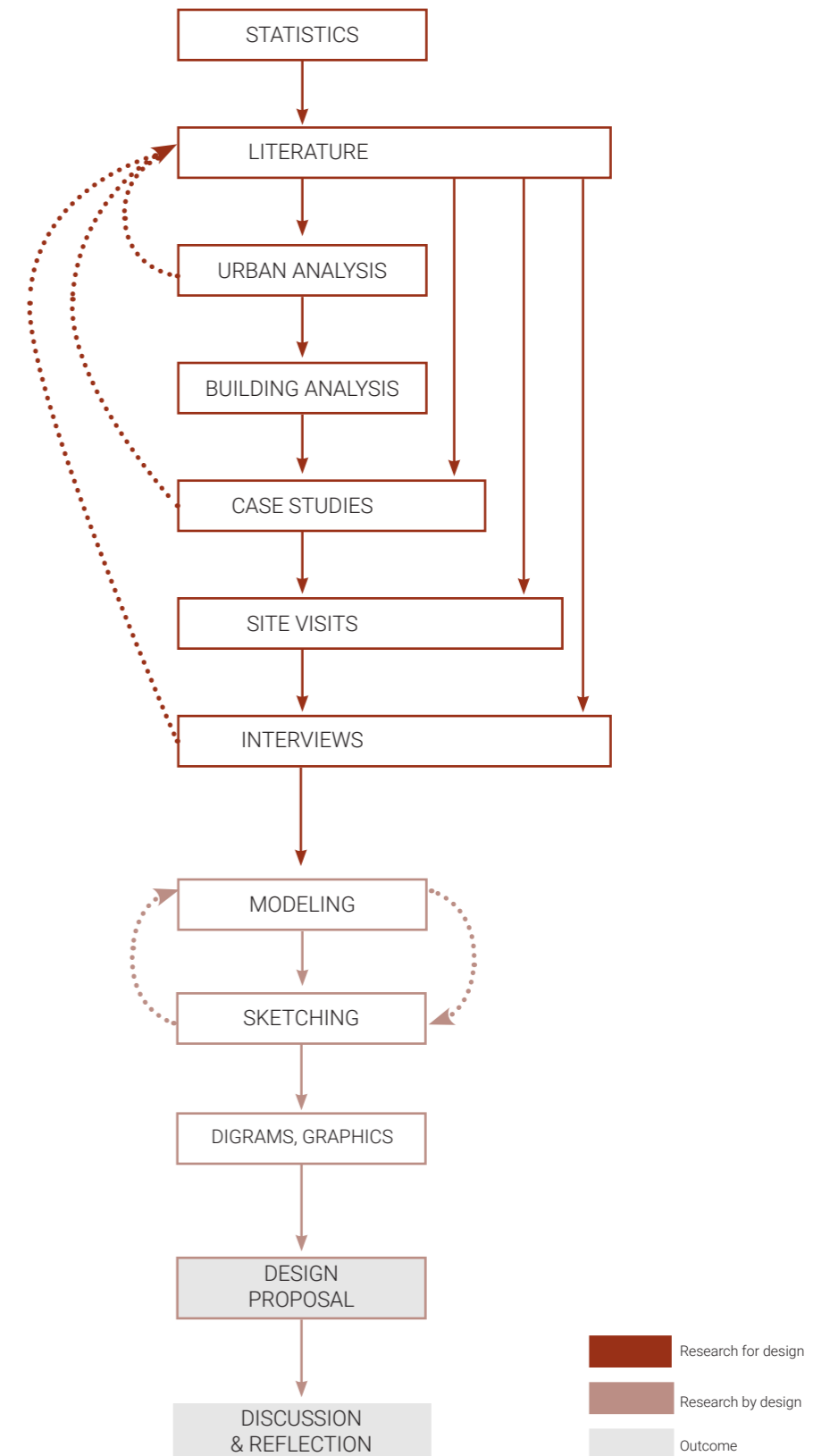
Site visits: Visiting the church for measurements analysis, better understanding the church's structure, observing the surroundings, taking photos, and conducting conversations.

Interviews: Interviews with Maj Bjerre Dalsgaard, an expert in the field of adaptation and reuse of religious buildings, and Morten Marstal, an architect living and working in Copenhagen, to gain knowledge about the adaptation of churches and the development goals of Copenhagen.

Modeling and sketching: To get a deeper understanding of spatial and aesthetic relationships, testing different solutions to get the best sensory experience and aesthetics.

Quantitative data:

Statistic analysis: To do research on redundant churches and Christianity in Europe to understand the scale of the problem and its causes.



II. THEORIES

HISTORY OF ADAPTIVE REUSE
MOTIVES FOR REUSE
ARCHITECTURE OF THE SENSES

HISTORY OF ADAPTIVE REUSE

Re-use of the building is not a new phenomenon and has been with us for centuries. For generations there have also been arguments over what is the right way to approach this complex topic and over time adaptive re-use has become a separate discipline intersecting architecture, interior design, planning, engineering, and conservation. (Plevoets, B. & Van Cleempoel, K. , 2009)

Many buildings, including churches, that we consider today as important cultural heritage have survived only because of reuse. For example, many churches were used as warehouses or stables during the French Revolution. The abbey of Fontenay in Burgundy, which is now a UNESCO World Heritage Site from 1820 to 1903 served as a paper factory. (Fiorani, D., Kealy, L., & Musso, S., 2017)

Until the 18th century, all reuses of buildings tended to stem from a pragmatic economic approach and didn't have much to do with heritage preservation. With the beginning of the 19th century, in the aftermath of the French revolution, the concept of heritage gained prominence and became a focus of debate. (Plevoets, B. & Van Cleempoel, K. , 2009)

Two opposing movements emerged at the time: the restoration movement headed by Eugène Emmanuel Viollet-le-Ducand (also called the Stylistic restorer) and the conservation movement (which was also known as an anti-restoration movement) headed by John Ruskin Willaim Morris.

Viollet-le-Ducand's influence (both good and bad) could be felt not only in France but all over the world. His work and life were divided between his interests: historian-archaeologist, conservator-restorer and also architect-creator. (Jokilehto 2004) His approach to building reuse can be most simply illustrated in his own words:

"The best of all ways of preserving a building is to find a use for it, and then to satisfy so well the needs dictated by that use that there will never be any further need to make any further changes in the building.... In such circumstances, the best thing to do is to try to put oneself in the place of the original architect and try to imagine what he would do if he returned to earth and was handed the same kind of programs as have been given to

the restorer be in possession of all the same resources as the original master-and that he proceeds as the original master did." (1990 [1854], pp.222-223)

This approach was heavily criticized in the late 19th century.

John Ruskin did not agree with Viollet-le-Ducand's approach. He called his approach to restoration „a destruction accompanied with false description of the thing destroyed" (Ruskin, 1849, p.148) and „the most total destruction which a building can suffer". (Ruskin, 1849, p.184)

The anitrestoration movement, criticized restoration architects for destroying a building's historical authenticity. Instead, they proposed protection, conservation and maintenance. John Ruskin's infulenece was so considerable that in his native English the word "restoration" took on the meaning of something negative. (Jokilehto 2004) His approach to the subject can be seen in the following quote:

"It is impossible, as impossible as to raise the dead, to restore anything that has ever been great or beautiful in architecture,... Do not let us talk then of restoration. The thing is a lie from beginning to end.... Take proper care of your monuments, and you will not need to restore them." (pp.184-186)

Although he did not write a theory of building conservation, he identified the value and importance of historic buildings more clearly than anyone before him. His work thus laid the foundation for modern conservation theories. (Jokilehto, 2004)

In the early 20th century, Alois Riegl also entered the debate on heritage preservation. Although he died young at the age of 48, he had a significant impact on art history and monument preservation. Riegl stressed the importance of the artist and his creativity. He emphasized that each period and each culture was governed by its own laws, influencing the artist, and knowledge of these conditions must be known by the historian in order to determine the artistic value of a work.(Jokilehto, 2004) His most important work is the essay "Der Moderne Denkmalkultus: Sein Wesen und seine Entstehung".

He argued that the core of the prevailing theoretical conflict lay in differing two main types: memorial values (age value, historical value and intended memorial value) and present-day values (use values, art value, newness value and relative art value) (Jokilehto, 2004)

Camillo Boito shared similar perspectives but took a more practical approach. While Riegl's work remained theoretical, Boito developed early guidelines for adapting and reusing buildings. Boito criticized Viollet-le-Duc's methods for compromising a building's material authenticity. At the same time, he found John Ruskin's idea of simply preserving decay to be impractical. Boito proposed adaptive strategies that should be tailored to the specific needs of each project. (Plevoets, B. & Van Cleempoel, K., 2009) The specific guidelines and strategies Boito suggested for adaptive reuse are:

- „1. Distinguish between new and old styles;
2. Distinguishing between building materials;
3. Suppressing profiles or decorations;
4. Exposing removed old elements that could be installed next to the monument;
5. Placing the date of restoration (or other conventional mark) on each restored element;
6. Using a descriptive epigraph engraved on the monument;
7. Describing and photographing the various stages of the work and placing documentation in or near the building;
8. Highlighting the publicity” (Plevoets, B. & Van Cleempoel, K., 2009, p. 12)

Boito's views were highly influential after World War I and became fundamental during the creation of the Athens Charter in 1931, the first document that promoted modern conservation policy. (Plevoets, B. & Van Cleempoel, K., 2009, p. 13) The Athens Charter states:

“The Conference recommends that the occupation of buildings, which ensures the continuity of their life, should be encouraged but that these buildings should be used for a purpose which respects their historic or artistic character.” (article 1)

After World War II, awareness of the importance of historic preservation became even stronger.

And the number of buildings that would need potential conservation became frightening. Reconsideration of what is conservation was shown in the Venice Charter in 1964 which emphasized the importance of adaptive re-use as a conservation practice. (Plevoets, B. & Van Cleempoel, K., 2009)

“The conservation of monuments is always facilitated by making use of them for some socially useful purpose” (article 5).

One of the first to represent this new theory was Radolfo Machado, who presented his views in „Architecture as Palimpsest” in 1976. He rephrased his views using a metaphor like the following:

“Some architectural drawings could be regarded as the equivalent of a palimpsest... but also the remodelled architectural work itself, since it can be seen as a text of a special kind that is characterized by the juxtaposition and co-presence of other texts. If an original building is considered as a first discourse that conditions future formal discourses to be inscribed upon it, then remodeling can be conceived of as rewriting.” (Machado, p.46)

His approach became an inspiration and a guideline for the way we currently view building adaptation.

The theories presented give me a solid foundation for my future project. Despite the differences in views, I take away important information from each of the thinkers. Ruskin taught me that any interference with historical substance must be done with full respect for authenticity and material values, which is why the preservation of historical details, such as columns or ceiling paintings, becomes crucial in my project. With Viollet-le-Duc, I embrace the idea that adaptation requires the introduction of modern elements to accommodate new functions. The works of Boito, and Machado made me realize the important role of adaptive reuse and that it is possible to preserve the existing context without completely being bound by it.

MOTIVES FOR REUSE

SUSTAINABILITY

People have always needed, need and will need buildings. They are an integral part of our lives and are essential for our well-being and sense of security. Unfortunately, the entire process of constructing buildings, using them, and often disposing of them results in a huge consumption of natural resources and makes the construction industry the largest consumer of natural resources and raw materials in the world. (Foster, 2020) Moreover, the building sector currently contributes 39% of global energy carbon emissions and building-related CO₂ emissions continue to rise, with projections suggesting a potential doubling by 2050. (Pomponi & Moncaster, 2017) To effectively limit global warming to 1.5°C, building emissions must be reduced by 80–90% by 2050. However, urban areas are expected to expand significantly, covering two to six times more land than in 2000. This rapid growth may lead to a dramatic increase in material use, complicating efforts to achieve these emissions targets. The new hierarchy in the construction sector needs to be established, prioritizing „not building at all,” followed by „renovating existing buildings for new purposes,” with „the construction of new buildings” being the least favored option (Kuittinen, M., 2023) To reduce carbon emission in the building it is necessary to shift into circular economy. Re-using of the building generating from 50 to 75% fewer emissions compared to new construction. (UNEP, 2023)

ECONOMIC VALUE

In addition to the fact that reuse of the derelict building can create new job opportunities and thus benefit the local community, reuse of the building also saves the cost of waste disposal or demolition. Moreover, reusing old buildings is often cheaper than constructing new buildings. (Latham, 2000, p. 7). By reusing the building, we can save the cost of acquiring land or purchasing materials. Designing buildings based on the principles of the circular economy increases their long-term value through the efficient use of resources throughout their life cycle.

This approach to buildings has many financial benefits, and Latham, in his book “Creative reuse of Buildings, Volume 1” sums it up perfectly with the words: *“Saving buildings, in much the same way that we might save any other hard-earned resource against uncertain and unpredictable futures is a way of banking our built investment, and husbanding the resources, labor and energy that they compromise”* (Latham, 2000, p. 8)

SOCIAL & CULTURAL VALUE

As was mentioned, there have been different approaches to preserving historic buildings during the centuries. The fact is, however, that old buildings often play an important role for local communities and are often places of worship, work, study or recreation. However, they don't have to retain their primary function in order to continue to preserve the sense of identification of the local community. (Latham, 2000, p. 6) Sir James Richard in the “Introduction to Modern Architecture” says: *“excessive demands for the preservation of everything old are caused not only by love of old buildings but by mistrust of what present-day architects are likely to put in their place, so the best answer to unreasonable preservation is better quality architecture.”*(Latham, 2000, p. 6) I believe that while preserving old structures is important, adaptive reuse offers a way to respect heritage while breathing new life into them.

URBAN DEVELOPMENT

Old buildings are often located in city centers that already have dense development, and the construction of new buildings is impossible. Beyond that, adaptive re-use of old buildings can act as a catalyst for the development of a particular, for example, previously industrial, neighborhood. Adaptive re-use works beyond the scale of the building and can have a positive impact on the regeneration of entire neighborhoods. *“Preservation is about more than simply preserving our past history. More fundamentally, it is about maintaining the health of our towns and villages”* (Latham, 2000, p. 10)

ARCHITECTURE OF THE SENSES

The space should be experienced and felt, rather than just seen. This approach is closely linked to the work of Martha Graham, a pioneer of contemporary dance, who emphasized the dancer's relationship to space. For Graham, space was not simply something to occupy or pass through; it was something with which dancers could actively interact, almost as with a physical partner. Her exercises guided students to "push," "pull," and "hold" space as if it were a tangible material, encouraging them to engage with it beyond typical reflexive movement. According to Graham, if dancers experience a deep connection to the space around them, they also develop a vital connection to their own inner physicality. (Bloomer & Moore, 1977) Through the conscious design of elements such as light, texture, color, and acoustics, design can foster a deeper connection between users and the building, enhancing sensory experiences.

COLORS

Color affects human perception on many levels, going far beyond the physical wavelengths of light. In nature and designed spaces, colors often surround us, influencing how we feel and behave. Studies show that colors often elicit specific emotional responses: blue calms, red and yellow stimulate, and each has a unique effect on mood and behavior. For example, an experiment conducted at New York's Architectural Digest Home Design Show showed that people behaved differently in rooms lit with blue, red or yellow light. Participants felt calm in a blue room, while yellow induced energetic, animated interactions, and red increased hunger and thirst. Moreover, people gathered in the rooms in different ways. The blue room encouraged people to gather around the edges of the room, while yellow encouraged lively, energetic interactions in the center of the space. (Sternberg, 2010)

However, our response to color goes beyond physical properties such as wavelength. Color perception changes depending on context, lighting and material contrasts. For example, even "vibrant colors" can appear muted on matte surfaces in low light, while bright sunlight passing through translucent objects such as ice or glass can cause intense color perception. Yellow autumn leaves, for example, can appear

dull on cloudy days (Fig. 8), but shine intensely like gold in bright sunlight. (Fig. 7) This suggests that the way we experience color is subjective and depends as much on environmental factors as on the color itself, creating an experience unique to each moment. (Holl et al., 2007)

In my design, I want to keep the original color palette of the church, which has blue and yellow tones. Additional elements introduced into the space will be based on these colors, taking into account their properties. The goal is to create spaces that will promote relaxation or, on the contrary, stimulate and energize users, depending on the function and character of the room.

LIGHT

Deep shadows and low lighting play an important role in how we experience space. Shadows soften what we see, making depth and distance seem somewhat mysterious and encouraging the mind to wander. Dim light allows for a relaxed, unfocused look that encourages dreaming and stimulates the imagination. In contrast, very bright, even lighting can actually stifle creativity. Our eyes naturally feel better in softer twilight than in intense daylight. (Pallasmaa, 1996)

Zumthor (2006) claims that atmospheres and spatial qualities are shaped by the placement and direction of light, the resulting shadows, and the surfaces it illuminates, which can alter in appearance depending on the light. (Fig.9 and Fig. 10)

Light is not only an essential tool for perceiving space, but also a key indicator of the passage of time. Light changes according to the time of day and season. We associate blue dawn with morning, while golden dawn with evening. It can be said that "time is the measurement of changes in light" (Valero Ramos, 2015). My project, which is an adaptation of a building, fits perfectly into the theory of light as a measurement of time. Light can become a storytelling tool and change the character of the interior, colors and mark the rhythm of the day.

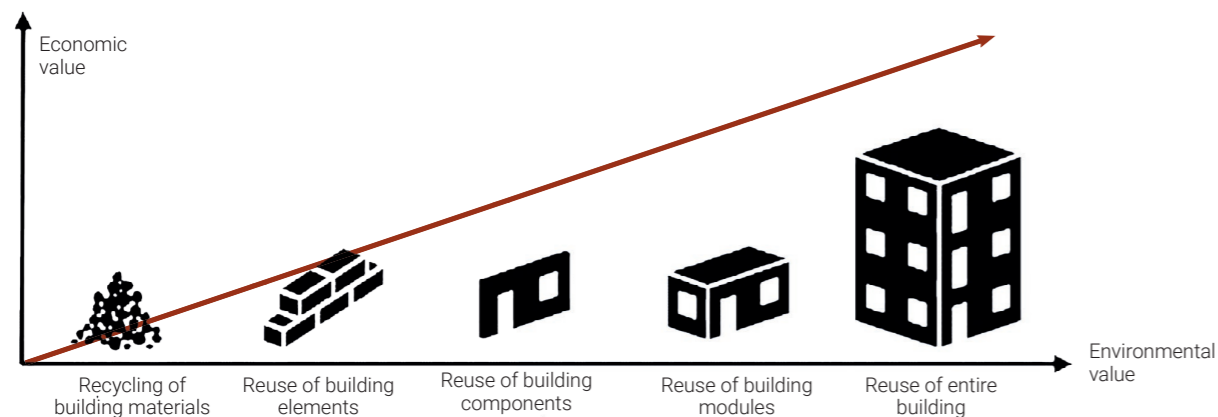


Figure 6: Economic and Environmental value of reuse from Eberhardt et al., (2019) re-visualized by author

MATERIALS

The material affects our senses in a unique way. We can see the material, we can touch it, but we can also hear it in a certain way. Each material has its own unique properties, shine and potential for transformation. A single material, such as stone, can take on myriad forms and textures: sawing, polishing or splitting it produces completely different results, changing the way we perceive it each time. The way materials interact with each other in a building can further enhance or weaken their impact. Finding the right balance allows materials to resonate and enhance each other, creating a vibrant atmosphere in the building. (Zumthor, 2006)

The true beauty of materials lies in their function and form, which fit seamlessly with their purpose. Through design, human interaction shapes materials into objects that perform specific functions, enhancing both their aesthetic and experiential qualities. (Erwine, 2017)

Natural materials such as wood, stone and brick bring a depth and authenticity that standard materials lack. Their irregularities and aging processes invite our senses to engage, connecting us to the material's origin and history. Time leaves visible marks on natural surfaces reflecting their life and use. For example, a pebble smoothed by waves represents the slow, steady process that has shaped it over the years, translating the passage of time into physical form. This wear and tear does not humble them, but on the contrary adds richness, reminding us of the history of the place and the material, in a sense, reminding us of our own temporality. (Pallasmaa, 2012) (Fig. 11 and Fig. 12)

In my design, I intend to use natural materials that age aesthetically and gain value over time. I will combine different textures and use the same material in different forms to achieve a varied visual experience. Due to the function of the space, the thermal properties of the materials will also be important. I plan to use natural fibers and materials such as wood, which provide a pleasant tactile experience.

SOUND

Just as music can evoke memories or change a mood, the acoustics of a space can change the way sound is perceived, reflected or absorbed within it, thereby building atmosphere. The contrast between silence and sudden sound, like the resounding chords of an organ in a cathedral, evokes deep emotions, heightened by the architecture that amplifies these sounds. Such a contrast awakens our awareness of the space around us. The experience would be very different if the same organ chords were sounded during rush hour in crowded Manhattan-their mighty power would fade into the noise of the street, becoming barely audible. (Sternberg, 2010)

Architecture defines spaces through the properties of sound and vibration. Solid walls or open spaces amplify, dampen or reflect sound differently, creating unique soundscapes within a city or building. Inside buildings, sound reflections increase awareness of scale, material and geometry; for example, a church with softened acoustics loses some of its spatial depth. This interplay of architecture and sound allows people to connect more fully with their surroundings in a sensory way, reminding them that the experience of space is not only visual, but also auditory. (Holl et al., 2007)

What's more, music can influence not only our perception of space, but also our health and well-being. Natural sounds, such as the sound of rain or waves, can affect our well-being by reducing stress and balancing physiological responses. Just as "pink noise" helps calm us down by masking unwanted sounds, consciously planned acoustics in architecture can create spaces that promote calm and relaxation. (Sternberg, 2010)

In the design, I will use both sound-absorbing materials to create an atmosphere that allows for relaxation, as well as sound-reflecting materials to amplify sound and engage in movement. I will also introduce flexible acoustic control elements that will allow the space to be adjusted according to the type of activity.

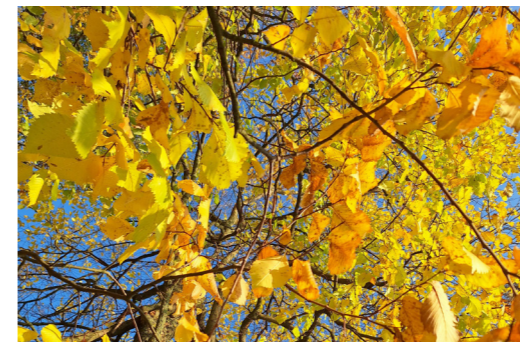


Figure 7: Autumn leaves during the sunny day

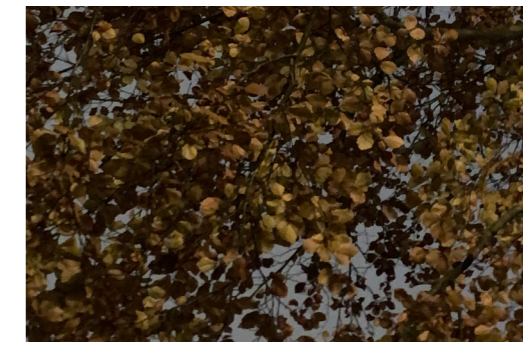


Figure 8: Autumn leaves during the night



Figure 9: Dancers illuminated



Figure 10: Perception of form and light

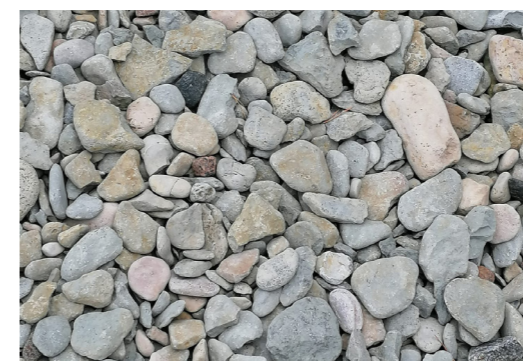


Figure 11: Small smooth stones



Figure 12: Large angular stones

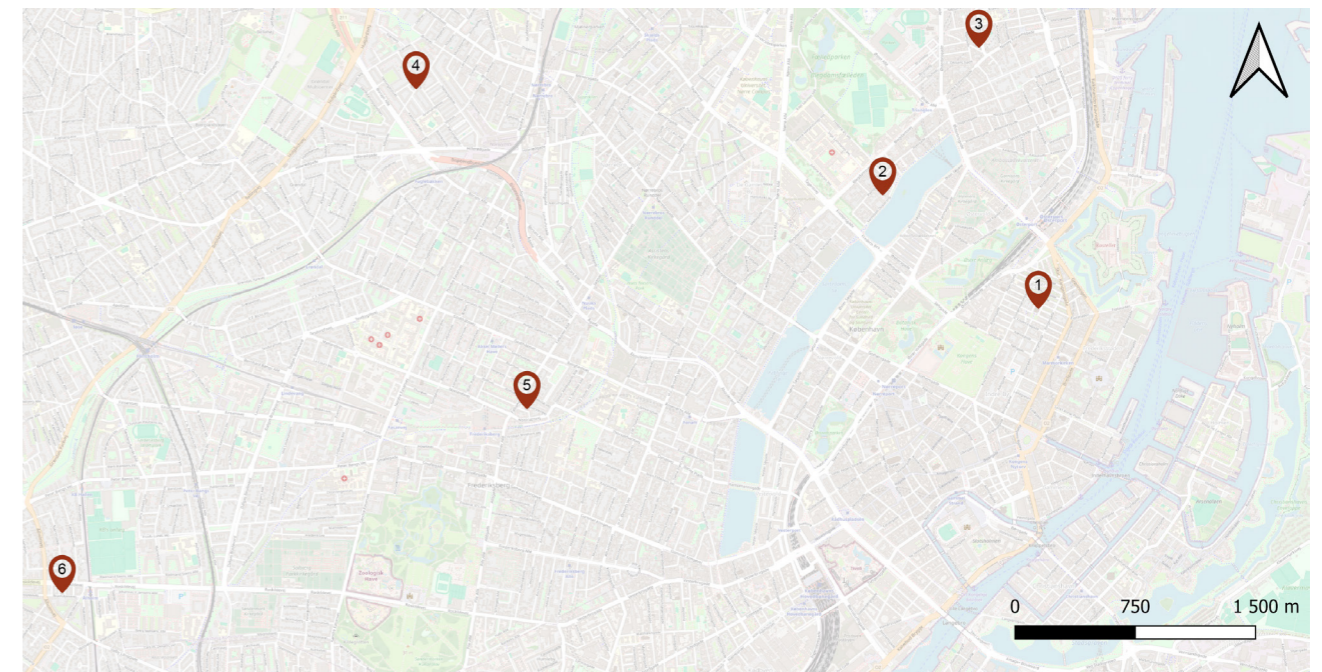
III. SITE & BUILDING ANALYSIS

POSSIBLE CHURCHES

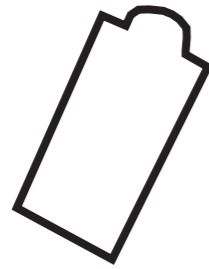
In selecting a church for my project, I chose Copenhagen as the location for two key reasons. First of all, Copenhagen is the closest large city to Gothenburg, where church closures have become a serious problem, with as many as sixteen churches recently taken out of service. The close proximity to Gothenburg was important to me when selecting the project site, as it allows me to visit the site in person for more detailed research and analysis. This proximity offers also practical benefits in terms of understanding the community context and architectural details first-hand. Additionally, the city has a progressive attitude towards adaptive reuse, making it a suitable environment for a project. To guide my selection process of which church I should work with, I set the following criteria:

1. **The church must be situated within the urban fabric**, as space in cities is highly valuable and should not be occupied by empty buildings. Instead, it should be used to serve the needs of the community.
2. **The church should date back to at least the first half of the 20th century**, as I aim to work with historical buildings and contribute to preserving cultural heritage.
3. **The church should not have undergone any transformations yet**. Due to the fact that more than 10 years have passed since the decision to close the churches, some of them have already been used for other functions. I want to work with the church that still stands empty to show its potential and possibilities for reuse.
4. **The church should have a minimum area of 500 m²** to allow for the possibility of accommodating different functions.

Churches that have met these requirements are marked on the map below



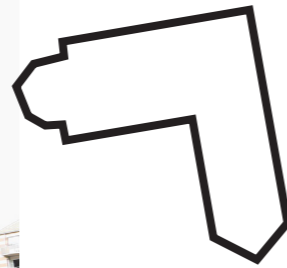
1. SANKT PAULS KIRKE



area: 1145 m²
year built: 1877

Figure 13: Sankt Pauls Kirke

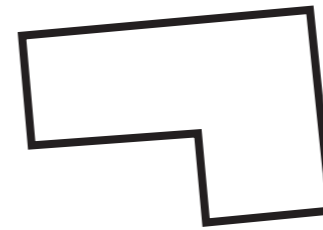
3. LUTHERKIRKEN



area: 804 m²
year built: 1918

Figure 15: Lutherkirken

5. SOLBJERG KIRKE



area: 530 m²
year built: 1903

Figure 17: Solbjerg kirke

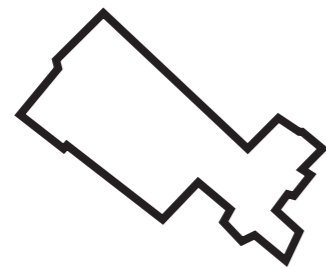
CHOSEN CHURCH

Based on my criteria, only six out of the sixteen churches met my requirements. Churches 1, 2, and 3 stood out due to their ideal locations in the city, while churches 1 and 3 appealed to me most for their interior architecture, which I believe could harmoniously interact with contemporary design, creating a space with unique character. Church 1, in particular, has a grand exterior with detailed ornamentation.

In contrast, the interiors of churches 2, 4, 5, and 6 are minimalistic, with little to no ornamentation. Additionally, their hall-like layouts limit their spatial potential for diverse functions.

Ultimately, I chose St. Paul's Church primarily because of its central location in the city and spacious layout, which allows for flexible adaptive reuse across various programs. Additionally, Sankt Pauls has an intriguing interior, with detailed elements, which offers an exciting design challenge to respect the building's historical identity while introducing a new function.

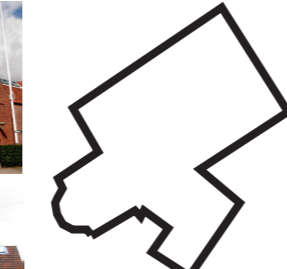
2. FREDENS KIRKE



area: 784m²
year built: 1899

Figure 14: Fredens Kirke

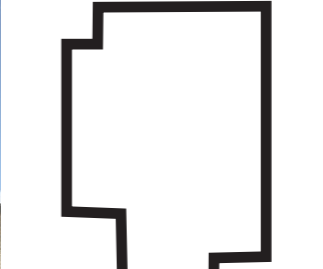
4. ANSGAR KIRKEN



area: 728m²
year built: 1939

Figure 16: Angarkirken

6. AALHOLM KIRKE



area: 728m²
year built: 1939

Figure 18: Aalholm kirke

URBAN ANALYSIS

LOCATION AND HISTORY OF THE SITE

Sankt Pauls Kirke is located in Copenhagen, the capital of Denmark, in the historic part of the Indre By district called Nyboder. Aside from the church, the neighborhood's distinctive features are the yellow houses that were built for sailors and their families in the 17th century. Despite the fact that it is currently the city center, when Nyboder was founded it was outside the fortifications of Copenhagen. For Danes, Nyboder is associated with their yellow color, and "Nyboder yellow" is often used in Danish as a general term referring to their exact shade of yellow, even though the original structures were painted red and white.

Almost 400 years later, Nyboder is still home to the rank and file of the Danish Navy, Army and Air Force, but since 2006, the district has also welcomed civilians. The houses are now protected as an architectural monument. New houses that are being built in the area are based on the old rows of terraced houses. (About Nyboder in Copenhagen, 2018)

Area is called by many „a pleasant oasis in Copenhagen" or „a small town in the middle of a big city" being mainly a residential area but also offering interesting restaurants and cafés. (Nyboder – Världens Äldsta Radhus, 2018)



COPENHAGEN



INDRE BY



NYBORDER



COMPOSITIONAL AND FUNCTIONAL ANALYSIS



LEGEND

- SANKT PAULS KIRKE
- RESIDENTIAL AREA
- EDUCATIONAL AREA
- INDUSTRIAL AREA
- PARKING AREA
- BUILDINGS
- OTHER CHURCHES
- WATER
- PARKS
- GRASS & GARDENS
- RESTAURANT/ CAFE
- STREETS
- RAILWAYS
- BUS STOP
- TRAM STOP
- METRO STATION
- VIEW OPENING TOWARDS THE CHURCH
- VERTICAL DOMINATOR
- LANDSCAPE DOMINATOR

VIEW OPENING



Author's photograph, 2024

AREA AROUND THE CHURCH



SUMMARY



23 Author's photographs, 2024

POPULATION DATA

According to data from the City Population Service, the analyzed church is located in the quarter called Fredriksstaden. Below are the available population analyses for this quarter for the year 2024.

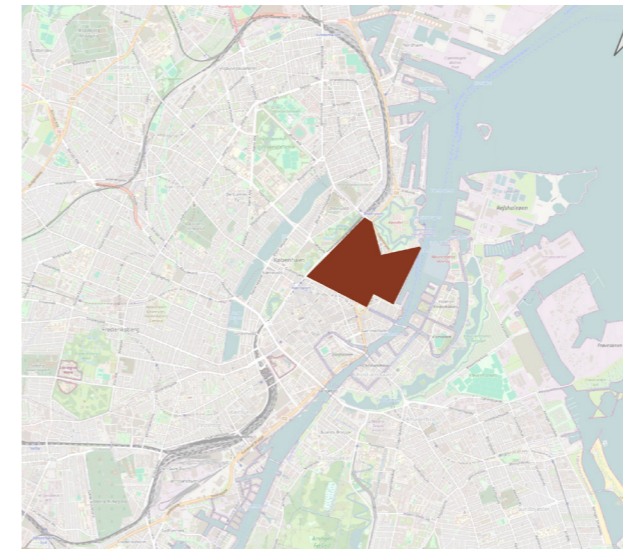


Figure 19: Location of the Fredriksstaden in the city
diagram based on data from City Population, 2024

- **10 234** population [2024]- Estimate
- **0.9963 km²** Area
- **10 272/ km²** Population Density [2024]
- ➡ **0,18%** Annual population change [2021-2024]

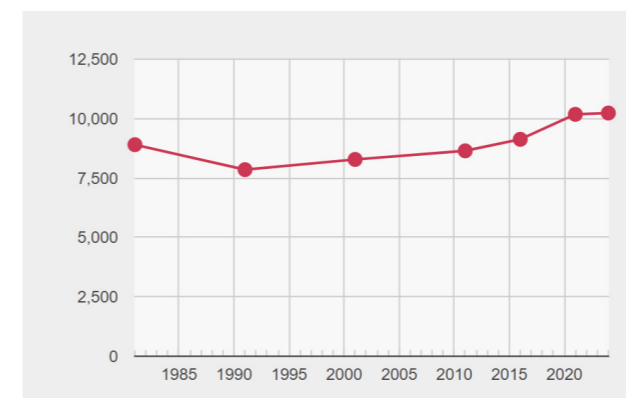


Figure 20: Population development
diagram based on data from City Population, 2024

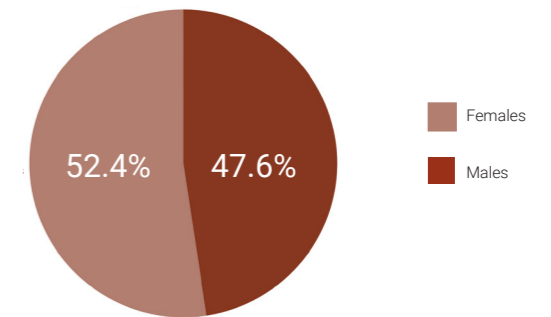


Figure 21: Gender
diagram based on data from City Population, 2024

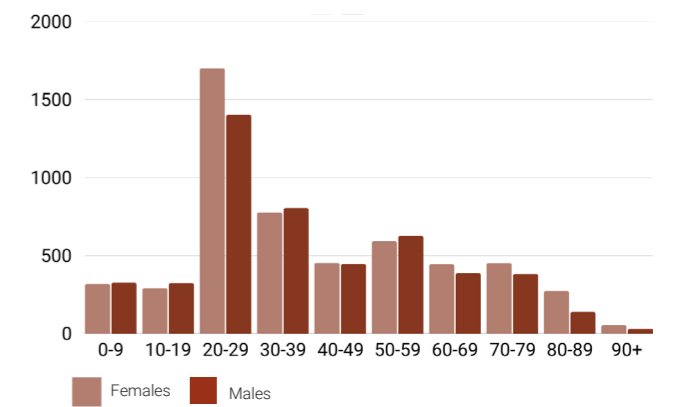


Figure 22: Age
diagram based on data from City Population, 2024

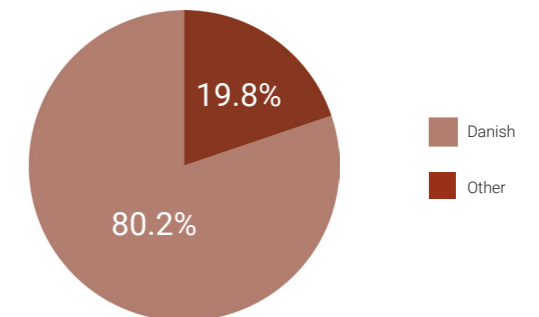


Figure 23: Nationality
diagram based on data from City Population, 2024

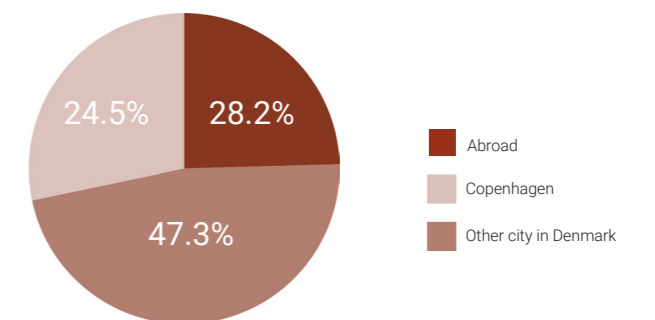


Figure 24: Place of birth
diagram based on data from City Population, 2024

CONSERVATION VALUE ANALYSIS



LEGEND

- LISTED BUILDINGS
- HIGH CONSERVATION VALUE (1-3)
- MEDIUM CONSERVATION VALUE (4-6)
- LOW CONSERVATION VALUE (7-9)
- WITHOUT CONSERVATION ASSESSMENT

Based on information from: kbhkort.kk.dk/

CLIMATE DATA

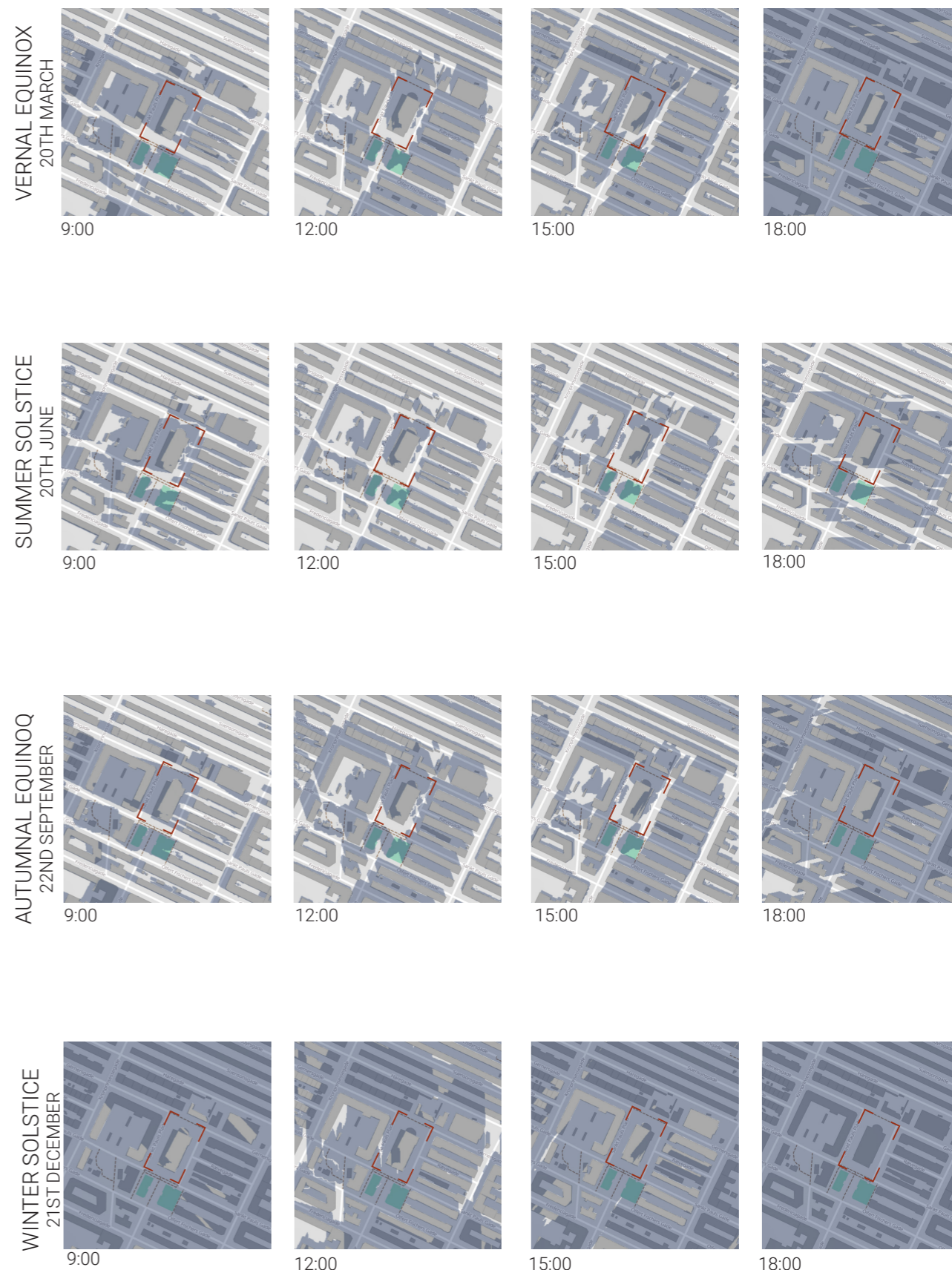
Jan	4,4°C	69%	59,2 mm	6 m/s	SW	7,8 h	86%
Feb	4,5°C	65%	53,4 mm	6 m/s	SW	9,6 h	84%
Mar	7,1°C	62%	47,8 mm	6 m/s	SW	11,9 h	82%
Apr	11,6°C	55%	45,1 mm	5 m/s	WSW	14,2 h	76%
May	16,4°C	48%	54,8 mm	5 m/s	SW	16,3 h	72%
Jun	19,6°C	44%	75,8 mm	4 m/s	WSW	17,4 h	72%
Jul	22,2°C	43%	74,0 mm	5 m/s	WSW	16,8 h	73%
Aug	22,0°C	47%	80,9 mm	4 m/s	SW	14,9 h	75%
Sep	18,2°C	50%	67,8 mm	5 m/s	SW	12,7 h	79%
Oct	13,1°C	58%	68,4 mm	5 m/s	SSW	10,4 h	83%
Nov	8,7°C	67%	59,9 mm	6 m/s	SSW	8,3 h	84%
Dec	5,8°C	70%	62,9 mm	5 m/s	SW	7,1 h	86%

Climat data: windfinder.com, weather-and-climate.com and weatherspark.com

LEGEND

- AVERAGE DAY TEMPERATURE
- AVERAGE CLOUD COVER
- AVERAGE PERCIPITATION
- AVERAGE WIND SPEED
- AVERAGE WIND DIRECION
- AVERAGE SUN HOURS
- AVERAGE HUMIDITY

SOLAR ANALYSIS



CONCLUSIONS

The church is located in the city center. It is well-connected by public transport, with easy access via buses, trams, and the subway which provide good connection of the plot with the rest of the city.

The church is situated in a predominantly residential area. There are many cafes and restaurants nearby and 4 other churches within 500 m. It is located at the end of the scenic axis and is surrounded by buildings of varying heights. They range from low, one-story historic nyborer buildings to six-floor high tenement houses. Despite the difference in heights, the neighborhood seems to maintain a common whole, and the church tower is the highest height dominant of the closest area.

The church is surrounded by a square, free from car traffic which has fenced green areas. Although currently underutilized, these spaces offer potential for landscape improvements, allowing the church's function to extend outdoors and integrate more with its surroundings. Additionally, a well-maintained green belt with trees surrounds the church, featuring an open lawn and historic church bells on display.

The population density is quite high, as the average population density of Copenhagen is around 7,000/km².

The district is dominated by young adults, the age group 20-29 clearly stands out from the other age groups. There are not many children in the area, but the number of older people is also significant. The area has seen an increase in residents in recent years, the largest increase occurred between 2016-2021. It can therefore be assumed that the number of residents will continue to grow in the coming years. The people living in the district are mostly Danes, however 1/5 of the residents come from abroad. Data regarding their nationality is unknown.

Although not officially listed as a monument, the church holds significant conservation value and is surrounded by historic buildings, so structural changes should be kept to a minimum, and if there are any new additions, they should be thought out and fit into the historical character of the place.

The church benefits from good sun exposure, while Copenhagen's climate, characterized by mild temperatures, frequent cloud cover, moderate precipitation, and relatively high humidity, should be carefully considered when designing outdoor spaces to ensure comfort and usability.

BUILDING ANALYSIS

HISTORY OF THE BUILDING

In the 19th century, industrialization led to an increase in migration from rural areas to cities. By 1861, there were just a few parishes in Copenhagen, and outside the city walls, only Sankt Johannes Parish existed, despite the fact that the area outside the defensive walls was home to around 20,000 believers.

In 1867, a request for funding a new church was submitted, and an architectural competition was announced. The new church was to be built at the end of Adelgade, in the oldest and most deteriorated part of Nyboder.

In 1872, a building permit was granted, and both the Evangelical Lutheran church and the parish were named Sankt Pauls. The architect, Johannes Emil Gnutzmann, oversaw the project. On November 1 of the same year, a cornerstone-laying ceremony took place.

The church officially opened on February 18, 1877. However, it was located in a poor area and deteriorated over the years due to the lack of funding for its maintenance.

At the beginning of the 20th century, another wave of immigration affected the condition of the church. Repairs were delayed by World War I and only began after World War II. Around this time, the population started relocating from the city center to the suburbs.

Social work became central to the church's mission after the war, with priestesses distributing aid to the poor. The church also housed a nursing home and a nursery for infants.

By the 1970s, the number of parishioners had decreased sharply, and the church was in such a state of disrepair that city authorities debated whether to demolish it or repurpose the building. Instead, it underwent a 12-year restoration, and in June 1993, it reopened for worship.

By 2013, the Diocese of Copenhagen proposed closing 16 churches, including Sankt Pauls, due to a decline in the number of believers. For now, the church remains semi active, offering one Mass every second week and holidays. (Kirkens Historie | Sankt Pauls Kirke, n.d.)



Figure 25: View for the church from 1911

BUILDING CHARACTERISTICS

Sankt Pauls Kirke was built during the Historicist period and the architect of the church, Johannes Emil Gnutzmann, was inspired in his design process by the church of San Fermo Maggiore in Verona. The church is equipped with the Neo-Romanesque brick style blinds, semicircular arches, dwarf columns, pinnacles and 47 m high tower. The church's ornamentation is quite simple: typical neo-romanesque decorations, including black and white brick ornamentation.

The church is characterized by the tower's distinctive cross-striped conical brick hat in the Trulli style, which is a rare architectural feature. This style comes from the 15th century and is especially found in the town of Alberobello, Italy, where there are about 1,500 buildings with conical roofs that are listed as UNESCO World Heritage sites. (Arkitektur Og Interiør | Sankt Pauls Kirke, n.d.)

The church has a basilica layout and ends in a semicircular apse. Both the main nave and side aisles have coffered ceilings. The side aisles reach a height of around 9.5 meters, while the main nave extends up to 17 meters. The distance between the columns is 5 meters. The side aisles measure 4 meters in width and extend 30 meters in length. The main nave spans approximately 12 meters in width, while the depth from the beginning of the transept to the end of the apse is around 15 meters.

During a visit to the church I was also told that underneath the entire church there is a space about 1.2 meters high that is used as storage, despite moisture problems.

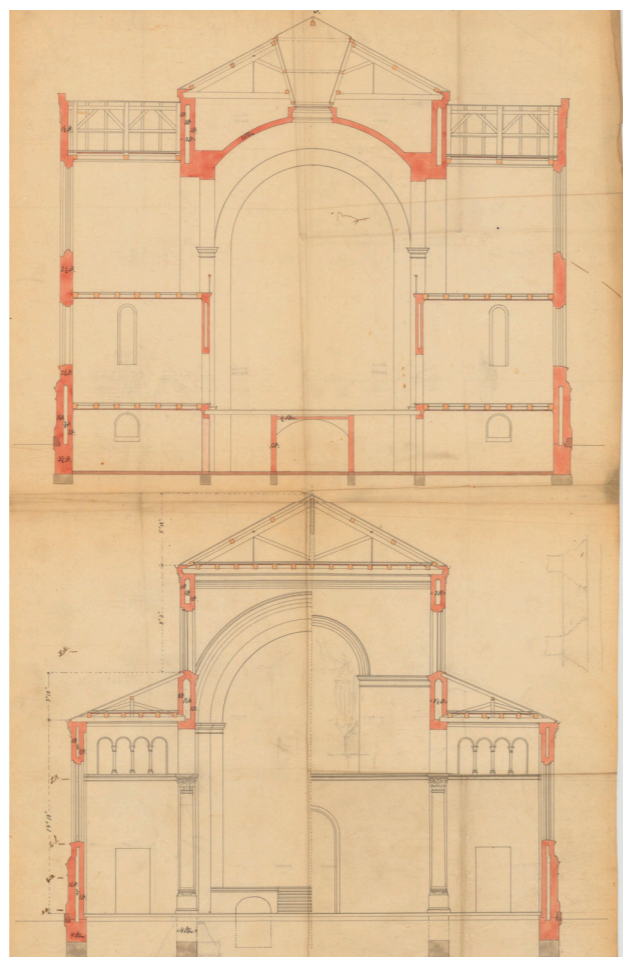
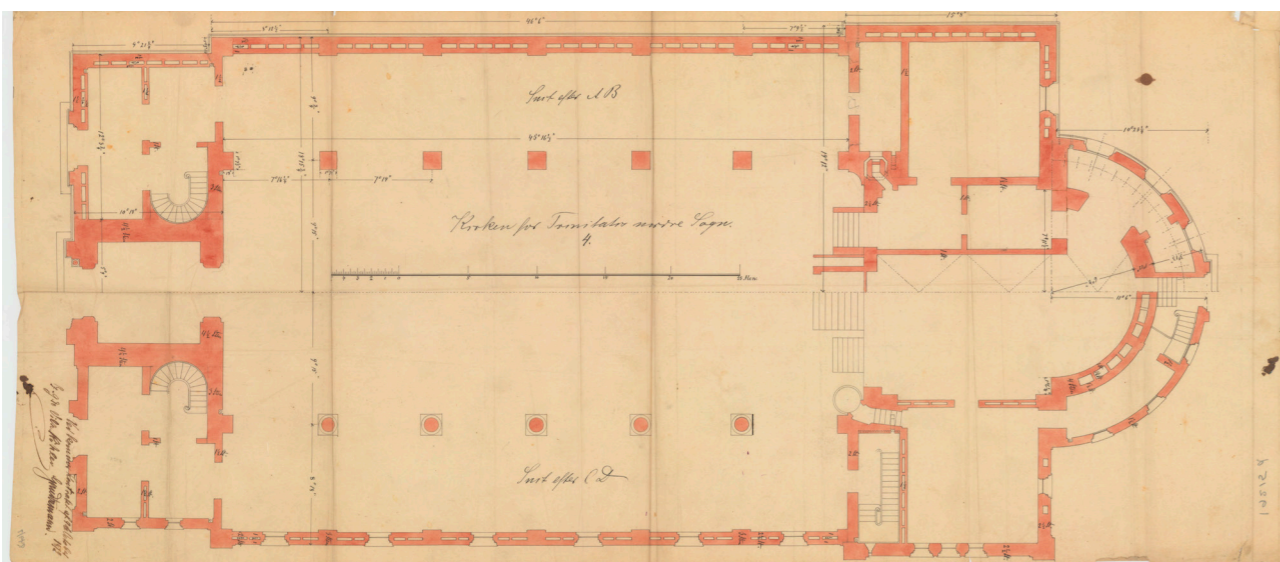


Figure 26: Historic sections of the church



29 Figure 27: Historic floor plan of the church

EXTERIOR DETAILS OF THE CHURCH

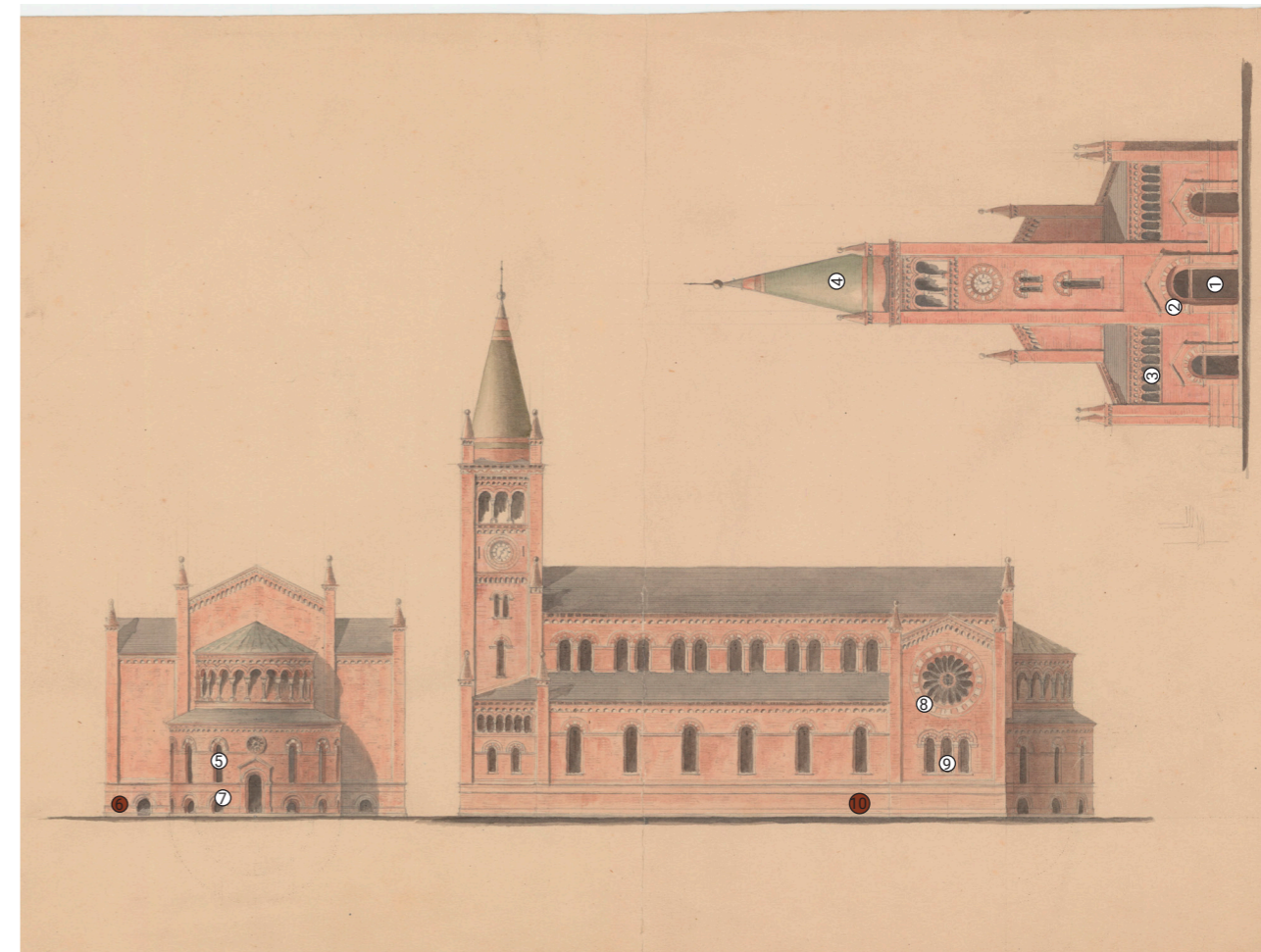
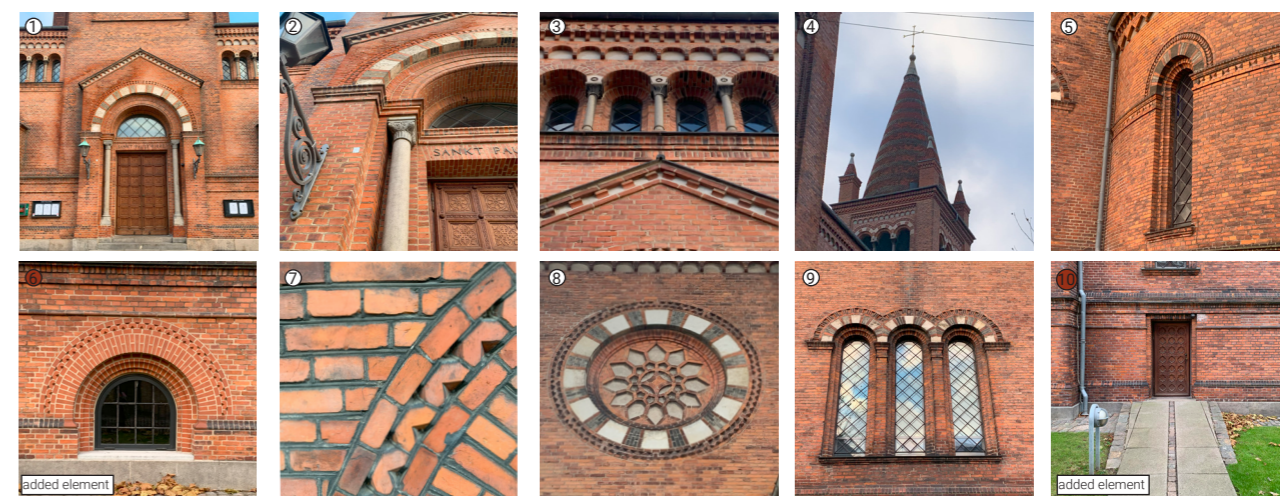
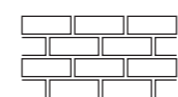


Figure 28: Facades of the church



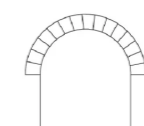
SUMMARY



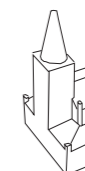
BRICK



STONE COLUMNS



SEMI-CIRCULAR ARCHES



TOWER OF THE CHURCH WITH A CONE ROOF



SIMPLE NEO-ROMANESQUE DECORATIONS

INTERIOR OF THE CHURCH

The current interior of the church is the result of a 1981-1993 renovation by architects Preben Thorsen and Steen Schäffer Ankilde.

Columns which separate the naves are made of granite, with Corinthian-style heads and sandstone bases. According to data derived from the church's website, these columns were built by the navy-nyborder residents.

In the apse is the church's only vault, which is painted with a starry sky, in the middle of which is a painted window with a Christmas rose motif. There is also a frieze, which is a copy of "Jesus' Walk to Golgotha."

The wooden coffered ceiling of the church has ornaments that reference historic Gothic frescoes. The colors of the ornamentation were the inspiration for the church's new color palette during the recent renovation, where the dark high pews were replaced by those in Irish blue.

(Arkitektur Og Interiør | Sankt Pauls Kirke, n.d.)



Figure 29 : Interior of the church 1877-1896 (View towards the apse)

Upon reviewing photographs of the church from its early days and comparing them with its current state, it is evident that certain elements have remained unchanged. These include the columns, ceiling decorations, the ornamentation within the arches as well as on the walls of the main nave.

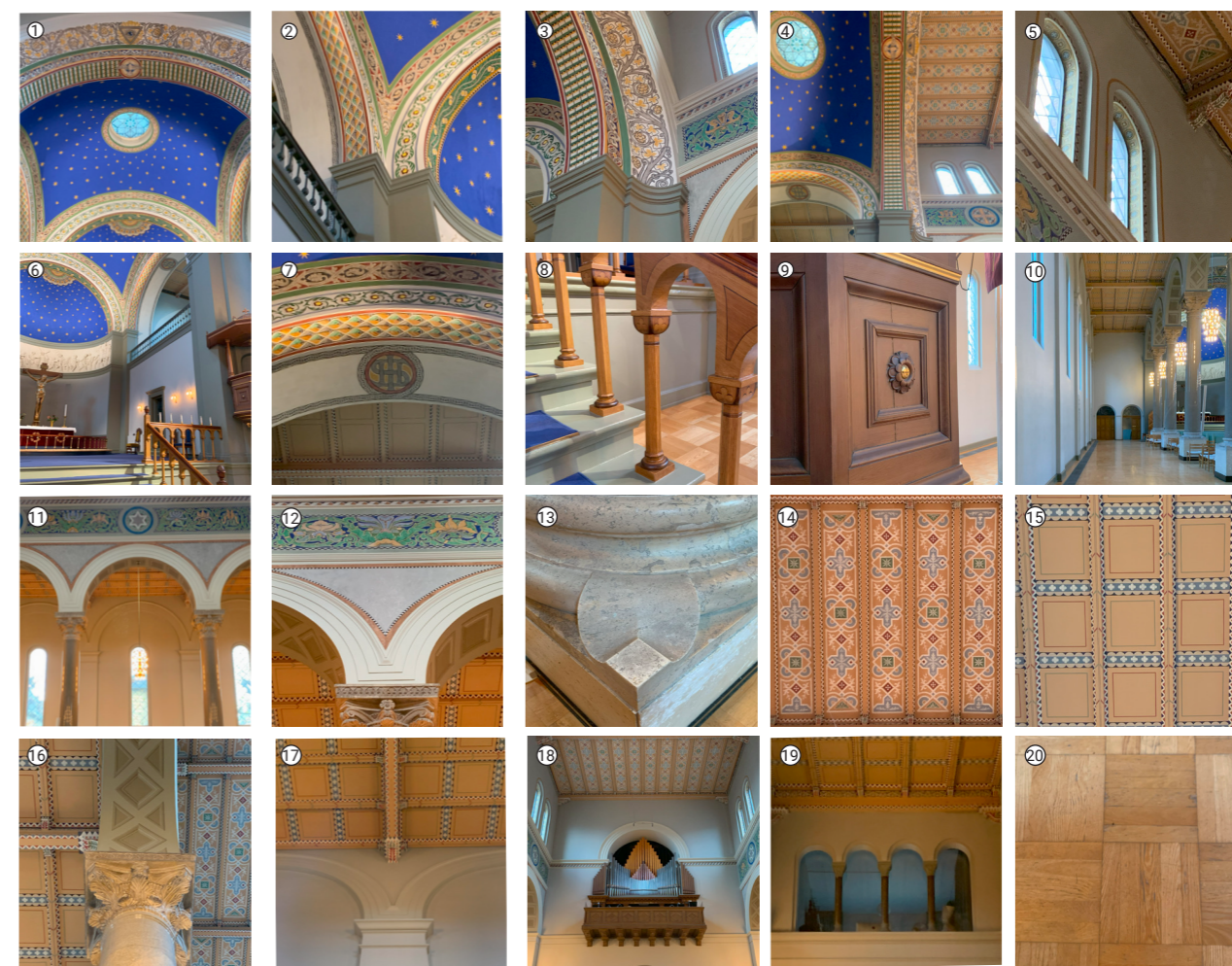
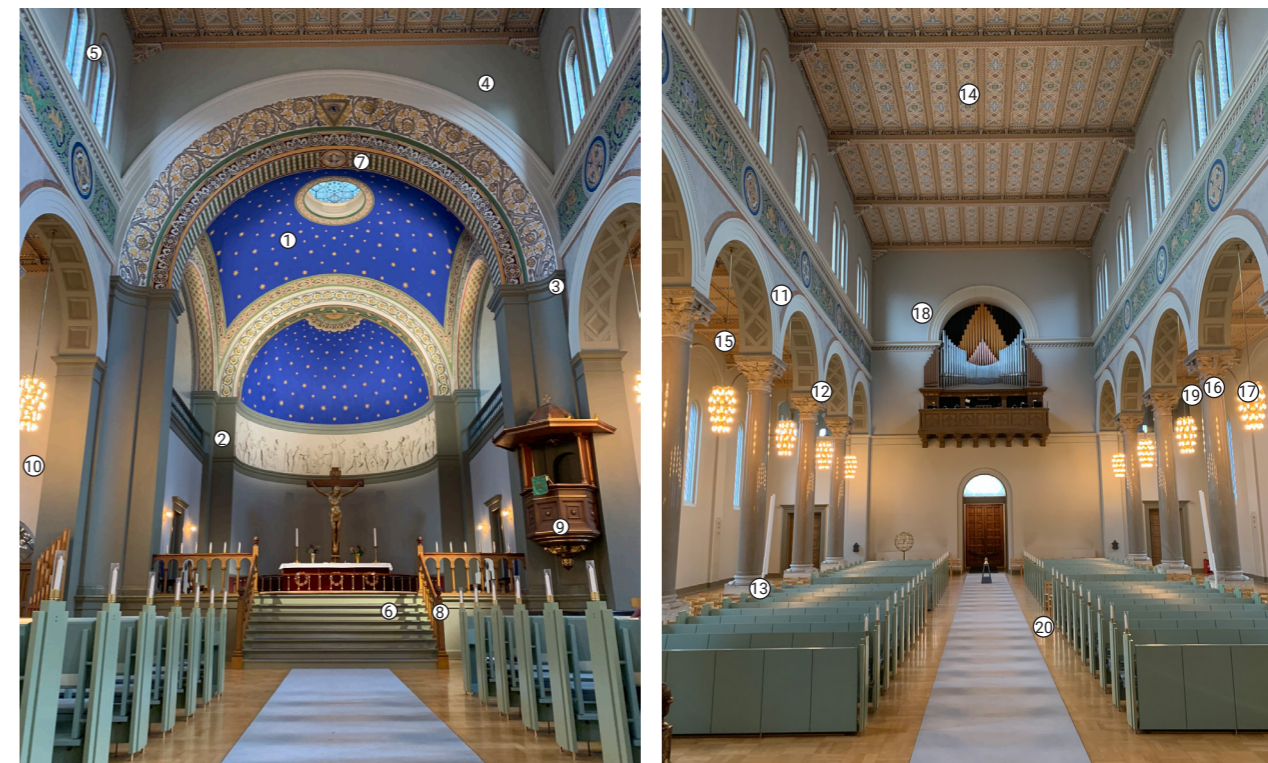
The interior of the apse, though beautiful and in harmony with the church's overall character, is a later addition. The pews have been entirely replaced with contemporary ones, and the organ has also been changed. Additionally, the ornamentation of the rainbow arch has been enriched with floral motifs that were not part of the original design.

The entire interior has a very coherent character, which I will strive to preserve, but the primary elements that will be prioritized in the later design to be emphasized and preserved will be the columns and ceiling paintings, due to their historical character.



Figure 30: Interior of the church year unknown (View towards the organ)

INTERIOR DETAILS OF THE CHURCH



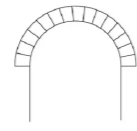
SUMMARY



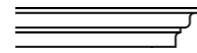
FLORAL ORNAMENTS



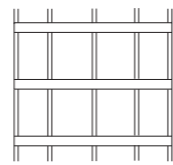
CORINTHIAN-STYLE COLUMNS



SEMI-CIRCULAR ARCHES

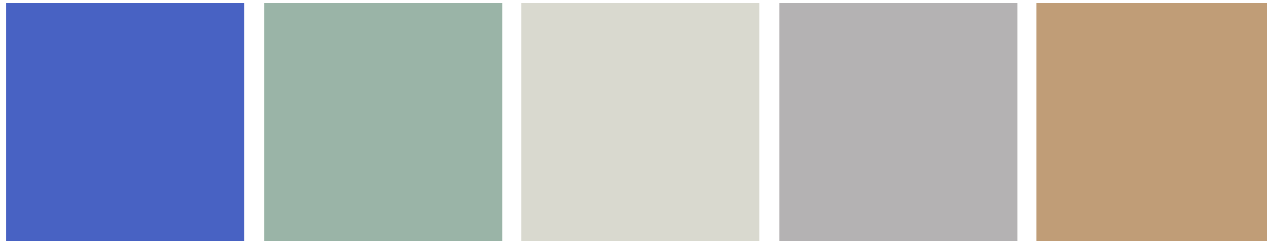


SIMPLE DECORATIONS



FLAT CEILING

MAIN COLOR PALETTE OF INTERIOR



ADDITIONAL COLORS OF DECORATION



CONCLUSIONS

Throughout its history, the church has also served other functions, such as a nursery school and a center for distributing aid to the poor. The fact that its columns were built by local residents highlights not only its social significance but also the community's involvement in its life.

The exterior of the church has remained largely unchanged since its construction, although minor modifications, such as the addition of windows, are visible. However, these changes were designed to mimic the historical character of the building, ensuring they blend seamlessly with the existing architecture.

Currently, there is one accessible entrance to the church, located on its side façade.

Over the years, the church has undergone renovations that have altered its appearance. Many elements, including the pews and flooring, have been replaced.

However, all modifications have been carried out with great respect for the original decorations, preserving the stylistic coherence of the interior.

Some elements of the church have remained unchanged since its construction. These include the granite columns and the decorative elements (primarily on the ceiling, but also within the arches). Due to their historical significance, these features should be preserved and highlighted in any future work on the interior.

The church features simple yet carefully curated ornamentation. The interior maintains a consistent color scheme of blue, green, and gray tones. The main materials used include painted plaster surfaces, a wooden ceiling, and granite columns.

The current design of the apse, through its interplay of light and shadow, creates an illusion of a larger space than it actually occupies.

The church is in excellent technical condition, and the space has been well preserved.



IV. PROGRAM SELECTION

STEPS TO DEFINE THE PROGRAM
THEORETICAL RESEARCH
POTENTIAL OF FUNCTIONS IN URBAN CONTEXT
PRELIMINARY VISION
CASE STUDIES
SPATIAL RESEARCH

STEPS TO DEFINE THE PROGRAM

Due to the fact that my approach to this particular adaptive reuse is more architectural-typological, rather than programmatic, I conducted analysis to select the most appropriate function that chosen building could perform in order to serve the local community to the fullest extent possible. For this purpose, I used various methods of analysis.

I conducted literature analyses aimed at investigating public opinions on the reuse of churches and what functions are socially accepted as well as a theoretical research directly concerning situation in Copenhagen.

The potential building program was then analyzed in an urban perspective checking whether the particular function was needed at that specific location and whether it could serve the local community.

After conducting theoretical and urban analysis, conclusions were drawn regarding the feasibility of potential programs within the building. These conclusions outlined a preliminary vision of the building's expected functional program.

After conducting initial analysis, more detailed studies were carried out, taking into account the characteristics of the building and spatial requirements, which resulted in a detailed functional program.

THEORETICAL RESEARCH

MUNICIPALITY GOALS

A few of the most important goals that may be relevant to the project stemming from the document "Copenhagen's Municipal Plan 2019-World city with responsibility" are:

- Building new housing, especially for students, as well as for the elderly due to Copenhagen's aging population.
- Using historical values to create the identity of existing neighborhoods.
- Extend culture and sports facilities on a level with the population development.
- Use cultural heritage as a foundation of understanding and developing the city.
- Maintain preservation-worthy buildings.
- Provide good location options for companies with many employees in central locations in the city.
- Promote sustainable tourism.
- Access to cultural and leisure activities in new and existing urban areas.

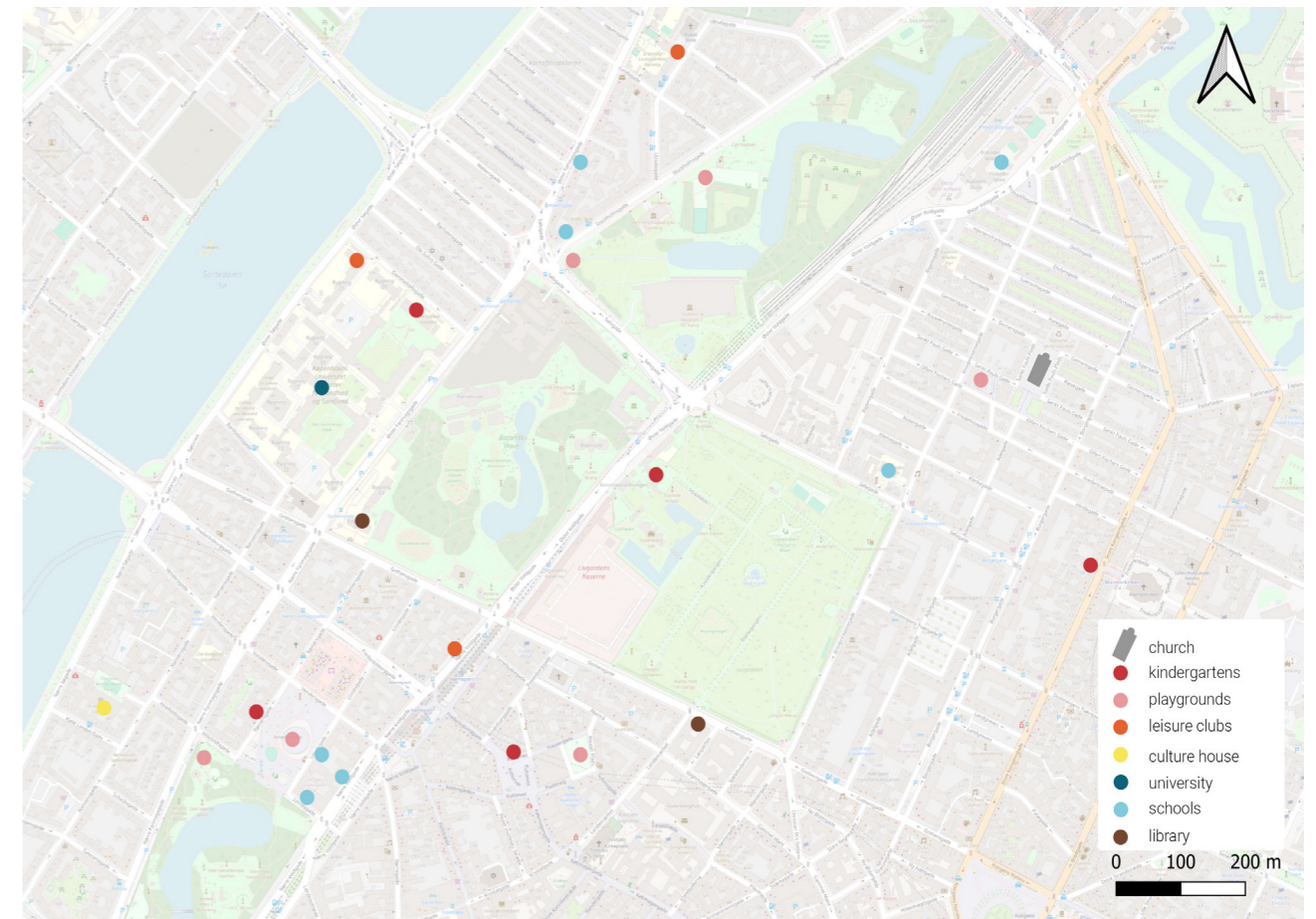
REPORTS

Realdania og Kirkefondet published two reports that contain crucial information when it comes to reuse of Danish churches.

The reports they published are: "NY BRUG AF DANSKE KIRKEBYGNINGER" and "IDEKATALOG Ny brug af seks københavnske kirkebygninger." Both reports present the situations of Danish churches, potential threats and opportunities for their adaptive reuse.

From NY BRUG AF DANSKE KIRKEBYGNINGER, we can learn what potential functions are considered appropriate and worthy of consideration as a new function of closed Danish churches. The proposals presented are:

POTENTIAL OF FUNCTIONS IN URBAN CONTEXT



1. Culture buildings: an assembly room, concert hall, restaurant, play and sports activities
2. Institution buildings: nursery, kindergarten, teaching room
3. Office buildings: offices as well as secondary functions such as staff rooms, large kitchens and bathing and changing facilities
4. Accommodation buildings: single-family houses, youth housing, dormitories, apartment buildings, care homes, hotels

The Idekatalog, however, presents specific functions which could be performed by 6 churches selected from the closed Copenhagen churches. The functions presented are:

1. Blågård Kirke (food court, Common House for Copenhagen's food association)
2. Samuels Kirke (Martial Arts house, Headquarters of humanitarian organization)
3. Absalons Kirke (Theater, Shelter for homeless)
4. Gethsemane Kirke (Youth club and homework cafe, Sports center)
5. Bavnehøj Kirke (Community center, Daycare center,)
6. Utterslev Kirke (House of amateur music, Music hall)

WHAT ARE THE DANES WILLING TO AGREE TO?

In order to examine the attitudes of Danes toward the reuse of churches, I have analyzed several articles. According to the article "Churches must be cultural centers," published by Berlingske, it appears that 80 percent of Danes have a positive view of using empty churches for cultural purposes, 33 percent would like to open the church doors to other faith communities, and 25 percent would like to use churches for private purposes. According to Thomas Martinsen, director of Bygningskultur Denmark, cities need new urban spaces in which to have a sense of community, and church space is perfect for this without detracting from its historical value either.

However, the general secretary of the Church Foundation, Kaj Bollmann, stresses that not all churches should have a cultural function. For example, rural churches will usually not be suitable for this, and that closing churches and converting them into cultural centers should be well thought out.

In another article, "Slippage in the attitude toward the use of churches," Secretary Kaj Bollman notes a change in Danish attitudes toward the reuse of churches. He notes their openness to converting to new functions instead of closing them and emphasizes that 5 years ago there was no such openness yet.

Svend Bjerg of the University of Copenhagen believes that if people are against the closing of churches, it is due to attachment to the tradition of which the people's church is a part. Svend Bjerg also insists that few people are able to accept the takeover of a church by another religion such as Islam, while it is much easier for them to accept the transformation of a church to be used for other Christian purposes such as a place for organizations to do church work.

INTERVIEW

The selected church is a 15-minute walk or 5-minute bike ride from the University of Copenhagen's Social Sciences campus, positioning it well to potentially serve university-related functions. I spoke with Morten Marstal, an architect specializing in the university's building strategies, who explained that while the university plans to close nearby buildings by 2027/2028 for cost and environmental reasons, they currently have no additional spatial needs as a result of these closures. He also noted a lack of quality sports facilities, including swimming pools, in the surrounding neighborhood.

CONCLUSIONS

Taking into account previous studies on the reuse of churches and also theoretical research on the potential demands of Copenhagen, I believe that the functions deserving further investigation are:

1. Kindergarten
2. School
3. Cultural center/Youth house
4. Library
5. Student housing
6. Sport center
7. Music hall

CONCLUSIONS

1. Although a kindergarten is definitely the appropriate function for which this church could be converted, there are already other kindergartens in the close vicinity. What's more, according to an article in The Local, 33 kindergartens were closed or reduced in Copenhagen in 2023 due to cost cutting. According to municipality, 3,000 fewer children now attend kindergartens than 4 years ago.
2. In the area there are many schools, including private and public schools, as well as language schools. The need for more schools is not identified.
3. In close proximity there is already a cultural center "Indre by" with a wide range of activities, in addition there are also 3 leisure clubs. It is therefore concluded that more typical cultural functions are not needed.

4. Next to the university there is already a big library, which also has study rooms.
5. On the other side of the lake is the Danish Academy of Music, and around it are many concert halls. It is about 3 km from the church but it is still city center. It is therefore concluded that a music hall is probably not the most appropriate function that a church can fulfill.

No sports facilities were found in the area. The city center is also a suitable location for student housing, which is currently in great demand. Further analysis should therefore take both functions into account.

PRELIMINARY VISION

STUDENT APARTMENTS

Copenhagen currently has a definite shortage of student housing, so the project could answer the city's problems. The church has many windows, so it would be possible to separate quite a number of rooms, moreover, it would probably also be possible to separate at least two floors. What's more, the church has a basilica layout, so even if the side aisles were completely built up, the nave would be illuminated. Reuse of church for student apartments would be a very interesting, but also challenging project.

The residential function has very strict conditions when it comes to thermal insulation and daylight. Although the church appears to be quite well lit, it is possible that there would be a need for new window openings, as well as replacing old windows with new ones. Thermal insulation of the building would certainly be necessary, which could affect the beauty of the building. Moreover, churches in their history have always been open, they were public places. The apartments are, by design, private, but it would be possible to combine this with a public function that would maintain the public character of the place.

SPORT FACILITIES

In Copenhagen's development goals, reports of Realdania og Kirkefondet and according to the architect Morten Marstal, there is the need for sports facilities. This project idea would also meet these requirements, and so would also meet the city's current development needs. For sports functions, daylight is not so important, definitely less stringent would be the requirements for thermal insulation. The existing interior of the church would also be an asset for new functions. The height of the church could be used for disputes requiring significant heights like aerial dance. The public character of the site is also preserved in this function. What's more, a certain continuity is preserved between the old and new functions of the church. Once the church took care of the souls of the faithful, now it would take care of their bodies.

Functions that are related to sports, however, are not always beautiful and aesthetically pleasing. It can be a challenge to design them in such a way as to showcase the beauty of the existing church and preserve its historical value.

FINAL THOUGHTS

Based on the analyses conducted, I conclude that while both student apartments and sports facilities are viable options for the selected church, sports facilities are the more suitable function. This option requires fewer structural interventions, such as vertical and horizontal divisions, allowing the church's height and spatial character to be better utilized. Additionally, sports facilities do not demand extensive thermal insulation, making them a more practical choice. Importantly, transforming the church into a public space ensures it serves the community inclusively, remaining accessible to all.

This function also simplifies the design process for spatial divisions and the functional plan, enabling me to focus on aspects that are critical to the project. These include preserving the spirit of the space, while creating specific atmospheres, and carefully selecting materials. My goal is to enhance the sensory experience for users while also considering aesthetic qualities.

However, I don't want to convert the church into a gym. I want to approach the topic of sports centers in a different way. I want the function I am designing to be focused on movement, exploring one's own body and its abilities, dancing together and the joy of movement, motivating both young and old to physical exertion and finding their community. The exact program of the building will be determined after more detailed analysis.

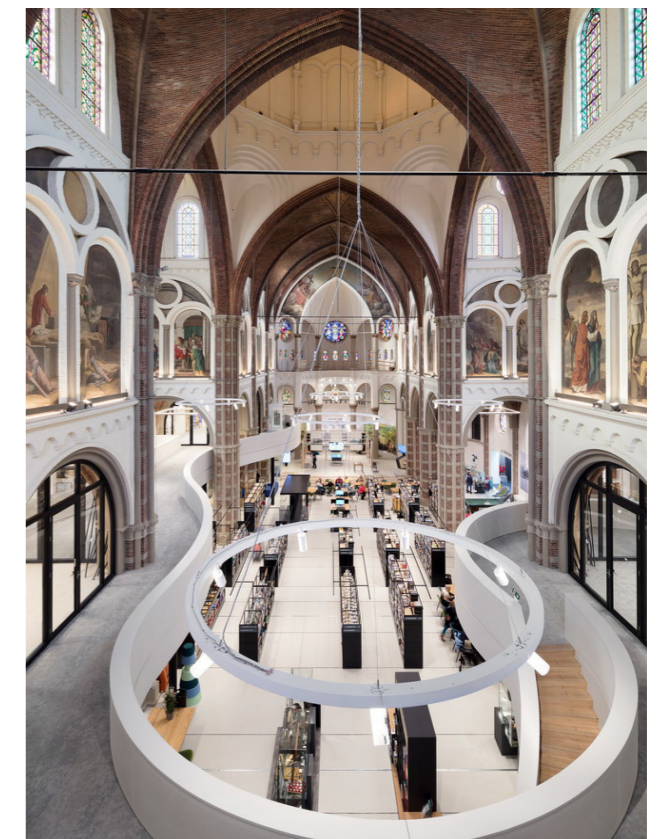
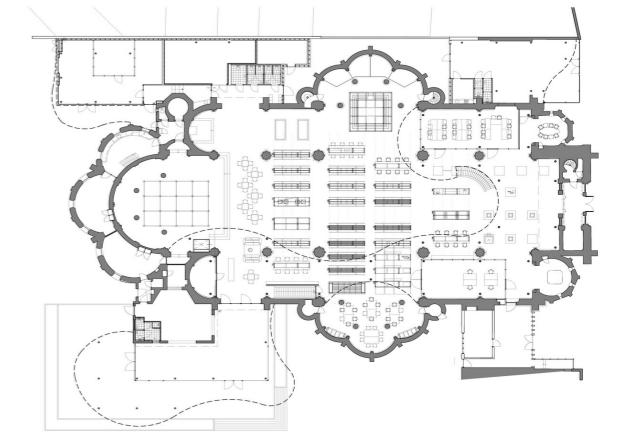
CASE STUDIES

CASE STUDY 1

Project name: Library, Museum and Community Center 'De Petrus'
Architects: Molenaar&Bol&vanDillen Architects
Area: 3000m²
Location: Vught, Netherlands

The former church has been adapted into a Library, Museum and Community Center. The project retains all the characteristic elements of the church, such as high vaults, original stained glass windows and massive columns. In this project, all functions are connected to each other in one open space and the most distinctive element is the mezzanine, which gives the historic building a new look. The second floor accessible from the mezzanine contains new functions such as study rooms and conference rooms, but also technical rooms. The mezzanine is mainly located in the side aisles of the church. In the library area on the first floor, books are arranged in shelves on rails that provide easy repositioning. This makes the space multifunctional and provides the opportunity to hold events on a different scale while also serving as a library. The mezzanine extends all the way to the outside of the church, creating a roof to the added restaurant and giving a slightly more new-modern feel to the building emphasizing its adaptation and the fact that it now serves a new function. (ArchDaily, Library, Museum and Community Center 'De Petrus, 2024).

I appreciate this project because it introduces one major element to the existing architecture, transforming the building's character and function while maintaining a strong dialogue with its original structure. Although much of the building remains unchanged, the additions have been designed with remarkable sensitivity, reflecting the shapes and rhythm of the existing design. This project exemplifies how thoughtful, minimal changes can make a significant impact.



Images/illustrations from Archdaily, photographer unknown

CASE STUDY 2

Project name: Sankt Paul's church, circomedia
 Area: unknown
 Location: Bristol, Great Britain

The 18th-century church has been given new life thanks to a partnership with Circomedia which used its space for circus exercises.

The original structure of the building was practically untouched, but was only supplemented with equipment allowing for exercises in the air. What's more, the floor was also replaced with a semi-sprung dance floor. In addition to being used for circus exercises, the church is now also being used as a conference hall, concert hall, award ceremony hall or wedding hall.

The project inspires me because it shows the potential that the church buildings carry. Hardly any permanent changes have been made, and yet the building has gained a completely different character and perception. The project is also interesting to me because circus exercises are linked to movement, so the project also shows me the potential of the church in supporting movement.



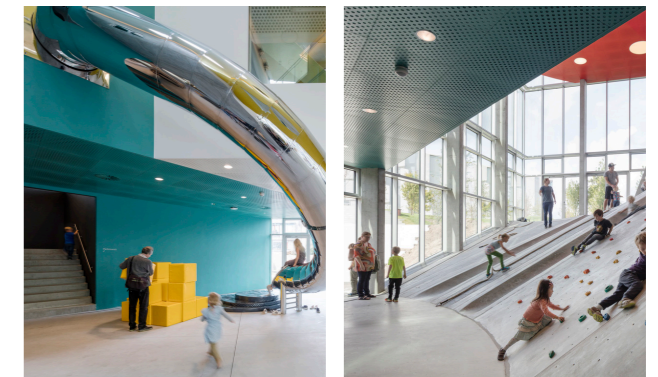
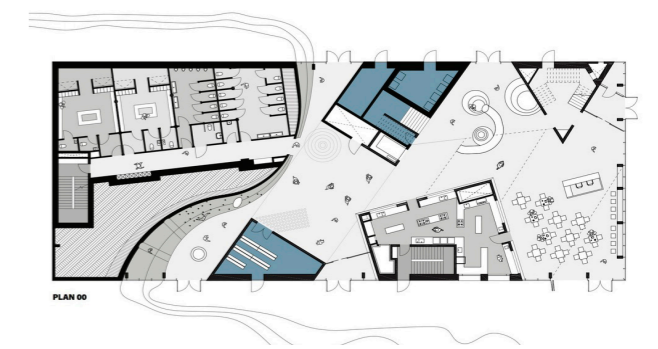
Images/illustrations from <https://www.visitchurches.org.uk/>, photographer unknown

CASE STUDY 3

Project name: Ku.Be House of Culture in Movement
 Architects: ADEPT , MVRDV
 Area: 3200 m²
 Location: Copenhagen, Denmark

The building was created in an attempt to create a project that would "connect people and improve the quality of life." The architects decided on a space that combines theater, sports and science where both mind and body are activated and became an incubator for neighborhood development. The space is dedicated to everyone regardless of age or physical ability. It is a place that connects people who otherwise would have no way to connect. KU.BE features 6 zones with separate functions, which are defined by a specific shape, color and material. It includes areas such as zenzone, performacezone or foodzone. The building encourages alternative forms of movement. To get from floor to floor, one can climb cubes, slide down slides or on a fireman's pole. The architects have turned the experience of the building upside down, and what in most priors would simply be a mindless journey, in KU. BE becomes an exploration of one's body. (ArchDaily, Ku.be House Of Culture In Movement, 2024)

This case study is important to my project because it centers on movement within a building, much like my own design. While KU.BE is a modern building and my project involves the reuse of a church, the functional focus is similar. Both aim to create spaces that encourage physical exploration. I appreciate how KU.BE incorporates movement in unexpected ways, turning circulation in the building into an experience.



Images/illustrations from Archdaily, photographer Adam Mørk

CASE STUDY 4

“Kontakt- Przestrzeń ruchu, tańca, muzyki i sztuki”, which in direct English translation would be “Contact- the space of movement, dance, music and art” is not an architectural inspiration, but the programic inspiration. The space is located in an old building in Kraków near the Słowacki Theater and has been in operation for more than a decade. It was founded by a Pole raised in France, who has traveled to Asia, Africa and South America. It is a place where music resounds in many languages and brings people together regardless of age, gender, background. It offers both regular classes such as Contact Improvisation, Contemporary Dance, Dance Theater, Afro Dance, Samba, Yoga, Choir, massage classes, and many others, as well as is a space for various events initiated by the participants. It is a space for self-expression and contact with one’s body. It is a place where, through dance, music, physiotherapy, you can regenerate your body and explore its possibilities. The atmosphere created in this place allows you to get rid of embarrassment, to express yourself freely. “Contact” received an honorable mention and first place in the ‘Local Life’ guide in Krakow in 2016 in the entertainment category, and the city government of Krakow honored their activities as Ambassador of Multiculturalism 2019. This place inspires me because of its function. I want the space I am designing to similarly allow people to explore the possibilities of their bodies freely and with acceptance. „Contact” is a relatively small space with a strong community, while my project will be larger, with more defined functions, and designed specifically around a structured program. However, despite differences in scale, location, and architecture, my goal is to create the same sense of acceptance and belonging that „Contact” fosters.



Images/illustrations from kontaktprzestrzen.pl, photographer unknown

SPATIAL ANALYSIS

To help define the functional program, I focused on classes offered by “Contact - a space for movement, dance, music and art” in Kraków as a starting point. Taking inspiration from this example, I analyzed which of the proposed functions can be adapted in the church building and for how many users, taking into account the spatial possibilities of the building. It was crucial to understand the spatial requirements of each activity and adapt the design to the specifics of the planned functions. Classes proposed by „Contact” include:

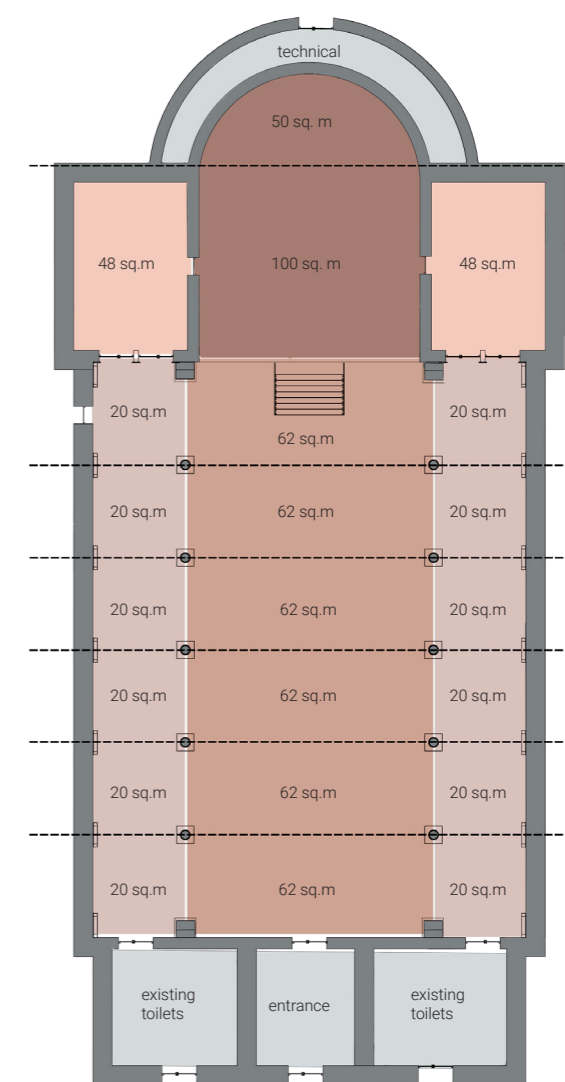
- Acro Yoga Flow + Thai massage
- Vinyasa - dynamic yoga
- Yoga (different levels of experience)
- Afro Dance
- Contact Improvisation
- Floor Dance
- Animal flow
- Bodywork
- Therapeutic dance
- Stretching
- Tibetan bowl sound therapy
- Somatic communication workshops
- Life/art process workshops based on Anna Halprin practice.

What’s more, from my own practice and experience, I believe that the program can benefit from the introduction of a few other activities such as:

- Tai Chi
- Ecstatic Dance/ 5Rhythms/ Movement Medicine
- Aerial dance
- Social dance (Lindy Hop, Tango, Salsa, Bachata)
- Relaxation zone

SPACE INSIDE THE CHURCH

During preliminary spatial analyses, it can be seen that the interior of the church is divided into modules of a certain area. These modules are natural spatial units that can facilitate further research and evaluation of potential uses of the building. In order to better illustrate this structure, the diagram below shows the layout of the modules, which allows for more precise analyses of the space and its functionality.

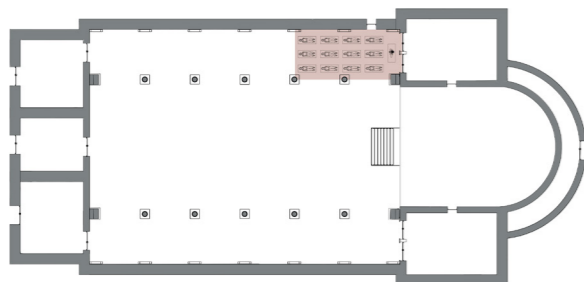


YOGA & STREACHING

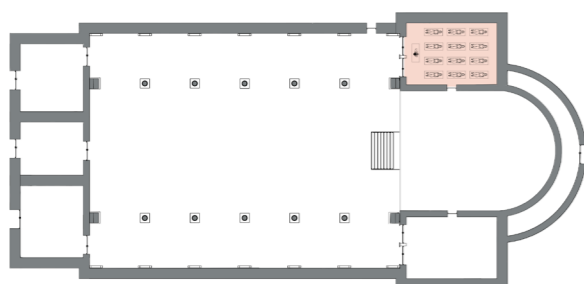
The space needed to practice yoga depends on the number of participants and the type of asanas performed. A standard yoga mat measures about 180x65 cm, and usually maintains about 80 cm of space between mats for comfort during practice. For static yoga, the space can be slightly smaller, while dynamic yoga, including Vinyasa yoga, requires more space. For dynamic yoga, about 3 sq. m. per person is assumed. Although stretching usually requires slightly less space, for ease of design assumptions, I assume similar space dimensions as for yoga.

With Acro Yoga, due to the lifting of partners in the air, the standard room height of 2.5 meters may not be sufficient. In order to ensure the comfort and safety of the exercises, the space should allow the partner to be fully lifted without the risk of collision with the ceiling. For basic positions, where the base lies on the ground and supports the other person on his or her feet, a height of 3 m may be acceptable, but for more advanced figures, especially when the partner is lifted on upright arms or dynamic transitions are performed, the recommended height is at least 4 m.

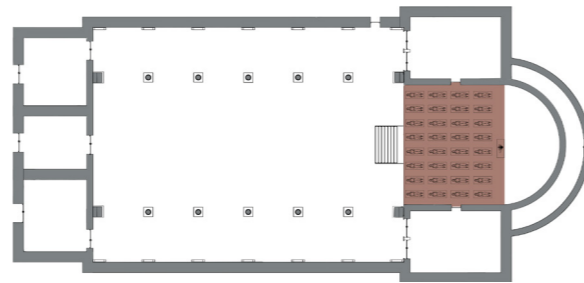
YOGA/ STREACHING FOR +/-12 PARTICIPANTS



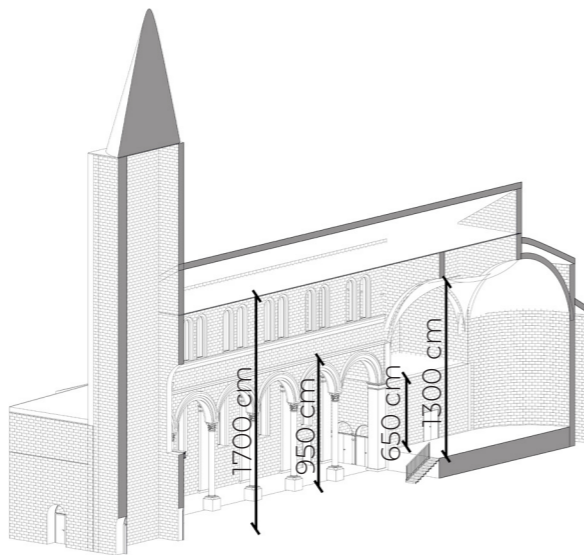
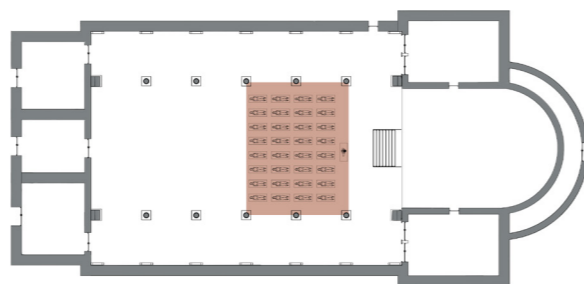
YOGA/ STREACHING FOR +/-12 PARTICIPANTS



YOGA/ STREACHING FOR +/-32 PARTICIPANTS



YOGA/ STREACHING FOR +/- 32 PARTICIPANTS



The proposed spaces of 40-124 sq. m allow for the organization of Yoga classes, and their height also allows for the practice of Acro Yoga, even with possible additional horizontal divisions. However, it is worth noting that the current layout does not include space for equipment storage, which should be taken into account in the further design process.

DANCING & BODY AWARENESS

The proposed dance styles and body awareness techniques, such as Afro Dance, Ecstatic Dance, 5Rhythms, Movement Medicine, Contact Improvisation, Floor Dance, Animal Flow, Body Work, LifeArt Process Work, Somatic Communication, Therapeutic Dance, Social dance vary in terms of dynamics, intensity and range of motion, which affects space requirements.

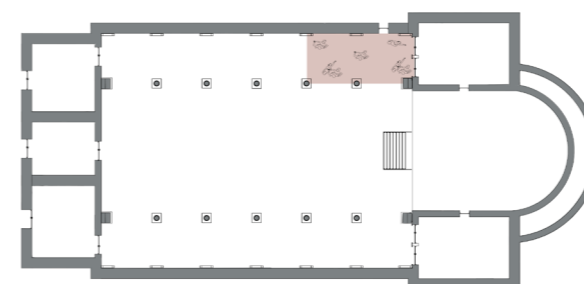
As a general rule, it can be assumed that the range of motion of the arms and legs is often comparable to our height, resulting in about 4 sq. m. of required space per participant. However, this space can increase or decrease depending on the dynamics of the movement.

Afro Dance include dynamic movements, spins and jumps, so it's worth providing them with a bit more space, about 6 sq. m per participant.

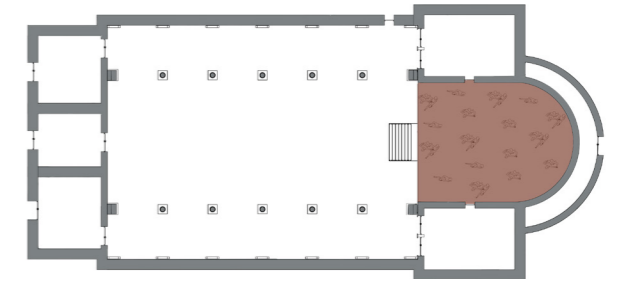
In contrast, Contact Improvisation, Floor Dance, Bodywork and Animal Flow require less space because the movements are more fluid, controlled and often performed horizontally, close to the ground. In Somatic Communication and Therapeutic Dance the movements are also less intense and the focus is on body awareness and internal communication. This results in the need for less space, about 3 sq. m per person.

In dances performed in pairs, the required space per couple is 4 to 6 sq. m, depending on the dynamics of the dance.

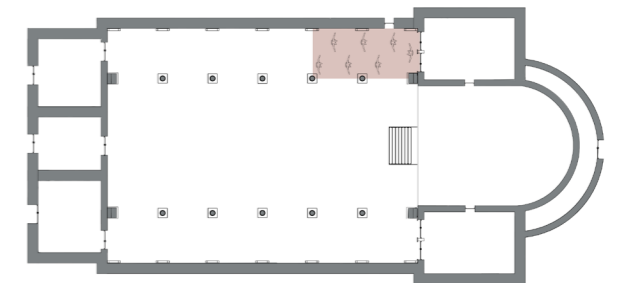
CONTACT IMP. FOR 14 +/- PARTICIPANTS



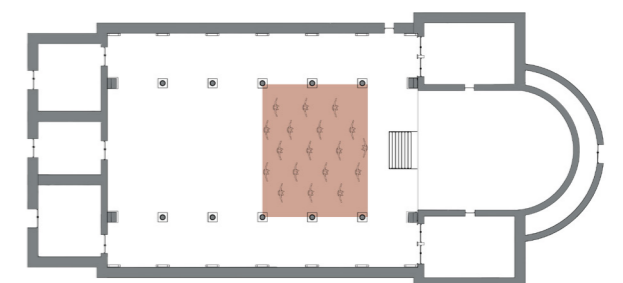
CONTACT IMP. FOR +/- 48 PARTICIPANTS



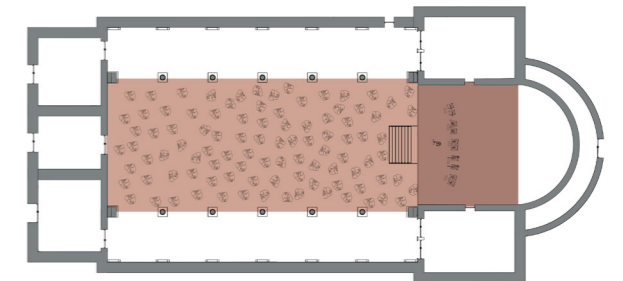
AFRO DANCE FOR +/- 6 PARTICIPANTS



AFRO DANCE FOR +/- 17 PARTICIPANTS



SOCIAL DANCE FOR +/- 200 PARTICIPANTS

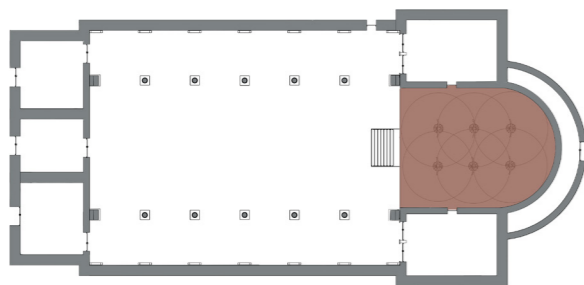


The proposed spaces of 40-372 sqm allow for a variety of dance classes and dance events. However, I noted that the rooms located in the side aisle should not exceed two modules in length to avoid creating disproportionate and difficult to use spaces. As a result, classes such as Afro Dance can be challenging to accommodate in the design proposal, as they require a significant amount of space for a relatively small number of participants.

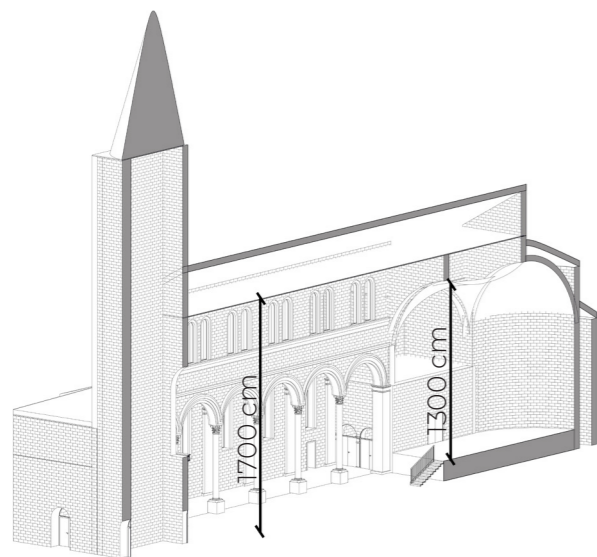
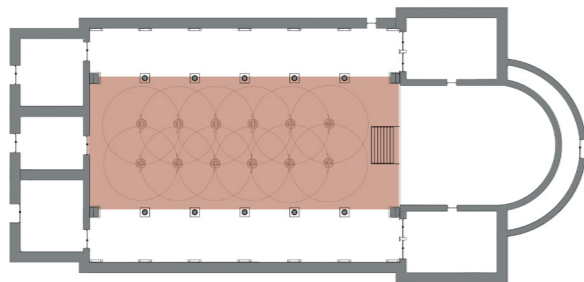
AERIAL DANCE

Aerial dancing requires adequate ceiling height, which means that the minimum height of the room should be at least 4 meters. According to recommendations from the aerial dance forums, there should be at least 3.5 meters of distance between two suspension points (such as sashes or ropes). The ideal space for this type of dance and aerobics should provide about 2 meters of free space in all four directions from the suspension point. As a result, for one dancer the space is about 16 sq. m.

AERIAL DANCING FOR +/- 6 PARTICIPANTS



AERIAL DANCING FOR +/- 12 PARTICIPANTS



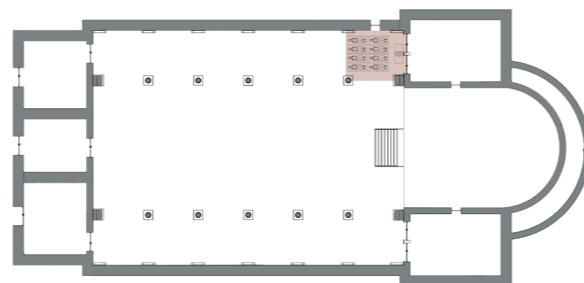
Aerial dancing requires very high ceilings, which are rarely available in standard buildings. The church space provides this necessary height, making it a suitable location. However, the discipline also requires a significant amount of floor space, occupying a large part of the building. Therefore, it is important to consider whether to consider this function in the program or to design it flexibly, allowing the space to be used for other purposes when classes are not taking place.

TIBETAN BOWL SOUND THERAPY & THAI CHI

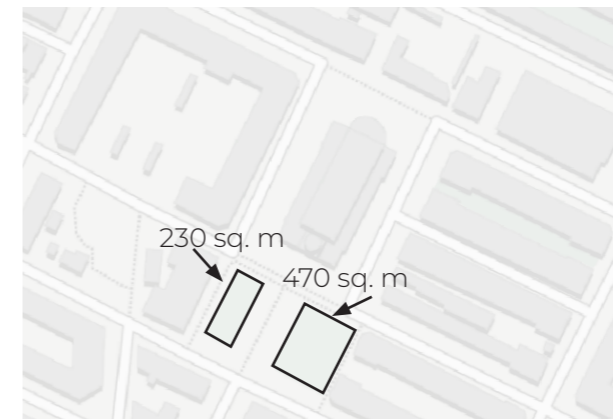
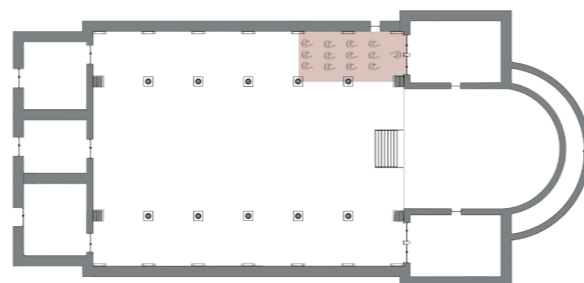
During sound therapy with Tibetan bowls, participants sit or lie in a comfortable position, listening to the sounds and vibrations of the bowls. For this reason, the space required per person is not large - 2 sq. m is sufficient. However, an important element of this therapy is the proper acoustics of the space, so that the sounds of the bowls can be clearly heard and not drowned out by other sounds.

Tai Chi is a martial art based on fluid, gentle and precise movements, so it doesn't require much space - 2 to 4 sq. ft. per person is enough. Tai Chi is also very popular for practicing outdoors.

TIBETIAN BOWLS FOR +/- 8 PARTICIPANTS



THAI CHI FOR +/- 12 PARTICIPANTS



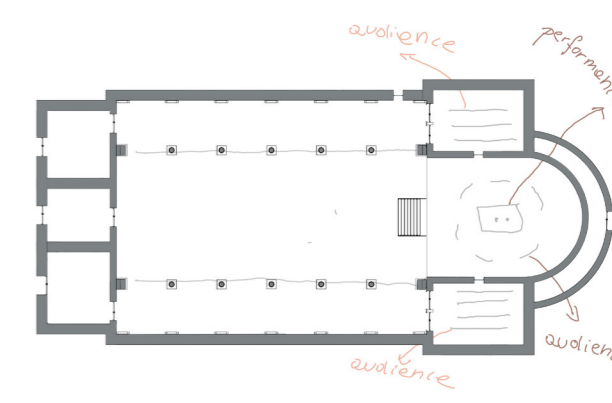
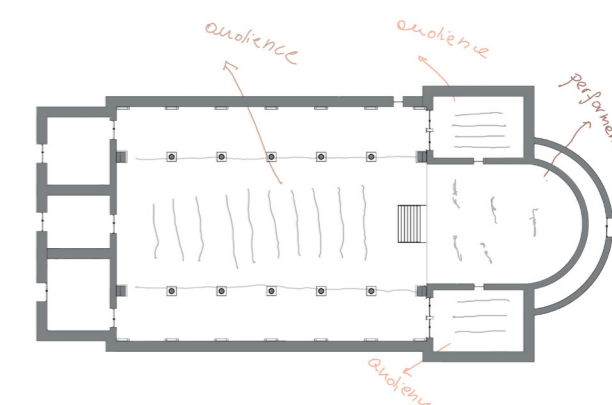
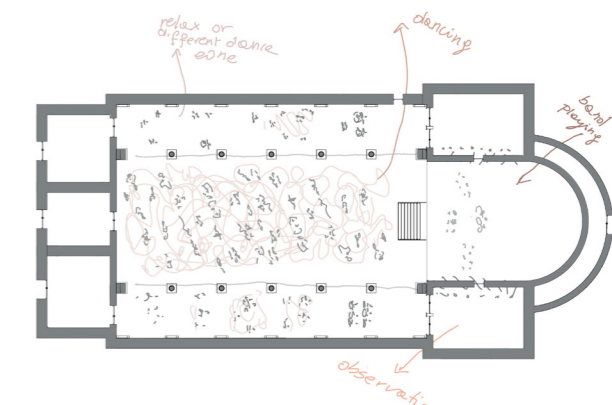
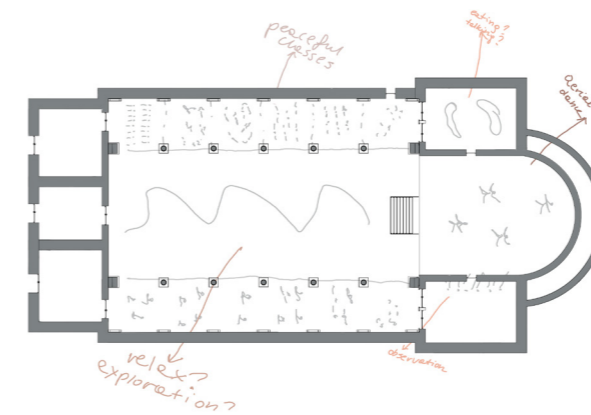
Tibetan Bowl Sound Therapy does not require a large area, so it is easy to find a suitable place for it. However, it can be a design challenge to provide adequate acoustic insulation to create an environment conducive to relaxation and the full experience of Tibetan bowl sounds.

Tai Chi can also be relatively easily located in a church space. Moreover, the fact that it is often practiced outdoors creates an opportunity for creative use of the space around the building, extending its functions to the outside area.

CONCLUSIONS

All classes are possible in terms of space in the church, but they should not take place at the same time. I noticed some spatial patterns, such as the fact that most of the classes are able to be held in the side aisles for intimate groups.

After analyzing the possible functions, I came up with ideas on how the space could be used in different ways, depending on the changing needs and activities, in order to accommodate the suggested program in the given space of the church.



These analyses are the basis for my later design vision, which will be aimed at ensuring this flexibility and adaptability.

V. ADDITIONAL THEORIES

BODY & SPACE

The importance of the human body has been explored and analyzed for centuries, from Leonardo da Vinci and his Vitruvian Man to Le Corbusier and his Modulor. The problem with these approaches, however, was that they did not take into account gender differences or disabilities. Moreover, they treated the body as a static form, while our interaction with space is always dynamic. (Tang, R., 2017)

In later years, figures such as Rudolf Laban, who was also an architect, explored body, its movement and space as integral to artistic expression and architectural perception.

"Movement is living architecture, so to speak - living in the sense of changing places as well as changing coherence. Architecture is created by human movements and consists of paths tracing shapes in space, which we can call 'trace-forms'." (Laban, 1974)

In 1926, he created a system of dance notation known as Labanotation, also referred to as Laban Movement Analysis (LMA). His goal was to preserve dances and choreography from oblivion, since at the time they were not widely recognized as a true art form. The main categories of LMA are: Body, Effort, Shape and Space. His notation system is a universal language and consists of recordings in geometric shapes that represent movement in the context of space and time. (D'Amico, L., 2019) Taking this into account, he created also diagrams to illustrate the body's potential in kinesphere, which he defined as the volume of all possible movements the body can make within its range. (Jilek, 2013)



Figure 31: Kinesphere

Laban was not the only one to analyze the capabilities of the human body and its position in space. Over the years, figures such as Martha Graham or William Forsythe have also had a significant impact on the field. This is a topic that is still being explored and developed. In this chapter, examining the relationship between body and space, I would like to take a closer look at the theory presented by Uysal and Wilson in their work "Embodying Architecture, Studying Dance: Movement as Means of Studying Body-Space Relationship."

In this work, the authors study the interaction between body and space, showing how these two elements influence and shape each other. They distinguish four theories of this relationship: BODYspace, bodySPACE, BODYSPACE and bodyspace, each of which describes a different way in which body and space define and transform each other.

BODYspace is an approach where the space is seen as stage for movement. In this theory body defines and gives meaning to space through spatial relationships. It is not just a passive element in architecture, but actively influences its perception and redefinition. In this kind of relationship, the body in motion breaks classical spatial orientations: directions such as up/down or left/right lose their fixed meaning and are re-constructed through interaction with the space. BODYspace is particularly evident in avant-garde forms of contemporary dance, where body movement not only introduces a temporal dimension, but also acts as an architectural element, modifying and redefining the surrounding space. (Uysal & Wilsing, 2001) An example could be Mikrokosmos by Anne Teresa de Keersmaeker. It is a quartet in which four dancers create both two- and three-dimensional geometric constellations, constantly changing their shape and pattern. The dancers' movements are dynamic, during the choreography they jump, bend, rotate and blend into the wall in a single line and then disperse into a cubic cluster.

"... as these women move off the walls, against which they were touching only an instant ago, it is as if they are the carrying columns built into the wall that come alive and start wandering about the space they happen to bound..." (Uysal & Wilsing, 2001, p. 390)

DANCE & ARCHITECTURE

Architecture and dance have much in common. Architecture goes beyond just shaping buildings, and is also responsible for the organization of space. Like a dance choreographer, we as architects design the circulation in a building, we design the movement of its users and also their experience of the space. (Dance, Movement, and Architecture- How are they connected. (n.d.). Rethinking the Future.) One of the elements that architecture and dance have in common is the body, whose relationship with space was discussed in previous chapter. In order to explore how architecture and dance can be related and inspire each other on other levels as well, I have distinguished 4 categories: rhythm, change, weight and breath, which are the common language for both the arts of dance and architecture.

The ancient Greeks were aware of these connections and based their art on the laws of nature and natural rhythms. (Ahmadi, 2022)

„[The Athenian saw the God Apollo]... through the ideal expression of art; when voices, full of sound, resounded in choral singing, singing the deeds of the god, while they gave the dancers the measure that gave rhythm to the dance, which itself, in graceful movements, told the story of these deeds; and when over the harmony of well-ordered columns a noble roof was woven, one on top of the other, the wide arches of the amphitheatre and the scenography planned on the stage.” (Wagner, 1993)



Figure 32-33: Mikrokosmos, by Anne Teresa de Keersmaeker

bodySPACE is an approach where the space is seen as motivator for movement. In this theory space defines how the body can perform and move. It is not just a background for performative actions, but it actively organizes and restricts movements, giving them a specific form. In this relationship, the body is not autonomic - it must adapt to the space, which determines its position and movement. (Uysal & Wilsing, 2001) An example of bodySPACE can be seen in the performance Magnanimous Cuckold, in which the central element was a huge stage machine equipped with doors, windows and moving segments. The actors were not the focal point of the performance - they wore identical costumes, and their movements were determined by the mechanics of the stage design. The space not only organized their position in the performance, but also imposed certain movement techniques, requiring their bodies to adapt to the machine.



Figure 34: The Magnanimous Cuckold, by Liubov Popova

BODYSPACE is an approach where the space is seen as partner in dialogue. In this theory both body and space are equal, working together, influencing each other and defining a common dynamic of movement based on direct physical contact. Space in BODYSPACE is not just a functional architectural background, but becomes an active tool that supports movement. An example is an actor who disappears into a dark space, leans against walls or hangs from them. Such a relationship is seen in many works by Lloyd Newson, among others. In this relationship, the body does not exist independently of the space, and the space does not exist without the movement of the body. (Uysal & Wilsing, 2001) “There is no movement without the wall and no wall without the movement.” (Kunst, 1995)



Figure 35: Strange Fish, by Lloyd Newson

bodyspace is an approach where the space is seen as mental counterpart. This theory is about the relationship of the alienated body with the alienated space. This is the most abstract of the four concepts in which space does not dictate the body's movement, but neither does the body dominate over space. There is no physical contact between the body and the space, the movement of the body in bodyspace does not necessarily change the space physically, but it does change the perception of it. An example is Hand Drawn Spaces of Merce Cunningham. Because of the virtual environment and imaginary space, any movement can occur at any time. However, this is not a relationship that provides freedom and comfort as in BODYSPACE, but it meets mutual negation and denial. (Uysal & Wilsing, 2001) “Nor is movement catalyzed or implied” (Bloomer & Moore 1977).

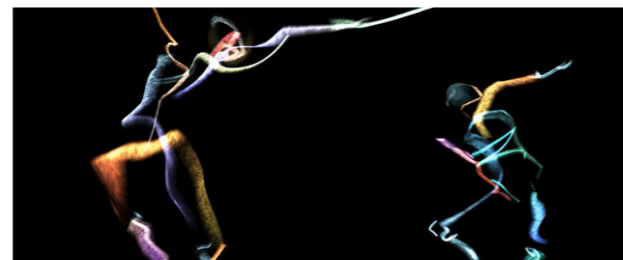


Figure 36: Hand Drawn Spaces, by Merce

RHYTHM

Rhythm is a fundamental element in music, dance and architecture alike, and its presence is undeniable. It is rhythm in music that organizes sounds into a coherent whole and distinguishes them from a group of sounds that can be called noise. In architecture, repeating elements such as columns, windows, lines or spatial forms create order in space. In dance, meanwhile, rhythm is expressed through the interaction of the dancer's movements with the music. (Ahmadi, 2022)

Rhythm also has the power to influence mood and evoke emotion. In music and dance, contrasts such as changes in tempo or silence affect the character of the art, creating a sense of surprise or tension. The effect of contrast is also important in the perception of architecture, such as when solid walls are periodically interrupted by large open spaces, void and shape (Ahmadi, 2022)

Rhythm is also linked to nature and is evident, for example, in our natural heartbeat. Moreover, the Fibonacci number, used in music, such as by Beethoven in his fifth symphony, and by architects, as in ancient Greek architecture, such as in the division of the Parthenon, has its roots in nature and can be seen, for example, in the arrangement of sunflower seeds or snail shells.

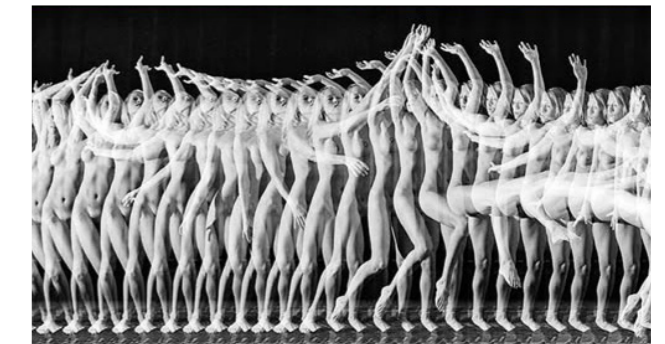


Figure 37: Rhythm in dance



Figure 38: Rhythm in modern architecture



Figure 39: Rhythm in ancient architecture

CHANGE

Dance and architecture have a lot in common, however these arts are at opposite ends of the spectrum in terms of time. Architecture is an art with one of the longest durations when dance can be a rapid process that disappears at the end of its duration (Jessica Lang and Steven Holl, Tesseract of Time)

Nevertheless, the adaptive reuse theory and dance theory can merge into a coherent whole. Dance is constant change, movement. The transformation of a historic building shows that architecture, like dance and music, is a dynamic art form that is able to adapt to the changing needs of society. In dance the real magic happens when dance partner interact with each other. In adaptive reuse, the existing building structure and the new added elements can be seen as dance partners. They should interact and complement each other, but also maintain their distinctiveness. (Schnarr, 2011)



Figure 40. Change in dance

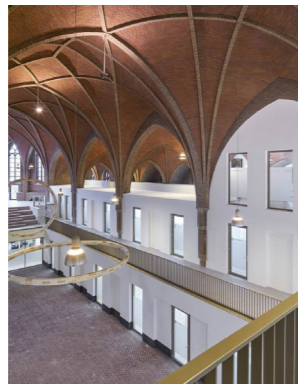


Figure 41. Change in architecture

WEIGHT

Another element that is common to architectural design and dance is weight. Dancers need to hold their own weight, they need to understand how their body rests on the ground, how it carries weight and how partners can share that weight with each other in movement. Most partner dances are based on the exchange of energy between partners. If any kind of lifting occurs in the dance, the weight is seen in two ways: as the one supporting and as the one being supported. One of the partners must be stable, "anchored" and connected to the ground, so that the other partner can "be suspended in the air", performing dance figures without touching the ground. (Schnarr, 2011)

In architecture, a building must also bear its own weight in terms of structural and dynamic loads. This can manifest itself in massive structural elements such as columns or pillars. A well-designed building is able to use the weight of the building as its advantage by integrating structural elements into its design. What's more architectural materials can be seen in a similar way.

For example, a heavy brick wall provides a solid base for glass constructions that appear to levitate in the air. The right balance of materials gives a feeling of security, stimulates the senses and creates engaging spaces.



Figure 42. Weight in dance



Figure 43. Weight in architecture

BREATH

To be a good dancer you need to understand your breath. Control over cyclic breathing gives an opportunity to synchronize with the body, giving the ability to maintain proper rhythm and coordination of movement, as well as influencing the endurance of the organism. Architecture also has a kind of "breath". Breathing consists of cyclic inhalation and exhalation. Both are needed for proper functioning and relaxation. Similarly, in architecture, this effect can be provided by an arrangement of rising and falling action inside a building. Open, airy spaces designed for gathering can be seen as an inhale. While their connections in the form of corridors, spaces that allow intuitive movement, and other more intimate spaces can be seen as an exhale providing the appropriate dynamics inside the building. (Schnarr, 2011)

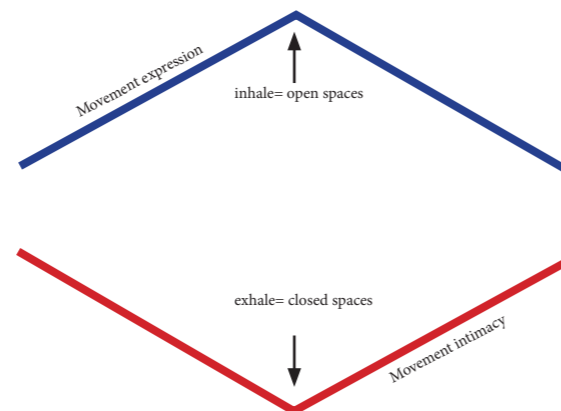


Figure 44: Architecture inspired by dance

VI. DESIGN EXPLORATION

DESIGN STRATEGIES

ACOUSTICS

The functional program does not assume that all functions will operate at the same time, but is a set of possible activities that define the character of the space and allow for differentiated user experiences.

Due to the different sound intensity of each activity, I decided to divide them into three categories. Activities with different volume levels can take place under the same roof, but with a schedule that prevents them from overlapping in time.

For this reason, Afro Dance has been removed from the program. It is an extremely expressive and sonically intense form that requires a considerable amount of space. It is also not usually practiced in very large groups, which made it difficult to fit it into one of the designated program modules.

Another challenge I face is that some classes require a quiet, well-dampened space, while others take advantage of the unique acoustic properties of the church. The high reverberation of this space causes echo and elongation of sound, which can affect the perception of the classes and the atmosphere of the place in a very interesting way.

However, if different classes are to be held at the same time, the walls separating the different zones should be properly acoustically insulated to ensure comfort and continuity. In addition, the possibility of using acoustic curtains or panels allows for more precise management of acoustics depending on the needs of specific activities.

I decided to combine both approaches, both the need for silence and the desire to take advantage of the resonating space. In order to understand how the space can be divided and integrated with each other, I also prepared a sound map.



Tibetan Bowls

Massage

Stretching

Tai Chi

Bodywork (calm)

Yoga

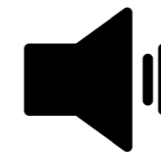
Halprin Workshops (calm)

Somatic Communication

Acro yoga

Aerial Dance

Exhibitions



Animal Flow

Contact Improvisation

Therapeutic Dance

Halprin Workshops (expressive)

Bodywork (expressive)

Performances



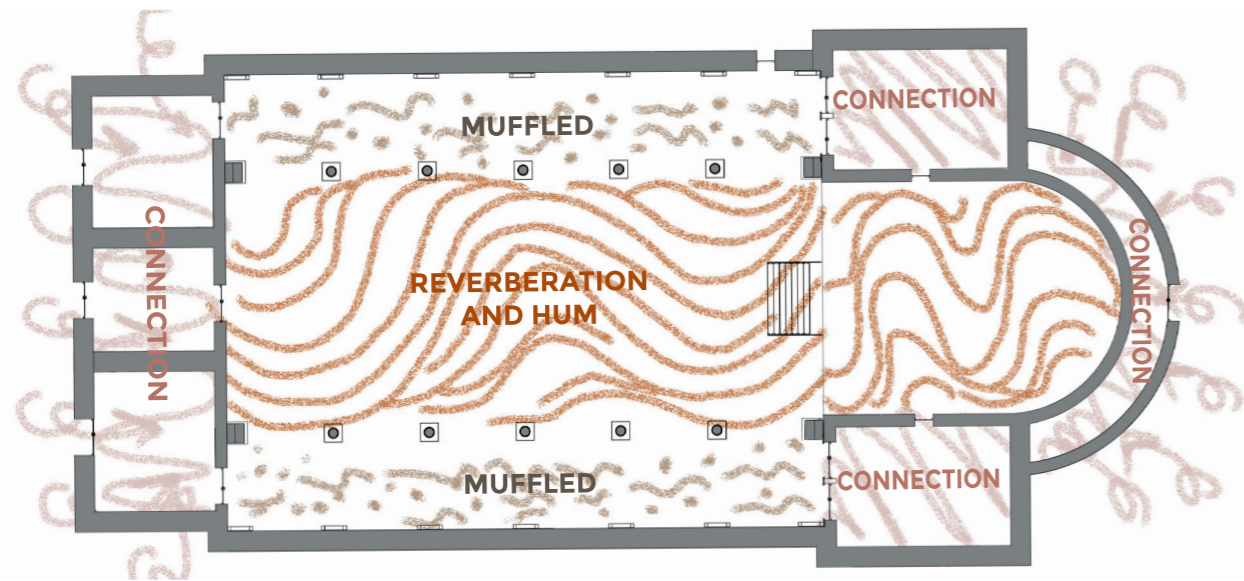
Ecstatic Dance

Social Dance

5 Rythms

Movement Medicine

Events with live music/ DJ



FLEXIBILITY

Another aspect important for the design is its flexibility, both physical: the design should adapt to the needs of its users, change according to activity, and emotional: be a place for both contemplation and intense sound. What's more, all changes introduced should interfere as little as possible with the existing architecture of the building. Design interventions should be as reversible as possible, and their form should be subtle, respectfully emphasizing the beauty and character of the historic structure, and not competing with it in terms of expression.

- Interfere as little as possible with the existing structure of the building
- Emphasize the rhythm in particular, but also change, weight and breath
- Creating BODYspace
- Integration of the green areas adjacent to the church into the design function
- Encouraging movement and discovery of space

RHYTHM

Rhythm plays an important role in my design and is an element that organizes both the space and the user experience. The design works with rhythm on several levels: architectural, sensory and functional. On the architectural level, the design preserves and emphasizes the existing rhythm of the temple, setting the pace and structure. I would like the rhythm also to be expressed through the form of the mezzanine, which will become the main architectural element of the interior. Its shape should evoke associations with dance: its dynamics, movement and variability. The mezzanine will have an asymmetrical form, emphasizing moments of emphasis in dance and symbolizing the fluidity of movement in space. On the sensory level, the rhythm manifests itself in the variation of materials, as well as in the experienced emotions. On a functional level, the rhythm is determined by the changeability of the building, its appearance and the functions it serves: from calm and quiet relaxation activities to evening artistic events.

SUMMARY

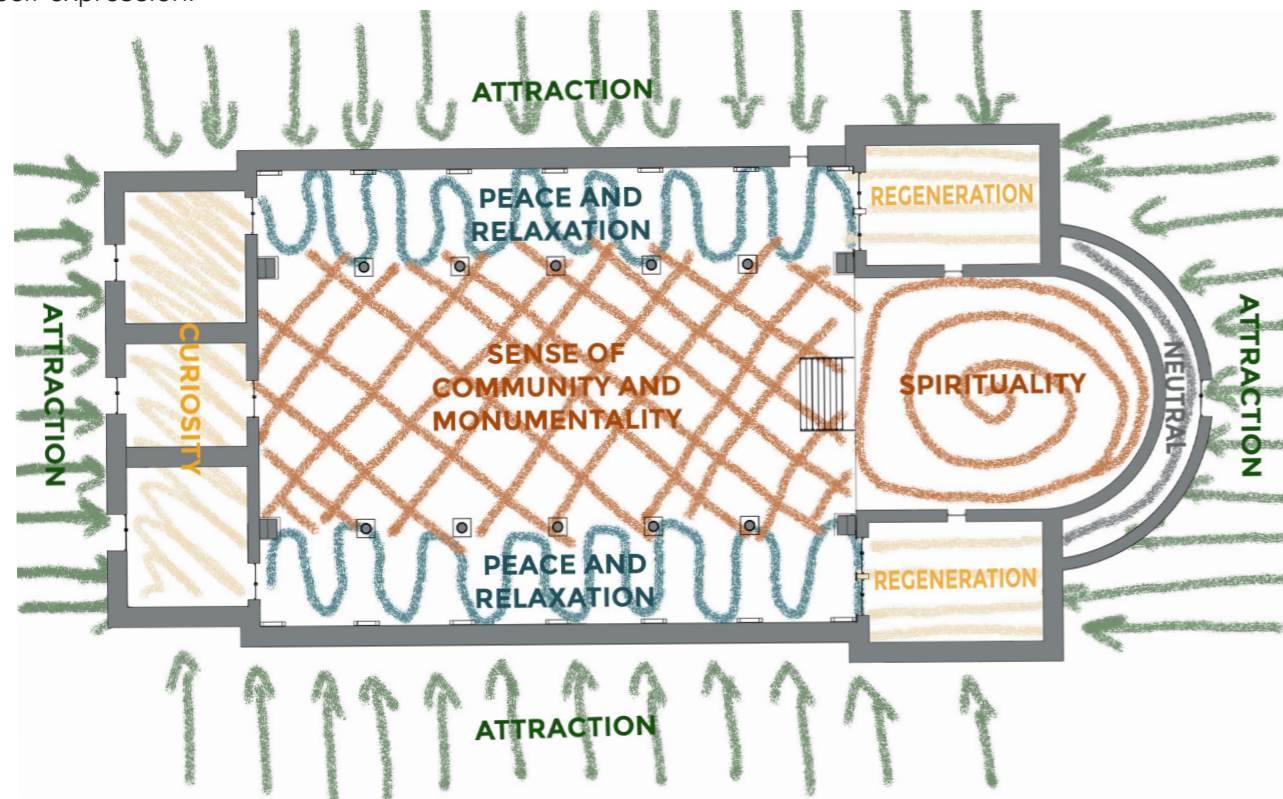
As a summary of all the earlier analysis, I can say that design aims to:

- Have regard to the used materials, colors, light and acoustics
- Emphasize the aesthetic qualities of the existing architecture, especially the columns and paintings on the ceiling
- Create different atmospheres

ATMOSPHERES

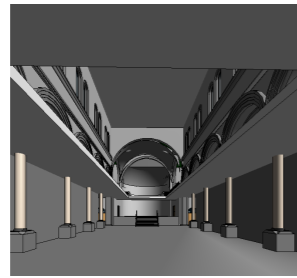
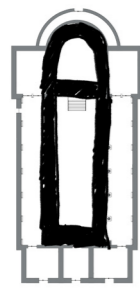
The church has its own unique character, which can deepen body awareness and sensitivity to the surrounding space. I would like movement through its interior to be a sensory experience of a journey through a range of emotions. This journey should begin with curiosity and slight tension, through a moment of breath held, to a full inhalation in the spacious, high interiors - giving a sense of grandeur and monumentality. At the end of this journey is the place of exhalation - smaller, intimate spaces that offer the security and comfort needed for authentic self-expression.

I would like the spaces I design to have a character of mainly BODYspace. So that they do not define movement, but that they support it, or inspire the exploration of one's own body, so that the human being becomes the center of attention and the creator of the surrounding space, which will be subordinated to his needs.

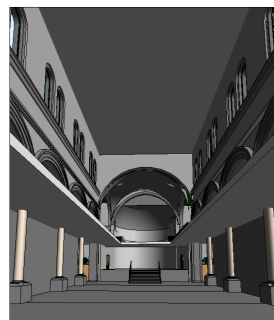


MEZZANINE'S SHAPE EXPLORATIONS

OPTION 1

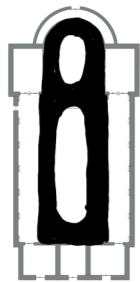


The next step in my design process was to introduce soft curves inspired by the rounded form of the apse. While this approach provided more expression than the initial, purely linear mezzanine, it still lacked the narrative needed to convey the building's new movement-based function. The geometry was not yet compelling enough to tell the story of the transformation.



Early in the design process, I experimented with a simple, linear mezzanine. Although I appreciated that the ceiling remained clearly visible, which was a key priority for me, the straight lines did not tell the story of the building's new function. The rigid geometry did not express a dynamic, movement-oriented program, which led me to seek more fluid, organic forms.

OPTION 2

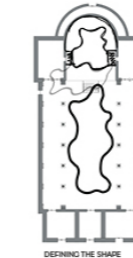
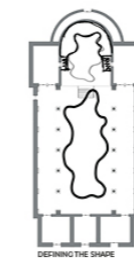
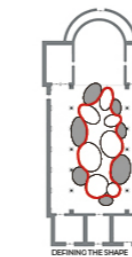
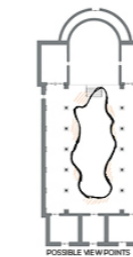
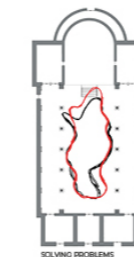
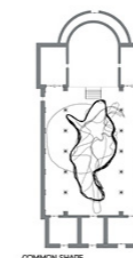
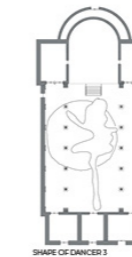
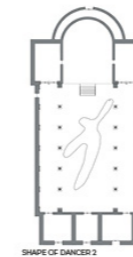
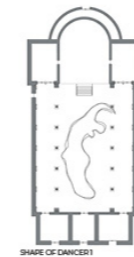


OPTION 3



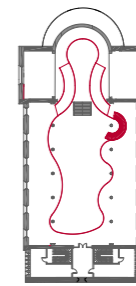
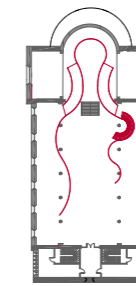
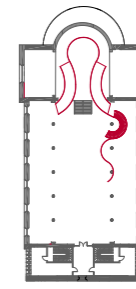
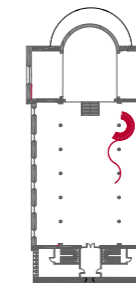
The next step in my exploration was to develop more dynamic and organic geometries. I experimented with a mezzanine design that combined a linear outer edge with a more pronounced, flowing path through the center. While I appreciated the sculptural quality and movement of this approach, the central path obstructed the view of the nave and partially covered the ceiling paintings, elements I wanted to emphasize. However, this iteration encouraged me to seek bolder, more fluid mezzanine forms that would better reflect the performative function of the building.

OPTION 4



In search of a more organic mezzanine form, I conducted an exercise in which I sketched various poses of the dancers, looking for inspiration in their movement. In the end, I selected the three most expressive sketches and translated their dynamic lines into potential mezzanine shapes. Although the final form obtained from this study was intriguing, it still seemed too random. I decided to continue my search, to look for inspiration in other shapes as well, but this approach strongly influenced the final architectural expression of the mezzanine.

OPTION 5- CHOSEN ONE

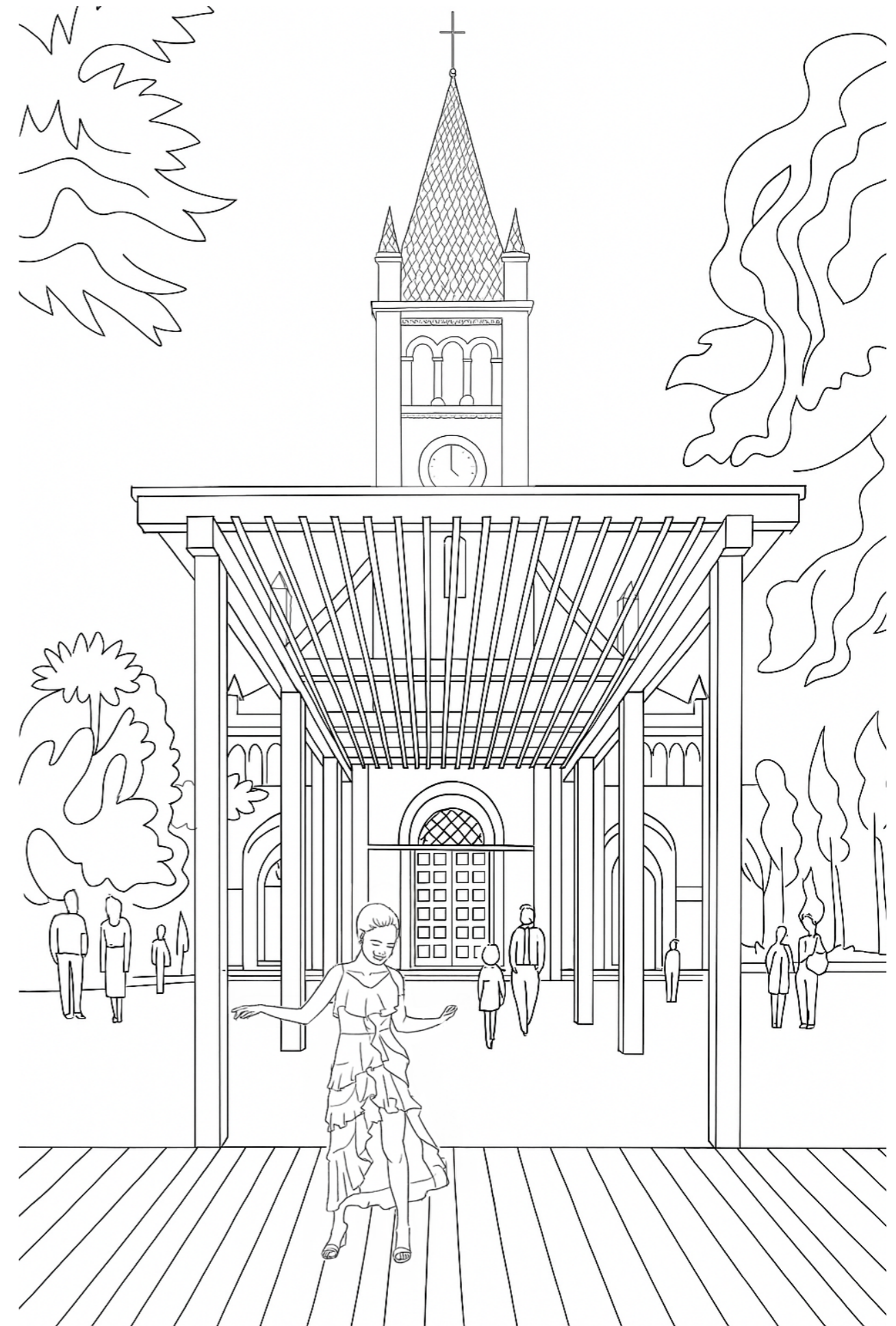


While designing the final version of the mezzanine, I was inspired by a previous concept that depicted dancers in motion. However, I wanted the arches to be more clearly defined and the entire structure to take on a more functional character. My goals were threefold: good flow – a smooth and comfortable connection between all spaces, asymmetry – to reflect the variability of music, changes in tempo and rhythm, good look in 3d – to evoke a sense of movement without obstructing the church's main architectural highlight: the ceiling.

I began by introducing stairs to connect the mezzanine with the ground floor, thereby improving its functionality. Then I sketched the first arches, which blended with the lines of the stairs. I experimented with adding ramps that would naturally connect both levels of the mezzanine at an optimal slope. Once I had found the right form, I linked the ramps together.

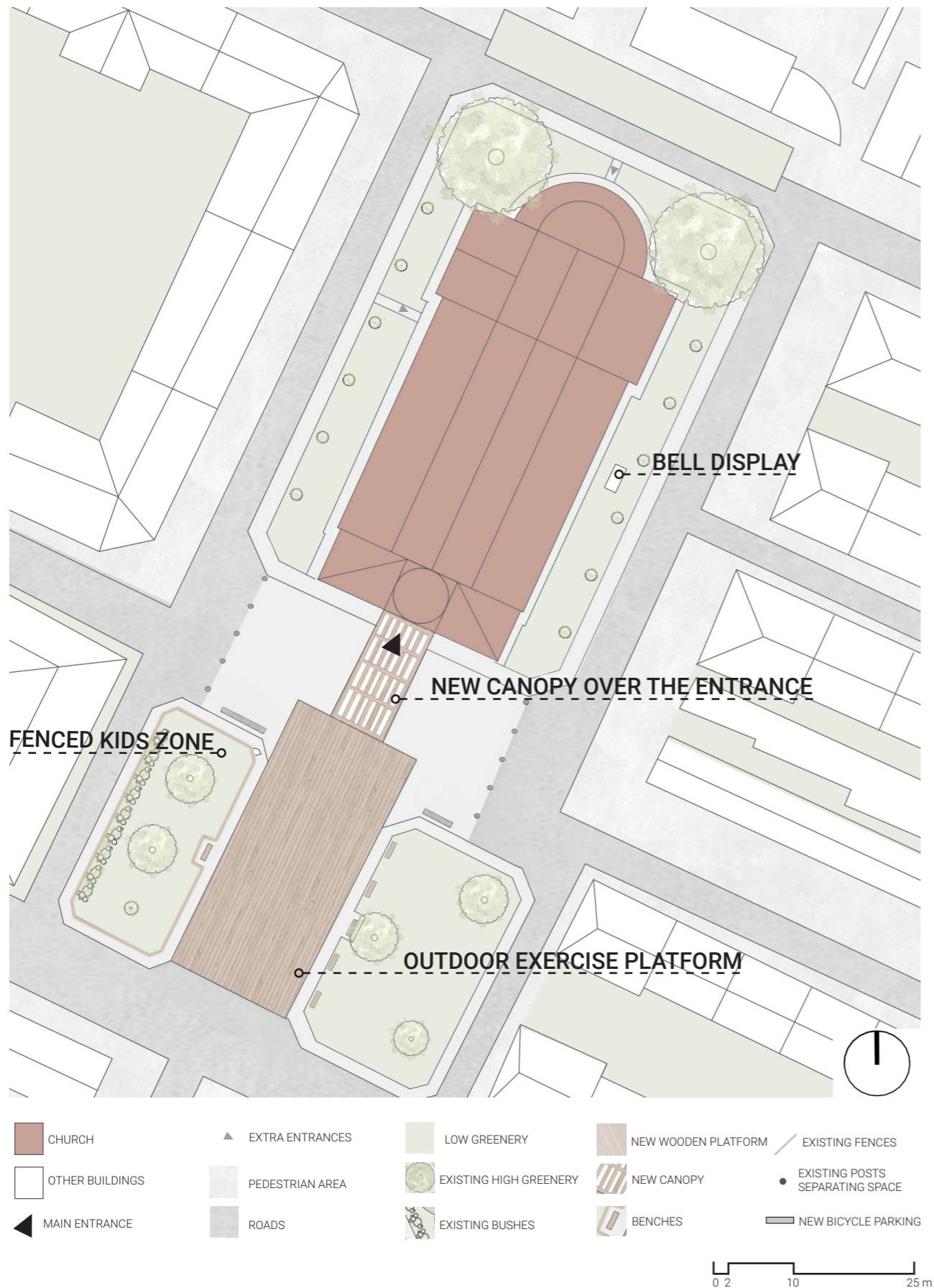
On one side of the mezzanine, I introduced more dynamic shapes, while the opposite side was designed to be smoother and more serene.

VII. FINAL PROPOSAL



SITE PLAN AND SURROUNDINGS
REMOVED
ADDED
PLANS
SECTIONS
CONSTRUCTION DETAILS
RHYTHM & MATERIALS
DESIGN SOLUTIONS

SITE PLAN AND SURROUNDINGS



When designing the church's surroundings, I wanted to improve the quality of the existing green areas with small intervention and open them up to people. Currently, these are fenced, unused spaces that, despite their potential, remain empty. My goal was to revitalize these places so that they would harmonize with the new function of the building and at the same time be accessible to everyone.

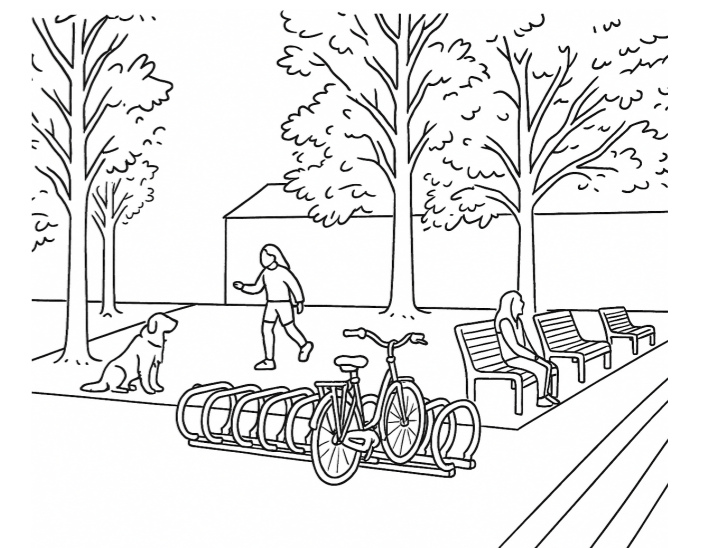
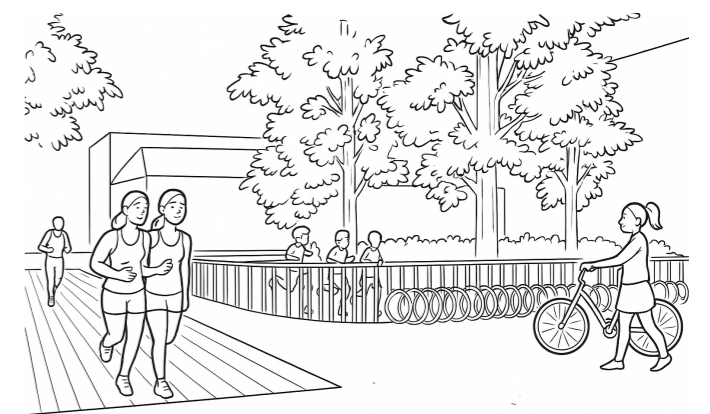
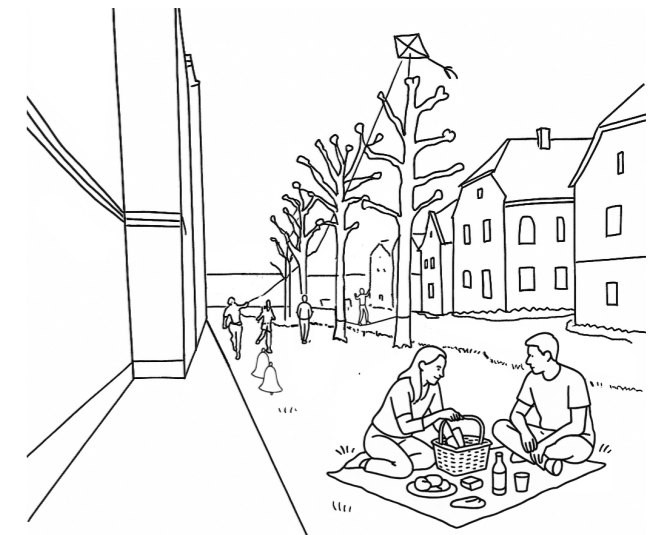
The first step was to remove all unnecessary fences and barriers, making the spaces more open and inviting. I decided to leave the green belt around the church untouched, preserving the bells as a symbol of the past and history of the building. This is an ideal place for picnics, contact with nature or free play on the slackline.

In the green quarters near the entrance to the church, I proposed renewing the greenery, preserving the existing trees, and planting new grass. I also suggested designing a few additional benches to allow people to watch activities on the wooden platform or simply relax. In the smaller quarter, I decided to keep the fence, creating a safe zone for children to play while their parents participate in the activities.

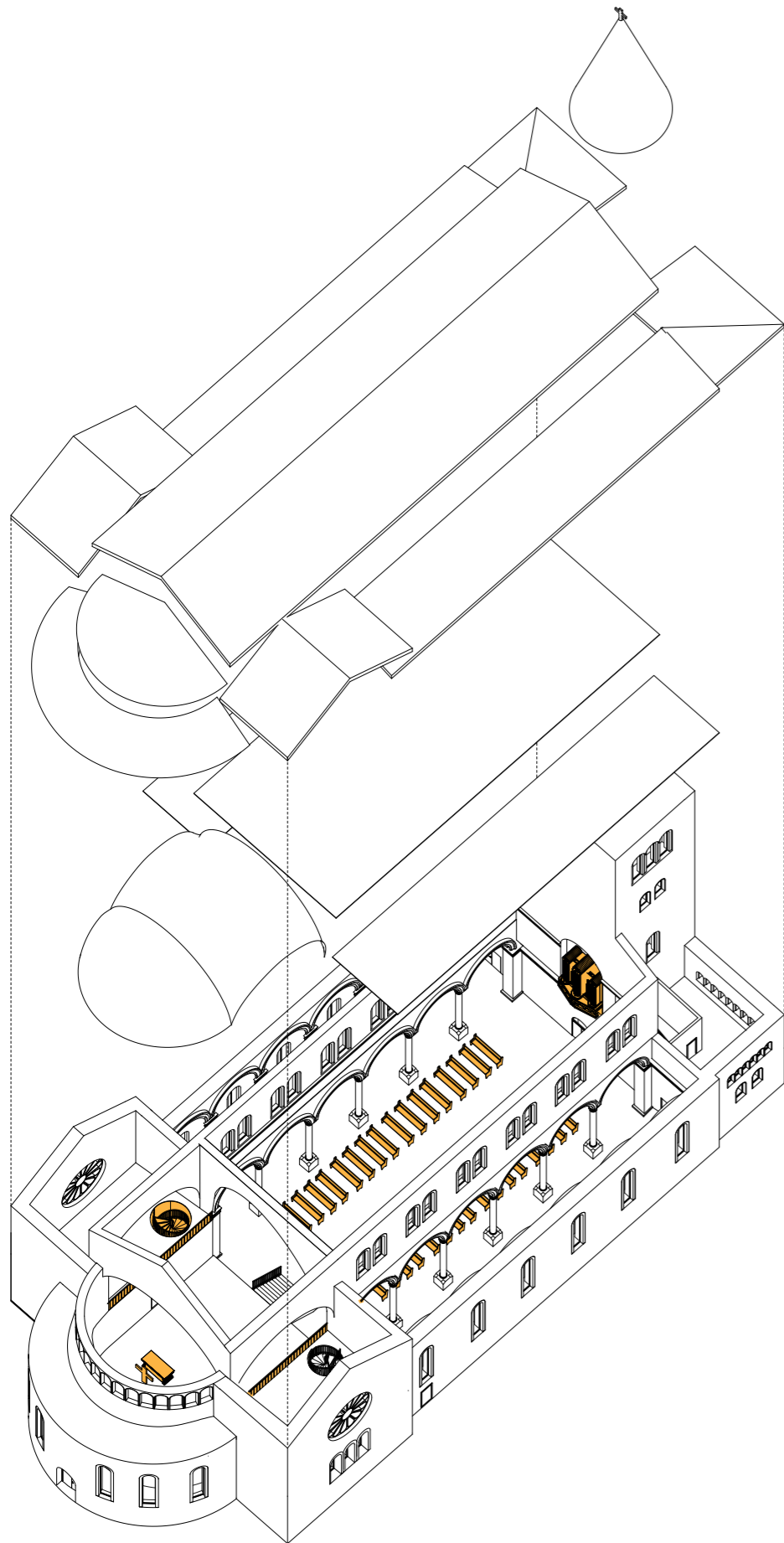
The most significant transformation took place in the area between the two green quarters, which has been redesigned as a wooden surface. This multifunctional platform can be used for example for outdoor classes or evening performances. Located directly in front of the main entrance to the church, it resonates with the building's new function and adds a sense of intrigue.

In addition, I proposed a roof over the main entrance, connected to a wooden platform, which not only protects against rain, but also serves an informative function: it signals that changes have taken place inside and invites you to discover the new function of the building.

I also included small bicycle parking spaces, considering that bicycles are the primary means of transport for many Copenhagensers.



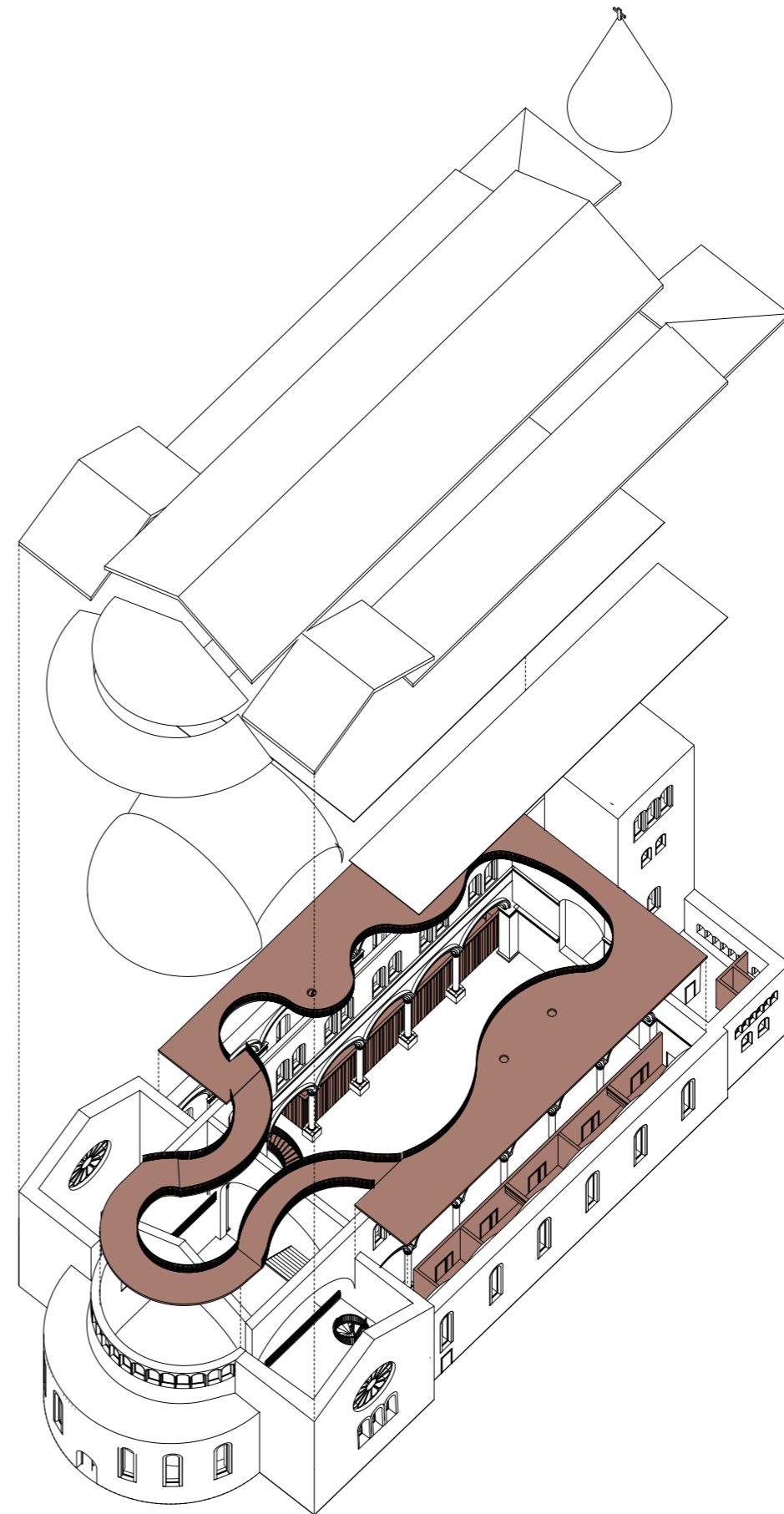
REMOVED



Elements to be removed have been kept to an absolute minimum. The only elements that have been removed from the church are the pews, the altar with the cross, one of the stairs, a few railings and also the organ. During the removal of the organ, the opening in which it was located was also slightly enlarged in order to be able to reach the projected mezzanine.

 REMOVED

ADDED



The key addition is a mezzanine, which serves as the central architectural element of the proposed intervention. It is accessed via a spiral stairs from the ground floor, as well as ramps that connect its two levels. The design is further complemented by newly introduced walls that separate the side aisles from the main nave, along with partition walls dividing the exercise rooms, some of which are movable to allow for flexible use of space. The entire structure is made of wood and has been designed to minimize interference with the existing building. A new lighting system has also been designed to accommodate the building's updated functions.

 ADDED

CLASSES



PERFORMANCE 1



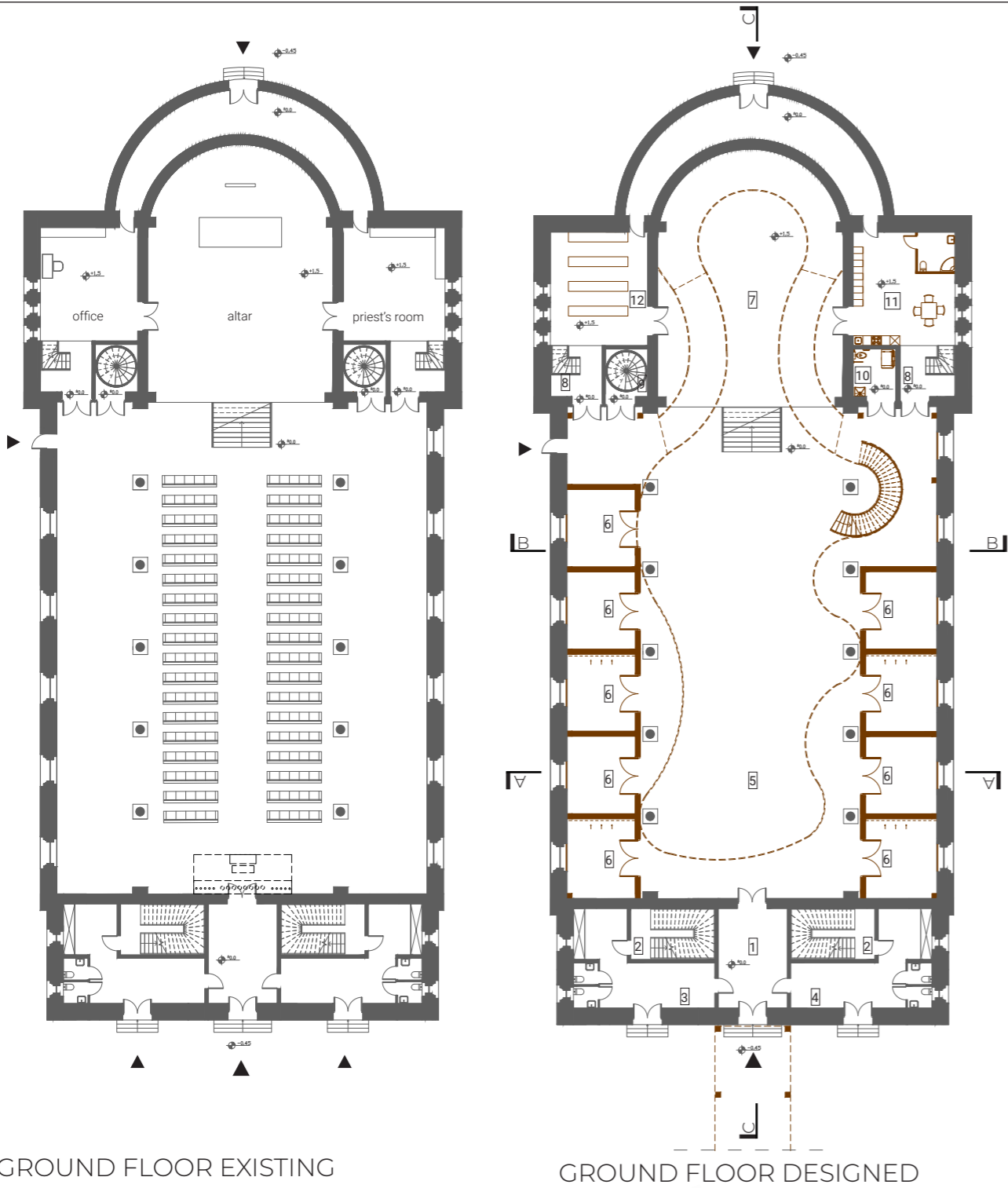
DANCE EVENT



PERFORMANCE 2

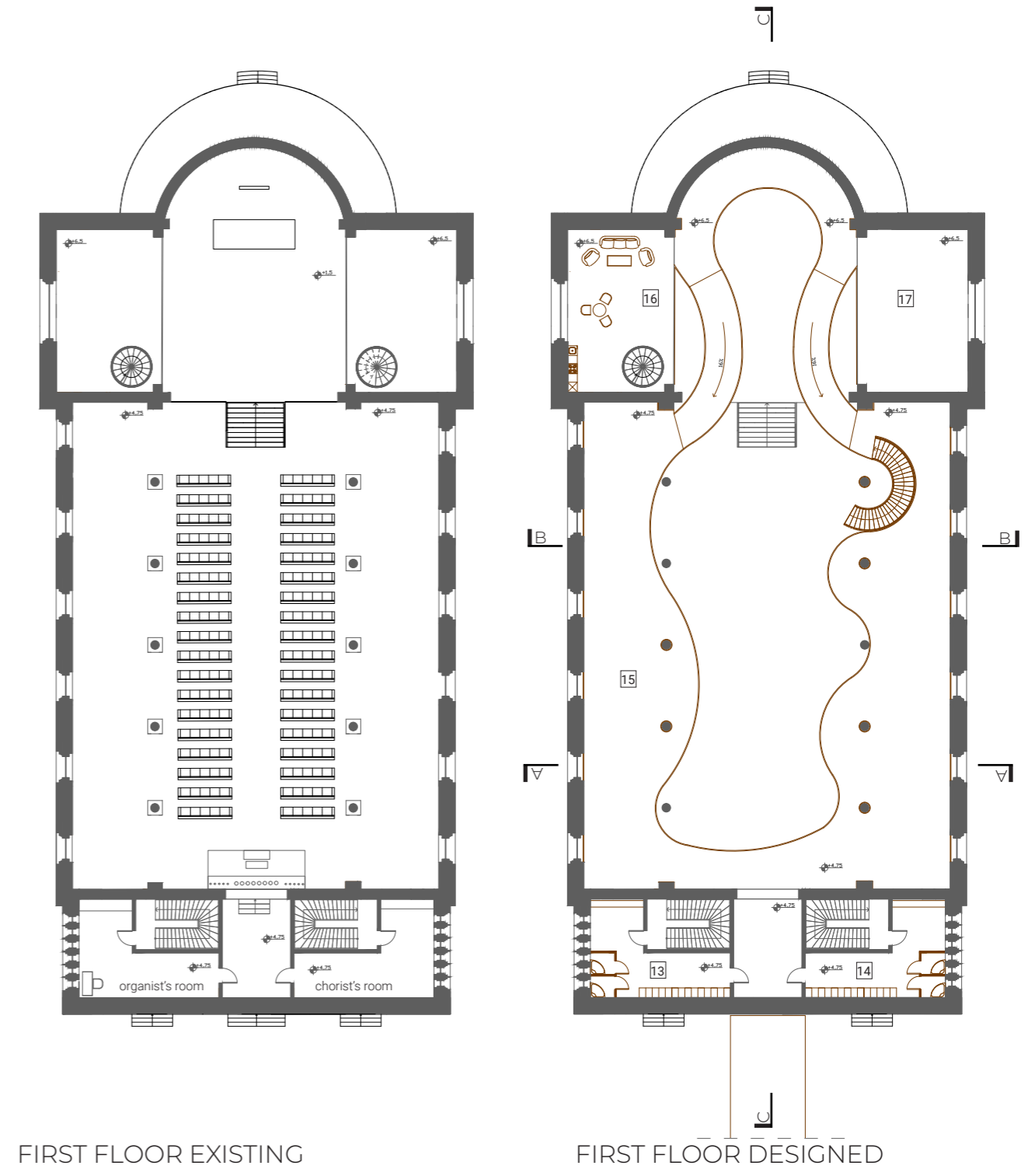


PLANS



GROUND FLOOR EXISTING

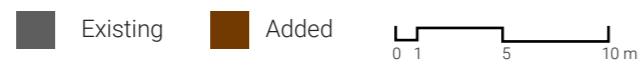
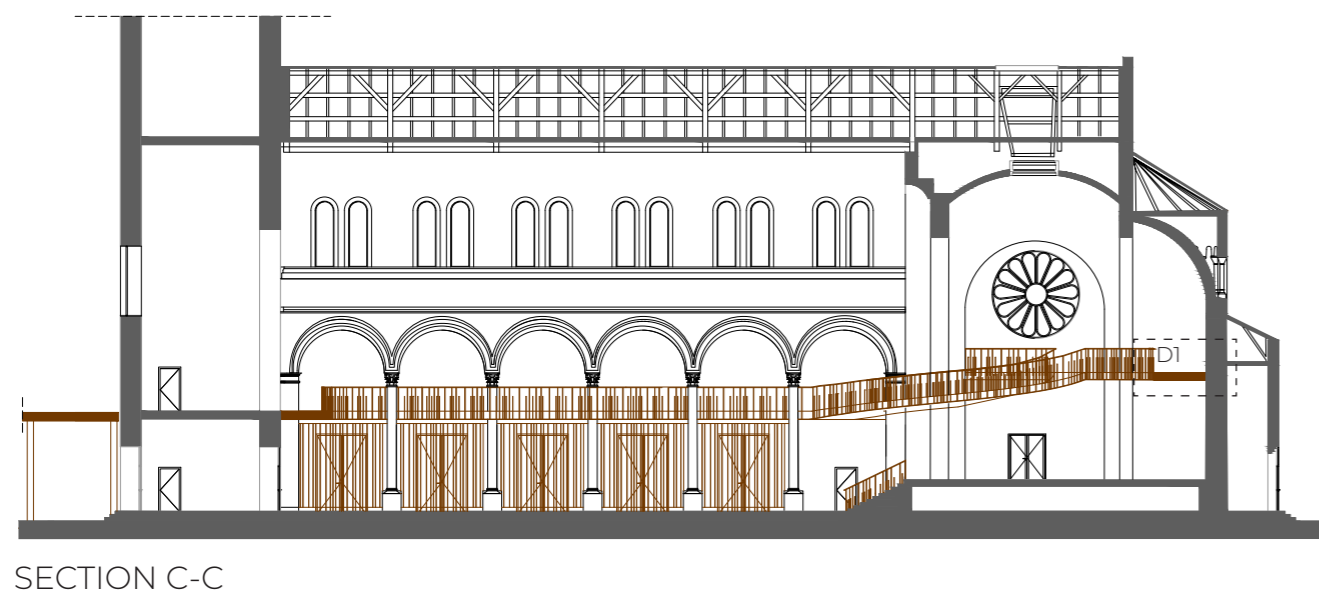
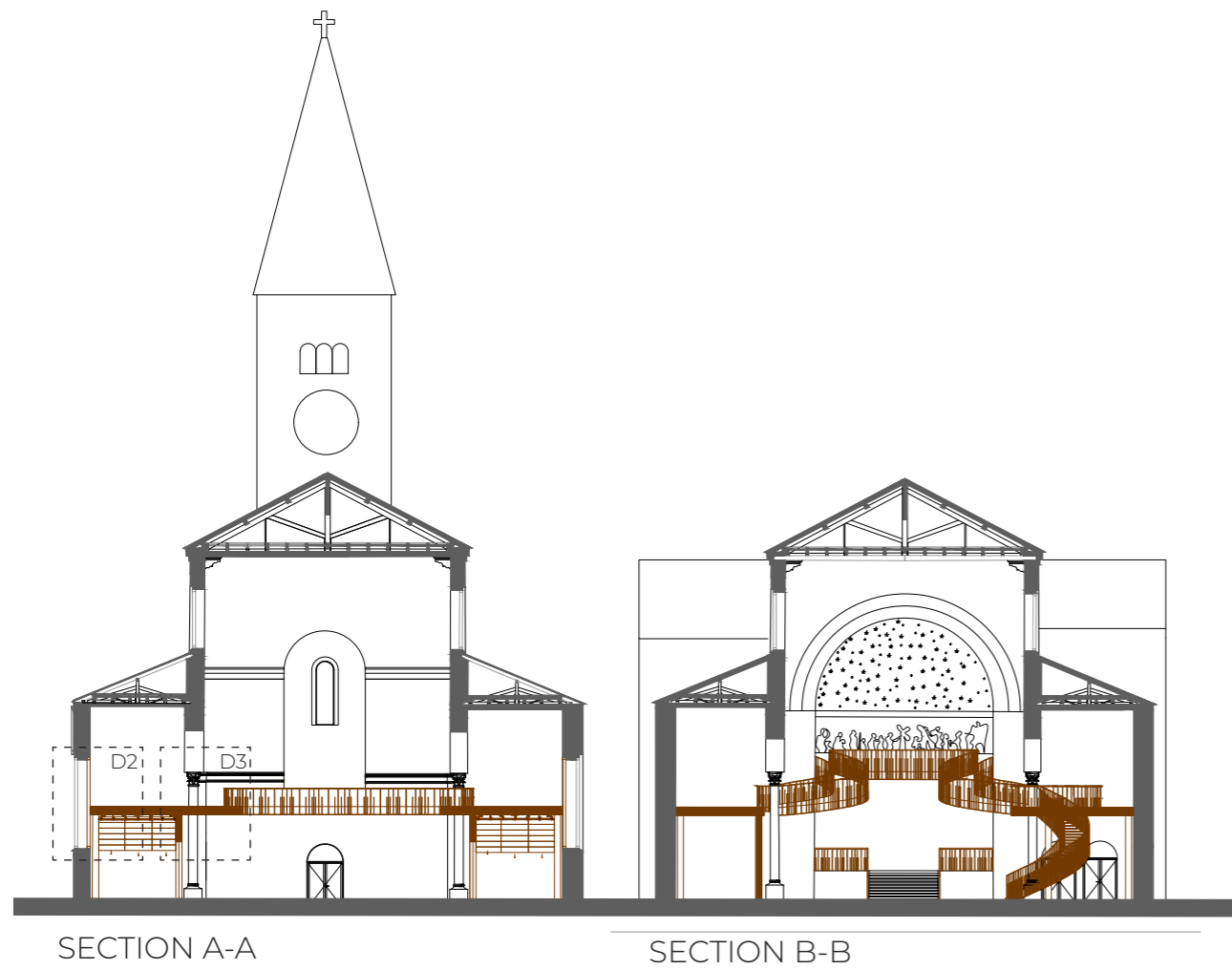
- | | | | |
|---|------------------------|----|------------------------|
| 1 | Entrance hall | 7 | Performance zone |
| 2 | Staircase to 1st floor | 8 | Staircase to +1,5 m |
| 3 | Women's toilet | 9 | Staircase to 1st floor |
| 4 | Men's toilet | 10 | RWC |
| 5 | Multi-use hall | 11 | Staff room |
| 6 | Exercise rooms | 12 | Storage space |



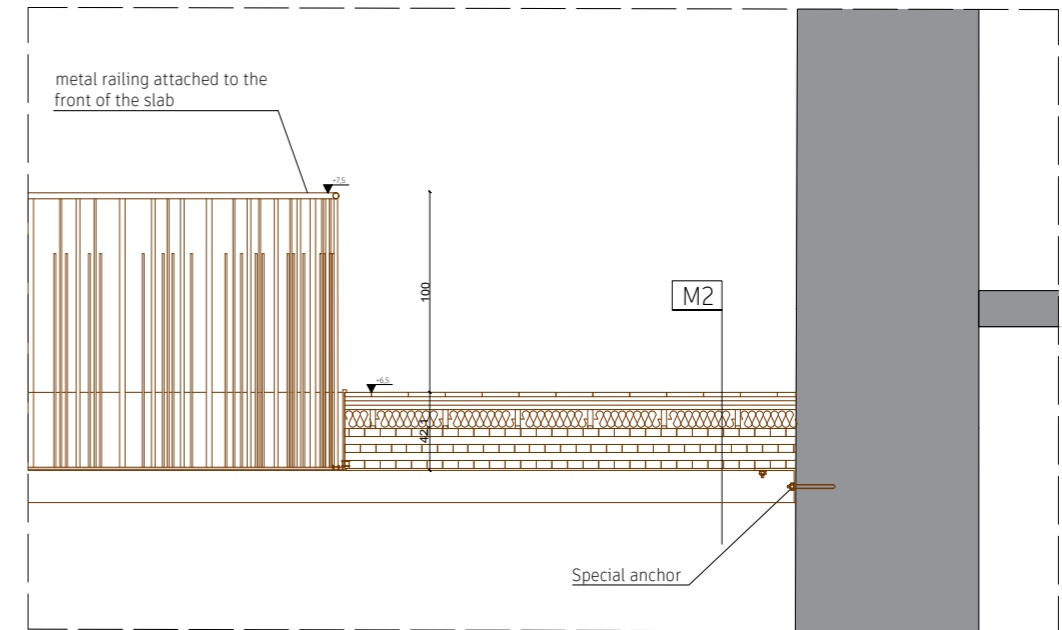
FIRST FLOOR EXISTING

- | | |
|----|-----------------------|
| 13 | Women's changing room |
| 14 | Men's changing room |
| 15 | Mezzanine |
| 16 | Break/meeting area |
| 17 | Self exploration area |

SECTIONS



CONSTRUCTION DETAILS



DETAIL 1

M1

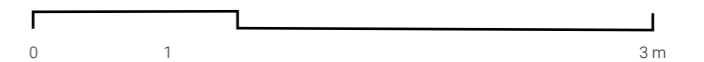
Wooden flooring 1,4 cm
 Sound- absorbing mat 0,3 cm
 Fire board 2,2cm
 Acoustic matting 2 cm
 Fire board 2,2cm
 Wooden joints 9,5 cm
 Rock wool 9,5 cm
 Sylodyn 2,5 cm
 CLT slab 22 cm
 Hangers for suspended ceiling 20 cm
 Suspended acoustic ceiling 5cm

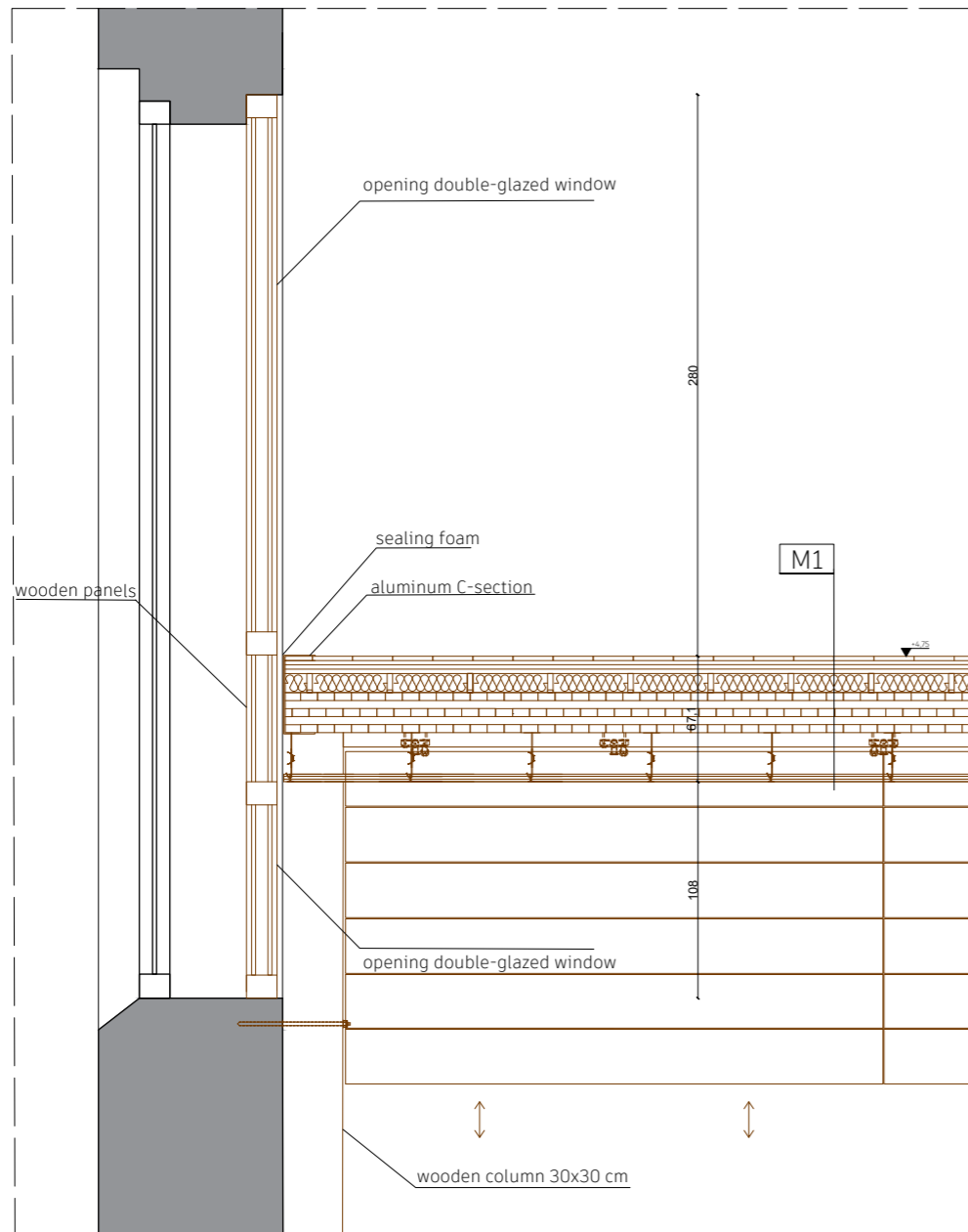
M2

Wooden flooring 1,4 cm
 Sound- absorbing mat 0,3 cm
 Fire board 2,2cm
 Acoustic matting 2 cm
 Fire board 2,2cm
 Wooden joints 9,5 cm
 Rock wool 9,5 cm
 Sylodyn 2,5 cm
 CLT slab 22 cm

W1

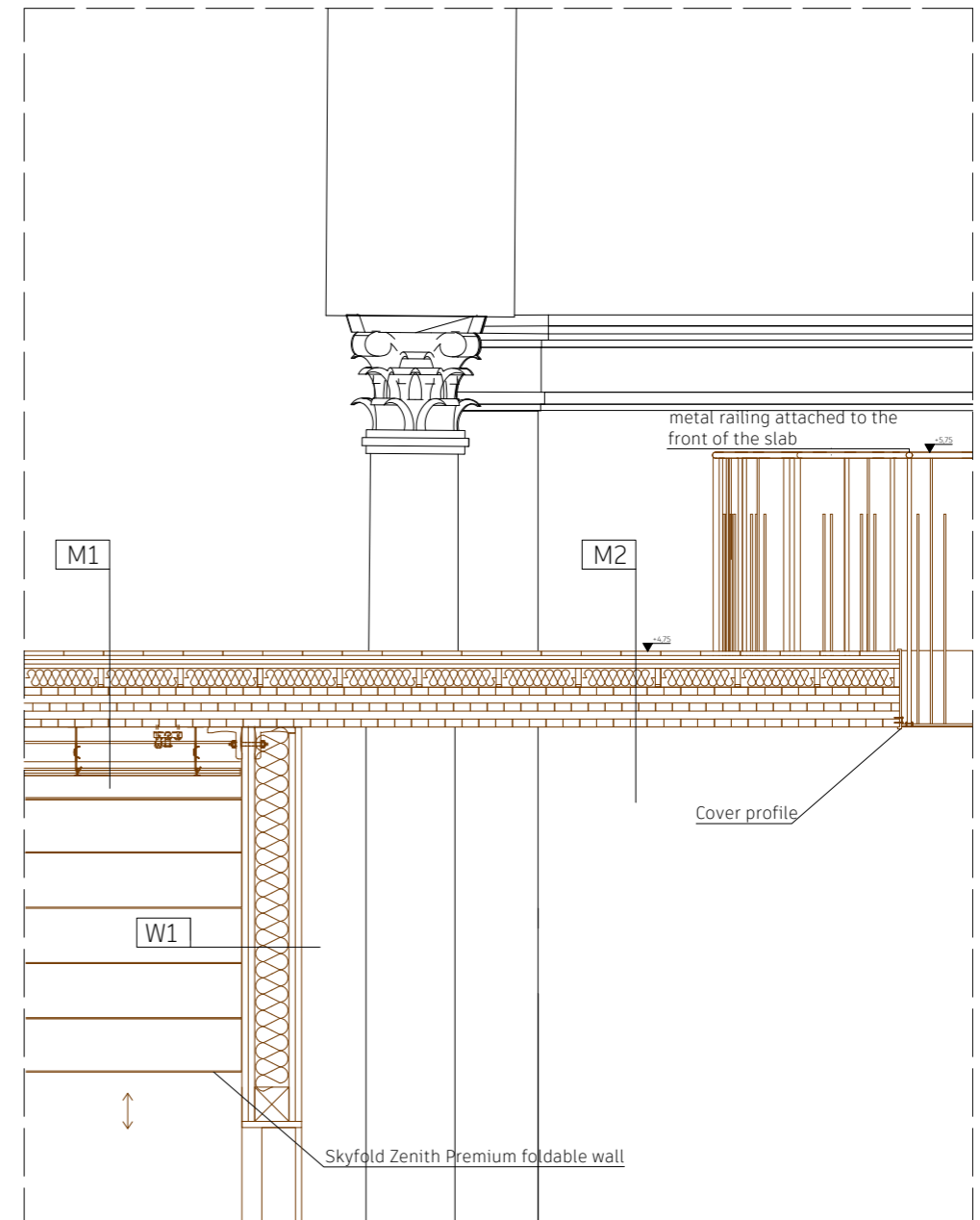
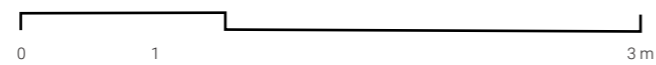
Acoustic panels on glue 2,5 cm
 GK board 2x1,25 cm
 rock wool on wooden grid 12 cm
 Tongue and groove boards 3 cm





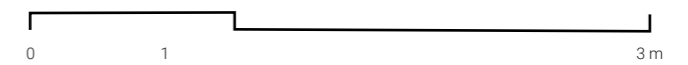
DETAIL 2

Existing Added



DETAIL 3

Existing Added



RHYTHM & MATERIALS



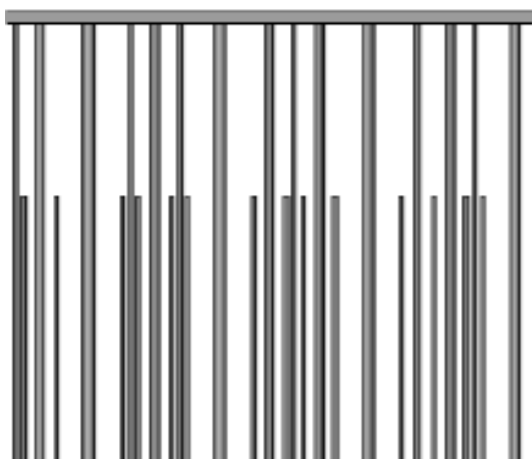
To establish a sense of rhythm in the balustrade, I designed three types of balusters with varying thicknesses and distinct spacing between each element. The three sizes are: thin (T – 2 centimeters), medium (M – 4 centimeters), and fat (F – 6 centimeters). Using these, I began exploring and testing different rhythmic sequences. After several trials, I settled on the following rhythm:

TMFTMTFMTMFTMTM

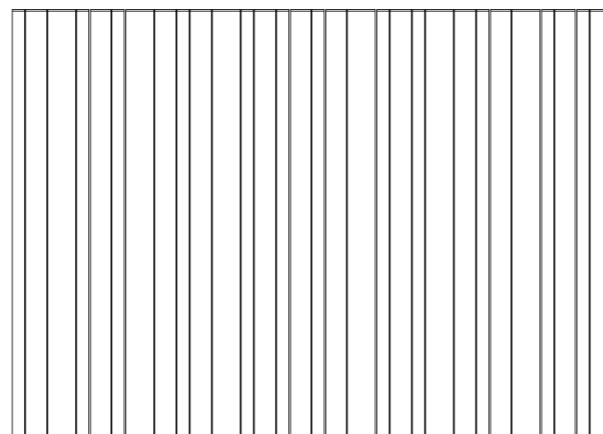
To introduce more variation, I later added shorter balusters. While doing so, I was inspired by the musical ideas of crescendo and decrescendo: gradual intensification and release as well as the dynamic flow of music. Interestingly, the addition of shorter elements gave the balustrade a visual quality reminiscent of piano keys. Although this wasn't my original intention, the resemblance felt compelling. I found this accidental reference to music particularly fitting, and decided to embrace it.

Once the balustrade design was finalized, I applied the same rhythm to the vertical divisions of the walls. This created a sense of coherence across the space without introducing too many unrelated patterns. The wall divisions are vertical to emphasize the height of the church and to align with the existing structural lines, rather than imposing a completely new and disconnected system.

RHYTHM OF BALUSTRADE



RHYTHM OF WALL PANELS



In my project, I chose cross-laminated timber (CLT) as the primary construction material. CLT offers greater flexibility in shaping complex, organic forms compared to traditional solid wood, while also providing superior structural strength. This allows for thinner construction elements without compromising stability. Additionally, wood is an environmentally friendly material, its production has a lower carbon footprint, and CLT structures can be easily dismantled, reused, or recycled.



CLT has a smooth, hard surface with reflective rather than sound-absorbing properties. To introduce subtle historical references, the underside of the CLT structure was painted Irish blue, a color inspired by the original hue of the church pews. This same shade of blue reappears in the folding furniture placed along the main aisle, reinforcing the visual continuity. Irish blue not only recalls the church's past but is also commonly found in wall paintings, further integrating the design with the building's heritage. Moreover, blue is associated with calmness and relaxation, making it a fitting choice for the relaxation zones within the space.



A discreet lighting system was also integrated into the church, allowing for a range of atmospheres through adjustable light colors. From warm yellow tones to soft pinks for evening events, the lighting enhances the spatial experience and responds to different functions. Existing light fixtures were shortened and repurposed.

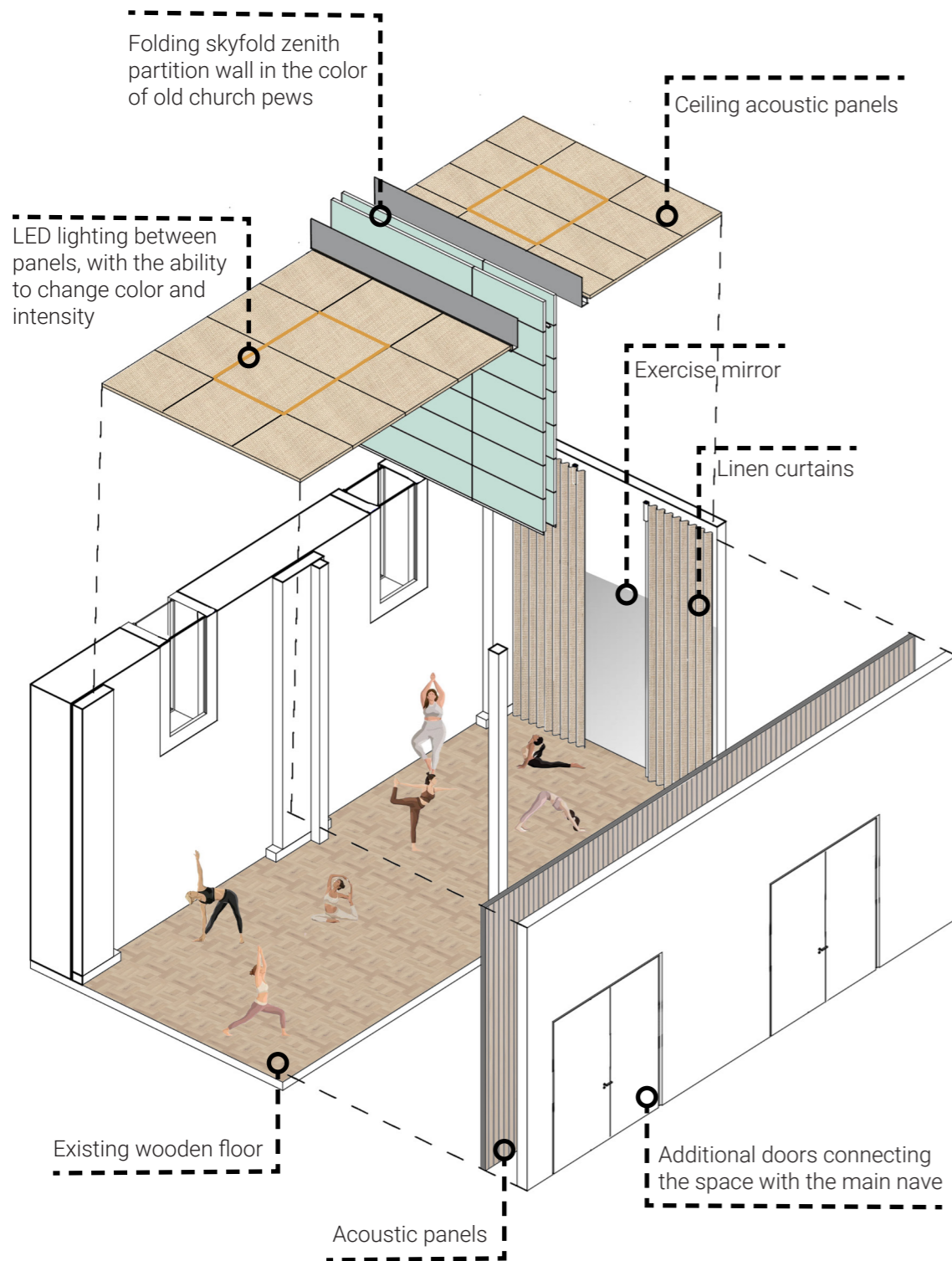
The mezzanine level is enclosed with bronze metal railings, chosen both for their sound-reflective qualities and their warm, complementary tone to the CLT. All other metal details, such as door handles, were designed in the same bronze finish to maintain material consistency throughout the space.



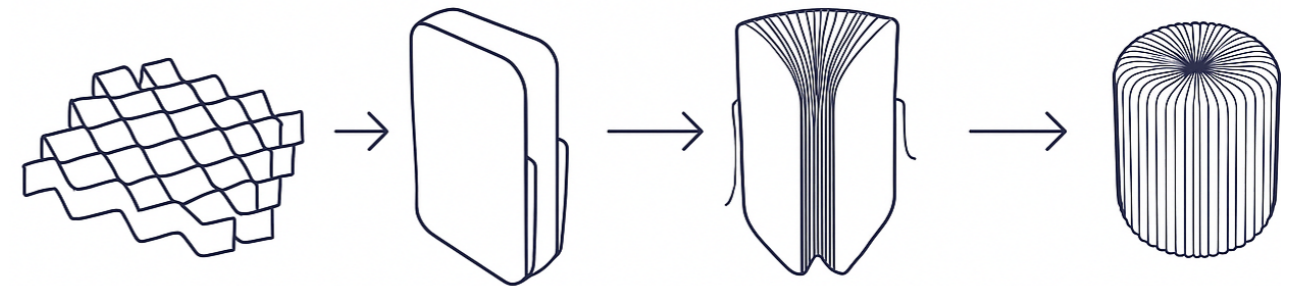
In the exercise rooms, I used natural materials with acoustic properties, fabric-finished ceiling panels and striped wall panels to dampen sound. Each room is equipped with a mirror to support movement-based classes, which can be covered with a linen curtain when improved acoustics or visual privacy are needed.

DESIGN SOLUTIONS

EXERCISE ROOMS



FURNITURE TO MULTI-USE HALL



As furnishings for the main aisle, I chose modular furniture made of waterproof honeycomb paper. Such a form provides exceptional strength despite the lightweight material, while at the same time allowing free modeling of the space. Thanks to its flexibility, the furniture can take a variety of shapes: from seating, stage, to elements conducive to exploration and active play, such as climbing structures. This type of furniture not only meets the need for multifunctionality of the space, but also allows users to co-create its layout according to their own needs and mood.

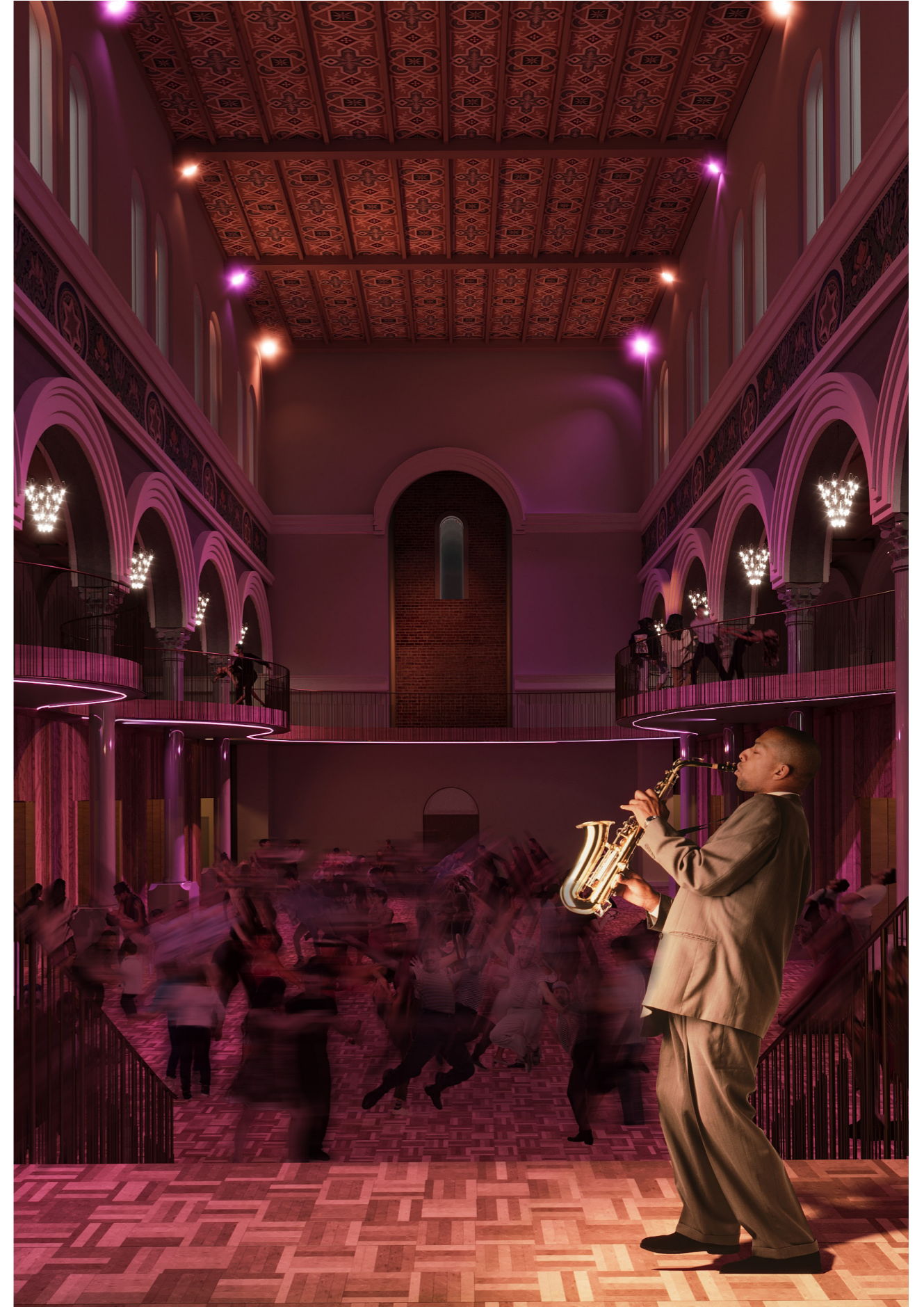
The advantage of this solution is also its mobility - the furniture can be instantly folded to a compact size and stowed away, taking up almost no space. Although similar systems are offered by many companies, my inspiration came from the products of Procedes Chene! Exposition & Décoration brand. This company provides many options for cross sections and sizes of elements.



SPACE DURING THE DAY



SPACE DURING THE NIGHT



DETAILS FROM A DIFFERENT PERSPECTIVE: THE CORINTHIAN CAPITALS



NEW ADDITIONS: STAIRS



DETAILS FROM A DIFFERENT PERSPECTIVE: BAS-RELIEF



NEW LOOK: FORMER ORGAN SPACE



VIII.

DISCUSSION & REFERENCES

DISCUSSION

The purpose of this thesis was to explore the potential of adapting historic churches to new functions while respecting their architectural, historical and cultural values. The subject of the analysis was the Sankt Pauls Kirke in Copenhagen, the context of which served as the basis for designing the adaptation.

As part of the project, I conducted a series of analyses, both of the building itself and its surroundings, in order to find a new, adequate function for this space. Ultimately proposing to transform the building into a "House of Movement and Dance"

In my thesis, I was looking for an answer to the question of how to use existing spatial qualities of the church so that they could support movement and the sensory experience of space. The church, as a building with unique proportions, great height and distinctive acoustics, proved to be the perfect backdrop for movement-related functions. The main design intervention was the introduction of a mezzanine floor, which allows to divide the space but also allows a new view of the church's interior and contact with its details from a different perspective. The main nave remained an open multi-purpose space, while the side aisles were adapted into exercise rooms.

A crucial question during the design process was how the new architectural elements should relate to the existing historic fabric. My strategy was to intervene as little as possible, always with deep respect for the original rhythm, geometry, and craftsmanship of the building. Wherever feasible, I aimed to ensure that the modifications are reversible, flexible, and sustainable. My research indicated that wood, as a warm, tactile, and renewable material, best responds to these requirements, adding a richness while complementing the historic interior. The proposed changes have been proposed in such a way as to complement and emphasize the aesthetic qualities of the existing historic interior and, despite their expressiveness, not dominate it.

Designing with the senses in mind presented its own challenges: in historic spaces, there are already many layers of meaning and elements that strongly affect perception. Balancing this existing character with new functions required restraint and an understanding that sometimes the simplest solutions are the most powerful.

Working on the adaptation of Sankt Pauls Kirke taught me humility and showed me that not every space needs big, radical changes to gain new life. Often, small architectural interventions, introduced with respect and awareness of the context, are enough to bring a strong impact on how a space feels and works. This project also made me realize that architecture can act like a scenography for human experience and shapes how people move, feel, and interact. Paying attention to sensory aspects such as light, sound, and material textures turned out to be important part of the design. Finally, I learned how crucial it is to understand the social context and the real needs of people who will use the space, because only then can a historic building truly come alive again and stay meaningful for its community.

REFERENCES

- Ahmadi, G. (2022). Dance with Musical Architecture: Eurhythmy in Gottfried Semper's Works. <https://vtechworks.lib.vt.edu/server/api/core/bitstreams/518793de-b6d8-4a1e-989c-0f67e1c411c6/content>
- ArchDaily. 'De poort van Borne' Healthcare Center / Reitsema & partners architecten. https://www.archdaily.com/891009/de-poort-van-borne-healthcare-center-reitsema-and-partners-architecten?ad_source=search&ad_medium=projects_tab (October, 2024)
- ArchDaily. Ku.Be House of Culture in Movement / MVRDV + ADEPT. https://www.archdaily.com/794532/ke-house-of-culture-in-movement-mvrdv-plus-adept?ad_source=search&ad_medium=projects_tab (October, 2024)
- ArchDaily. Library, Museum and Community Center 'De Petrus' / Molenaar&Bol&VanDillen Architects. <https://www.archdaily.com/892558/library-museum-and-community-center-de-petrus-molenaar-and-bol-and-vandillen-architects> (October, 2024)
- Archdaily. Santa Eulàlia Space / Carles Enrich Studio. https://www.archdaily.com/956705/santa-eulalia-space-carles-enrich-studio?ad_source=search&ad_medium=projects_tab (October, 2024)
- Arkitektur og interiør | Sankt Pauls Kirke. (n.d.). <https://www.sanktpauls.dk/om-kirken/arkitektur-og-interior> (October, 2024)
- Bloomer, K. C. & C. Moore (1977) *Body, Memory, and Architecture*. Yale U Press, New Haven & London.
- Cirillo E, Martellotta F. (2006) *Worship, acoustics, and architecture*. Essex (UK): Multi Science Pub
- D'Amico, L. (2019) „A Study of Labanotation and its Applications from 20th Century Europe to 21st Century America,” *Proceedings of GREAT Day: Vol. 2018, Article 12*.
- Eberhardt, L. C. M., Birgisdottir, H., & Birkved, M. (2019). Potential of circular economy in sustainable buildings. *IOP Conference Series Materials Science and Engineering*, 471, 092051. <https://doi.org/10.1088/1757-899x/471/9/092051> (October, 2024)
- Embodied carbon.World Green Building Council. <https://worldgbc.org/advancing-net-zero/embodied-carbon/> (2024, October)
- Fiorani, D., Kealy, L., & Musso, S. (2017). Conservation/Adaptation. Keeping alive the spirit of the place. Adaptive reuse of heritage with symbolic value. (pp. 1–373). EAAE. <https://iris.unige.it/handle/11567/875906>
- Foster, G. (2020). Circular economy strategies for adaptive reuse of cultural heritage buildings to reduce environmental impacts. *Resources, Conservation and Recycling*, Volume 152, <https://doi.org/10.1016/j.resconrec.2019.104507>. (2024, October).
- Gaudiumpress English Edition. (2024, February 6). Germany: 131 churches closed in 5 years - Gaudiumpress English Edition. <https://www.gaudiumpress.ca/germany-131-churches-closed-in-5-years/>
- Globus Antik. About Nyboder in Copenhagen. <https://globusantik.wordpress.com/2018/04/04/about-nyboder-in-copenhagen/> (January, 2025)
- Holl, S., Pallasmaa, J., & Gómez, A. P. (2007). Questions of Perception: Phenomenology of Architecture. <http://ci.nii.ac.jp/ncid/BB10541278>
- Kirkens historie | Sankt Pauls Kirke. (n.d.). <https://www.sanktpauls.dk/om-kirken/kirkens-historie> (October, 2024)
- Kunst, B. (1995) *Body and Space*, MASKA 13. 15 Feb 2000. <http://kid.kibla.org/~intima/kunst/ibas.html>.
- Jilek, J. (2013). *Dance and Architecture: Five_Six_Seven_Eight* (Master's thesis, Chalmers University of Technology). Chalmers Open Digital Repository. <https://odr.chalmers.se/items/fc8299cf-4b2d-41b1-8c32-ac1710a2f4df>
- Kuittinen, M. (2023). Building within planetary boundaries: moving construction to stewardship. *Buildings and Cities*, 4(1), 565–574. <https://doi.org/10.5334/bc.351>
- Kvallsstunden. Nyboder – världens äldsta radhus. <https://kvallsstunden.se/nyboder-varldens-aldsta-radhus/> (January, 2025)
- Laban, R., & Ullmann, L. (Eds.). (1974). *The Language of Movement: A Guidebook to Choreutics*.
- Latham, D. (2000). *Creative Re-Use of buildings*, Volume 1. Donhed Publishing Ltd.
- Lindblad, H. & Löfgren, E. (2016) *Religious buildings in transition, an international comparison*, University of Gothenburg.
- Machado, R. (1976). *Old buildings as palimpsest: Towards a theory of remodelling*. Progressive Architecture,
- Navarro, J., Sendra, J. J., & Muñoz, S. (2008). The Western Latin church as a place for music and preaching: An acoustic assessment. *Applied Acoustics*, 70(6), 781–789. <https://doi.org/10.1016/j.apacoust.2008.09.014>
- NY BRUG AF DANSKE KIRKEBYGNINGER. (2014). Realdania og Kirkefondet. https://realdania.dk/nyheder/seneste-nyt/nyheder-uden-projekt-2014/rapport-og-idekatalog-saetter-fokus-paa-ny-brug-af-kirkebygninger_240314 (2024, October)
- Palaghia, T. Adaptive reuse of sacred space. *RTF | Rethinking the Future*. <https://www.rethinkingthefuture.com/designing-for-typologies/a4034-adaptive-reuse-of-sacred-space/> (2024, October).
- Pallasmaa, J. (1996). *The eyes of the skin: architecture and the senses*. <https://ixtheo.de/Record/1651593418>
- Pelotes, B. & Van Cleempoel, K. (2012) *Adaptive reuse as a strategy towards conservation of cultural heritage: a survey of 19th and 20th century theories*.
- Plevoets, B., & Van Cleempoel, K. (2013). Adaptive reuse as an emerging discipline: an historic survey. In G. Cairns (Ed.), *Reinventing architecture and interiors: a socio-political view on building adaptation* (pp. 13-32). London: Libri Publishers
- Plevoets, B., & Van Cleempoel, K. (2009). Adaptive reuse of the built heritage: Concepts and cases of an emerging discipline. *Routledge*. <https://doi.org/10.4324/9781315161440>
- Pew Research Center, *Being Christian in Western Europe*. <https://www.pewresearch.org/religion/2018/05/29/being-christian-in-western-europe/> (2024, October).
- Pew Research Center, *Global Christianity – A Report on the Size and Distribution of the World's Christian Population, 2010-2050*. <https://www.pewresearch.org/religion/2011/12/19/global-christianity-exec/> (2024, October).
- Pew Research Center, *Religious Composition by Country, 2010-2050*. <https://www.pewforum.org/2015/04/02/religious-projection-table/2050/percent/all/> (2024, October).
- Pomponi, F. & Moncaster, A. (2017) *Circular economy for the built environment: A research framework*. *Journal of cleaner production* 143. doi: 10.1016/j.jclepro.2016.12.055
- Rodrigues, C. & Freire, F. (2017) Adaptive reuse of buildings: Eco-efficiency assessment of retrofit strategies for alternative uses of an historic building. *Journal of cleaner production* 157. doi: 10.1016/j.jclepro.2017.04.104
- Rethinking the Future. *Dance, Movement, and Architecture- How are they connected*. (n.d.). <https://www.rethinkingthefuture.com/architectural-community/a10279-dance-movement-and-architecture-how-are-they-connected/> (October, 2024)
- Riegl, A. (1982 [1903], Fall). *The modern cult of monuments: Its character and its origin*.
- Rudolf Laban | Modern dance pioneer, movement analysis & choreography. (1998, July 20). *Encyclopedia Britannica*. <https://www.britannica.com/biography/Rudolf-Laban> (October, 2024)
- Ruskin, J. (1849). *The seven lamps of architecture*. London: Smith, Elder.(p. 148-186)
- Save the Parish. (2024, August 22) *Closing churches can cut worship numbers, new opinion poll finds*. <https://www.savetheparish.com/2024/08/22/closing-churches-can-cut-worship-numbers-new-opinion-poll-finds/>
- Schnarr, L. M. (2011). *Pendulum Performing Arts Center: Adaptive reuse design of the historic Court Square Building in Springfield, Massachusetts* (Master's thesis, University of Massachusetts Amherst). <https://scholarworks.umass.edu/theses/641>
- Sternberg, E. M. (2010). *Healing spaces*. <https://doi.org/10.2307/j.ctvjghtgs>
- Tang, R. (2017). *Variable Space: A Conversation Between Architecture, Landscape and the Body*. Association of Collegiate Schools of Architecture.
- The Tablet. (2013, December 4). *1,000 Catholic churches in Holland to close by 2025*. <https://www.thetablet.co.uk/news/170/1-000-catholic-churches-in-holland-to-close-by-2025>
- UCA News. (2022, July 22). *French report warns of danger to historic churches*. <https://www.ucanews.com/news/french-report-warns-of-danger-to-historic-churches/98124>
- United Nations Environment Programme. (2023). *Building Materials and the Climate: Constructing a New Future*. <https://wedocs.unep.org/20.500.11822/43293>.
- Uysal, V. S., & Wilsing, M. (2001). *Embodying Architecture, Studying Dance: Movement as Means of Studying Body-Space Relationship*. University of Bilkent. <https://d1wqtxts1xzle7.cloudfront.net/80964187/ddssar0028.content-libre.pdf>
- Wagner, Richard. *The Art-Work of the Future and Other Works*. U of Nebraska Press, 1993
- Valero Ramos, E. (2015). *Light in architecture: The intangible material*. RIBA Publishing. <https://www.taylorfrancis.com/reader/read-online/f42b9369-d79d-42ef-9f2b-f426ca5f6374/book/pdf>
- Viollet-le-Duc, E. E.(1967 [1854]). *Dictionnaire raisonné de l'architecture Française du XIe au XVIe siècle* (K.Whitehead,Trans. Vol. 8). Paris: F. De Nobele. (p.222-223)
- Zumthor, P. (2006). *Atmospheres : Architectural environments ; surrounding objects*. Birkhäuser

IMAGES

- Cover: Created by the author, improved with the help of AI and then edited again by the author
- Figure 1: Practising Christians per church building: work of the author, based on data from Pew Research Center, 2011, Wordometer, 2024 and H. Lindblad, E. Löfgren, 2016
- Figure 2: Christians' distribution: work of the author based on data from Pew Research Center, 2011
- Figure 3: How many Christians are practicing: work of the author, based on data from Pew Research Center, 2011
- Figure 4: Currently Christians vs raised christians: work of the author, based on data from Pew Research Center, 2011
- Figure 5: Number of Christians belonging to Folkekirken, work of the author, based on data from Statistic Denmark
- Figure 6: Economic and Environmental value of reuse from Eberhardt et al., (2019) re-visualized by author
- Figure 7-8: Author's photographs, 2024
- Figure 9: Dancers illuminated. Schnarr, L. M. (2011). Pendulum Performing Arts Center: Adaptive reuse design of the historic Court Square Building in Springfield, Massachusetts (Master's thesis, University of Massachusetts Amherst). <https://scholarworks.umass.edu/theses/641>
- Figure 10: Perception of form and light. Author's drawing
- Figure 11-12: Author's photographs, 2024
- Figure 13: Sankt Pauls Kirke. Collage based on Wikipedia and author's drawings. [https://da.wikipedia.org/wiki/Sankt_Pauls_Kirke_\(K%C3%B8benhavn\)](https://da.wikipedia.org/wiki/Sankt_Pauls_Kirke_(K%C3%B8benhavn)) (October, 2024)
- Figure 14: Fredens Kirke. Collage based on Wikipedia (exterior), Jyllands Posten (interior) and author's drawings. [https://da.wikipedia.org/wiki/Fredens_Kirke_\(K%C3%B8benhavn\)](https://da.wikipedia.org/wiki/Fredens_Kirke_(K%C3%B8benhavn)) (October, 2024), <https://jyllands-posten.dk/indland/ECE3948487/Indvandrerer-overtager-folkekirker/> (October, 2024)
- Figure 15: Lutherkirken. Collage based on Wikipedia and author's drawings. <https://da.wikipedia.org/wiki/Lutherkirken> (October, 2024)
- Figure 16: Ansgar Kirke. Collage based on Wikipedia (Exterior), Ensmukafsked (Interior) and author's drawings. https://commons.wikimedia.org/wiki/Category:Ansgar_Kirke_%28K%C3%B8benhavn_Kommune%29 (October, 2024) <https://www.ensmukafsked.dk/Ansgar-Kirke> (October, 2024)
- Figure 17: Solbjerg kirken. Collage based on Wikipedia and author's drawings. [https://da.wikipedia.org/wiki/Solbjerg_Kirke_\(Frederiksberg\)](https://da.wikipedia.org/wiki/Solbjerg_Kirke_(Frederiksberg)) (October, 2024)
- Figure 18: Aalholm Kirke. Collage based on Wikipedia (Exterior), Facebook (Interior) and author's drawings. https://da.m.wikipedia.org/wiki/Fil:Aalholm_Kirke_Copenhagen_2.jpg (October, 2024) <https://www.facebook.com/profile.php?id=100064467231386&sk=photos> (October, 2024)
- Figure 19: Location of the Fredriksstaden in the city, work of the author, based on data from City Population, 2024
- Figure 20: Population development: work of the author, based on on data from City Population, 2024
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- Figure 24: Place of birth: work of the author, based on on data from City Population, 2024
- Figure 25: View for a church. Det Kgl. Bibliotek, Digital Collection. <https://kb-images.kb.dk/DAMJP2/DAM/Samlingsbilleder/0000/431/435/DT117691/full/full/0/native.jpg> (January, 2025)
- Figure 26: Sections of the church. Det Kgl. Bibliotek, Digital Collection. <http://www5.kb.dk/images/billed/2010/okt/billeder/object1706855/da/> (October, 2024)
- Figure 27: Floor plan of the church. Det Kgl. Bibliotek, Digital Collection. <http://www5.kb.dk/images/billed/2010/okt/billeder/object1706868/da/> (October, 2024)
- Figure 28: Facades of the church. Det Kgl. Bibliotek, Digital Collection. <http://www5.kb.dk/images/billed/2010/okt/billeder/object1706881/da/> (October, 2024)
- Figure 29: Interior of the church 1872-1896 (View towards the apse) Det Kgl. Bibliotek, Digital Collection. <https://kb-images.kb.dk/DAMJP2/DAM/Samlingsbilleder/0000/431/427/DT117666/full/full/0/native.jpg> (January, 2025)
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- Figure 32-33: Mikrokosmos, by Anne Teresa de Keersmaeker : <https://www.rosas.be/en/publications/441-hoppla> (February, 2025)
- Figure 34: The Magnanimous Cuckold, by Liubov Popova: Uysal, V. S., & Wilsing, M. (2001). *Embodying Architecture, Studying Dance: Movement as Means of Studying Body-Space Relationship*. University of Bilkent. <https://d1wqtxts1xzle7.cloudfront.net/80964187/ddssar0028.content-libre.pdf> (February, 2025)
- Figure 35: Strange Fish, by Lloyd Newson: <https://www.facebook.com/people/Strange-Fish-DV8-Physical-Theatre/100071619798841/> (February, 2025)
- Figure 36: Hand Drawn Spaces, by Merce : https://www.researchgate.net/publication/384407496_Organs-without-body_a_study_on_the_genealogy_of_vision_leading_to_the_posthuman_age/figures?lo=1 (February, 2025)
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- Figure 38: Rhythm in modern architecture. [https://architecturetoday.co.uk/reading-the-rhythm/#Lightbox\[Article_Gallery\]/2](https://architecturetoday.co.uk/reading-the-rhythm/#Lightbox[Article_Gallery]/2) (April, 2025)
- Figure 39: Rhythm in ancient architecture. <https://www.re-thinkingthefuture.com/fresh-perspectives/a4901-rediscovering-history-the-milestones-in-architecture/> (April, 2025)
- Figure 40: Change in dance. Pinterest. <https://pl.pinterest.com/pin/449163762857122234/> (May, 2025)
- Figure 41: Change in architecture. Archdaily. <https://www.archdaily.com/891009/de-poort-van-borne-healthcare-center-reitsema-and-partners-architecten> (May, 2025)
- Figure 42: Weight in dance. <https://www.facebook.com/photo.php?fbid=897781347049348&id=468864523274368&set=a.550341875126632.> (April, 2025)
- Figure 43: Weight in architecture. https://de.wikipedia.org/wiki/Elbphilharmonie#/media/Datei:Elbphilharmonie,_Hamburg.jpg (April, 2025)
- Figure 44: Architecture inspired by dance. Pinterest. <https://pl.pinterest.com/pin/466192998900309965/> (May, 2025)
- Figure 45: Materials. Collage based on pictures from Pinterest. (May, 2025)
- Case study 1. Archdaily. https://www.archdaily.com/892558/library-museum-and-community-center-de-petrus-molenaar-and-bol-and-vandillen-architects?ad_source=search&ad_medium=projects_tab (October, 2024)
- Case study 2. Visit Churches. <https://www.visitchurches.org.uk/visit/church-listing/st-paul-bristol.html#undefined1> (February, 2025)
- Case study 3. Archdaily. https://www.archdaily.com/794532/ke-house-of-culture-in-movement-mvrdv-plus-adept?ad_source=search&ad_medium=projects_tab (October, 2024)
- Case Study 4. Kontakt Przestrzeń. <https://kontaktprzestrzen.pl/galeria/> (October, 2024)