

Mission Field H2O

*A wetland
preservation facility
to 'make new' a
church's identity,
within the community*

*... "Come!" Let the one who is thirsty
come; and let the one who wishes take
the free gift of the water of life" (Rev.
22:17 NIV)*



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• 2022 •

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Figure ii. (above) Sunset view midway through the wetland (Author, 2021)

Plagiarism Declaration



I, Roxanne Norton-Esau (student number 1446903) am a student registered for the Master of Architecture (Professional) course in the year 2021. I am aware that plagiarism is not tolerated. I have followed the necessary conventions to ensure all thoughts and ideas are referenced, including visual material.

I am aware that the University of Witwatersrand can take disciplinary action against me if there is a belief that this is not my own unaided work, or if I have failed to acknowledge the source of the ideas or words in my writing.

Signature:

Date: 23 February 2022



Figure iii. (above) Night Skyline facing west over the wetland (Author, 2021)

Acknowledgements

All praise to God for His word that always motivates and inspires me to do good works for Him. I thank him for his favour over my life, for the many blessings and for giving me the strength to make it through this year.

...
A deep sense of appreciation to my supervisor, Sandra Felix who played a role in my academic achievement this year. Thank you for your guidance and encouragement when I needed it.

To the unsung hero, my husband, for putting on his 'mom and dad hat' many times. Your support, your love, and your patience through this time will forever be appreciated.

To my babies, thank you for understanding and sacrificing many missed moments with me. To my extended family and friends, thank you for your unwavering support and for reminding me to have some fun when I'm stressed out.

Preface

2020 started like any other year, filled with big dreams and hopes, but one fateful day in March, our first Covid-19 case made headlines in South Africa. Things escalated quickly, and our lives suddenly shifted from a life of freedom and joy to a place of isolation and fear. I was in a dark place and had lost hope in fear of my family members lives near and far, and this tested my spiritual grounding.

Then one night, my eyes caught something lit up in the night sky, and it spoke volumes. It read, "HOPE" ... For the first time, Ridgecrest Family church had an overwhelming presence, like never before, and every resident who witnessed this word felt the supernatural power of God in our midst.

This one word inspired this research report and the need to renew the church's presence and awaken their intangible mission. If ones own spiritual grounding can transcend from something as tangible as a word lit up in the night sky, then what symbolic power could architecture, which is understood to read like a text, have in luring man to God?

With a pinch of grace and hope, I begin to take cues from the understanding that church architecture could once again connect man to God, using the element of water as the tangible medium for Mission Field H2O.



Figure iv. (above) Church sign: 'Hope' seen at dusk, from across the Wetland (Author, 2021)

Abstract

This research report attempts to crossover two areas of interest, spirituality and climate change; where the church acts as a change agent to necessitate a new worldview around water. The investigative narrative looks at how architecture at a micro-scale can support the church in harnessing a shifting culture, through the collective preservation of a wetland. This allows the architecture to symbiotically form part of the ecology of the wetland and becomes a place of environmental and spiritual awareness.

The Covid-19 pandemic has made its impact on all aspects of our lives. It not only amplified underlying concerns about climate change, spirituality, and declining health, but it shook the church to its tipping point, with its new social distancing protocols, making the church building more underutilized than ever before. The new global culture's views about the church has been impacted, threatening the notion of 'fellowship' under the 'new normal.'

Water is central to our lives, and another area of concern that this research investigates. Everyone has the right to have access to clean water, but with an increase in population growth, the quality of this precious resource is negatively impacted through pollutants and neglect.

The ecological construct of a wetland is one of nature's most natural resources that can assist in improving water quality and preservation. Given the unique location of the church bordering the wetland, Mission Field H2O, becomes the new mission paradigm that strengthens ties between the church as the 'change agent' and the community it serves. By creating a hybrid multipurpose wetland preservation church facility, the report addresses more relevant 21st-century challenges, such as health, well-being, climate change and spirituality. All these factors will come together, connecting man with nature and with God, *'making new'* the church's identity.

Keywords: Wetland, water security, church, spirituality, change agent, preservation, stewards

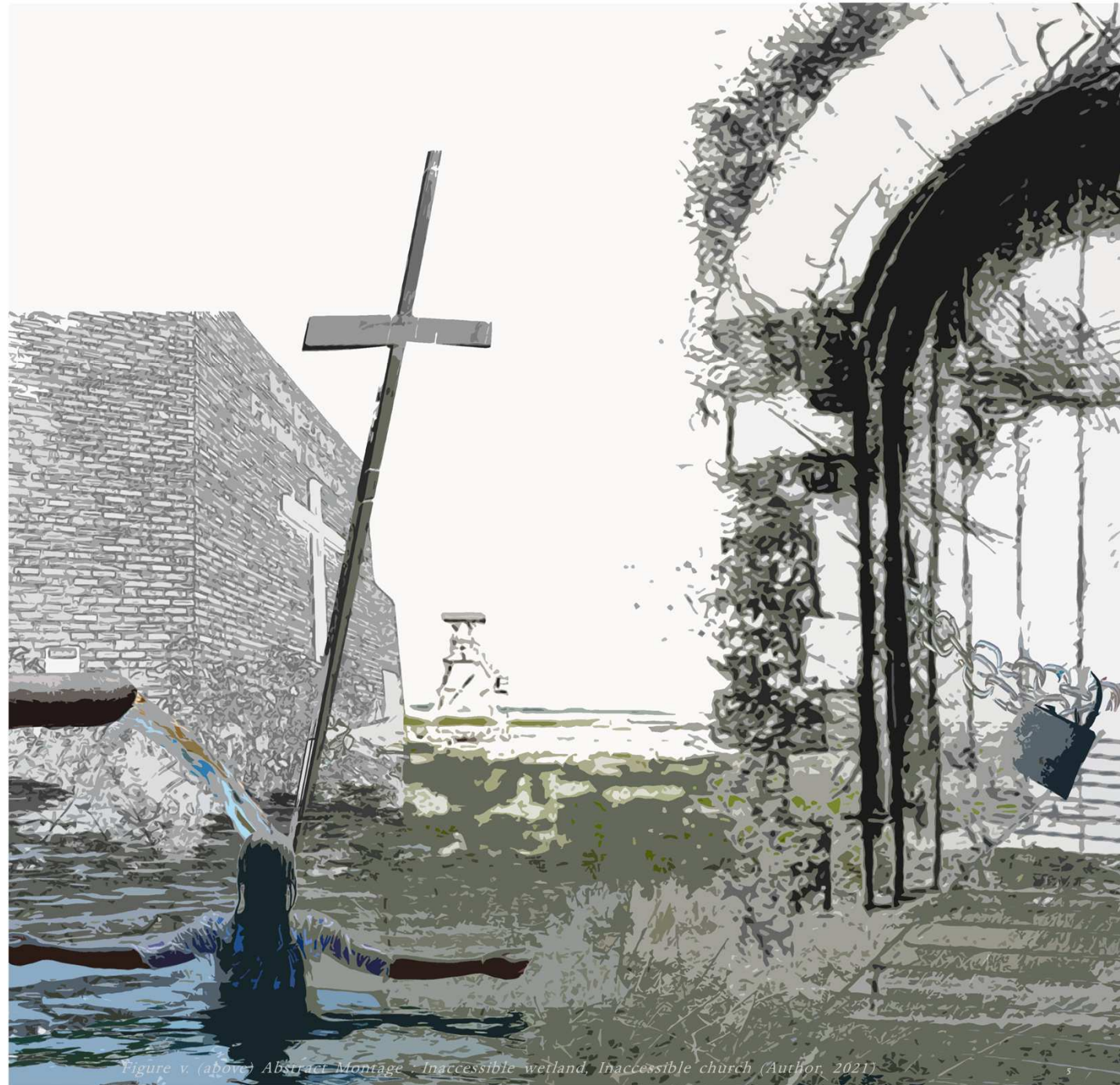


Figure v. (above) Abstract Montage : Inaccessible wetland, Inaccessible church (Author, 2021)



Figure. vi (above)

Montage illustrating the church during the pandemic on its tipping point and preaching needing to switch online. This caused churches to lose many of their followers(Author, 2021)

WHY MISSION FIELD H₂O



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Project Motivation

PROBLEM STATEMENT

The Christian church and the community:

Radiokop consists of a mixed demographic made up of medium to high-income brackets. This affluent suburb is clustered with gated communities, making them inaccessible to the Christian church for their outreach programs. The urban design of the area does not allow for interaction between community members. The suburb lacks recreational spaces to meet and encourage healthy living. Additionally, the church building has no presence and is underutilised. Technology has also become central to the way society connects, (escalated by the pandemic.) This raises more concerns for the church, whose beliefs are central to fellowship and human connection. The church therefore requires a mission paradigm that needs to embrace these new cultural values escalated by the pandemic.

Currently, the church lacks relevance, as it does not meet the needs of the Radiokop community, in its outreach programmes. Traditionally, churches are involved in outreach for disadvantaged groups, but since Radiokop is an affluent community, the church is required to redirect their mission to accommodate the needs of the community, which is to help them in their efforts to protect the wetland. The wetland is constantly under threat by developers who view the land as a potential profit. Many unsuccessful attempts have seen the community stand against further development. Furthermore, another threat that lingers, is the interference from the waste pickers, who sort recyclable materials in the wetland, destroying the ecosystem, and natural water movements.

RESEARCH QUESTION

What role can architecture play in facilitating the church building as a discursive space that encourages social cohesion through Environmental awareness while still expressing itself as a semiotic symbol for Christianity?

AIMS & INTENTIONS

The architecture aims to assist the church in its ministry by raising environmental awareness whilst using the wetland as its mission field. The intention is to address the harvesting of water and initiate renewed movement through the site. Furthermore, a waste management plan will be put in place, to resolve conflicts between the community and the waste pickers, who as stakeholders involved, will work together in keeping the wetland protected and clean. The hybrid programme allows for a safe space for the community to gather, and offers a new modern identity for the Christian church, unifying its purpose as both a church and a preservation facility, with the aim of being inclusive to all walks of life, and religious beliefs.

RESEARCH METHODOLOGY

A combination of quantitative and qualitative approaches develop the research argument, as it assists in the creative component that translates into an architectural proposal.

The qualitative research combines literature reviews that pertain to Christian theology, biophilia and phenomenology theories. These theories are vital for church design as they merge in a powerful way to connect worshippers with their faith.

These findings will further assist in the creative approach that involves awakening the church as a spiritual space. The quantitative study includes site analysis and observations and an enquiry into the science and ecology of the wetland.

Online surveys was conducted to gain a better understanding of the stakeholders involved. Where necessary, informal interviews with the church council was needed to clarify design requirements.

DEFINITIONS

Chapel: The church building where services are held

Christian: A believer in Christ, reborn into the faith through baptism.

Church : According to the bible, an assembly of Christians who come together in fellowship, symbolically as the body of Christ.

Church: Also referred to the building for Christian worship, referred to here as 'church building' for clarification.

'Make new': the term 'make new' holds significance for this project, because God restores and resurrects, and similarly, this project tries to do the same with the wetland.



Introduction

A CHURCH BUILDING FOR THE UNCHURCHED

There is no doubt that technology and globalisation have altered our human condition. Central to this is the current pandemic we find ourselves in, which has raised opportunities to re-evaluate things under the *new normal*. In an era where technology is constantly evolving and has become central to our livelihoods, the church finds itself in a state of changing paradoxes, challenged to be more relevant in its mission.

The evolutionary story of the Christian church tells a tale of change and how they played a role in the transformation of society. The Christian church was a body of people who would congregate at their homes for support and to learn more about the bible. Over time, these meeting places evolved into more permanent architectural spaces for spiritual guidance.

An historical investigation of the church reveals that it as an important place to meet and fellowship. Its architecture was arranged using organised patterns and symbols to encourage spiritual illuminance which gave it an innate power to lure man to God. Architecture thus played an important role as mediator in the evangelistic mission of the church. For centuries, its architecture dominated towns and cities, but over time this grandiosity was lost to modernism, with the belief that God is in the heart and not in the building.

This belief evolved the church building into something less significant, mundane and underutilised, but what remained was the intangible mission.

Then in 2020/2021, the pandemic restricted human interaction. These church spaces that we have become accustomed to, shifted from enclosed spaces that everyone fellowshiped and found refuge in, into a place where people have become mentally aware of an airborne virus, and neglecting the idea of fellowship out of fear of the virus.

People started turning to their electronic devices to compensate for the loss in social contact, not realising the effects social media and the news may have on their mental health (Zhao, N., & Zhou, G. 2020). Studies have shown how people began to engage and value nature more through the pandemic as their widespread public use of greenspaces increased (Waugh, 2020; JoJack, 2021). Mother nature became a sanctuary, as many shifted their daily rituals into the outdoors, weighing the dangers of free movement between private and public spaces. During this time, the church became insignificant, and its building, an empty shell.

With this understanding, the design of a new church typology prompted an interest in how the church building could bring man back to God under the pandemic while being more relevant in a time of cultural shift.

Thus raising the need for a hybrid program to create a tension between secular and spiritual space, and offering a new identity and social role for the church building as an inclusive space for all people, regardless of faith.

By using elements of nature, and the principles of biophilia and phenomenology theory, man can now find sanctuary in an innovative, more socially responsible hybrid architectural typology that encourages a healthier lifestyle and restores the relationship between God, man and nature.

This research report explores the historical journey of the Christian church as the *change agent* and how architecture supported it in its evangelistic mission. The theoretical underpinning looks to Christian theology to develop an understanding of Christianity and Christian spirituality. A qualitative investigation into phenomenology theory aids in understanding the types of architectural spaces required to enlighten one's spiritual awareness. The second underlying theme for this research looks at how strategic urban design principles, ecology, and psychology of spaces can activate the wetland, through movement.



21st Century Mission Paradigm

POST-MODERNISM AND CHRISTIANITY

As we enter the 4th industrial revolution, the notion that we are heading toward the 'The Last Christian Generation' (McDowell and Bellis, 2006) comes to light. According to Timothy Lawless, the church in the twenty first century is rapidly losing membership and "seems to be destined for obscurity and irrelevance" (Lawless, 2012). The church understands that Christianity is an ongoing process by which God, through Jesus, is saving the world. Despite the church undergoing centuries of evolution due to shifting social cultures, the word remains the same, and the mission is to keep the word going and alive.

Today, the church find's themselves in a paradigm shift, when pop-culture requires more innovative and relevant missionary work to suit their post-modern society worldview. Rev. Dr Isaias Catorce (Catorce, 2013), in his article 'Postmodernism and its influence in the church,' explains how post-modern culture has moulded society through the expressions of art, architecture, politics, philosophy, economics and literature.

He criticises these forces for their effects on the way society now functions through the visual and symbolic. We have seen a cultural shift where man is dependant on machines, and as a result of technology, the post-modern culture who is naturally 'experimental rather than rational, have begun to think with their eyes rather than hear with their conscience' (Catorce, 2013).

It becomes apparent from this standpoint that visual forces are elements that our post-modern society thrives on for a better understanding and to find meaning. Therefore, by knowing the innate power of architecture, we can begin to pave new ways of engaging the secular complexities that society presents. Through its expressive form and function, church architecture can once again be a meaningful public announcement, proclaiming the Good news of Christ.

I concur with Rev. Dr Isaias Catorce, who challenges Christians to be pro-active in their mission, to find ways to '*make new*' and reshape Christianity through a new mission paradigm,

without losing touch with traditional matters of the Christian faith (Catorce, 2013).

Architecturally, this requires the church building to serve as a multi-functional space that is inclusive and becomes relevant to the community it serves. Additionally, it becomes an architecture of meaning, and a machine that embraces 21st-century technologies that address matters relating to environmental awareness and preservation. The new architectural typology would not only shape people's worldview but also begin to acknowledge God as the creator of all things and that, "... in Him, all things hold together"(Col. 1:15-18, NIV).



Making New

Research Methodologies

The issue of climate change has dawned on us from as early as 1965 (Kestin et al. 2020). It took many years for this ‘movement’ to find momentum. Thanks to the advancement of technology, this movement has reached people on a more global scale than ever before. During the 2020 pandemic, social gatherings and human activities came to a halt. When the world stopped for nearly a year, nature miraculously healed itself, reclaiming earth. It was during this time when people became cognisant of biodiversity and sustainability (Clark, 2020). At the same time, religious and institutional buildings lost their significance under the ‘new normal.’ This research looks to the enquiry of the church as a *change agent* and tries to find ways in which the current circumstances presented may advocate for a hybrid typology proposed to restore or ‘make new’ the identity of the church and the wetland.

Survey 1

The first study conducted covered environmental sustainability awareness and the well-being of the community. This as a means to establish the need for more recreational spaces and accessibility of the wetland: 41 residents participated;

- 97.6% agreed that a recreational space is required and liked the idea of the wetland used for recreational purposes.
- 65.9% of people are environmentally conscious and have changed their sustainability habits,

Would you be interested in a recreational space in our area? Bike/walk paths/ parks etc.?

41 responses

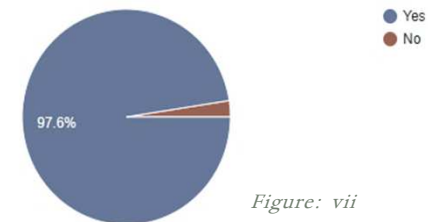


Figure: vii

During Lockdown did you consider changing your sustainability habits?

41 responses

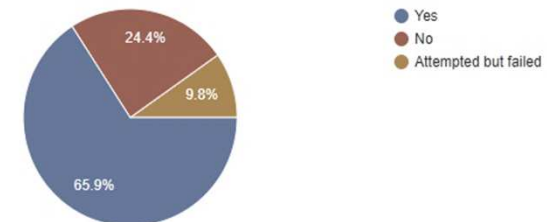


Figure: viii

Figure: viii (above) Graph (Author, 2021)

- 60% started veggie gardens, although only half of these participants managed to keep their garden alive.
- 53% of these people are making conscious decisions to lower their carbon footprint.
- 65.9% of people became more conscious of their health and well-being and participated in more outdoor activities with lockdown levels initiated.
- 65.9% of people have changed their sustainability habits since lockdown and realised its benefits.
- 53% expressed an interest in getting more involved in environmental sustainability workshops and awareness activities.
- 92.7% are interested in the idea of incorporating the waste pickers into the waste management plan for the area.
- 85.4% agreed to be on board with community outreach programs surrounding waste management in the area.
- 70% showed an interest in a community facility of this kind, with 66% agreeing (religion aside) to support the church in protecting the wetland.

Religion and Community:

While the demographics of the area was not surveyed, an open-ended question was posed to the participants, asking that, religion aside, if they would visit the church facility for other amenities rather than for spiritual reasons. Results showed that 66% of the participants who is assumed both Christian and non-Christian would not mind utilising the church for other purposes.

These findings are thus satisfactory, as it shows support from the community, in favour to want to improve their environment, and support the church in its mission to preserve the wetland.

(Please refer to the appendix for more records of questions and answers.)

Would you be interested in joining an outreach program about environmental awareness, despite it being run by a church? (religion aside?)

41 responses

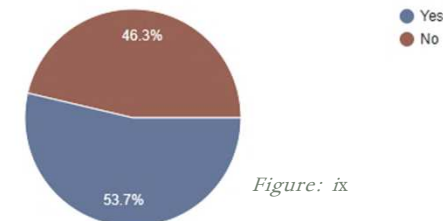


Figure: ix

Would you be more accommodating to the waste pickers if they were managed and formalised into the area?

41 responses

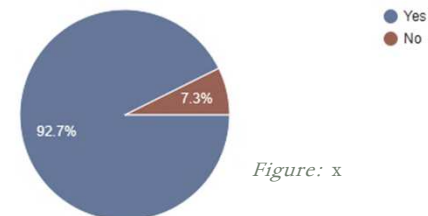


Figure: x

Religion aside, would you visit a community centre that is run by the church?

41 responses

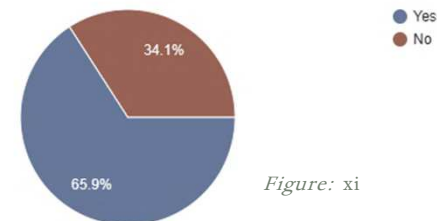


Figure: xi

Figure ix, x, xi (above) Graph (Author, 2021)

Survey 2

The second research conducted was based on Spirituality and experiencing the Church building, with 109 participants. The research conducted established how often people would visit the church before the Covid-19 pandemic. The results show that;

- 60.6% people attend church once a week, while 33% rarely did.
- 95% of people attended church willingly and did not feel forced.
- 33% of these people stopped going to church since the pandemic started. Only 23% of them prefer the convenience of online sermons. The remaining 10% have lost their connection with the church but still claim to be spiritual.
- 63% have expressed concerns about gathering in big groups for church, with 54% agreeing to an outdoor church.
- 26% of these Christians who connect with the church via online sermons struggle to get into the spirit.
- 71.6% of Christians prefer being in a church building to fellowship, with 69.7% agreeing to needing outside factors, such as nature, music, lighting, to transcend their spiritual conscience and psyche.
- 60.6% of Christians agree that the church building should be beautiful, as it may attract more people.
- 66.1% of people prefer small churches, rather than large churches, for a better sense of community.
- 52% of the participants say they go back to church because they feel part of the community and enjoy the company of people who fellowship there. While the rest go back to church due to the excitement built up around fellowship entertainment.
- 85% agree that fellowship is vital for spiritual growth.

The data show that the church building is underutilised which raises an opportunity to introduce other amenities during the week. Personal growth and fellowship are the churches main concern, and for this reason the church design must allow for flexibility and pockets of spaces to meet and greet. Nature plays an important role in stimulating the mind, it encourages time to pause and reflect, and therefore needs to be included to enhance the internal spaces of the church for a better spiritual experience. Furthermore, the online survey confirms that participants prefer 'small-scaled' churches over mega-type churches. The Pastor also agrees that a medium sized church for 400 people, could still encourage a close-knit community.

(Please refer to the appendix for more records of questions and answers.)

How often before Covid protocols, have you visited a religious place?

109 responses

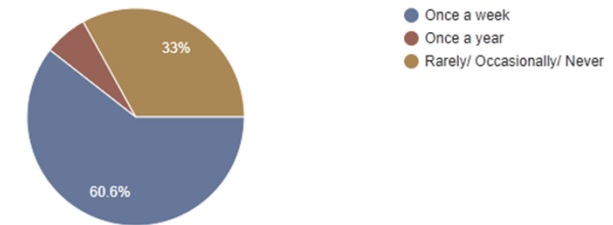


Figure: xii

Do you think a beautiful designed church building would attract more people?

109 responses

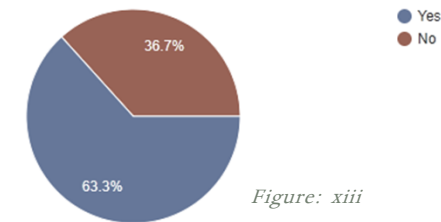


Figure: xiii

Do you prefer attending large churches or small churches? (Assume pre-covid or post covid)

109 responses

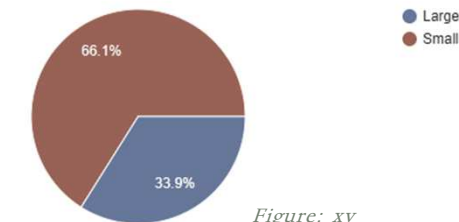


Figure: xv

Do you think fellowship is important for your growth as a Christian?

109 responses

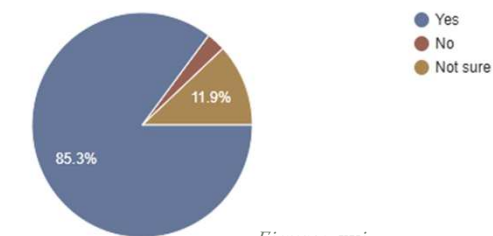


Figure: xvi

Figure xii, xii, xv, xvi (above) Graph (Author, 2021)

Program

The program for the building wants to find ways to harvest water and use it as a medium for learning about our most precious commodity. It strives for inclusivity and encourages waste management education to the larger community and the waste pickers of the area, within its incubation spaces. The church will double up as a conference facility, with multi-purpose studios to generate rental income.

The programme embraces the wetland as an extension of the church preservation facility, to carry out its mission in. Bearing in mind that the wetland is not owned by the church. It is a private property neglected by its owner, and the church will begin a process of taking ownership over the neglected land with the owners permission, as an organisation. The intention is to keep the wetland mostly untouched, to protect the biodiversity on the site, while allowing human movement and interaction along allocated routes.

Furthermore, play spaces and recreational spaces will be provided in the in deemed *safe zoned areas* of the wetland, not to impose too much on the natural biodiversity, while still allowing a close-up learning experience in nature.

CHURCH | WETLAND

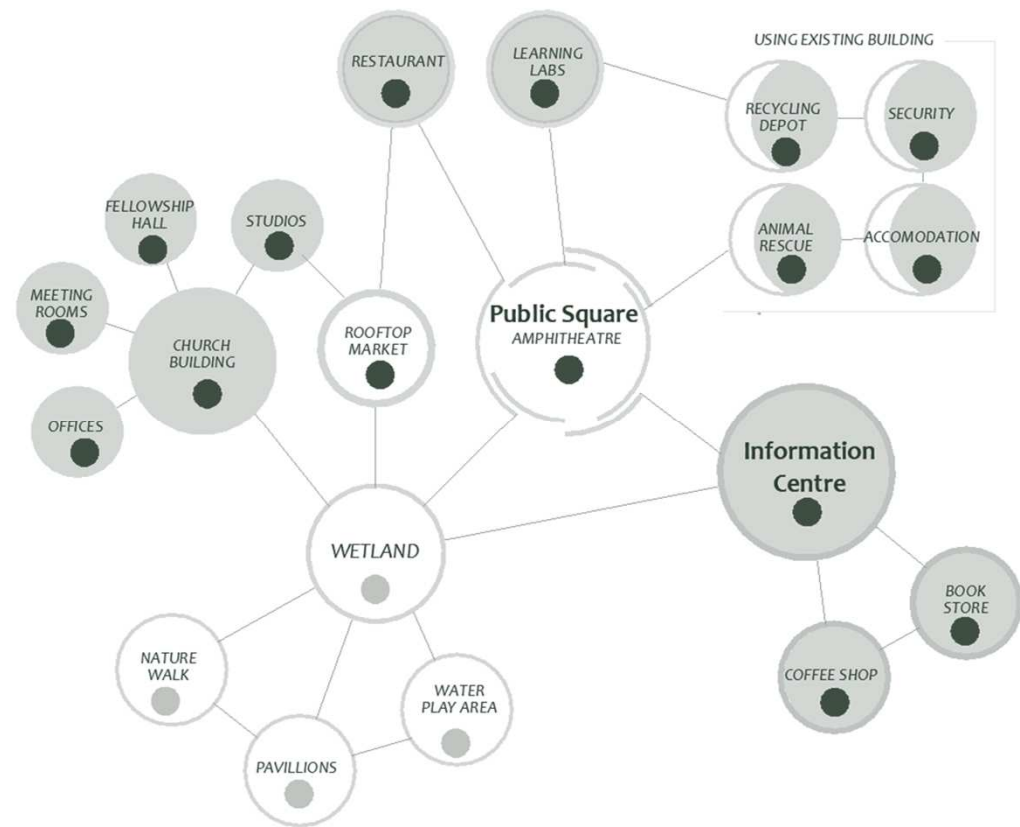


Figure: xvii (above) Program arrangements and connections, (Author, 2021)

● Architectural intervention vs Landscaping/Urban intervention ●

BUILDINGS ●

Utilities - Public:

Public Square Amphitheatre
Information Centre/ Library
Gallery/ Circulation foyers
Restaurant

Resources: Semi-Private

Multiple discussion rooms
Water Purification Workshop and learning labs
Recycling Zone

Instructional Programs:

Public/Semi-Private

Multi-purpose training studio's for developing of creative skills, and extra murals.
Fellowship Cafe
Breakaway rooms for counselling and support groups.

Missionary Areas: Public Spaces

Outdoor Amphitheatre
Chapel/ Church / Main Hall/ Galleries
Roof Market
Constructed Wetland areas

Other:

Accommodation for waste pickers

Services:

Ablution Facilities
Security / Maintenance response group
On grade parking

WETLAND ●

Recreation:

Walkways, Cycling and Running paths
Children's play parks

Figure xviii: Program superimposed onto site model, (Author 2021)





Chapter 1



SITE ANALYSIS

Location

The following images locate the site's position, to its surrounding context, in the suburb of Radiokop.

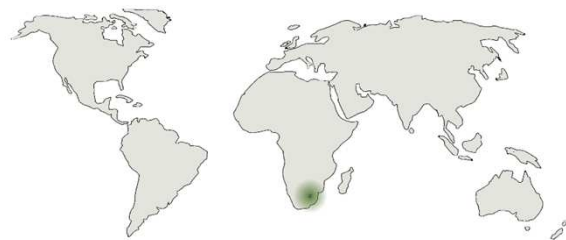


Figure: 1.1 (top) Geographic Location of Site proposed in South Africa - Gauteng Province (Author 2021)



Figure: 1.2 (above) Site location in the City of Johannesburg, (Author 2021)

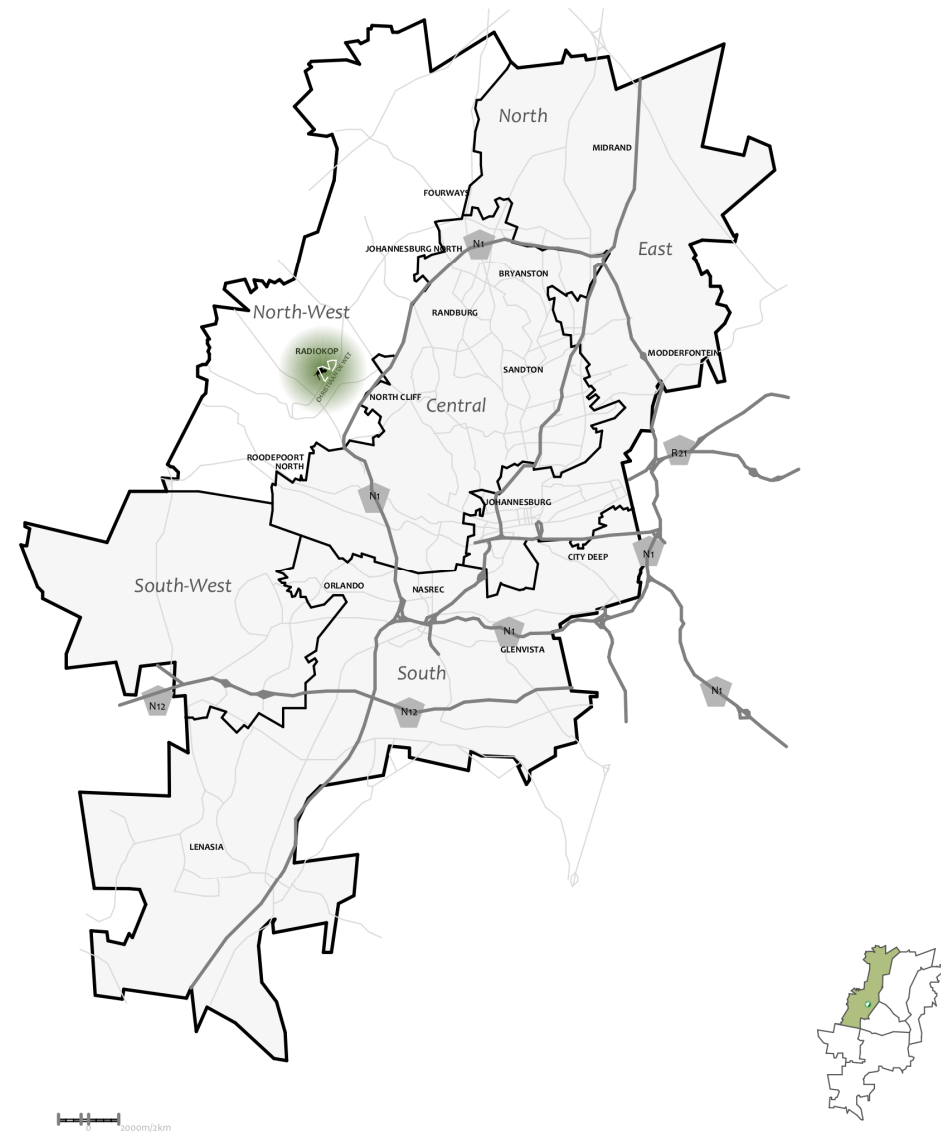


Figure: 1.3 (above) A macroscale location of Radiokop within the North-western part of Johannesburg (Author, 2021)

Site Selection Process

Radiokop was formally agricultural land, now mainly zoned for residential developments, and can be characterised by its many rolling hills and nature reserves surrounding it. The church is located on Erf forty-four (44), consolidated to the lower portions of Erf three (3) and four (4). The wetland is zoned for agricultural land, identified as Erf two hundred and eight (208).

Ironically, Radiokop first became home to Sentech, a broadcast transmission company, which earned Radiokop its name. The suburb consists of many smaller gated communities of young families and a small hidden community of vagrant waste pickers who illegally occupy the wetland.

The wetland runs adjacent to the church site and is a registered class 2 protected area, posing a unique opportunity for a project of this kind.

The Site Analysis helps develop considerations required for the wetland preservation facility, such as;

- The Upgrading of Stormwater catchments.
- Water testing laboratory.
- Recycling Collection Centre.
- An animal rescue facility.
- Recreational facility.

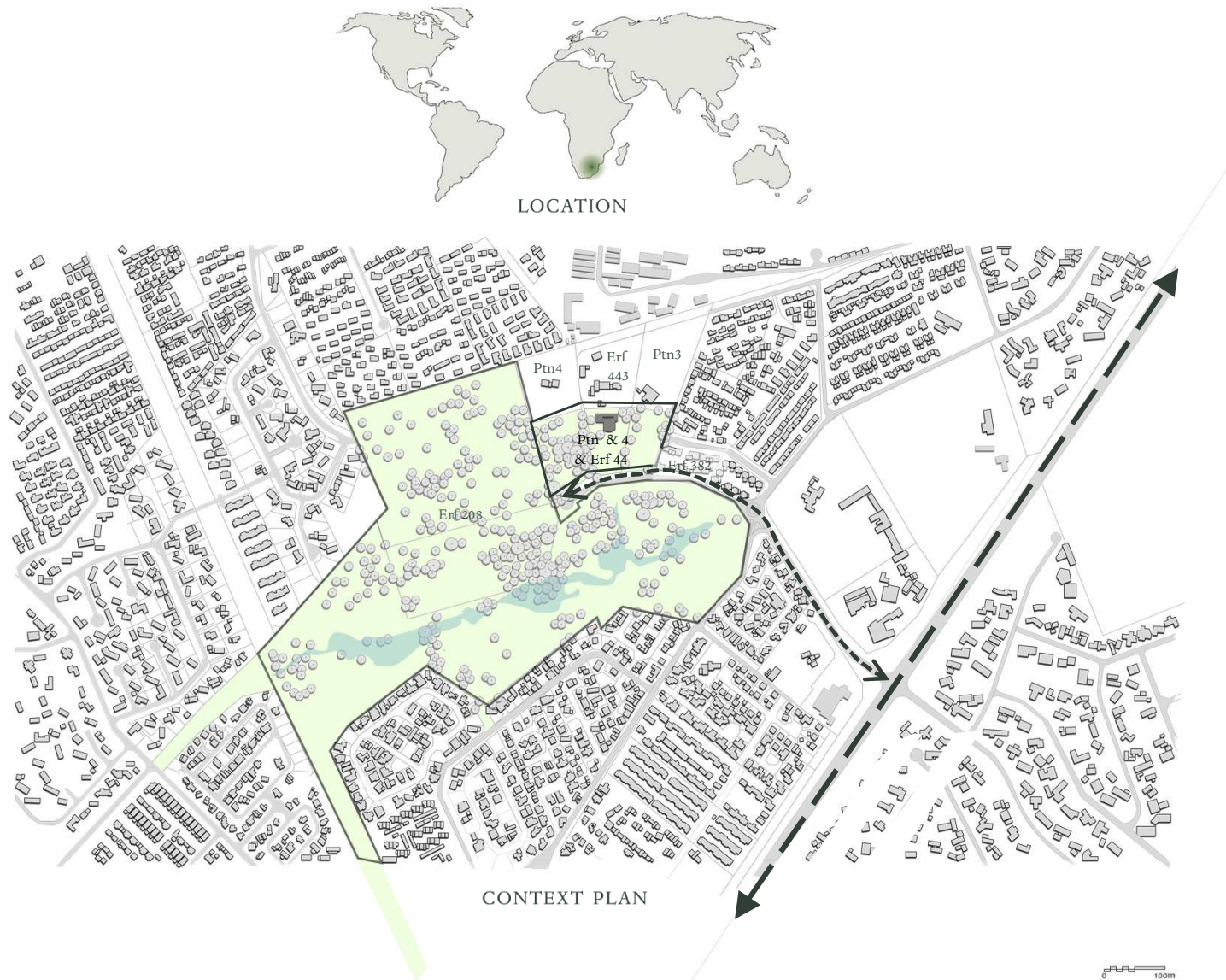


Figure 1.6: (above) Site Plan showing consolidated erf details , (Author 2021)

Access

The street artery map locates the site from the M1 Highway with Christiaan de wet as the main artery that passes Radiokop. Vehicular access is via Erasmus Road. The wetland takes up most of the South of Radiokop and splits the community into two portions.

The church is at the end of Erasmus street, adjacent to the wetland. The street cannot continue as it was later realised that it will encroach the wetland and the protected granitic outcrop, which could cause damage to the bio-diversity of the site.



Figure: 1.4 (above) Birds eye view of wetland and church site, (Author 2021)

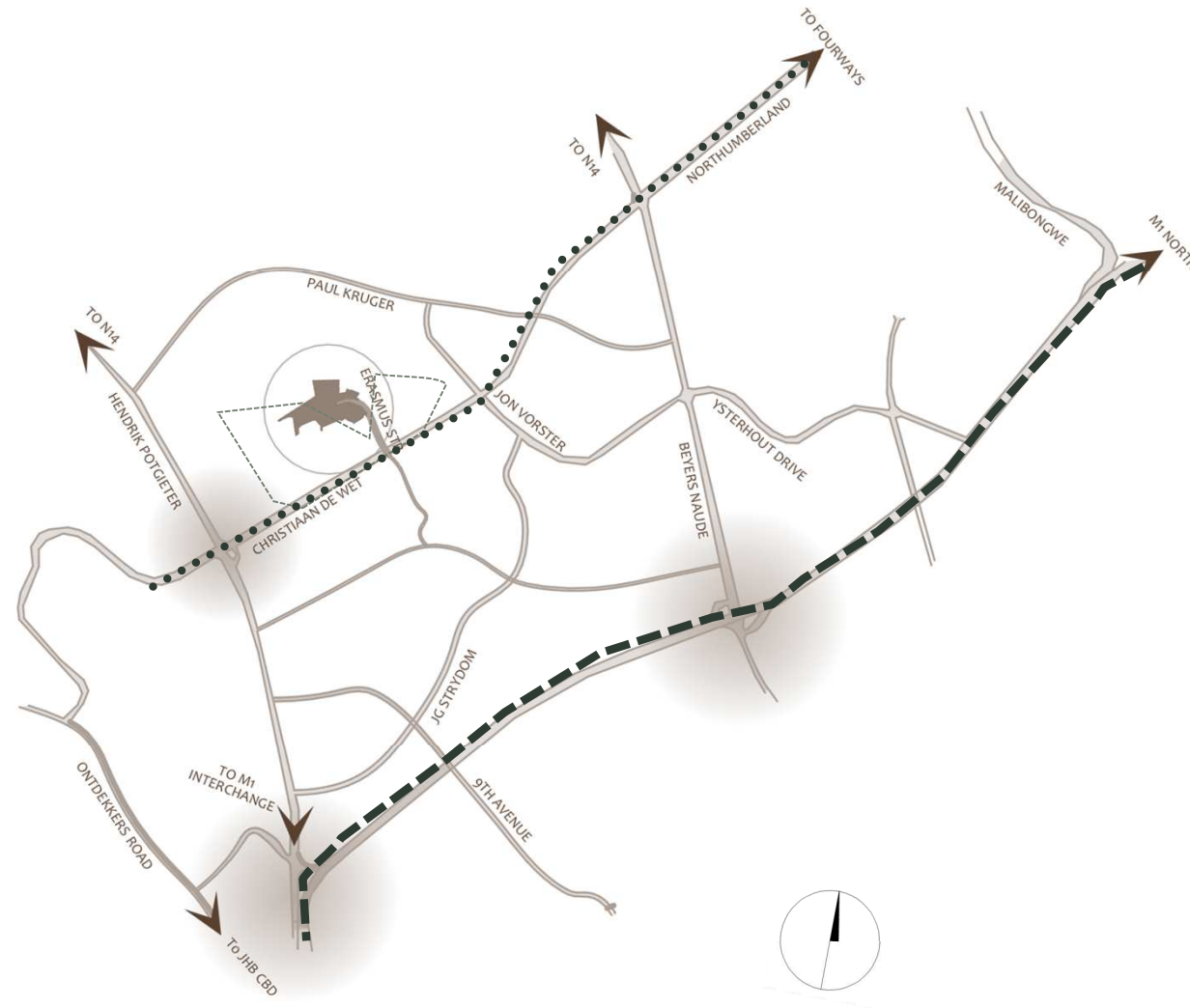


Figure: 1.5 (above) Street Arteries, (Author 2021)

Site Identification

SITE A - CHURCH | SITE B - WETLAND

Ridgecrest Family church is on Site A. Site A is made up of three consolidated erfs, with direct access to the wetland (Site B). The existing church will be re-used in the design, with minimal demolition work, and the facility's programme will subtly move beyond the boundary of the church site into the wetland. The street below the church, will be incorporated back into the landscape. The Radiokop wetland (B) is a physical barrier between the church and the community but presents a unique spirit of place. The architectural intervention, will take place on-site A, with urban interventions for Site B.



Figure 1.7: (above) Ridgecrest Family church front view, (Author 2021)



Figure 1.8: (below) Aerial view of church site, (Author 2021)



Figure 1.9: (above) Figure ground sketch showing wetland and church site, (Author 2021)

Building a community

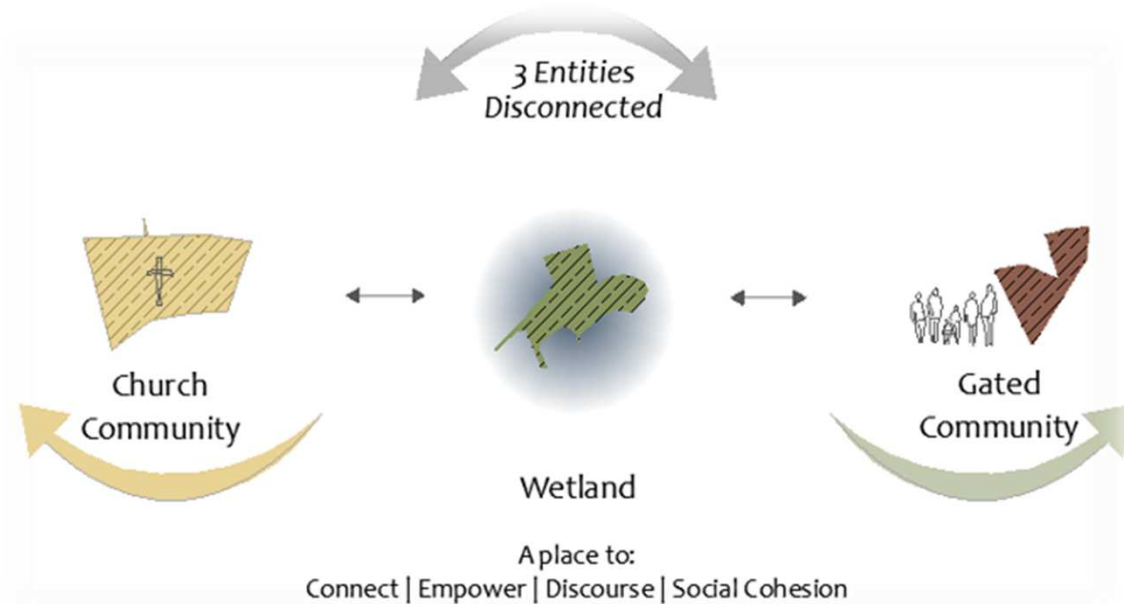
BRINGING TOGETHER 3 ENTITIES

There are three entities that this project wishes to activate. The church, the wetland and the community as illustrated on the right.

Churches are known as change agents who dedicate their time to missionary work to change society. It therefore seems fitting for the Christian church to be appointed as stewards of the wetland as an organisation that will always remain stable. Therefore, introducing a facility of this kind, has the ability to strengthen ties between the church and the community.

The church has been around for as long as Radiokop existed, around 2002. Starting in the neighbouring school hall, ten members set out to make an impact on the Radiokop community. Nineteen years later, membership grew to 150 people that continues to grow annually. The primary focus of the church was and will always be is to grow their memberships and spread the word of God. However, the focus primarily for this facility, was to add another layer to the church's vision, and create a place for the broader community to visit, with a common goal of preserving the wetland, while at the same time, providing a platform for the church to grow in membership.

The ancillary amenities provided at the church site, therefore addresses the needs of the community as well as the church, and offers supportive strategies to make it relevant for both spiritual growth and community building.



The fact that most members stand united to protect the wetland, proves that religion aside, a common interest has been established and in a similar way, the church preservation facility, will become a place for the community to meet and exchange.

As for the wetland. It is currently seen as a mass that separates the church from the community. It forces movement around its perimeter, rather than through it. However, the proposed programme lures the community toward the church through allocated landscaped pathways within the wetland, that is accessible from all directions (see page 30, Fig1,60 – illustrating the various entrances from gated communities).

By activating movement through the wetland, the perception of the wetland as an inaccessible isolated mass will become the glue to bring the church and the surrounding gated communities together.

Furthermore, when restoring the element of moving water, as well as human movement, the genius loci and experience of the wetland as a recreational space will be enhanced, and most likely will become an attractive space for community members to utilize.

Figure 1.10: (above) Bringing together 3 Entities, (Author 2021)

Building a community

OBJECTIVES: MIND MAP

The mind map visually explains the intentions of the church as a change agent, that could;

- Assist in building a culture of inclusivity and well-being for all stakeholders involved, which includes empowering the disadvantaged 'waste picking' community.
- Incorporate supporting strategies that protect and nurture the bio-diversity of the wetland and others.
- Liberate the church and the narrative of water as 'sacred ' for both Christian and preservation practices.
- Provide a facility to serve as a discursive and performative architecture that encourages social cohesion through environmental awareness
- This intervention could serve as a pioneer project which can be replicated for other wetlands throughout South Africa, run by all types of organisations.

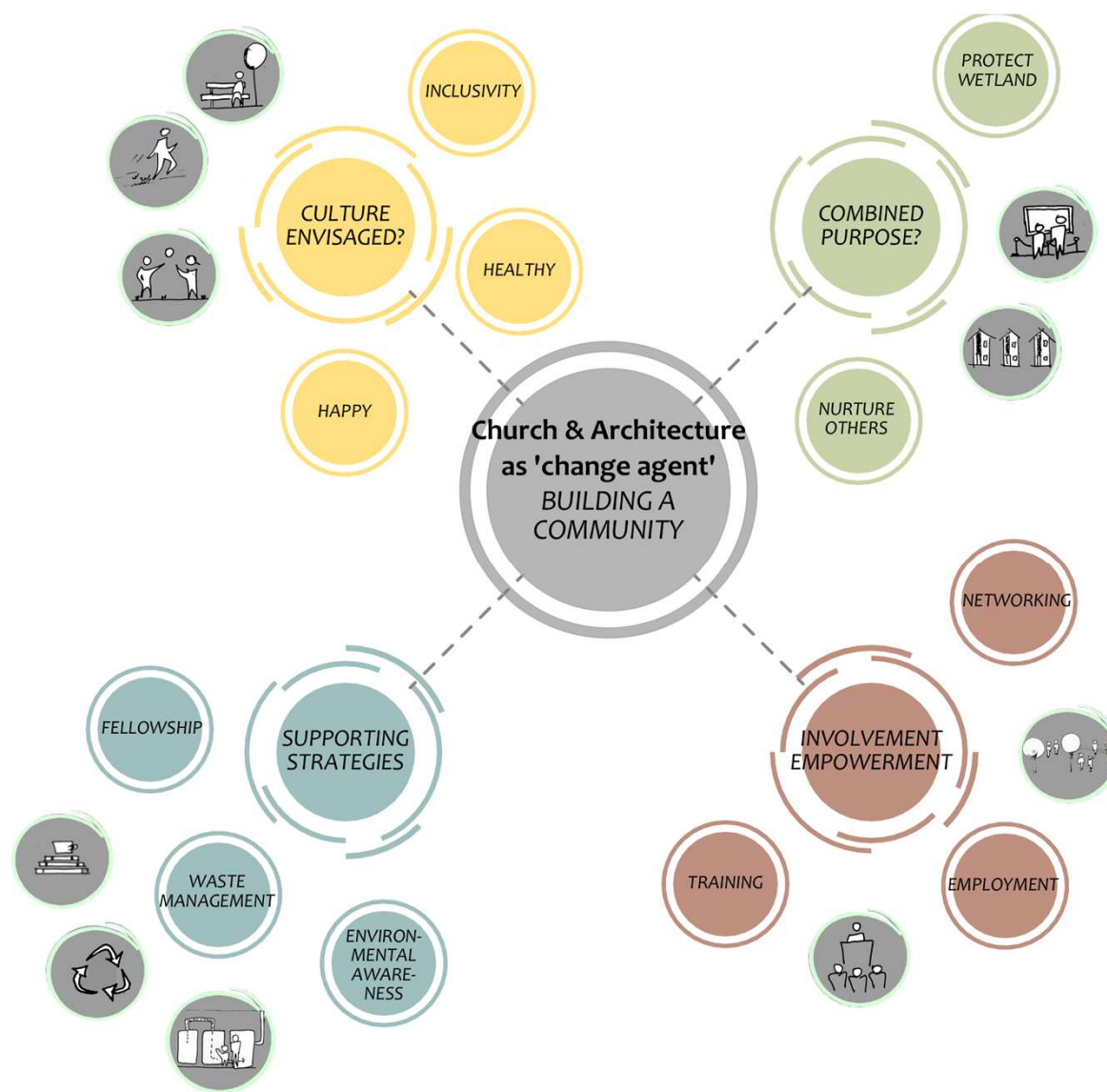


Figure: 1.11 (above) Mind map of building a community through church and architecture (Author, 2021)

Orientation

The image visually establishes the scale of the sites. The wetland is 275 000 m² while the church site is 21 500m². The idea is to create a recreational journey across the wetland site, entering from the various points, with the church as the focal point. The orientation of the church is toward the wetland, which is surrounded by gated communities along its perimeter.

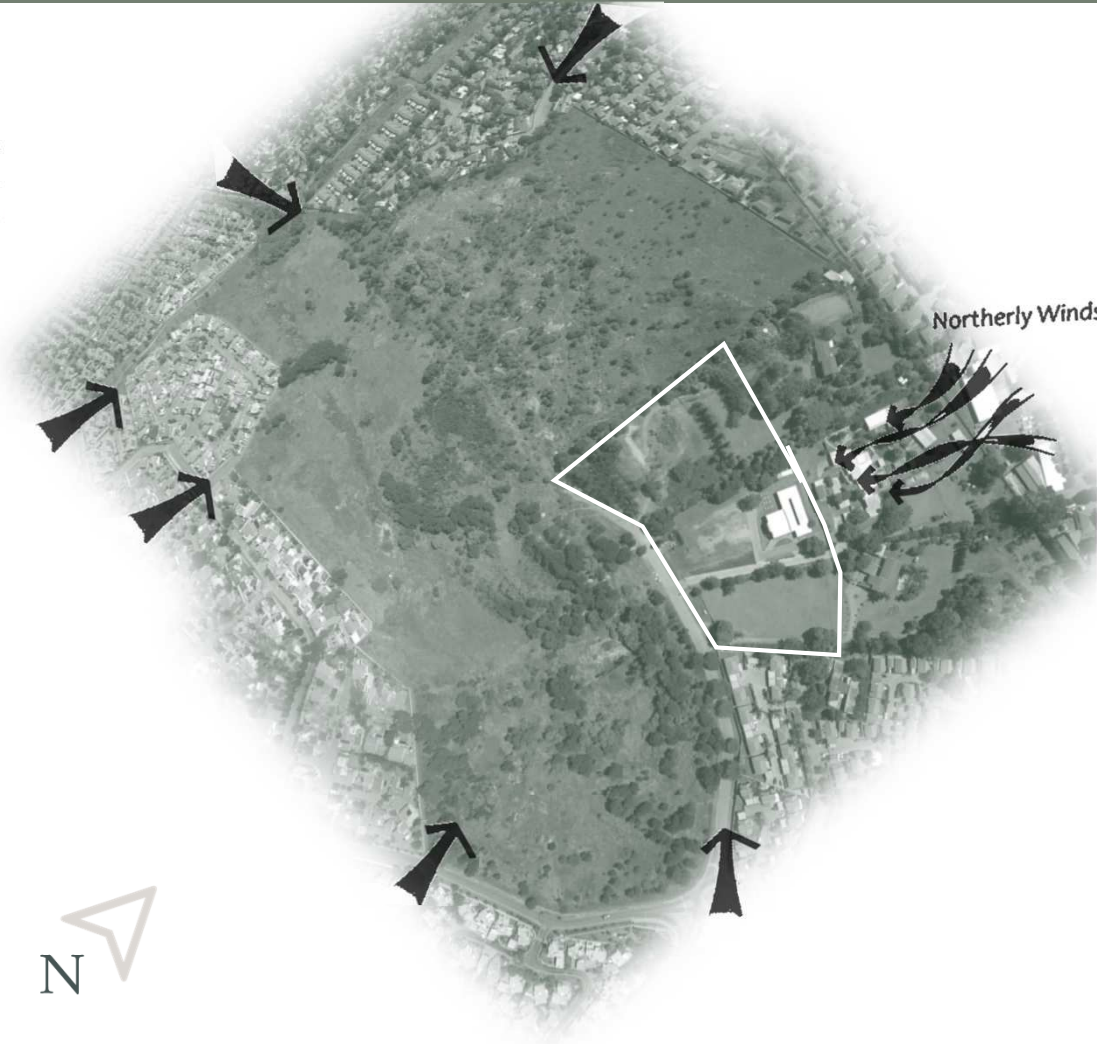
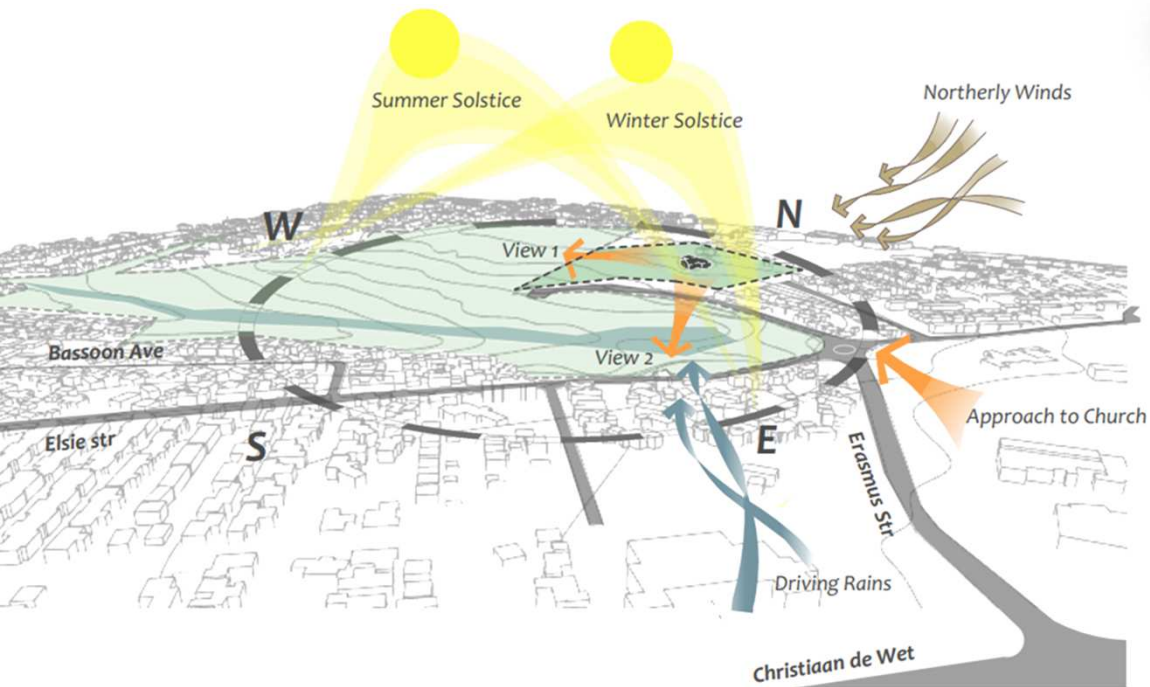


Figure 1.12: (above) 3d site analysis, (Author 2021)

Figure 1.13: (above right) Orientation and aerial view of drone images stitched together (Author, 2021)

Figure 1.14: (QR Code right) Scan QR Code for Drone Video footage (Author, 2021)

Figure 1.15: (right middle) View 2 toward Radiokop Suburb & Dense Vegetation (Author, 2021)

Figure 1.16: (far right) View 1 Toward Roodekraans Hill (Author, 2021)



Pedestrian Movement

The graphs below show varying foot traffic between the road and wetland terrain. Radiokop consists of avid runners who use the road for their recreational activity. Mostly men are seen taking short cuts through the wetland, with the occasional family groups walking their dogs.

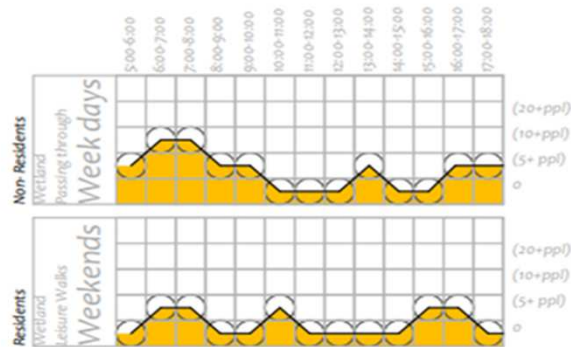


Figure 1.17a: Graph showing peak time movements in Wetland

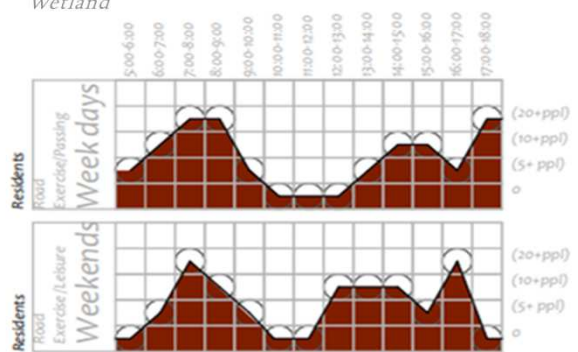


Figure 1.17b: Graph showing peak time movements in and around suburb streets



Figure 1.18: Varying pedestrian movements through Radiokop (Author 2021)



Yellow circles as entry points.



Yellow lines on map showing traffic of pedestrian movement through wetland



Red line indicative of Pedestrian movement along allocated pavements – runners use this space more often

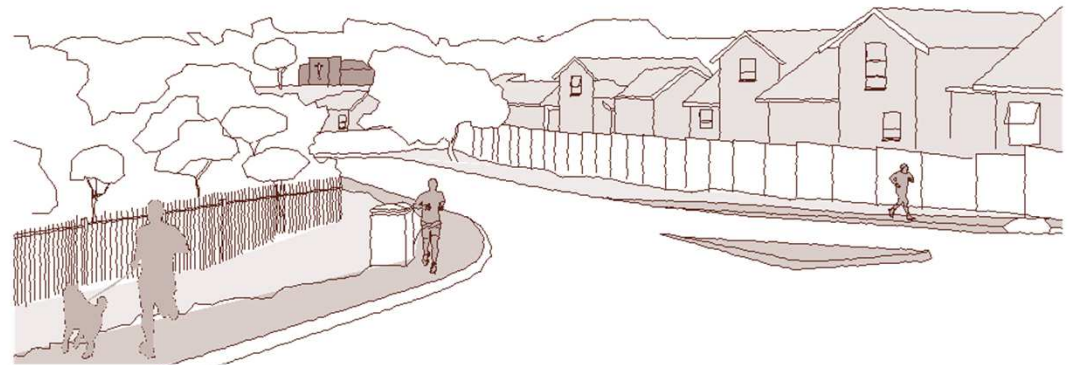


Figure 1.19: Sketch conveys a dense vegetation on the left with housing surrounding it. View from main entry circle – view to church unobstructed. (Author, 2021)



Figure: 1.20 Montage of Fauna found in Wetland
(Author, 2021)



Figure 1.21: Photo montage of Fauna/Flora found on the site on plan with photo view of Egoli Grassland and Granitic Ridge
(Author, 2021)

Fauna and Flora

The scoping report issued by Holgate and associates environmental management services (2003) lists the geology of the site to comprise of many red-data systems, namely, the indigenous grasslands (green), aquatic vegetation and fauna (blue) and the class 2 granitic ridge and rocky outcrops (brown).

Several biophysical sensitive habitats live within the outcrop, grasslands and marshlands. Due to the high sensitivity of the wetland's fauna and flora, developing around sensitive sites is restricted to a 100m buffer zone, as per usual restrictions.



Figure 1.22: Blue Guarri
Euclea crispa



Figure 1.24: Mountain
Cabbage Tree *Cussonia*
Paniculata



Figure 1.26: Acacia



Figure 1.23: Cape
Sugarbush
Protea Caffra



Figure 1.25: Wild Olive *Olea*
Europaea



0 100m

Flora

While the predominant vegetation across the site is grasslands, tree species found are a combination of Pine trees, Black wattle, Acacia and aloe species.

Figure 1.27 (above): The map demonstrates the volume of trees on the site, mostly a combination of indigenous trees listed on the left. Grasslands take up the rest of the site, and reeds are closer to the marsh and ravine area.
(Author, 2021)

Figure 1.28:
Rock Scorpion
Hadogenes
© Kemp, A (2019).



Figure 1.29:
Puff Adder
Bitis arietans
© McNab, D 2019.

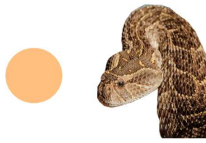


Figure 1.30:
Striped Mouse
Rhabdomys pumilio ©
Gibbons, B (2021).



Figure 1.31:
Spotted Eagle Owl
Bubo Africanus
© Eccles, T (2012)



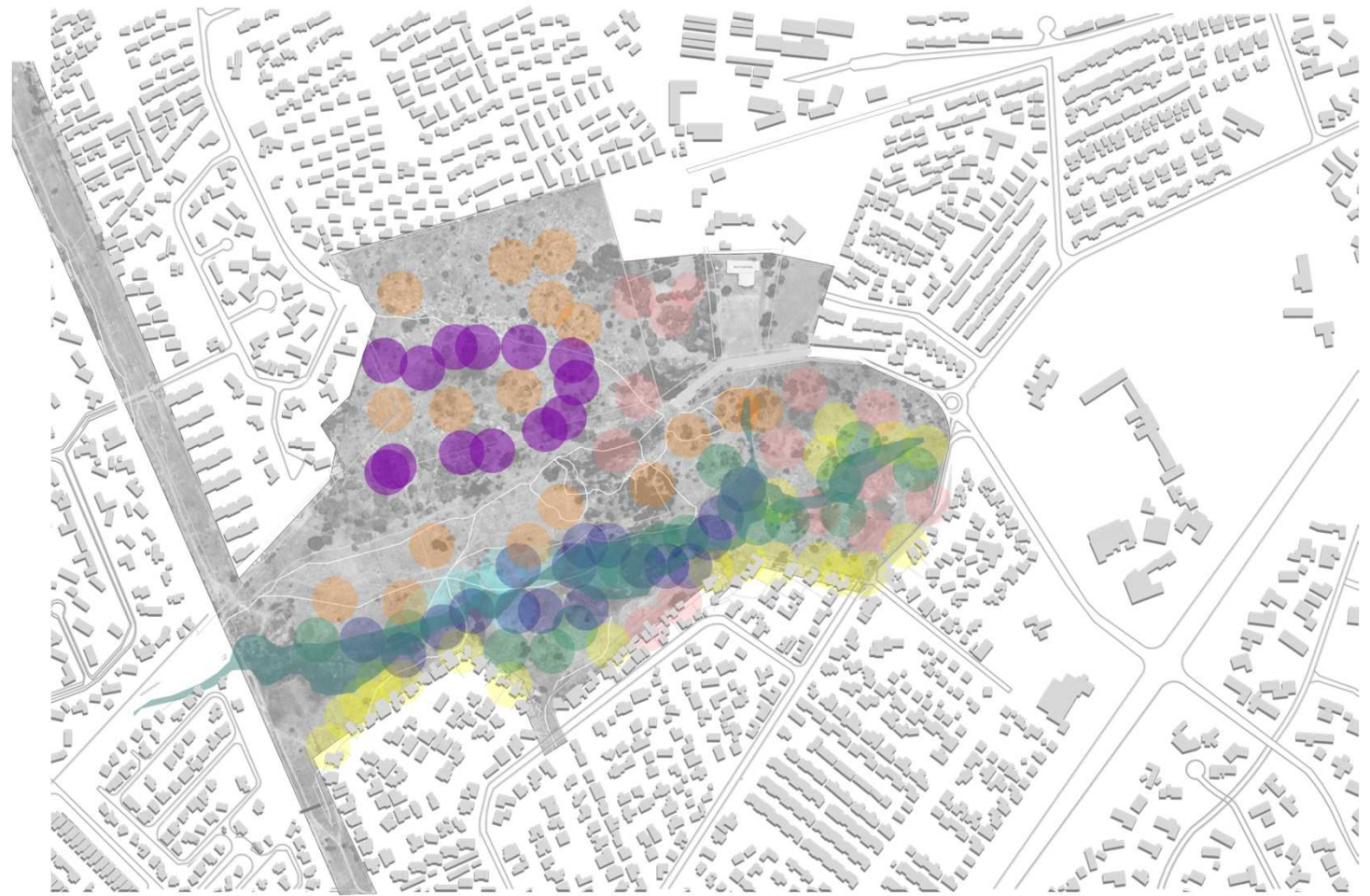
Figure 1.32:
Rinkals snakes (cobra)
hemachatus haemachutus
© About animals (2018).



Figure 1.33:
Giant Bullfrog
Pyxicephalus adspersus
© Brignell, C (nd)



Figure 1.34:
Slender Mongoose
Galerella Sanguinea
© Alongi, J (2011)



0 100m

Fauna

These creatures found on the site are seasonal, such as the spotted Eagle Owl, which hunts in high grasslands between February to April. Most of the fauna listed are nocturnal, making it particularly difficult to spot during the day. The Scoping report by Holgate and Associates (Rensburg and Holgate, 2003) lists some of the fauna spotted on the site, reported by community members.

Figure 1.35: (above) Mapping showing locations of various species found within the wetland habitat.
(Author, 2021)

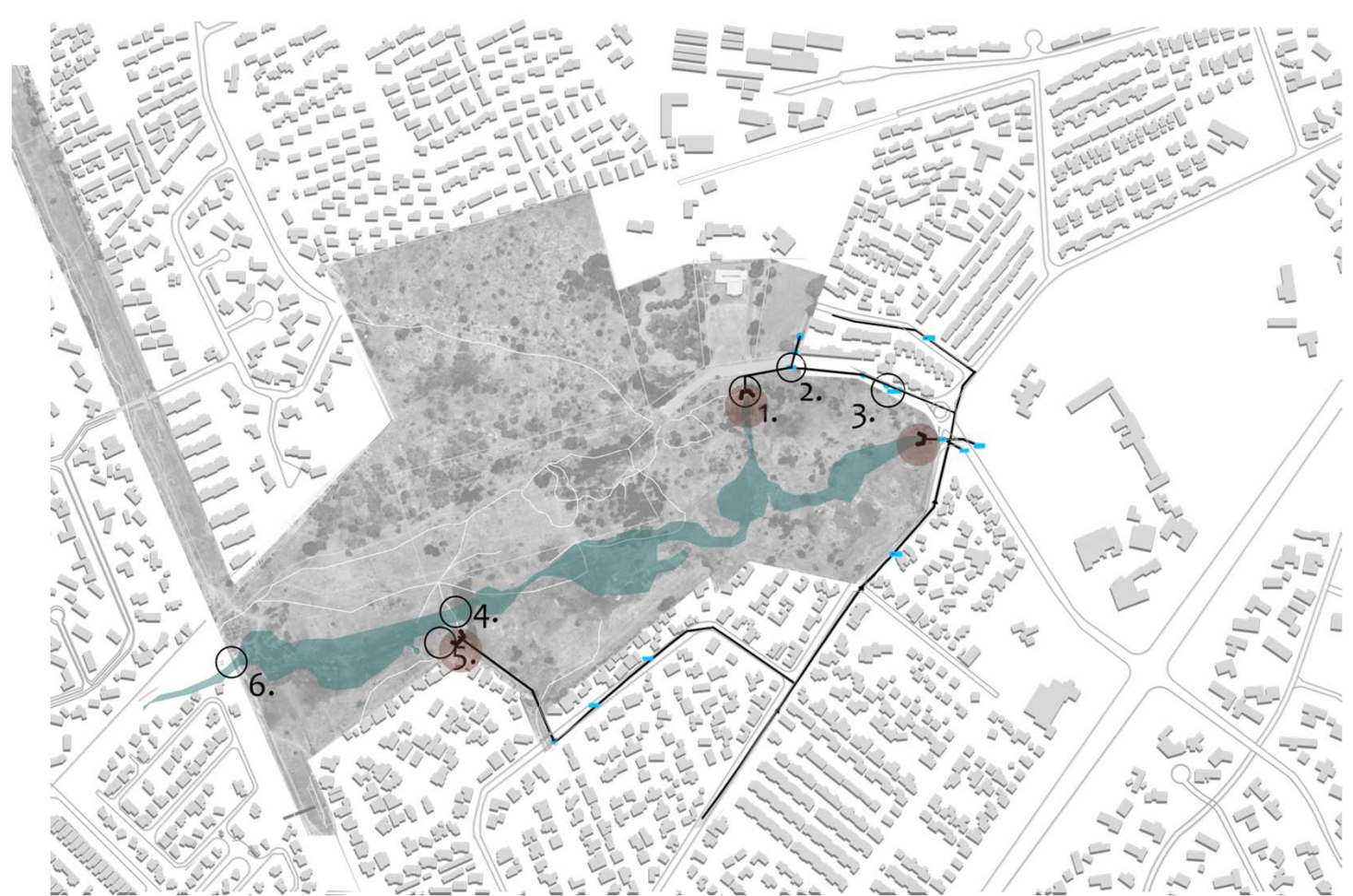
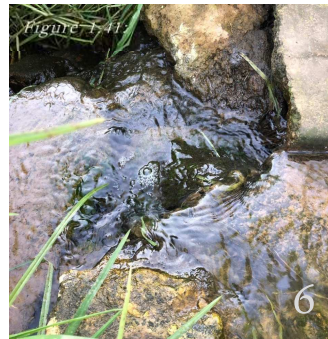


Figure 1.42 (above)

Map highlights three catch pit areas, that are currently insufficient in its design to effectively collect water and divert it safely into the wetland. These are the areas to be refurbished. (Author, 2021)

0 100m

Storm water Management

Due to years of development in and around the wetland, stormwater run-off has slowly diverted water away, harming its biodiversity. Furthermore, the catchment pits are overgrown and polluted, blocking incoming water. Although, the water table is a lot higher during the rainy season. The soil is drenched throughout the year due to a perineal stream that exists. Better catchment systems and maintenance thereof, are required to increase the water flow through the site, as suggested by Figure 1.41, proposing the refurbishment of three catchment pit areas.

Figure 1.36: (1) non-operational stormwater headwall in the background, (Author 2021)

Figure 1.37: (2) Stormwater Drain, (Author 2021)

Figure 1.38: (3) Stormwater Drain, (Author 2021)

Figure 1.39: (4) Ravine Water Quality, (Author 2021)

Figure 1.40: (5) Running Filtered Water further down stream, (Author 2021)

Figure 1.41: (6) Close up, Water Quality, (Author 2021)

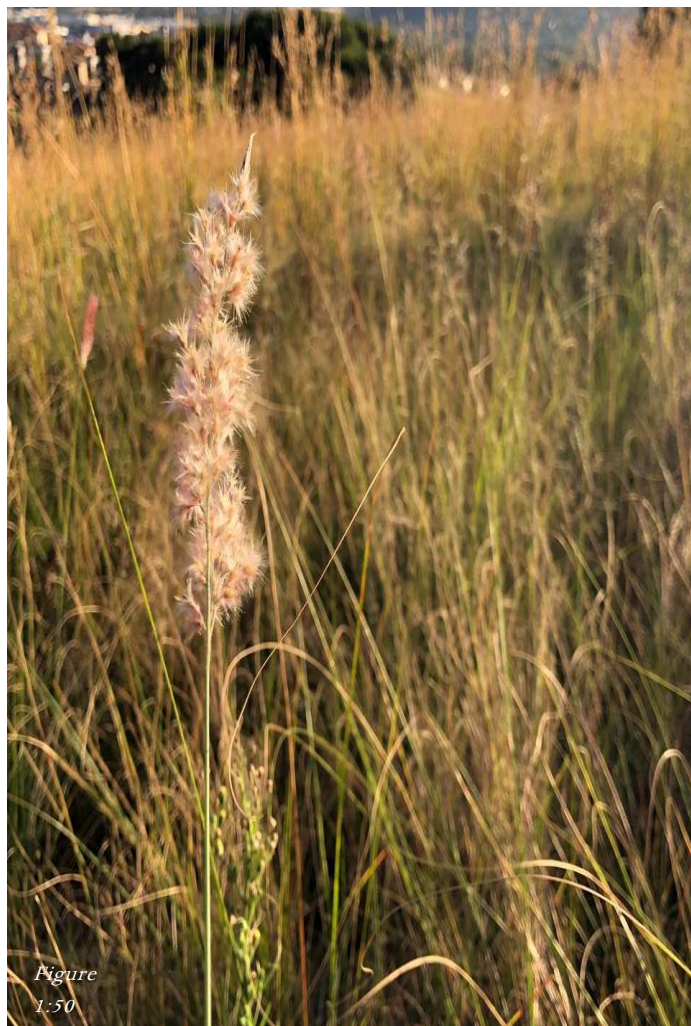


Figure 1.49: Figure Ground (in brown) demonstrates the high-density area, illustrating the volume of garbage collected from the Radiokop community and taken to the wetland. (Author, 2021)

The site is disturbed annually by illegal activities, such as illegal logging, squatting, and arson, causing severe surface erosion. The greenbelt debate continues between community members, who believe the waste pickers (i.e. vagrants), are cesspools for criminal activity. Annually these waste pickers are removed by authorities, only to return to the site. Majority of the garbage collected are separated into various heaps consisting of plastic bottles, plastic bags, and plastic sheets. These bundles will be carried away at some point, leaving the wetland polluted and smelly.

A long-term waste management plan is required to address this recurring problem at the proposed facility requiring support from all stakeholders involved. The program will create employment for the disadvantaged sectors of society, while addressing the waste impact on the wetland, and involve the broader community in utilising the recycling facility.

Waste Impact & Management



The images show a range of *Bankenveld Grasslands* found on the site, indigenous to South African Flora. These flora species are valuable on the hilltop and marshland areas, as they assist in removing excess pollutants and prevent flooding, as it traps sediment and reduces flow velocities in high peak rainy seasons.

Figure 1.50: *Giant Spear Grass Trachypogo spicatus*, in background with *Phragmites* (common reed) in foreground, (Author, 2021)

Figure 1.51: *Wild Oat Grass Monocymbium ceresiiforme*, (Author, 2021)

Figure 1.52: *Red grass Themeda Triands* in background, (Author, 2021)

Figure 1.53: *Schoenoplectus brachyceras* - Perennial reed, (Author, 2021)

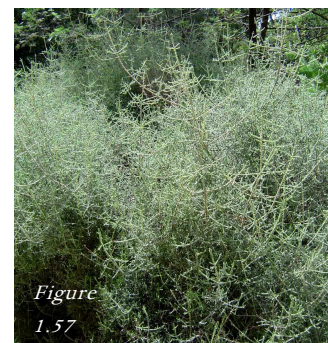
Figure 1.54: *Aloe Greatheadi* Davyana ©JMK, CC By SA (2014).

Figure 1.55: *Bitterwortel Chironia Palstris transvaalensis* © Wursten, BT (2012)

Figure 1.56: *Delaspermae herbeus*. © Stang, D (2006)

Figure 1.57: *Bankrupt Bushes Stoebe Vulgaris*. © Wursten BT(2004).

Indigenous Flora



Barriers and Edges

Radiokop consists of many gated communities (highlighted in yellow) that create physical boundaries against the wetland and the street. Street edges are a combination of high boundary walls, palisade fences, and steel barricades, which form the barriers and perimeter edges of the wetland.

Boundary walls have also posed a challenge for the church who cannot access residents who reside in these gated communities. However, the entry points illustrated into the wetland allows for easy access from these gated communities (yellow), whilst still connecting neighbouring suburbs, such as Strubens Valley and Allen's Nek with Radiokop, offering an opportunity for all members to meet here.



Figure 1.58: Street Edge and Indigenous Landscaping
(Author, 2021)



Figure 1.59: Palisade fence as barrier to wetland
(Author, 2021)



Figure 1.60: (above) Figure ground showing Gated communities, Typologies and Entrances to wetland (Author, 2021)

Churches

Ridgecrest Family church is Radiokop's only church. The map on the right shows a few more, located within a 10km radius. Most of these churches have no multi-functional spaces, leaving many of the church buildings standing empty. There is the exception of one church that associates itself with a pre-school, and its hall, doubles up as a gathering space for the children.

Below are the typical architectural church styles, with face brick being the most popular material used. The architectural styles are simplified, resembling a warehouse or hall. Interestingly, when overlapped with each other, the architectural styles morph into one another to resemble a chapel.

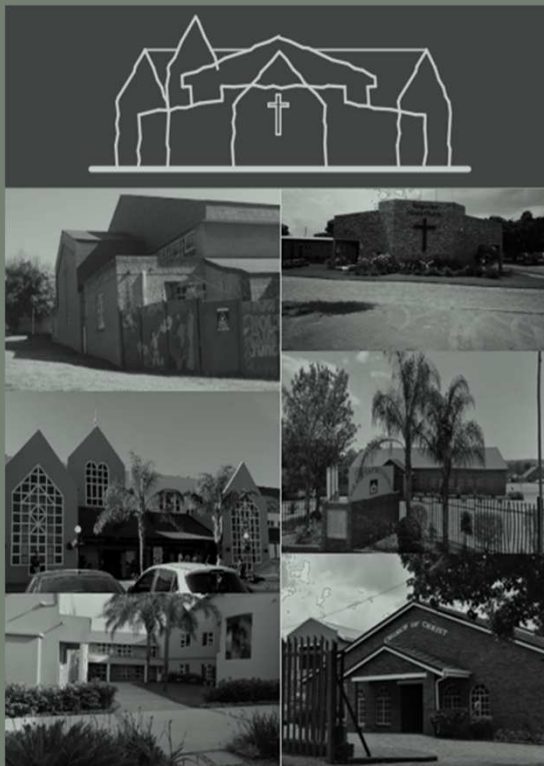


Figure 1.61: (above) Map showing churches in 5km radius of Radiokop (Author, 2021)

Figure 1.62: (left) Collage of church typologies. © google maps,(nd)

Figure 1.63: (right & top right) Elevation sketch and Floorplan showing existing church building with rooms and bathrooms to be re-used as the recycling depot; Converting its spaces into vocational spaces and overnight accommodation. The new facility will be attached to the existing face of the Ridgecrest church building.

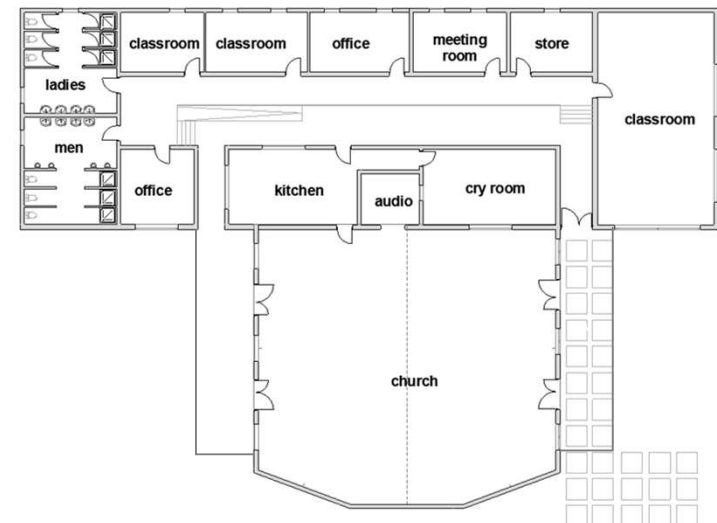




Figure 2.1: Photograph across wetland, Author 2021

Chapter 2



THE WETLAND

- Wetland Woes 33
- The Sound of the Sight 40



Wetland Woes

URBAN DESIGN SOLUTIONS FOR RAPID URBANISATION

This section looks at the concerns about environmental sustainability and climate crisis faced due to rapid urbanisation. It also investigates the role of the wetlands ecological systems on climate change and urban design approaches that can halt climate change.

The topic of ecology raised its head in the post-war period as a way, to combat problems of air pollution, nuclear testing and pesticides. Ecology does not only look to the natural landscape but how humans operate in it and drew significant attention among biologists and social scientists in the 1960s (Pickett et al. 2019).

Human interaction with the environment and the pace at which humans were transforming had a tremendous impact on nature changing (Pickett et al. 2019, p31). The urban pattern we see worldwide is a heterogeneous layer of materials piled on top of the natural environment. (Pickett et al. 2019) These material layers, consequent to urban developments, are the causes for urban heat island effects, air pollution, noise and increased water run-offs that cause flash flooding. (Culwick & Khanyile et al. 2019).



Figure 2.2: Montage showing the polluted wetland under the Church's nose (Author 2021)

For this reason, to achieve healthier urban environments, ecological models were invented, such as the watershed model, to improve the quality of run-off surface water. (Pickett et al. 2019). Other models, such as the green city movement in the 1800s was also initiated to assist in lessening urban heat and environmental impacts while encouraging positive effects on the health and well-being of society.

These models have since evolved into more complex models, calling for international commitment against climate change. One such model is the Green Infrastructure (GI) approach which assists in absorbing greenhouse gases. It addresses urban development designs to build resilience against certain risks that come with climate change. (Culwick & Khanyile et al. 2019).

The *Gauteng City-Region Observatory* (GRCO) report is an approach for climate change for the South African climate. The report demonstrates simple technical solutions that address water security and urban stormwater management within urban contexts. It argues in support of the GI approach to protect, manage and invest in green assets since government policies favour housing and agriculture, moreover the protection of natural green spaces and wetlands.

South Africa is taking a lot longer to adapt and understand the current state of the world and has not fully grasped the sustainable age yet. While there are white paper trails of actions to be taken by various government departments, the reality is that not enough is getting done. Which is reasons why private companies, community members, and affected parties need to step in and assist in being the change.

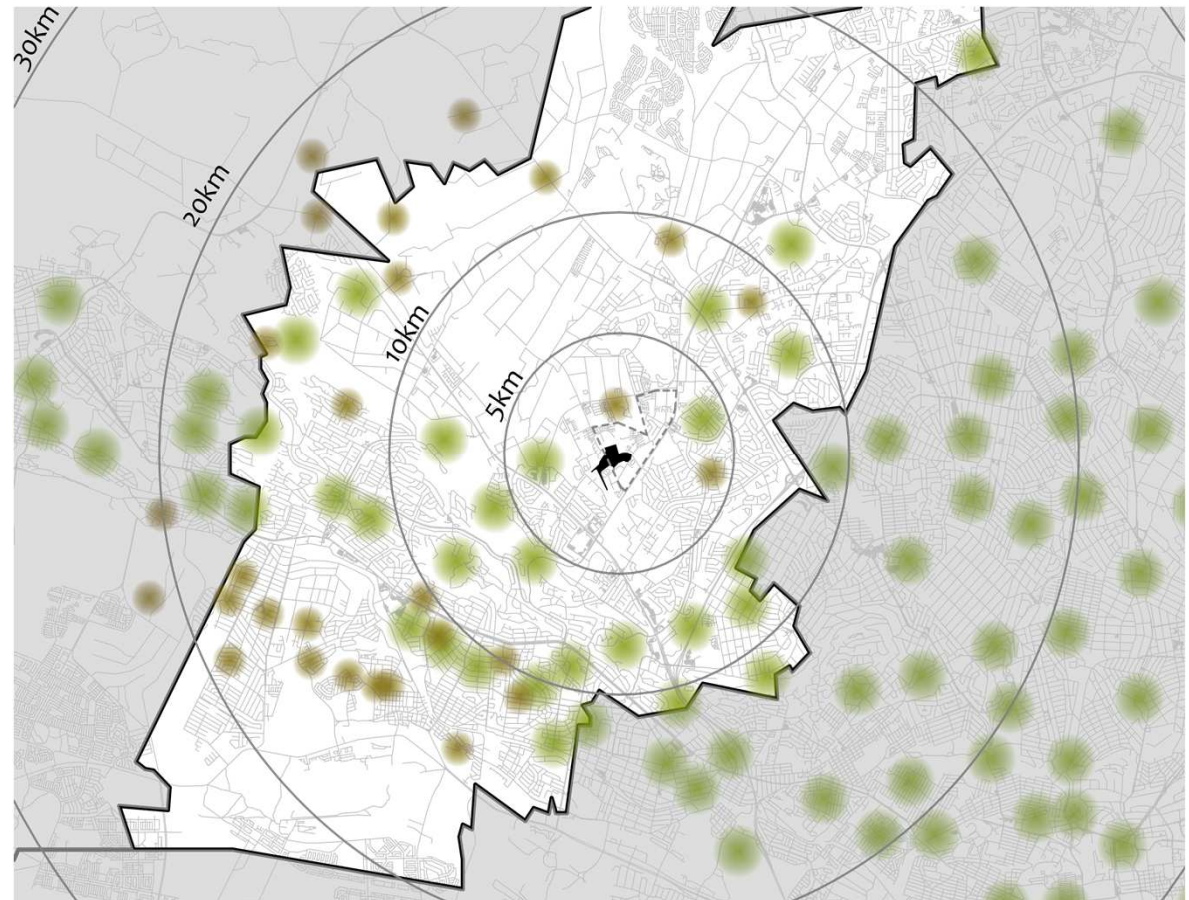


Figure 2.3: (above)

Mapping showing proximity of Recreational and Sports Facilities from Radiokop, with the closest park being 5km distance from the area. (Author, 2021)

■ ROODEPOORT PARKS | ■ RECREATIONAL FACILITIES

LACK OF GREEN ASSETS IN GAUTENG

Many studies suggest the benefits of green spaces that contribute positively to the quality of life and stress reduction (Cushing, 2020). Pickett (2009) explains that access to parks increases property values to proximate homeowners who can observe wildlife. Additionally, green spaces provide a range of ecosystem services, such as microclimate control, heat reduction, flood control, air purification, and noise reduction (Culwick & Khanyile et al. 2019).

Figure 2.4(right) shows the GCRO map, locating Radiokop in the circled area. It is clear that Radiokop has an abundance of naturally occurring green spaces surrounding it, but not many of these spaces are accessible for recreational purposes. Instead these spaces are earmarked for development, which is causing a lot of unrest in the community who have become accustomed to the green open spaces.

Figure 2.4 further illustrates the uneven distribution of parks in the southern, western and northern outskirts of Johannesburg. Khanyile (Culwick & Khanyile et al. 2019) places particular attention on the fact that many of these green spaces shown on the map are privately owned spaces, restricted to the public, perhaps even earmarked for development. He further states that the majority of these wards in the city, have allowed below the prescribed 4ha of park access required for citizens, which is a concern for our well-being. An example of this statement is seen in figure 2.3 (page 34) showing the closest recreational facility 5km away from Radiokop, which is too far to access via foot.

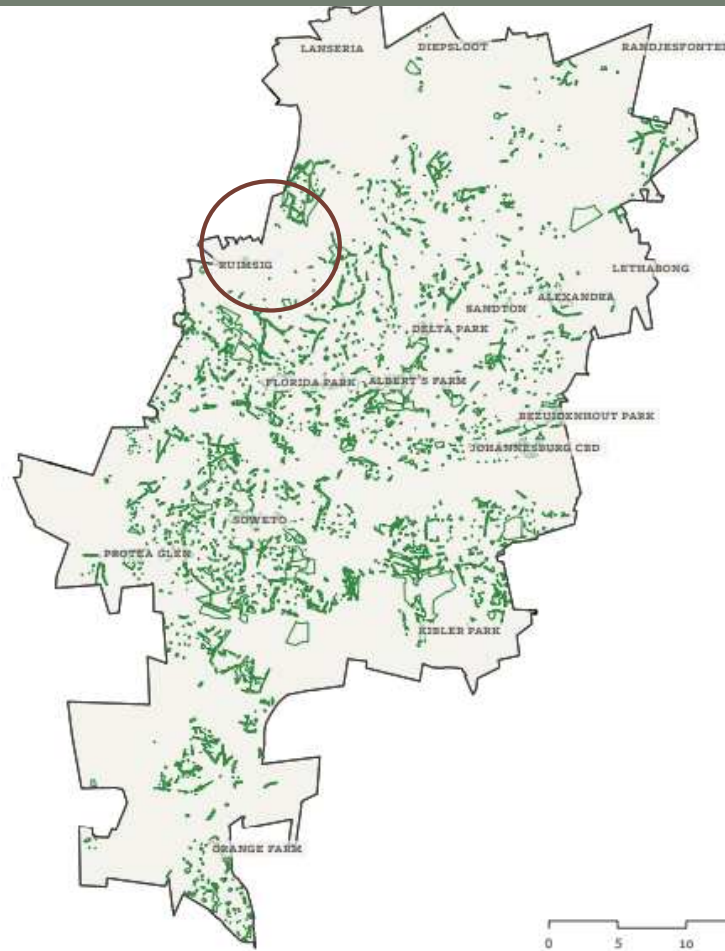


Figure 2.4: Johannesburg municipal boundary with City parks and zoo data. Image sourced from MDB (2011b) City of Johannesburg municipal boundary; CoJ (2017) Johannesburg City Parks and Zoo Land Data

** Circled area highlights location of Radiokop, and its proximity to other green spaces.

WETLANDS AS PRIME LAND

Urban areas are experiencing a shortage of land due to an increase in population growth and demand for residential property. As a result of this, wetlands are targeted as prime land for development and are purposefully being degraded or shrunk in size (Culwick & Khanyile et al. 2019).

Gibson et al. (2018; cited in Culwick & Khanyile et al. 2019:24) warns of the trend performed by developers who deliberately transform wetlands. Transforming takes several years and involves developers diverting or restricting water drainage into the wetland environment, which over time, transforms it into natural land for other land uses. (Culwick & Khanyile et al. 2019)

It is clear in Radiokop, that the urban development processes, such as building roads, houses and other infrastructure, are preventing the natural water networks from accessing the wetland environment. The more these developments occur around the wetland, the more the natural biodiversity is being interrupted.

The GIS Data mapping report shown in Culwick and Khanyile's GCR report #11 (2019), illustrates how Gauteng province's wetlands decreased from 631 km² in 1990 to 535 km² in 2014. 79% of these wetland losses in Gauteng was due to wetland land-use transformation (Culwick & Khanyile et al. 2019). An urgent effort to protect the biodiversity and natural hydrological systems of the wetland is needed. Failure to do so may result in biodiversity loss, an increase in flooding and deteriorating water quality.

WATER QUALITY

A concern among the Radiokop community is the periodical attempts to burn grasslands, cutting down of trees and illegal dumping in the wetland. All these actions result in the overall contamination and loss of water.

Water pollution is the greatest threat to all of us. The more it is contaminated, the more difficult it is to filter for drinking water. Additional to this is the loss of drinking water averaging up to 80% due to poor infrastructure (Swilling, 2020: 98). There is grave concern that in 20 years, the water supply would need to increase by 140% to meet the increasing demand of the population (Swilling, 2020: 98).

From 2009 to 2012, a draft titled; *Water for growth development framework (WGDF)*; was released to all South African municipalities as a long term tool to deal with the water crisis that comes with climate change and the increase in population. The report sought solutions for; disaster management, soil erosion, maintenance of catchments, effective management, re-allocation and use of water sources; as its objectives for climate change. (DWA,2010)

Yet, due to poor service delivery and failing infrastructure, the issue of the water crisis and climate change cannot be addressed without first addressing current infrastructural issues and municipal management. Ultimately, it comes down to how effectively stormwater infrastructure can be maintained at a micro-scale before we can begin to address ways to preserve and harvest water at a macro-scale. Therefore strategies need to be put in place, for better water collection and flow.

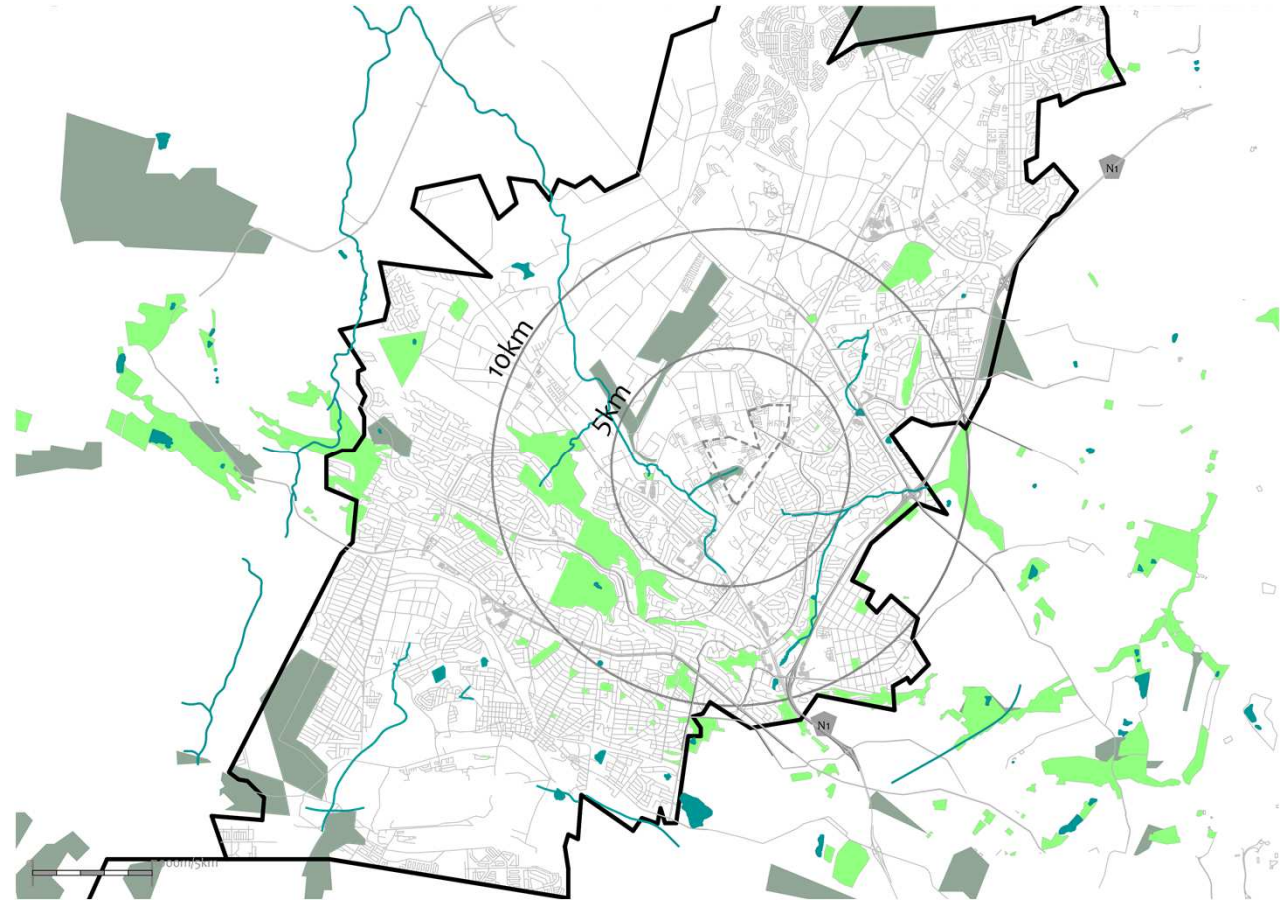


Figure 2.5: (above)

The map shows the abundance of wetland spaces, water sources and streams that eventually link up into the crocodile river into Muldersdrift. (Author, 2021)

GREENBELTS | WETLANDS | STREAMS

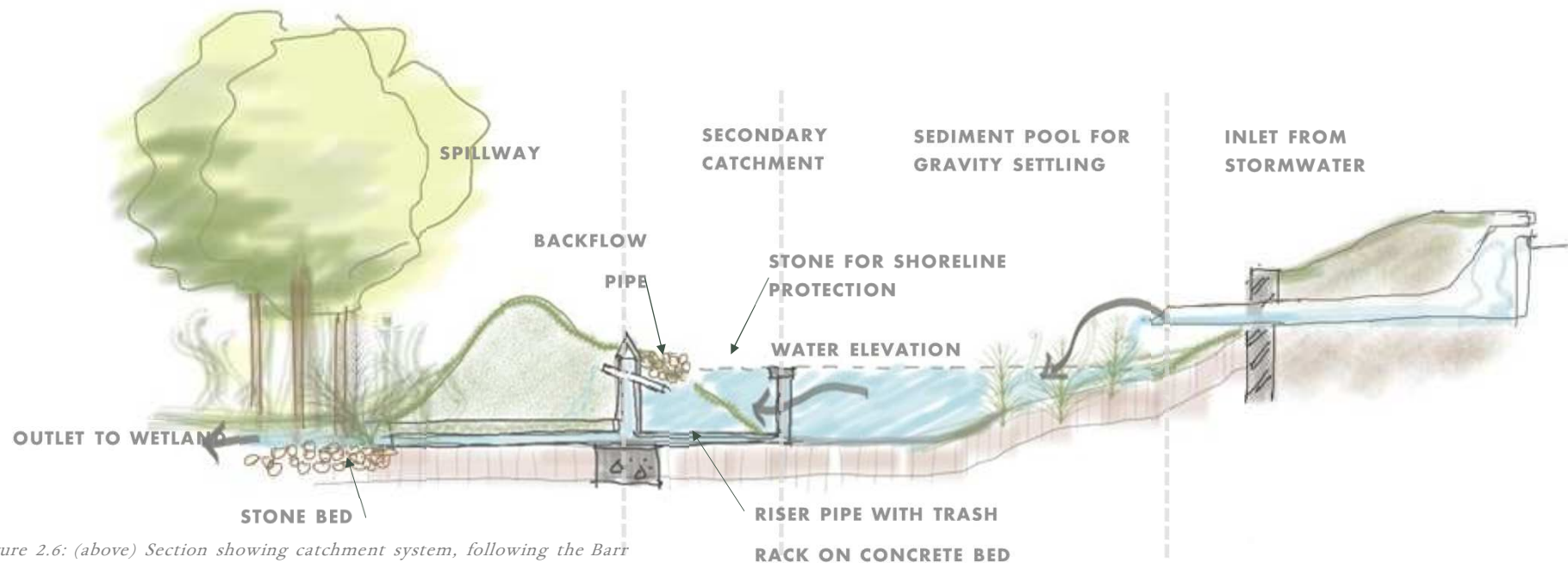


Figure 2.6: (above) Section showing catchment system, following the Barr engineering design approach (Author, 2021)

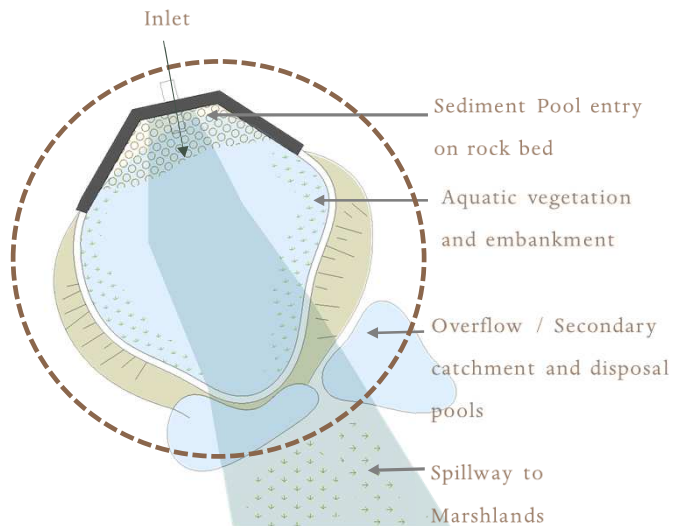


Figure 2.7: Floorplan of Catchment / Retention pond, (Author, 2021)

CATCHPIT UPGRADES TO WETLAND

The intention is to direct as much water back into the wetland through better water catchment pit design, that will naturally be filtered out into the grasslands, allowing nature to take its course.

Figure 2.8 and 2.9, are illustrations adapted from the Barr Engineering Company(2001), showing a catchment pit strategy that captures and releases the water at various flow rates into the wetland site.

The stormwater inlet releases water into a retention pond, allowing it to cool down.

It allows the sediment to settle before moving over into the secondary pool area, where floating pollutants are separated manually before slowly releasing through the Barrel drain over the stone bed into the wetland.

A pool section is needed at the inlet to allow the water enough time to filter and regulate the pollutants or toxins that contribute to greenhouse gases. The illustrations above show how the three catchment pits in the wetland will be refurbished, with pooling filter systems, to improve the water quality that enters the wetland site.

OTHER STRATEGIES FOR RADIOKOP'S WETLAND

This research report looks to the wetland as a vital and low maintenance water filtering system that captures the stormwater run-off to be recirculated back into the rivers and water reservoirs. In 2010, the department of water affairs acknowledged groundwater as a resource, meaning that it needed to be protected to ensure the continuity of the water supply. This requires that catchment areas be micro-managed, as they form part of the micro-tributaries into the larger river systems – see figure 2.5. (DWA,2010)

According to the GI approach, resilience to climate change can be achieved, by adopting a few urban harvesting drainage strategies. Figure 2.6 shows some examples of these systems, such as permeable paved areas, vegetated swales or water basins, bio-retention ponds, filtration systems and constructed wetlands. This combination of water harvesting strategies will be used in series in the design of the facility, as suggested by Culwick (2019), to offer a unique solution that slows down water flow, prevents flooding, and breaks down sediment. (Culwick & Khanyile et al. 2019:36).

It is important to note that run-off water inherits the temperature from the tarmac or concrete surfaces. These sudden temperature changes could harm animal species living in ravines. Therefore, the green infrastructure drainage systems mentioned above not only assist in lowering urban heat stress but also allows the water enough time to cool down before being diverted into the wetland catchpits and ravines where these animal species reside (Culwick & Khanyile et al. 2019).

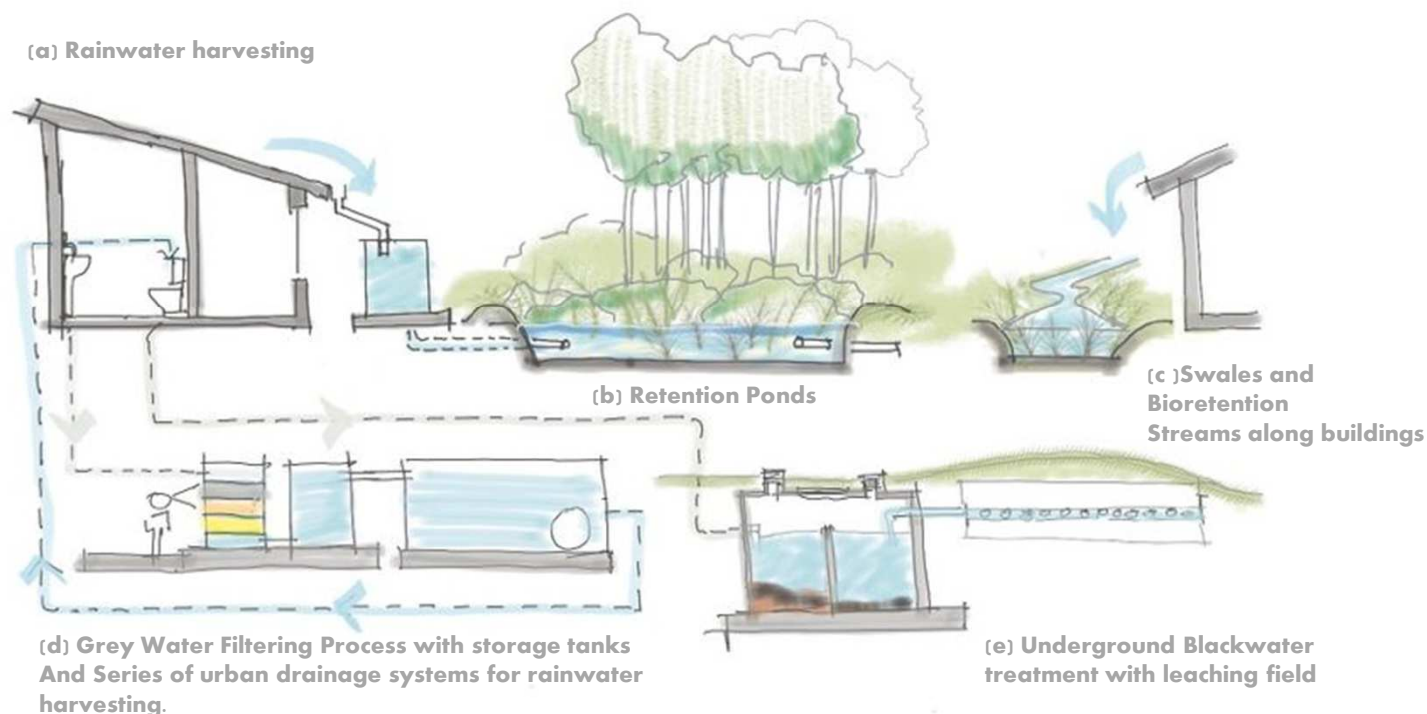


Figure 2.8: (above) The GI Approach: Sketches showing different water harvesting and urban drainage purifying systems to be used in series in and around the church site before entering the wetland below. (Author, 2021)

LEARNING OPPORTUNITIES

Incorporating the above systems in and around the architecture, provides learning opportunities for its visitors, as they get to explore the water catchment and purification process first hand.

Being able to physically see how the systems work, will add a valuable learning experience that could help in making conscious decisions about water preservation.

A range of interesting interactive experiments at various scales can showcase how combining a good variety of vegetation and aquatic plants in these drainage systems work together to purify and preserve the soil nutrient factor and prevent erosion (Culwick & Khanyile et al. 2019).

As an example, experiments such as the home-based science experiment, by Marino (2012) will teach students the interdependency that the soil, water and vegetation, have to each other (Marino M, 2012).

This experiment demonstrates three soil environments in large soda plastic bottles. In the absence of vegetation, water evaporates quickly, and soil erodes. The eroded soil breaks down further and contaminates the water, making it difficult to filter for drinking water.

Once visitors are exposed to this level of information, they will realise how valuable soil is in shaping life. Like a porous skin to the earth, it forms a basic eco-system function to regulate green-house gases, is home to micro-organisms and is critical for filtering water.

In the context of the wetland, visitors will understand its interconnected ecological system before setting out into the wetland after being exposed to the visual lessons and lectures at the facility. This will open up their knowledge systems to understand the processes within the natural setting of the wetland that will further be highlighted along the journey via information display boards.



Figure 2.9: (right) Science Experiment on soil erosion, © Maria Marino (2012)

<https://www.lapappadolce.net/science-experiment-on-soil-erosion/>



The sound of the sight

Experiencing the Wetland

The wetland is perceived by many as the physical gap that disconnects the church from its surrounding community. Yet, it becomes the vital link for the church in its mission, as stewards of the wetland. This chapter is the author's journal entry that attempts to describe the spatial story of this wetland, through the lens of phenomenological experiences.

The experience of this site is otherworldly. It is both spiritual and secular, given its position between the church and the realities of the suburbs surrounding it. In many ways, it is the threshold that becomes the *"connection between areas ... [it becomes] as a place in its own right, [as] it constitutes, essentially, the special condition for the meeting and dialogue between areas of different orders"* (Hertzberger, 1991:32)

As this natural space co-exists between these two separate entities (community and church), Journeying through the site instigates a process of thought, pause and spirituality, that involves all the senses through time. The author attempts to take the reader on a journey through sensory experiences, referencing qualitative aspects of sound, sight, texture and smell.



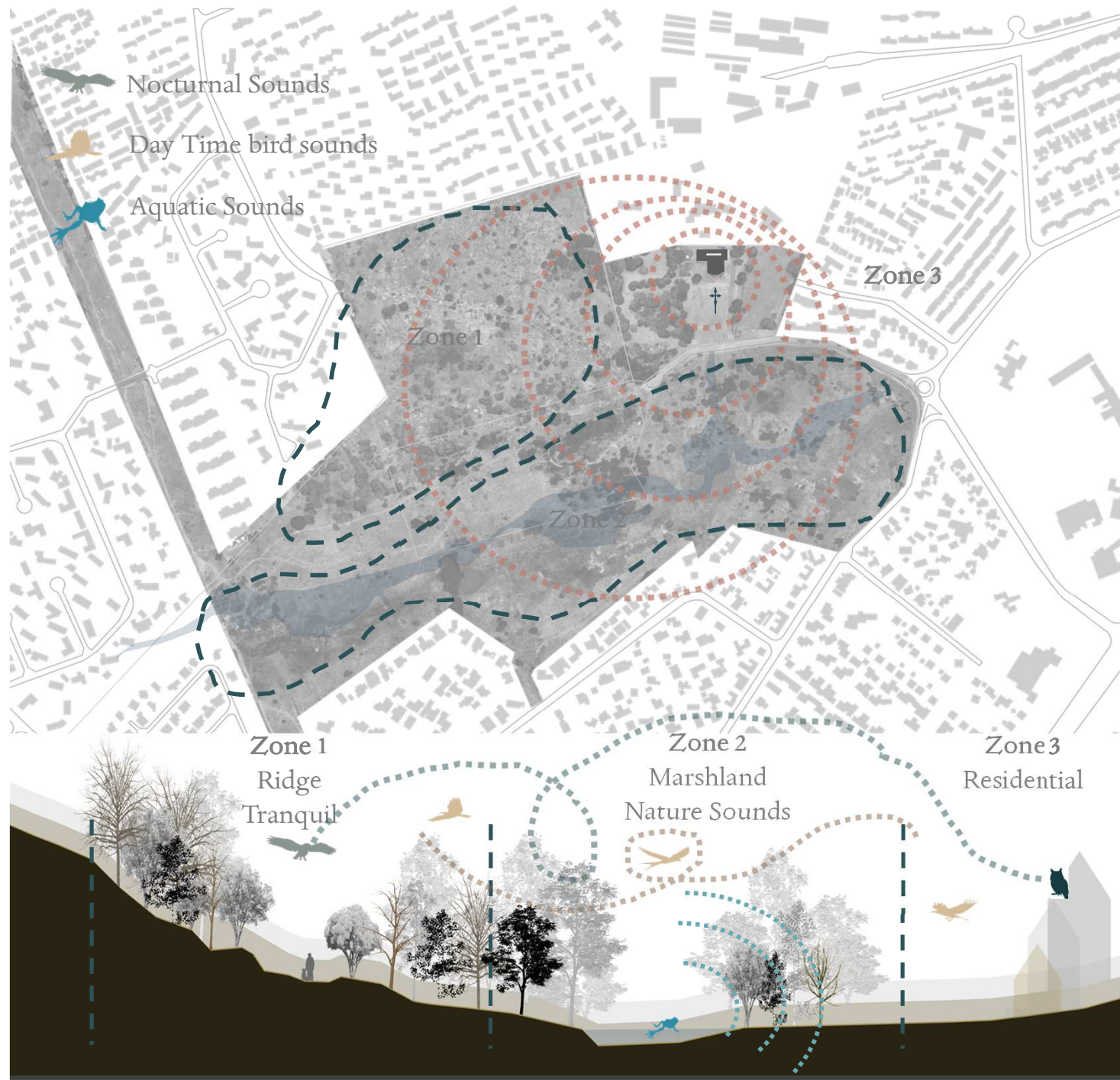
Figure 2.10: (above) Montage Surreal Wetland Landscape (Author, 2021)

Of Sound

Radiokop Wetland is tucked away between houses, untouched and wild, with a few pathways that permit low-foot traffic through the field. People who live here form part of an affluent community who enjoy the peace, the sounds of birdlife, the owls and the overall sense of place. This wetland is a magical place to many who live within its realm. What makes it empiric is the sound of nature that sweeps you deep into thought; The starry nights and the bright moon in pure darkness with a twinkling of lights on the hillside from the distant city; The croaking sounds of the frogs in the distance and the hoot of an owl above your head and crickets at your feet.

In the daytime, it is the lush shades of greens and earthy tones, accompanied by the beautifully coloured bird life, chirping away, sometimes startled by the screams of the Hadada. Daytime experiences are very different to night-time experience. The experience through sound is what heightens the genius loci of this space, which Holl describes as being “absorbed and perceived by the entire body” (Holl et al., 1994) and will “have a mesmerizing effect on the psyche” (Holl et al., 1994). Some Sundays, when the church is fellowshiping outdoors, the sound of the instrumental music filters the air and swoops down the valley, creating a spiritual space. And as the echo fades across the wetland, it gives one awareness of the enormity of the site. Despite your absence at the church, the music surrounds you and invites your entire being into worship.

Figure 2.11: (right) Montage Sound Mapping
(Author, 2021)



Of Vision

There is no visual connection to the church in the daylight, given the topography and densification of the trees. The perception is that the church is tucked far-away and not visible. The wetland site at the foot of the church could thus become the threshold that transitions you into the spiritual realm of the church. The temporal quality of light and sound in the daytime, physically displays a vast spatial distance between the church and the community. At night, when there is no light, it contradicts the spatial distance and geometry of the site. Our entire perception of the wetland is shaped by the visual of the cross, artificially lit in the night sky. Suddenly the church is closer than we think, and it is telling us something. The lit-up cross is the visual connection between heaven and the earth. It reminds those who see it of the spirituality that exists inside each one of us. In a literal sense, the lit-up cross is the axis mundi for Christianity, which in its verticality points to the heavens while its horizontal beam physically separates heaven and earth, accentuating the mysticism of the place and the spirituality embedded within. These geometric signs are vital for the design of the church building, which could represent itself as a symbol or perhaps a reminder of God's kingdom and begins to build up enquiry around its meaning and the search for inner spirituality, which begins to bring man to God. Holl (Holl et al., 1994) explains that "some public buildings may have their most important hours of service at night." Night-time perception is an important aspect to consider in the design of the church facility, to have a *loud* presence in our time of silence.



Figure 2.12: Vision montage – View from a residence home into the wetland (Author, 2021)

Slide 43

RN1

Roxanne Norton-Esau, 2021/07/15

Of Tactility

The wetland is accessible from 5 directions that merge between neighbouring suburbs into this single space. Each entry point is polluted - your first impression may change your mind from continuing the journey, but what lies beyond these boundaries is an experience to be reckoned with. Due to the monumental scale of the wetland site, it feels daunting and unapproachable with very narrow walkways.

The approach taken on my walk was from west to east, on a straight axis along the top end of the wetland site. The footpath ascends gradually toward the church and runs along a granitic ridge. The views are most spectacular, walking along this contour. There is a juxtaposition between the natural environment you find yourself in and the view out to the rolling hills in the distance with man-made structures clinging onto them. These visual images add to the story of the place that begins an enquiry as to how it became. Behind you, the ruins of an old farmhouse haunt the place and speak of a history forgotten. Continuing your walk, you become engulfed by the flora that sways in the gentle breeze, prickling against your skin. Sometimes the footpath disappears with the overgrown grass, but with the church as the focal point at the edge of the wetland, it ensures you will not get lost. This is a significant position for the church. At first, it cannot be seen, but as you elevate towards it, it becomes clearer from your perspective - symbolically the church becomes the refuge for the souls that might have lost their way.

The meandering paths take you closer to the water's edge and as you continue upstream, you can smell the stench as you approach the waste picker's campsite. Standing water due to tons of plastic spread out across the ground - a sad sight to see. While these waste pickers are not visible to the residents, you can certainly smell their destruction. As you walk 300m left out of this swamp, you'll be surprised that the church building is right there.

"A boundary is not that at which something stops, but that from which something begins." (Heidegger, M; 1961)

Figure 2.13: Montage Tactility (Author, 2021)



Destruction

An annual problem that exists is the illegal cutting down of trees during winter seasons. It begins with the burning of the grasslands, to clear up pathways so that tree fellas can easily access the wetland. A few days after burning the site, the horrid sounds of chainsaw's break the silence. The charred burnt fields, the smell and the ash destroy the sense of place. This has been ongoing for ten years, and has directly impacted the biodiversity, soil nutrient factor, and drop in water bodies of the area. A scientific case study reveals a 30-40% loss in water and soil nutrition when trees are removed (Miller T, Spoolman S, 2017). In a Utopian world, we would prefer to let nature take its course and flourish with no interference from man, but in an urban setting, where people tend to dwell; these spaces become dangerous spaces. The value architecture brings when intertwined within these open spaces offers a sense of ownership and importance, and for this project becomes the *ecological mission* that seeks to preserve the precious gift of water and restore it into the wetland, purified and renewed.

Figure 2.14: (right) Montage Destruction (Author, 2021)



Varying perspectives

Almost everyone has a view out onto the wetland due to the topographic landscape of the suburb. The streetscape of the area attempts to acknowledge the indigenous landscape of the wetland, by mimicking the indigenous vegetation into its street edge landscape designs. However, an artificial connection exists, as the only interaction between the community and the wetland is narrowed down to only the visual. Theorist Vernon Bourke, in his explanation of rationalism theory, suggests *"the criterion of the truth is not sensory but intellectual and deductive"* (Bourke, 1962, p.263). Interpreted in this context; these artificial connections exist because people are not physically moving through the wetland. Taking away opportunities to; enquire, to learn, to interact, to care, and to connect more with nature. David Canter states that *"differing experiences give rise to differing perspectives"* (Canter 1977). Therefore, the connection this research tries to create, is to move beyond the sensory experience of place into an ecological perspective that encourages every community member to take ownership of the wetland. The research observation shows minimal desire from the community to venture into the wetland, mainly due to lack of footpaths and to some extent, fear. However, almost 97% of the community in the survey have shown an interest in utilizing the wetland, if it was made more accessible.



Figure 2.15: Section through wetland and material study collage (Author, 2021)

Biophilic principles

Having experienced the phenomenological characteristics of the site, encourages a design that wants to remain connected with nature, through use of biophilic principles that encourages psychological well-being, and a positive physical and cognitive health.

Erich Fromm (1973) first defined Biophilia, as the “passionate love of life and of all that is alive (Cushing et al, 2020)” The term was popularised by American botanist Edward Wilson in his book Biophilia (1984), with ‘Bio’ meaning life and ‘Philia,’ love. . Cushing (2020) explains that man’s connection to nature is gradually being broken through urbanisation that shows a steady rise from 3% in 1800s, to 68% by 2050 (Cushing et al, 2020). She explains that despite the acceleration of urbanisation, humans still have an innate and strong desire to be close to nature despite our revolutionary perspectives. (Cushing et al, 2020) She further explains that the ephemeral qualities and constant changes in nature can restore and stimulate our minds, as we are forced to pause, and relax. This explains why man’s fascination to the sights, scent and sounds of nature when experienced, enhances creativity, and supports cognitive performance and mood enhancers. Furthermore, studies have shown therapeutic benefits and healing properties, as well as reduction in crime and domestic violence (Cushing et al, 2020).

Figure 2.16: (right) A spatial configuration montage showing various Nature of Space themes, such as; ‘Risk’ - The Levitating Rock at Los Angeles Museum; ‘Complexity’ - Allen Lambert Galleria Toronto and ‘Prospect and Water’ - Salk Institute courtyard California, (Author 2021).

Browning et al (2020), in his book Nature Inside, developed 15 core patterns of biophilic design that enhances one's experience of place, to assist designers in making their spaces more memorable. The list below are the basic biophilia principles, adapted from (Cushing et al, 2020) to be considered in the design.

***NATURE IN SPACE:** Refers to the presence of nature in the built environment, through multi-sensory interactions, such as;*

- Visual connection: A view to an element of nature (e.g., green walls, views, natural processes)
- Non-Visual: Ephemeral connection, sound, touch, smell, as a good reminder of nature around us.
- Thermal and Airflow Variability: When building spaces mimic natural environments , surface temperature and subtle airflows.
- Presence of Water: Water’s calming effect, visual and sound enhances experience of space.
- Dynamic Diffuse Light: When light, shadows and varying colours, change over time to create similar to movement and calm as nature.
- Connection with Natural systems: Awareness of Nature’s natural occurrences, such as a change in season that can lead to a relaxing and profound moment.

***NATURAL ANALOGUES:** Refers to the natural material that offer indirect connection with nature.*

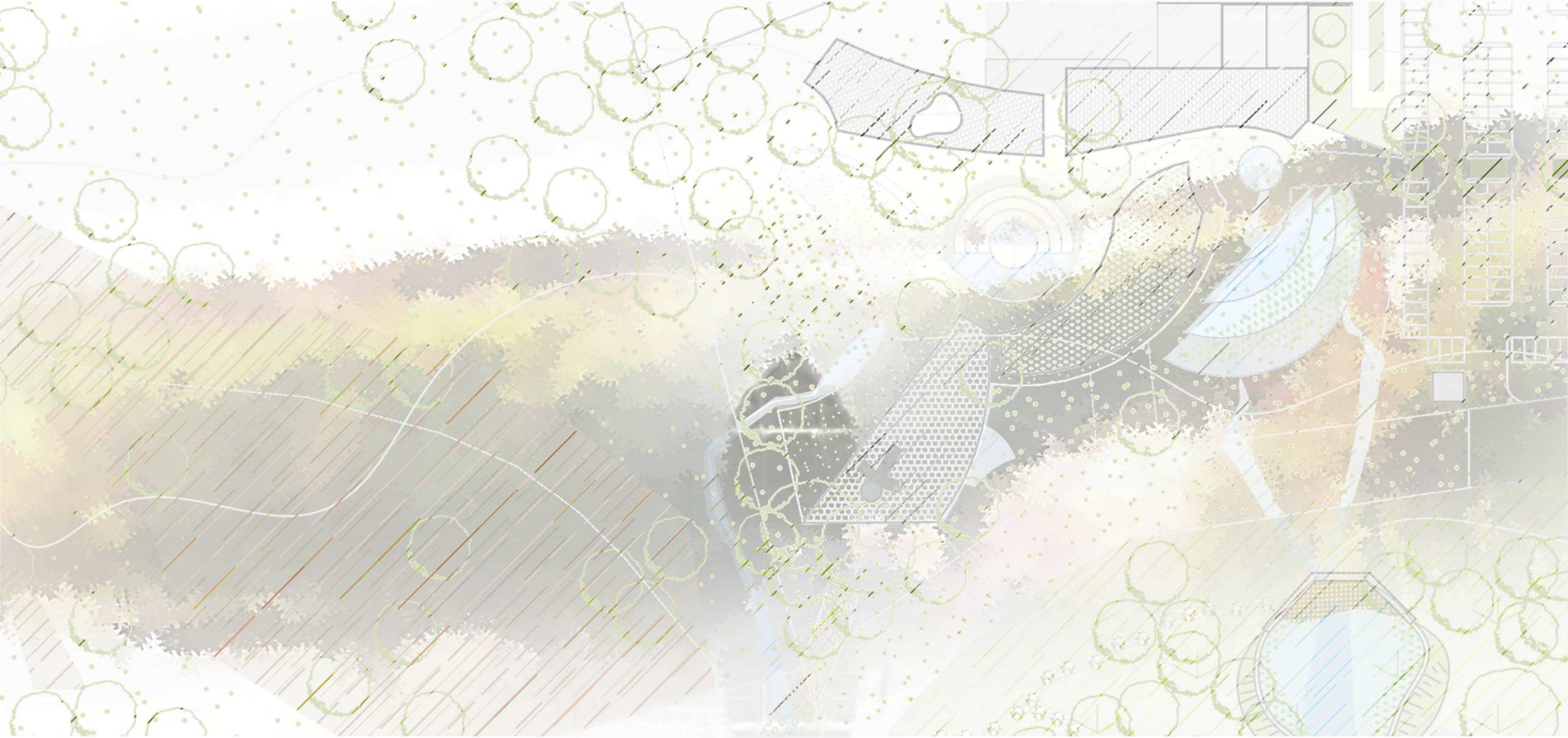
- Biomorphic forms and Patterns: Bringing nature’s forms and arrangements into the built form.
- Material Connection: Minimal processed material reflect a unique local ecology to create and authentic sense of place.
- Complexity and Order: Rich sensory information that adheres to spatial hierarchies, found in nature.

***NATURE OF SPACES:** Refers to the spatial configurations of Nature.*

- Prospect: Unimpeded long view enables safety and control.
- Refuge: Providing protection from natural elements
- Mystery: Partial view, entices, and encourages people to explore and discover.
- Risk: The feeling of danger with a reliable sense of safety.
- Awe: Stimuli that defies reference allowing one to perceive something.

Combining a few of these spatial configurations, informs an interesting experience of space . The montage on this page is an example of what Risk, Complexity, Prospect and Water might look like, if combined as special features in a space.





Chapter 3



THE CHURCH

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- Formulating a sacred architecture 63



The church as Change Agent

BRIEF HISTORICAL INTRODUCTION

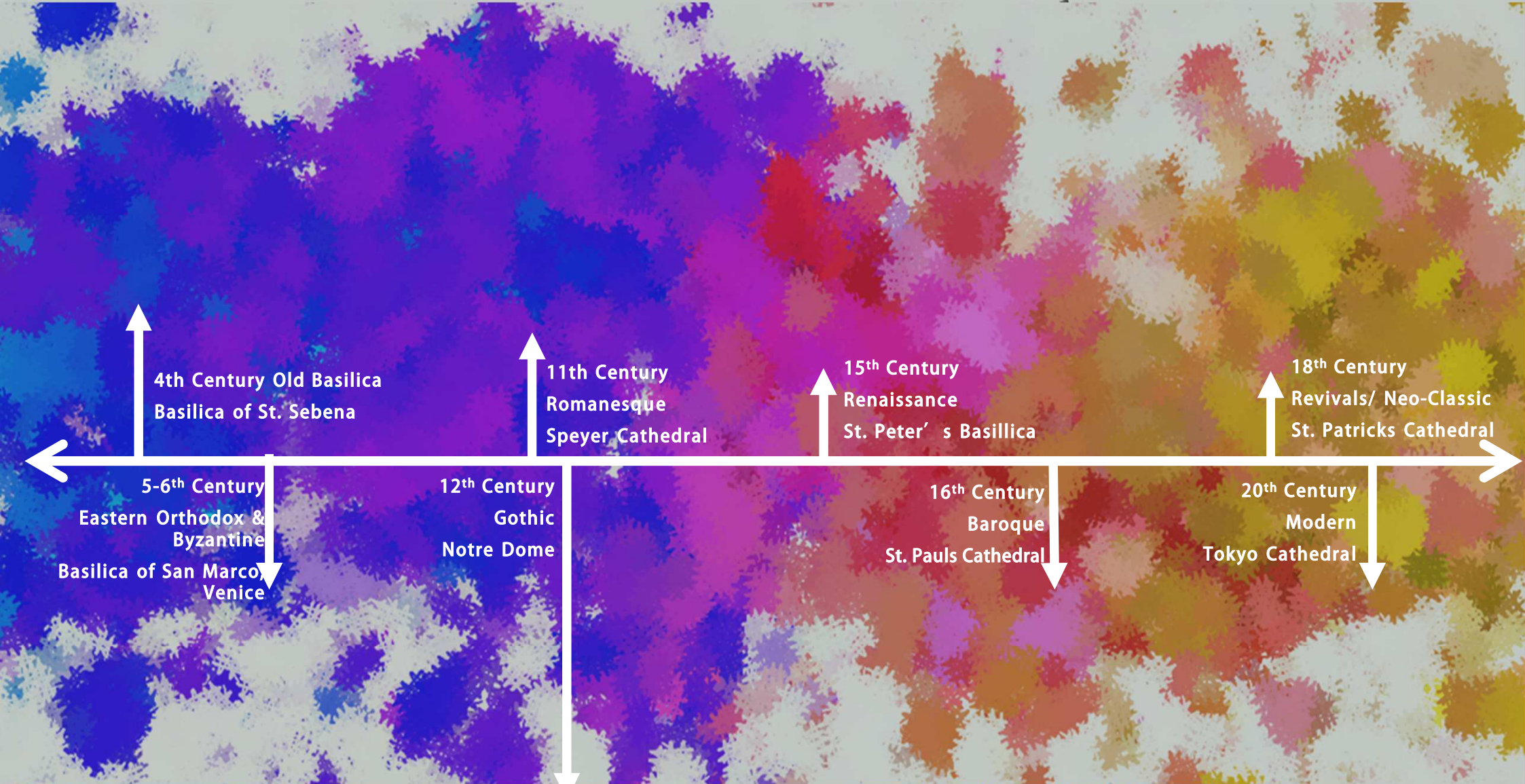
The story of Christianity reveals the rise and fall of architecture and how it became intertwined in the theories, principles and politics of the church. A historical enquiry into the church reveals how theological philosophers used architecture and art to support the church in their mission to grow the faith and transform society. Architecture had tremendous political power that helped shaped society through its meanings. When coupled with religion, architecture became a sign-symbol derivative of the sacred text, giving it an almost supernatural power that awakened the realm of spirituality, symbolic of the glory of God. The controversy of the 16th-century reformation earmarked an era of disconnect between architecture, the arts and the new protestant churches. To purify and reform the church, all decorations, art, and sculpture, was removed from worship spaces to create a more authentic spiritual experience focused on piety, biblical preaching and personal holiness. Today protestant churches have multiplied globally, establishing this same ideology within their church spaces that God is in the heart and not in the building.

This led to a church architecture today viewed as mundane and homogenous (Cuthill, 2008). The investigative narrative for this section looks at the historical evolution of the church as a change agent and how architecture supported it symbolically. From this investigation, old design principles are adapted for the new church design to accentuate the spirituality that we experience in older church buildings, as a way to rekindle the lost connection between the church and architecture, and from this, formulate a new perception of a church building as heaven on earth.



Figure 3.2: Sketch, Romanian Athenaeum Concert Hall, Bucharest, Romania (Author 2021)

Historical architectural typologies: Rich Christian Architectural themes influence on cultural buildings



THE START OF THE CHURCH

The apostle Paul drove the Christian movement after Jesus's resurrection by preaching in public spaces, such as markets, city gates and pagan temples of Athens. The old traditional belief of worshipping in the sacred temple overturned when teachings and prayer happened on the outskirts of the temple. Peppard (2016) helps locate architecture in the early Christian days through the following bible scripture, which says;

"The apostles performed many miraculous signs and wonders among the people. And all the believers used to meet together in Solomon's Colonnade." (Acts 5:12, NIV)

In this case, architecture defined the spaces used for these cultural gatherings. Ancient urban cities were highly populated, with a vast amount of movement that Paul knew would be beneficial to spread the gospel, as he captured the attention of many spectators. The monumental scale and materiality of the colonnades in temples and courts, allowed for good acoustics and provided enough space for people to gather comfortably and fellowship together outdoors. The portico consisted of rows of columns defining its space covered with a wooden roof to offer protection against the natural elements. (see figure 3.4)

There were no specific church buildings yet, but *Solomon's Colonnade* was a significant historical public gathering space linked to the church. It was ordained and sanctified as a place to meet for all (Schloeder, 1995). The Colonnade in its classical form brought order and structure through its pagan architectural meaning, which symbolically became an important space to learn the new *order and structure* of Christianity.

Design Principle Translated/ Applied:

Outdoor colonnades and porticoes are celebrated spaces for fellowship. Fellowship is an activity much enjoyed by Christians as a social gathering that encourages Christian growth and building community. Currently, Ridgecrest family church has a tea garden that members spill out onto for tea and fellowship. It is equipped with a play park and is also seldom used for outdoor concerts. These elements will be included in the design of the new church.



Figure 3.4: Artist impression showing Solomon's colonnade at Herod the Great's temple from inside the Royal Stoa
© Balage Balogh (nd)

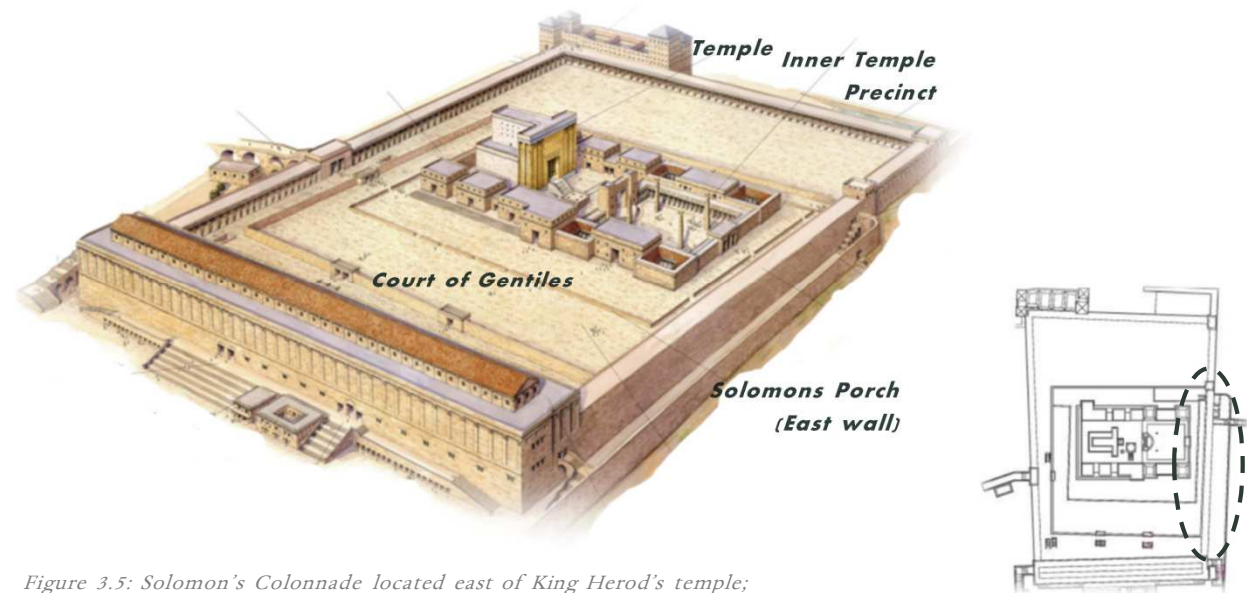


Figure 3.5: Solomon's Colonnade located east of King Herod's temple;
Perspective and Plan ©gracespearfish.com (nd)

HOUSE MINISTRY

Soon the public life of the church was outlawed by the Roman Empire. As a result, fellowship moved out of public spaces and shifted into house ministry helping the faith to grow rapidly in the first three centuries. Christian houses were marked and identified using the *Ichthys* symbol representing the Christian meeting place.

“Day after day, in the temple courts and from house to house, they never stopped teaching and proclaiming the good news that Jesus is the Messiah.” (Acts 5:42, NIV)

The new Roman law did not change the Christian ethic, as everyone continued in their commitment to the benefaction, contributing to the welfare of the classical city (Pillay J, 2017). Christians were obligated to continue in Jesus’s mission to help the poor even in the face of persecution or without any reward (Pillay J, 2017), and for this reason, Christian homes were places of support to widows and the poor. (Comisky, nd). Although these homes had only the capacity of 10-20 people, once the church got too big, they would plant another home church elsewhere (Comisky, nd). The book of Acts explains how Christians devoted themselves to fellowship (Acts 2:24-27, NIV). It was of utmost importance, as it helped Christians grow in faith. People would fellowship over food and practised rituals of breaking bread as a remembrance of Jesus’ death and resurrection. They used this time to sing hymns, recite psalms and grow closer to God. Given the architectural style of the classical urban city, people lived in apartments with shared courtyards.

The courtyard house is an ancient design principle that formed cultural and social interactions. It not only served the function of keeping out harsh climates but was used to build community. The spatial organisation of the courtyard impacted social connections. Its spaces helped cultivate and grow Christianity through song, literature and other activities. A closer look into the architecture of these house churches reveals a level of intimacy while at the same time also offered protection from the watchful eye of authority (Fletcher, nd).

These courtyards would sometimes become the overspill space for fellowship, and *‘life happened in front of neighbours’* (Meek, W: 2003). It became a noble way of showing others the social lives of the baptized Christian who displayed equality, despite gender or class. Having borne witness to their testimonies and seeing the tight-knit bond between the Christian communities, attracted others to want to experience Christ for themselves.

Bosch (1999, cited in Pillay 2017:7) points out that *humanisation* has been part of the Christian mission from the beginning, and this paradigm shift will be the first of many to come. Christianity emerged as something new and became popular amongst slaves, women, and the poor. It completely transformed a society depicted as *“macabre, lost in despair, perversion and superstition”* (Pillay, 2017)

Design Principle Translated/Applied:

Courtyards allow for adaption, flexibility, and interaction as social spaces. The intention is to provide courtyard spaces for social gatherings and Christian fellowship.

(John 18: 24, NIV): “Now Annas had sent him bound unto Caiaphas the high priest”.



*Figure 3.6: The house of Calaphas converted into an Armenian church, Mount Zion – St. Saviour
©Biblewalks.com (nd)*

INCLUSION OF WOMEN IN CHURCHES

Meek(2003) points out in his writings that women were prominent in the missionary field, but their roles in the church were ignored until recently (Meek, 2003). He argues that women were vital in spreading the gospel, using their hospitality and social skills in their daily activities. Historically, we see Christian women holding very honourable positions in the church. Female deacons in the early church performed pre-baptismal anointing (Peppard, 2016:54), nuns played a vital role in helping in ministry, and through reformation, women assisted in planting churches (Duffield, G & Bruce, M 1972: 9-25). All these women supported men and worked in unity for the good of humanity. Duffield argues that Jesus raised the status of women in the ancient world, breaking current conventions (Duffield, G & Bruce, M 1972:9-25) which is the reason why women's ministry in the protestant church is of equal importance. Jesus never discriminated. He expected men and women alike to grow spiritually. We see an example of this in a comment Jesus makes to Martha in Luke 10:41-42 (NIV), that her woman responsibility to host was not as important as she made it out to be, but rather that her spiritual growth should take priority over any worldly matters (Luke 10:41-42, NIV).

Design Principle translated/Applied:

In the context of Radiokop, there are working mothers, stay-at-home mothers, nannies and grannies who often take afternoon strolls to walk their dogs and attentively watch their children ride their bicycles down the street. In discussion with Ridgecrest family church leadership, they wish to provide a safe space for these women and children to play and meet to build on their ladies ministry.

Therefore, incorporating spatial needs for women and children is of utmost importance for the church design, to offer a safe space for them to partake in the everyday social-cultural activities presented by the church.

Drawing on the requirements for inclusivity can be as simple as providing well-lit areas, wider footpaths, street furniture, walkability, cycle paths and places to engage and play (Cushing, 2020).

These are all considered in the landscaping of the wetland recreational spaces, leading up to the church, to encourage social interaction among woman and children.



Figure 3.7: Illustration Montage: Woman and the Church (Author 2021)

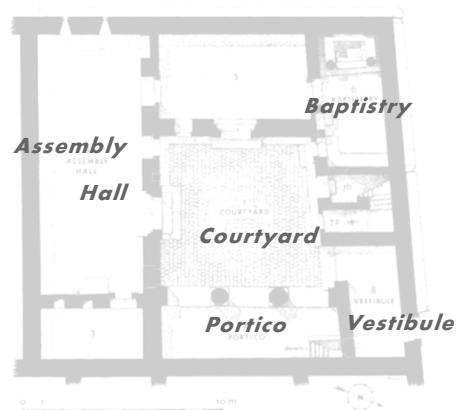


Figure 3.8 :Floorplan Sketch house-church (Peppard, 2016)

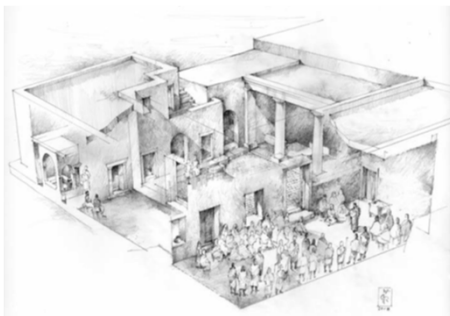


Figure 3.9 :Hypothetical reconstruction house-church (Peppard, Prosol W, 2016)

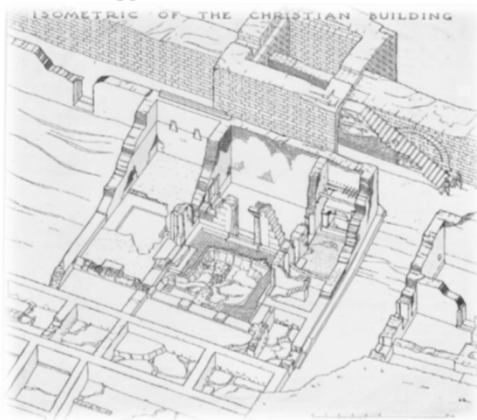


Figure 3.10 :Isometric of House-church remnants (Peppard, 2016)

UNCOVERING EARLY RITUAL

In 1928-1937, archaeologist Michael Rostovtzeff believed he found *the oldest renovated domestic church* in a military settlement known as Dura-Europas, Syria. It seemed to have been buried intentionally (Peppard, 2016) – under the assumption that the imperial government tried to exterminate Christians and their churches for not accepting the pagan religion.

The mission of this church was to minister to the army that manoeuvred between cities and settled there. The domestic quarters found was converted to fit up to 75 people. The eastern wall of the house church was completely ruined and could not be refurbished. Interestingly, what they did find was portrayed as a martyrium (a chamber for burial) with imagery that spoke of death. Nevertheless, to their surprise, it was a baptistry (Peppard, 2016). It is here that it comes to light that imagery defined spaces in the worship place. Peppard's (2016) interpretation of these early ritual church spaces gives an interesting perspective of the experience of initiation into the faith; he explains it as “*not to commemorate the deceased, but to initiate the living into new life*” (Peppard, 2016) as a symbol to scripture that “*We were therefore buried with him through baptism into death in order that, just as Christ was raised from the dead through the glory of the Father, we too may live a new life.*” (Rom 6:4, NIV).

The second floor of the dwelling was not well preserved. Image panels seen on portions of the walls presented different programs. Figures 3.8, 3.9, 3.10 illustrate the spaces and programs of the early church.

The artwork found in the church closely resembled that of the synagogue discovered down the street, except that the church art expressed salvation and resurrection imagery that appealed to those of Christian beliefs. This is a good indication that art became another form of language to support the faith in the early church.

Design Principle translated/Applied:

The architecture for the church should celebrate the baptism ritual since it is the initiation into the faith. The baptism chamber resembles a place of death in the old church, symbolically supporting scripture. Similarly, the baptism chamber in the new church design should hold symbolic meaning and be conscious of the ground that buries old life, while at the same time, publicly declare baptism as a celebration. This prompts an architecture that gradually opens up to the heaven as if it was ascending ones spirit into new life.



Figure 3.11 :Remnants of Church (Peppard, 2016)

THE RISE OF CHURCH ARCHITECTURE

The church enjoyed much favour during the time of Constantine when the emperor made Christianity the state religion of the Roman Empire. Constantine's attempt to create a Christian empire meant that it would be a safe world to practice Christianity, alongside be morally fit for Christians to live in a world that accepts the Christian faith and ethic (Pillay, 2017). This social order that he implemented was a period of significance for Christians as he took over the responsibilities of the church and institutionalised it (Pillay, 2017), causing yet another paradigm shift in the transformation of Christianity. Constantine supported the churches input on social matters relating to scriptures teachings on charity and love (Pillay, 2017). Christianity reigned for nearly two millennia after (Lawless, 2007).

The new faith had an impressive architectural setting that fell under imperial patronage. It showcased its magnificence through its furnishings and decorations, making use of natural light to emphasize the spiritual effect (Farber, nd). In a letter written by Spanish Pilgrim, Egeria, she describes the opulent effect of the Holy Sepulchre in Jerusalem, saying;

"The decorations are too marvellous for words. All you can see is gold, jewels and silk...You simply cannot imagine the number and sheer weight of the candles, tapers, lamps and everything else they use for the services...They are beyond description, and so is the magnificent building itself. It was built by Constantine and...was decorated with gold, mosaic, and precious marble, as much as his empire could provide." (Farber, nd)

Constantine funded many early Christian churches across Rome, Constantinople, the Holy Land and other sites. (Salzaar, n.d.) The design model for the church formed the basis for many churches in Western Europe, based on the Roman judicial courts as a statement of the *"church bringing forward the Justice of Christ into the world"* (Schloeder, 1995). The monumental scale of the temple appears as a simple brick/stone façade externally, but internally, the experience of space is heightened through the senses, using lighting, texture, colour, repetition, scale and geometry, evoking a sense that you are entering the Kingdom of God.

Looking at the architectural design of Old St. Peter's Basilica built 333-386AD (See Figure 3.13). Its design includes a Temple court as the communal meeting place for fellowship. The design of the temple echoed the Jewish temple, with layers of outer courts that would eventually lead into the nave, progressing into the sanctuary. The Basilica temple is approached from the western side, with the altar orientated to the east. The belief that Jesus says he will come again from the East (Mt. 24:27, NIV) is the reason for many altars facing Eastward as Christians prayed in this direction (Serratelli, 2017). The nave is an oversized hall with a wooden roof structure, met by a triumphal arch before crossing into the altar. This *crossing over* was termed the transept that formed the sign of the cross. The altar forms part of the apse, which was a semi-circular projection defining its space as sacred. In the basilica courts, this apse was a place where imperial legal power was dispensed and ironically was

the place where Pilate judged the crucifixion of Christ. This can be seen in the miniature below, depicting the apse as the judgment space, which is represented by the blue semi-circular arc drawn above Pilate's head.



Figure 3.12 : *Codex purpureus rossanensis* (c. 550): One of the oldest illuminated texts in the world
https://findatwiki.com/Codex_Purpureus_Rossanensis

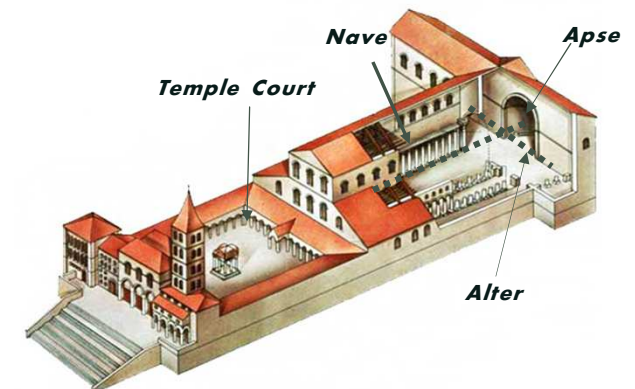


Figure: 3.13: Reconstruction drawing of the Old St Peters Basilica Perspective. ©Romano Impero (2021)

Initially, the altar was a place of sacrifice in Jewish temples, but in Christian faith became the space where communion was practised, in remembrance of Christ's sacrifice for our sins. The altar was flanked on either side of this nave with a colonnade of arches to form an aisle with stained glass clerestory windows that illuminate the interior space.

A baptism chamber (baptistery) was added later and took the characteristics of the Roman mausoleum (like a tomb) with the symbolism of death and resurrection linked to the ritual.

Design Principle translated/Applied:

The procession into the church chamber followed a layering of spaces, spaces for fellowship, spaces to unite in prayer, and spaces to pause, contemplate and reflect. Similarly, the journey into a new church should consist of a layering approach. Additionally, its interior spaces should build up phenomenological experiences to evoke the senses spiritually before entering the chapel.



Figure 3.14: (above) Artist impressions of old St. Peters Basilica Court with Cross section. ©Romano Impero (2021)

Figure 3.15: (right) Artist Impression of Interior of Basilica Court with floorplan.

©Romano Impero (2021)

<https://www.romanoimpero.com/2010/10/basilica-costantiniana.html#.WvqQYcwaPFg.pinterest>

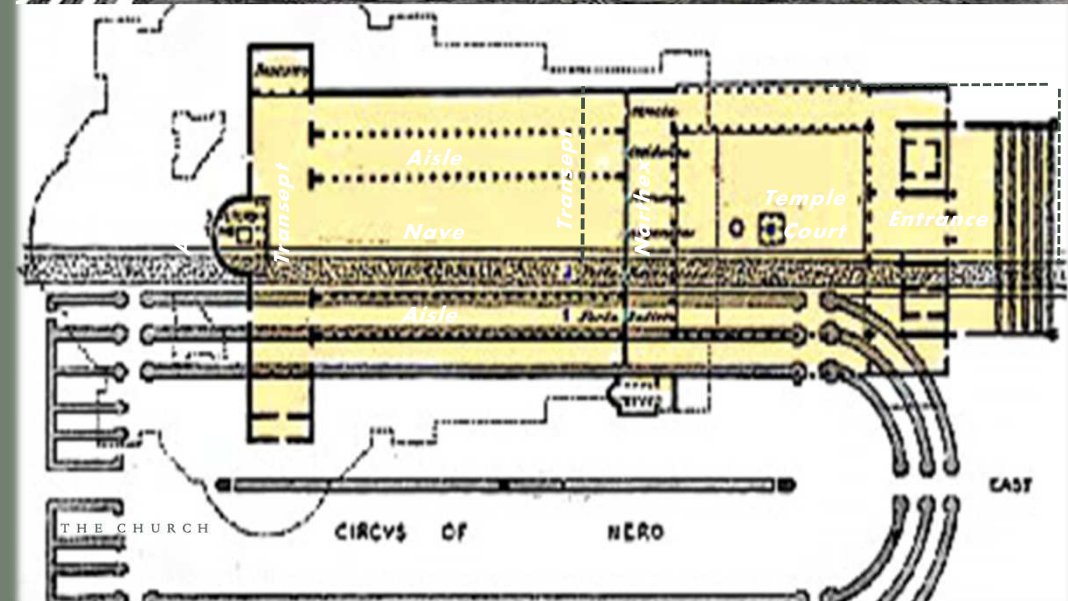




Figure 3.16 : (above) Artist impression of the Interior of St. Sabina Basilica, based on Basilica design principles ©Oneonta, (nd) http://employees.oneonta.edu/farberas/arh/arh212/early_christian_basilica.html

THE CHURCH AS PATRONAGE OF ART

We see a paradigm shift again in the church, as it becomes very political and a key player in the politics of kings and emperors. Placement in society was based on a feudal hierarchy system and depended largely on birth rights (Pillay, 2017). The church functioned on both religious and secular affairs and controlled relations of all men and women, rich and poor. The church maintained its support to society, by contributing to literature, the building of universities, healthcare, and their input of legal systems. The church's focus was to save souls and operated in all social activities advocating a moral code that the wealthy should help the poor (Pillay, 2017).

The legacy of the church's relief program to the poor was through their monasteries who offered spiritual guidance, food, and homes for orphans and the aged. Their involvement in the education of the arts and crafts movement offered through vocational training helped generate economic activities, but more importantly, spread the word of Christianity through the arts. Schloeder (1995) explains that the church used the Arts to strengthen their mission, and every artist, builder or artisan intricately understood theology, cosmology, and mathematics, which merged skilfully to portray glorious artwork to the people.

Churches showcased their wealth using elaborate architectural styles and engineering innovations. The Romanesque architecture was simple yet elegant in detail, using its classical orders and engineering ingenuity of domes, vaults and arches.

Spaces such as the dome emphasized the central square of the building, known as the *naos*, which became a symbolic architectural space that *redeems* the world with its heavily decorated iconography of the redeemer. The dome evoked images of sacred places, such as the 'empty tomb' or the womb of the Virgin Mary (Schloeder, 1995). The design and craft of the Byzantine era (553- 549AD) shared a deeper meaning and symbolism that expressed the sacred text through its art form, having the power to transcend the spirituality of the worship place. (Schloeder, 1995).

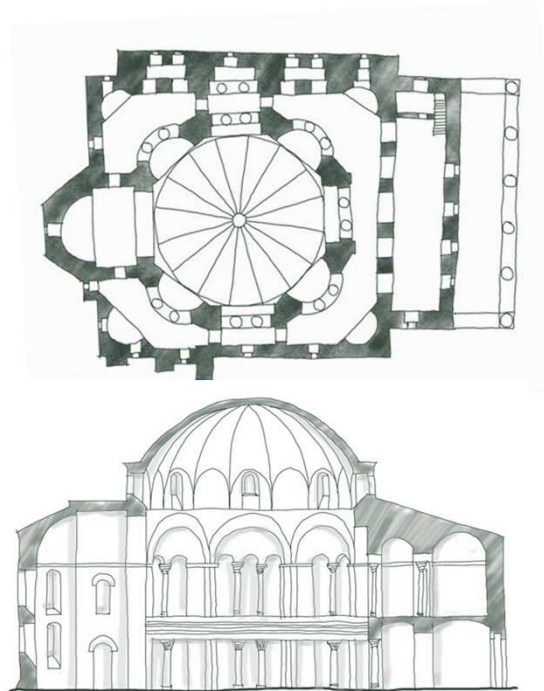


Figure 3.17: Church of St. Sergio and Bacchus showing plan and sectional dome as a dominant feature of the architecture, Naos redeeming the world.(Author, 2021)

Gothic architectural forms were inspired by nature. Its verticality was expressed through tall spires appearing to link heaven to earth, and natural light was expressed through the interior spaces of the church, giving a sense of weightlessness. Every element of the cathedral was well thought through, rich with symbolism, making the medieval church architecture of its time indeed mystical. The careful use of geometries, axis points and hierarchal drama accentuated the human bodily experience and the sacramental reality of the worship space as heaven on earth.

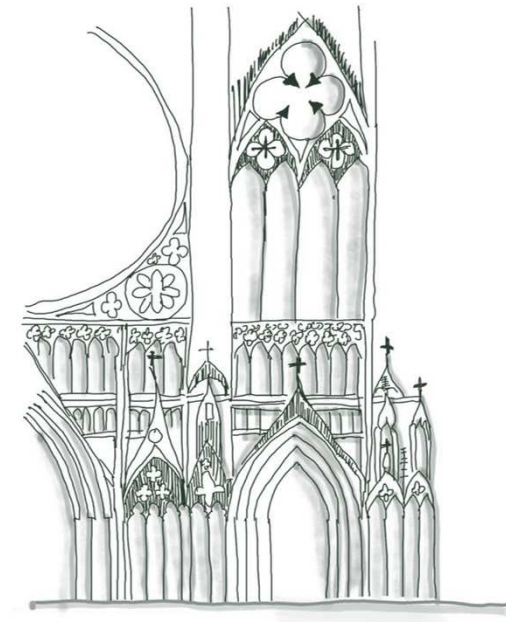


Figure 3.18: Strasbourg cathedral Façade Windows sketch, using geometrics inspired by nature (Author, 2021)

Many beautiful analogies have been drawn from scripture to try and develop church architecture. Schloeder (1995) cites the bible, describing some typical analogies of the church to be understood as the *body of Christ* and Jesus as the *cornerstone* (Mark 12:11, NIV), the *keystone* (Acts 4:8, NIV) the *foundation* (1 Cor 3:11, NIV), and the *door* (Jn 10:19). Furthermore, the apostles are the *pillars* (Gal 2:9, NIV) holding up the church, and the Christian people "you also, like living stones, are being built into a spiritual house" (1 Pet: 5, NIV) All these elements come together in the design of the church and expressed as the "dwelling place of God" (Schloeder, 1995). Church architecture becomes profound when linked to scripture, as its user begins to understand these knowledge systems that transcend one into spiritual awareness.

Professor Hays in his Harvard lecture, *Aesthetics perception and the architectural imagination*, suggests that "imagination, is necessary if we want to treat architecture as a mode of knowledge." (Harvard X 2017, 0:0:44) He goes on further to cite Classical philosopher Aristotle "the soul never thinks without a phantasm... [suggesting that] ... thought, needs some material imagery to carry it." (Harvard X 2017, 0:0:51) It is with this understanding, that the phenomenological experiences of light, geometry, proportion and scale, of church spaces, comes together as a tapestry of various symbolic elements, that draws on the senses, unified to create imagery in a mental capacity, that may re-assert the human bodily experience as the locus (Holl et al., 1994), offering authorship and perceptions of that architectural space (Hays, n.d.).

Design Principle translated/Applied:

To have a beautiful elaborate church might seem unnecessary for some, while it is the author's belief that the house of God should be celebrated and therefore should be something of pure beauty .

The new church design will take cues from nature, allowing it to take centre stage. It will attempt to tread lightly while showcasing elaborate engineering, rather than decoration.

Similar to the monastery, the programme offered should take advantage of its vocational and learning spaces to carry on it mission to save souls.

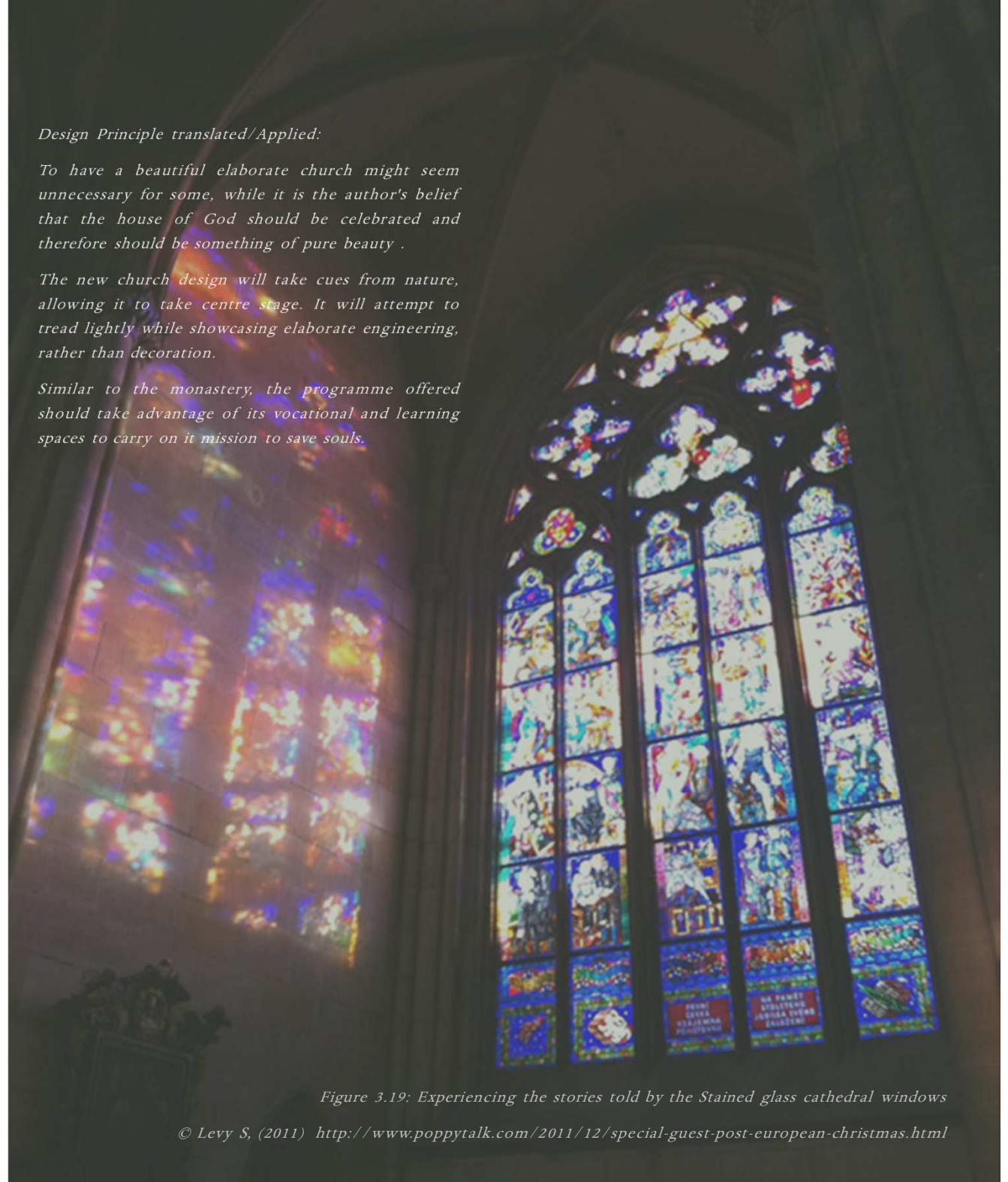


Figure 3.19: Experiencing the stories told by the Stained glass cathedral windows

MEANINGS UNDER SEIGE – REFORMATION

The reformation period was a time of capitalism. Rural areas grew into urban areas, and the trades industry grew into large commercialised industries. The feudal system fell away, and the government took over the welfare of society from the responsibilities of the church, diminishing a lot of the power the church had in their organisation. (Pillay J,2017)

The capitalist ideology leaned toward economically driven agendas. Unfortunately, behaviours were becoming more materialistic and self-seeking. The church needed funding which influenced the morale of the catholic church, as they began to side with the rich, and justified theological ways to provide economic and political advancement for the church (Pillay J,2017). The church initiated a term coined *indulgence* which was contributions made by earnest believers for expensive art and architecture. These *good deeds* were used as a way for penitence and a place in heaven (Zucker and Harris, 2018, 0:10:43). These conflicting understandings of theology and the corrupt actions of the church raised concerns and led the church toward a new movement of 'reformation.' Priests, such as Martin Luther began to question the ethical actions of the church. In his doctrine for spiritual equality for all Christians in 1525, he rejected several of the catholic churches' teachings, especially disputing his view on indulgence. His thesis began a modern reformation of the church, stating that the catholic church had no authority to remit and forgive sin, but that this act is received through God alone (Zucker and Harris, 2018, 0:10:01). Luther's next mission was to translate the bible for all to understand and read, with the notion that man could have a direct relationship with God, without the mediation of a priest.

The printing of the bible, led to many different interpretations of scripture that sparked the beginnings of Protestantism. These new liberal world-views justified the faith of individuals and became the new paradigm intertwined with early modernity. (Pillay J,2017)

The rise of protestant doctrine argued good deeds must stem from one's own heart, rather than being told what to do (Pillay J,2017). The act of rituals were also a lot simpler in comparison to the Anglican, Lutheran and Catholic churches. The fact that society could now turn to other priests for guidance took away the power from the Catholic church which began to threaten their model to transform (control) society. Sadly, this turn of events resulted in a bloody war over religion and the many persecutions of Christians. The Anabaptist and Protestant churches had concerns over idolatry (Zucker and Harris, 2018, 0:1:27) and as a response, the war was not only against Christians but towards the destruction of architecture and art too (Zucker and Harris, 2018, 0:0:50). Catholic churches were converted into much simpler places of worship, stripping walls clean from artwork and defacing sculptures (Zucker and Harris, 2018 0:2:39); Maag K, 2017).

Matthew Barret (2018) speaks of church architecture changing entirely, when the altar was replaced by the pulpit, making the word of God the central focus and not the priest (Barret, 2018), and as a result, the protestant notion that God dwells in the heart and not in a sanctuary resulted in very simple worship spaces. However, the Catholic Church was doing the opposite and countered this notion of reformation by responding with much more complex and extravagant churches, showcasing astounding religious art and amazing

3-dimensional sculptured facades, known as Baroque architecture (1600-1800), believed to evoke human senses with its dramatic effects to restore public faith.

Conflict and politics in the church changed the tangible (architecture and art) but did not change the intangible (mission of the church to change society). Could it be that Christianity and architecture have both experienced similar patterns of struggles to maintain tradition, theories and principles from being deconstructed? For some time, Christianity found architecture and together, they made beauty, but politically driven agendas broke them apart, deflecting the faith into various directions, with fragmented meanings and ultimately many denominations.

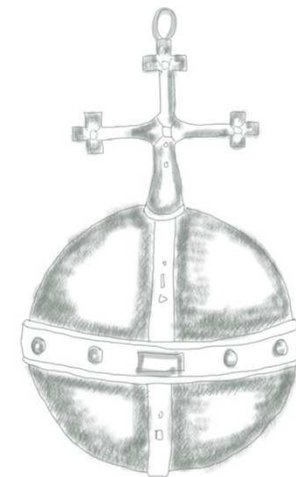


Figure 3.20 : Globus cruciger, Iconography: Symbol representing Christ's dominion over the globe or Salvator Mundi (Saviour of the world),

(Author 2021)



Design Principle translated/Applied:

Christianity and architecture have evolved and undergone a process of transformation due to globalisation, technology, and cultural shifts.

While architecture and Christianity are on opposite ends, they share ethical responsibilities to people who engage with them. No matter what form they take, their mission remains to connect with humanity and be the change agent for society, and their role has always been to provide for the basic human need; In the architectural realm, that would be to provide shelter, and in the Christian spiritual realm, God is the shelter.

"Whoever dwells in the shelter of the Most High will rest in the shadow of the Almighty" (Psalm 91:1-4).

This investigation helps encourage a church design with a programme that offers a balance between secular lifestyles and spiritual lifestyles, as a way to address the complexities society presents. Additionally, an architecture that is gentle and inclusive to people from all walks of life with no judgement.

Figure 3.21: Dome Interior, New St. Peters Basilica , Italy

THE CHURCH HISTORY OF SOUTH AFRICA

The Dutch Royal Family merged with the Protestant church in the Netherlands to form the Dutch reformed church, following the doctrines of John Calvin, whose evangelical work had been adopted worldwide by many churches. Theological developments and controversies distorted Calvin's doctrine, further splitting up the Dutch Reformed church. When the Dutch came to South Africa around the mid-1600-1700AD, they brought their religion to infiltrate the lands. Churches were built in the neo-gothic and neo-classical styles all around South Africa to remind them of their colonial backgrounds. It became social spaces, business hubs and landmarks. It didn't take long for it to become political space too, when the Dutch-reformed theology was abused in favour of the Afrikaner nationalism, separating development between races and economic injustice (Pillay, 2017). Although these actions had detrimental effects in setting back the country, other churches did not agree with the Dutch reformed church and created alliances against the church to suspend them. This ecumenism of churches successfully worked as a body and was not concerned about their denominations at the time, but rather to make an impact on the transformation of South African Society. This was the first time that the church's mission as transformation agents came together in unity and gained the attention and respect of all Christians and non-Christians alike. This one true action sparked hope and a realisation that the church, no matter their difference in doctrine, kept God central to their mission and came together in their shared mission of evangelism and service to society to make a change for the good of all man, as Christ intended.

SYMBOLISM IN THE 21ST CENTURY CHURCH

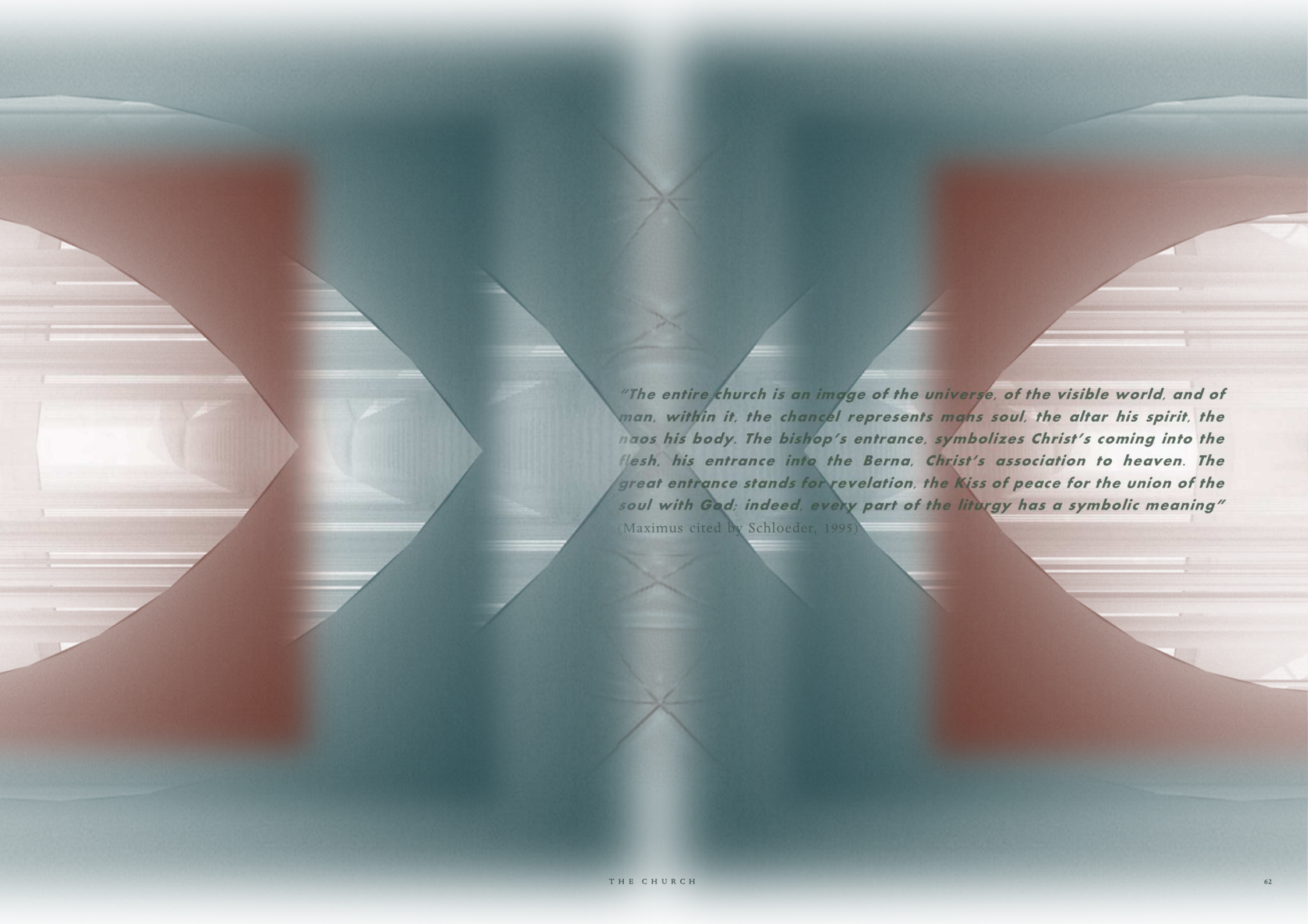
Thanks to reformation, the Christian faith has found itself in almost every century, evolving its doctrine due to secularisation. This has resulted in many *emerging churches* in the 21st century who fuse their doctrine to suit secular and sometimes ethnic traditional lifestyles, such as the likes of African Traditional Churches who synthesize Christian and African beliefs. To some extent, this merging of beliefs does raise concerns about how far the Christian religion can be adapted? Be that as it may, one aspect that remained unchanged through the evolution of the church is the importance of symbolism that signify the mysticism of a worship place. The sign of the cross is the most recognisable symbol. The divine circle is also another geometric form that portrays perfection and eternal unity. Another significant and ancient symbol to both African and Christian beliefs is the sign of the fish, known as the *Ichthys* - a symbol first used secretly to identify other Christians. It's been told that when Christians would encounter strangers, they would arbitrarily draw an arc in the sand while in conversation with a stranger. Should the stranger be a Christian, they would know to complete the other half of the arc to form the fish symbol (symbolsage, nd).

The symbols significance begins when God offers us through scripture his '*water of life*' and implies all Christians be '*fishers of men*.' This symbol was interpreted in the third century by Tertullian a theologian, linking the Ichthys to baptism (Issitt M and Main C: 50), interpreting its symbolism, that Christians are the fish that finds life in God's water and only by remaining in His water, can we live.

The amalgamation of all these meanings is vital for the design as it represents the tangible mission, relevant on both secular and spiritual levels.



Figure 3.22 : The many Symbols of the Church © Praisebanners.com (2021)



"The entire church is an image of the universe, of the visible world, and of man, within it, the chancel represents mans soul, the altar his spirit, the naos his body. The bishop's entrance, symbolizes Christ's coming into the flesh, his entrance into the Berna, Christ's association to heaven. The great entrance stands for revelation, the Kiss of peace for the union of the soul with God; indeed, every part of the liturgy has a symbolic meaning"

(Maximus cited by Schloeder, 1995)



Formulating a Sacred architecture

BRINGING TOGETHER OLD AND NEW

The 16th-century protestant reformation shaped the modern world and transformed the church and society to co-exist, regardless of faith or religious commitments. The church has proven to be one of the legendary change agents of our times, and has transformed society by making itself relevant, by addressing social and political matters for the good of mankind. Additionally, the church stood as a pinnacle for architecture. It helped add symbolic, cultural and aesthetical value to places and had the innate power to bring Man to God through its phenomenological properties that interweave elements of nature, light, scale, materiality and movement to evoke transcendence. When one thinks of sacred architecture, our minds automatically think of Gothic cathedrals with its awe-inspiring presence that captivate our imaginations, likening the experience to heaven on earth.

In the following investigation, an archetypal comparison is made between St. Georges Cathedral, Cape Town, completed in 1900 and another experience based on a 20th-century megachurch, known as Rivers Church, Rivonia, Johannesburg.

EXPERIENCING THE OLD

Upon arrival to St. Georges cathedral, your approach is directly off the street, welcoming passers-by to come in. The heavily textured stone walls and dated architectural masonry details, take you on a historical journey through time. The first impression was that the interior space would be as cold and gloomy as the grey exterior stone walls that enclose it. However, pleasantly surprised, the beautiful stained glass lit up the interior space, in a glorious spectrum of colour, visually telling a story. The axial position of the alter draws your eyes toward it, proclaiming its sacred importance, elevated for everyone to see. The scent and crackling of the burning candles gently break the silence while you stare in awe at the colossal volumes of space surrounding you. The echo of the choir begins to filtrate the air through the vaulted nave. From this scene, architecture has engaged with the user. All the tangibles presented touched on the senses, inviting the eyes to dwell, and the skin to feel, allowing the imagination to take its cause.

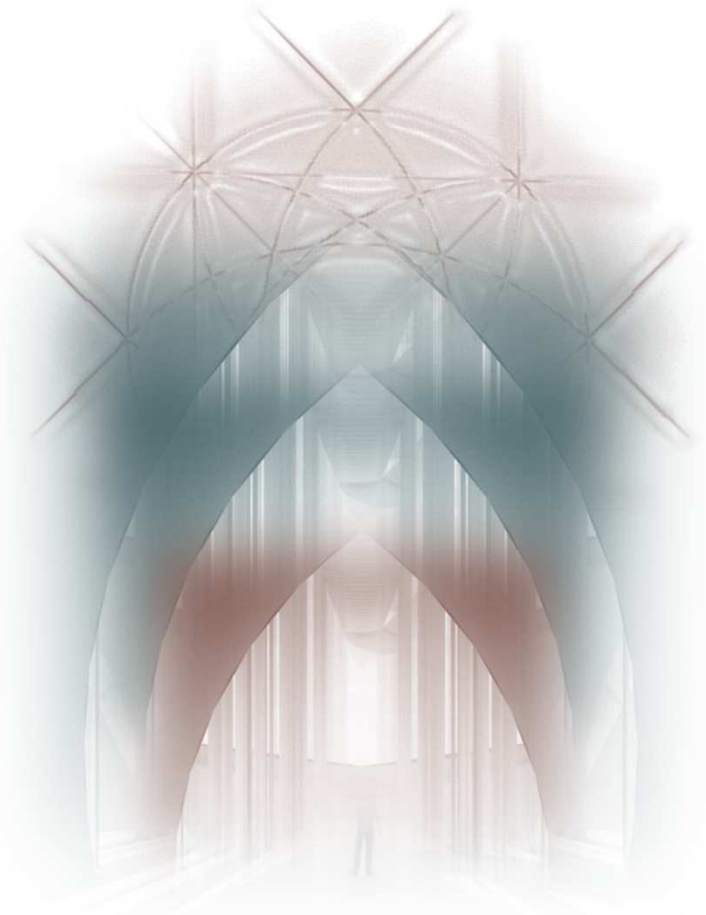
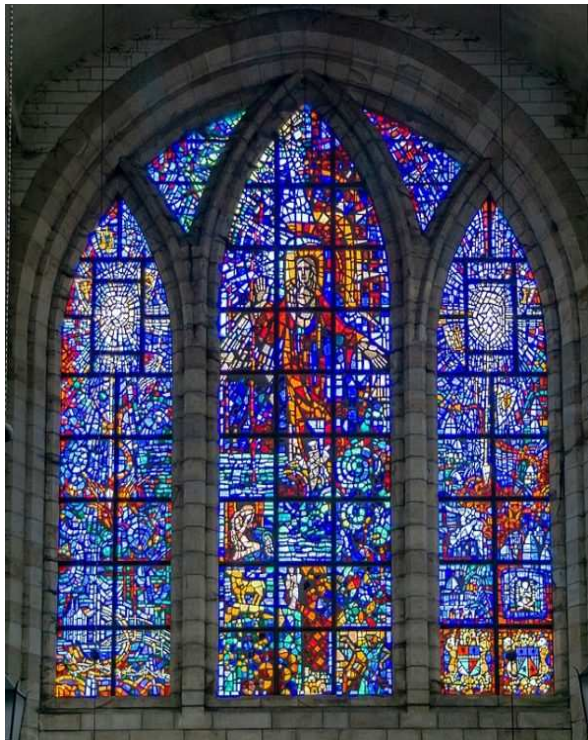


Figure: 3.23 : Artist Impression, Church Spatial Experience – using symbols (Author 2021)

These complex experiences had the innate power to transcend one into a spiritual place of awareness, where reality is left behind, and you begin your journey into solitude.

"Rethinking Sacred Spaces, in the age of megachurch," tells the conversion story of Russian orthodoxy (988AD) and how man discovers God through experiencing the architecture of the Constantinople Hagia Sophia (Cuthill, 2008).

Figure 3.24: (below) Stained glass window by French artist Gabriel Loire, at St George's Cathedral, Cape Town. ©Halama Rainer (2018) Wikipedia commons



https://commons.wikimedia.org/wiki/File:Wikimania_2018_by_Rainer_Halama-0503_cropped.jpg

In the early Byzantine period, having seen something as grandeur as this, could have been perceived as something truly spiritual, as you are mesmerised by the temporal movement of the sun rays that filter the domed structure. In the Renaissance, it was believed that our senses formed part of a hierarchical system, from vision being the highest sense down to touch as the last (Holl, S: 1994). Architecture of the renaissance engaged all the senses at the same time (Holl et al. 1994) and it is through these experiences told, that the mysticism of a church building won an entire nation over to Orthodox Christianity (Cuthill 2009).

When architecture makes use of the senses it *"mediates intellect, as well as sensory thought"* (Holl, S: 1994). This is why art and architecture became so vital in the role of the church. The masons and artists had a deeper understanding of theological underpinnings that strengthened the church's mission to communicate ideas to unlettered minds. Had it not been for our senses, the representation of these sacred architectural spaces and our procession into the various church spaces, could not fully be understood or felt.



Figure 3.25: (above) Emperor Justinian offering Hagia Sophia to baby Jesus, Emperor Constantine presenting the model of the city to baby Jesus as a gift. Picture credit: ©Raddato Carole (2018)

EXPERIENCING THE NEW

In the modern-day church, these traditional design methods have been lost. On approach, you drive into a parking lot the size of a shopping mall with no direct access from the street. The warehouse-like building stands in isolation from its context surrounded by a fence running along its perimeter and making it inaccessible and unfriendly to people passing by. These millennia church designs have lost their creativity and lack transcendence. Instead, visual technology takes centre stage to captivate its visitor.

As you enter by car, thousands of members are seen rushing to grab their seats. Ironical how this community of strangers are detached from each other yet symbolically come together as one Body in Christ. The experience of the church felt more like a movie theatre, with comfortable soft seats, great audio, and a distant view to the pastor on the stage. From the start, it's 'camera, lights, action!' The experience was very entertaining, transfixed by the big screens into a world of worship.

After the sermon, there was no place or garden to dwell or ponder on the word. The only fellowship space was a large glass foyer filled with an amazing aroma of coffee in the air and a crowd of strangers. Many people left as fast as they came in, while smaller 'cell groups' gathered with familiar faces.

Thinking back there was no memory and experience of the architecture. Rituals were not visible in front and stained glass was traded for strobe lights. The projector screen became the worship space, and many people traded the traditional tactility of the bible for their electronic devices.

Here the bodily experience did not feel anything like the old church, where your senses engaged with everything. However, the spiritual experience was reached through other mediums of technology and music. Jorge Otero (2013) explains that as early as 1960 architects warned that industrialisation would impoverish the bodily experience, resulting in an architectural phenomenology being lost due to technology (Otero, J:2013: xi-xxxiv).



Figure 3.26: Dark theatre-like interior view at River church, showcasing the artificial lighting. Picture credit: Stage Audio (2014).

While I concur with this statement, these differentiating experiences between old and new church, still had the innate power to transcend me into worship. It probed the question about authentic Christian spirituality and discernment. How can architecture and technology enhance the spiritual journey? And how can it be done with as much respect and sensitivity of the protestant belief?

UNDERSTANDING CHRISTIAN SPIRITUALITY AND HOW ARCHITECTURE TRANSCENDS US THROUGH THE SENSES

Spirituality may mean different to many cultural societies and belief systems, but in Christian traditions, being spiritual means to live life under God's influence and through his word. Christian beliefs are very firm in their understanding that inauthentic spiritual experience can be a distraction from God. With the way our culture thrives on the visual, we have begun to openly adapt to these secular rituals, merging our Christian beliefs with fasting, meditating, retreats and dance practices. These rituals have become acceptable methods to evoke the mind but have also been warned against practising with discernment.

The Christian spiritual experience is different. This is described by Pretorius(2008) as an individual's 'altered state' and emotional response to the truth. It's a feeling deep in your heart that touches your inner soul. It can only come with a "higher level of internalised awareness and personal experience with the Holy Spirit" (Pretorius, SP: 2008). A Christian's spiritual experience cannot be pinned by a particular form (idol/building) but does require time with the bible, devotion, or worship and the "supernatural intervention by the Holy Spirit" (Pretorius, 2008).

Newberg et al.(2001 cited in Pretorius, 2008) says neurophysiological studies found that spiritual experiences are triggered through physical behaviour in the form of a ritual, or it can be set in motion from the mind, stating further that "humans are blessed with an in-born genius for effortless self-transcendence" (Pretorius, 2008: 153).

This means that our entire bodily experience can be heightened through our senses, and for this reason can trigger emotion. Outside factors such as music, silence, speech, meditation or text, can thus also transcend one into this state of spiritual experience.

Steven Holl (Holl et al., 1994: 41) explains that "the building speaks through the silence of perceptual phenomena" however, the perception of this built work depends on the mental energy of the user that is articulating it in that space (Holl et al. 1994). It is here that he goes on further to suggest that we draw on the cognitive process of the users by transferring architectural meaning through the senses brought on by phenomenological experience that plays on both physical and mental state that "stimulate both inner and outer perception" (Holl et al.1994:41-42). Inner perception can be defined as the intellectual and spiritual that architecture wants to motivate, while the outer perception can be viewed as the physical spatial entity" (Holl et al. 1994). From this understanding, spirituality can be derived through a play of various architectural phenomena, such as light, filter, shadow, movement, texture, or water that comes together in dialogue for the user to understand and take authorship over.

Holl explains that "to pass from one discursive space to another, requires reasoning, through text". (Holl et al., 1994)

Therefore, when architecture becomes discursive and establishes a dialogue with its user, spirituality can be derived through built

form and the tangibles presented becomes a medium that is both empirical and rationale to its receiver (Holl et al. 1994). To be transported into a realm of spirituality and inner peace, requires an architectural phenomenon to interact with the senses, decoded through human cognition. An example of this is to look at the phenomena of light. According to St. Augustine, in his doctrine of Illumination, "Light is the principle to all cognition" (Allers, 1952) Architects devoted their design of worship spaces, to the art of illumination, to connect man to God, and have since been a popular choice among them.

Holl (Holl et al., 1994) explains light as gracefully changing throughout the day, further suggesting that how one captures it through its architecture, can be fundamental in orchestrating the "perceptual spirit and metaphysical strength of architecture" (Holl et al. 1994). Accentuating this experience with colour, materiality, verticality and voids, differentiates the space as spiritual, rather than secular. But for a Christian, when experiencing this light and interpreting it with scripture,

'...Arise, shine, for your light has come, and the glory of the Lord rises upon you... (Isaiah 60:1, NIV)'

the 'perceptual spirit and metaphysical strength of architecture' (Holl et al., 1994) successfully begin to provide an opportunity to reflect on one's spiritual journey.

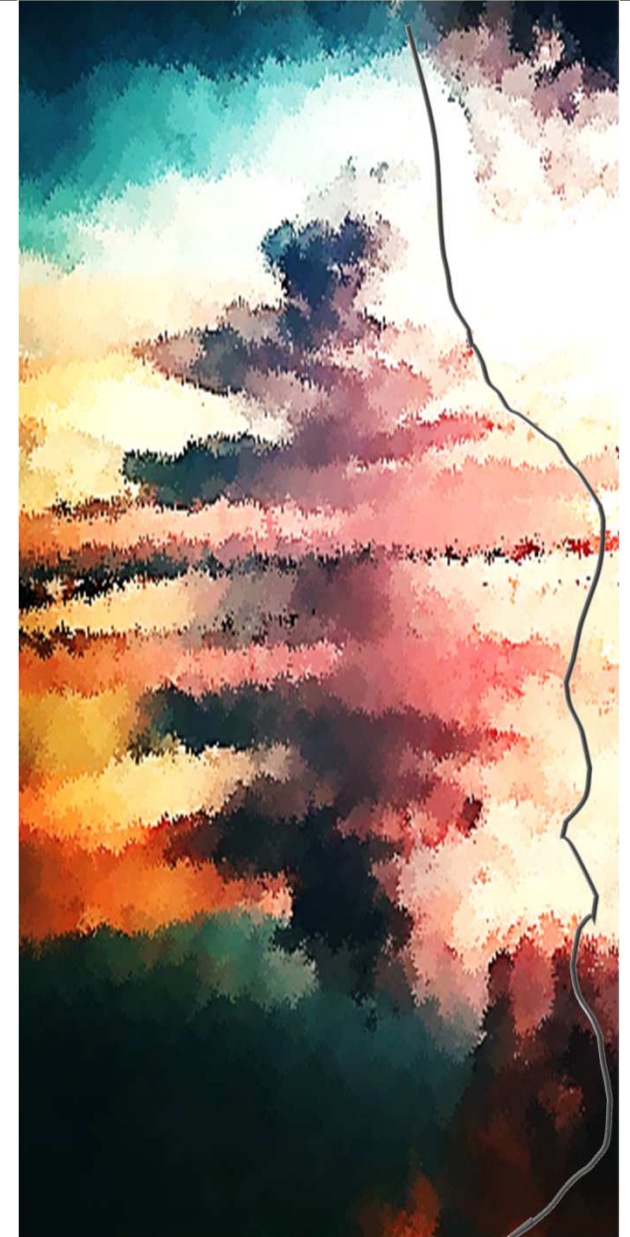


Figure 3.27: Artist impression; Cognitive states,
(Author, 2021)

MYSTICISM & RITUAL

There's been a long-standing debate surrounding Protestant Christianity and mysticism (spirituality). It could be understood as something hidden, such as a *"deeper awareness of God's presence in the life of a believer"* (McGinn, 2015). Prof. McGinn, in his analysis of Mysticism, explains it was used for *"communal and liturgical life aimed at union with God [...] where spiritual practices were meant to prepare for a deeper sense of God's presence, [which is] integral for Christian Spirituality"* (McGinn, 2015).

"May my prayer be set before you like incense;" (Psalm 141v2, NIV)

An example of a mystic ritual would be the movement of the procession and the smoke of the incense basket, which gives an ambience of heaven on earth with its cloudy scene.



Figure 3.28: Incense atmosphere

© Daniel Keding (2021)

<https://aleteia.org/2017/07/06/holy-smoke-why-the-church-uses-incense-at-mass/>

The ritual is believed to transcend the entire congregation and their prayers up to God. According to Von Meiss, the aesthetic experience of our environment involves all our senses (Von Meiss, 1990, p15). To hear, smell and feel can sometimes be more intense than the visual because it allows you to perceive the space before visually seeing it. If we had to consider the incense, during prayers when our eyes are closed; The clicking sound of the incense basket comes to you before the scent, but memory allows you without seeing the visual impact of the smoke, what the atmosphere would look like. Similarly, the scent diffuses from the smoke also allows one's imagination to "compensate for the lack of other senses." (Mathews, 2003).

In the seventh century, Rev. Maximus established the 'mystagogy' theory, as a way to develop a series of relationships to link God to Human Beings (Constas, 2019). He first established the church as an icon or image of the kingdom and looked at dramatizing the liturgy, through a sense of order and hierarchy (Constas, 2019). Maximus began to develop an ecclesiology for the church, combining anthropological perspectives, ritual, axis, hierarchy and movement within the worship space.

Maximus compared the church to the image of Christ on a cross, now resurrected and dwelling within each person. Here the church becomes a living temple, in which body, soul, and mind correspond to nave, sanctuary and holy table (positioned in the sign of the cross). This makes the church building indeed 'mystical,' (Constas, 2019) and prompts the user, with the understanding, that they come together to church united as the body of Christ.

Rev. McGinn explains that the reformers "sought to come to terms with some of these rich traditions of Christian mysticism" (McGinn, 2015). From this standpoint, we can better understand that the Protestant Christian, uses their free will to choose their spiritual journey, provided their rationale is true to the word. Some reformists were more conservative than others and had mixed feelings about some of these rituals, resulting in many denominations and rules, with only the ritual of baptism and communion remaining. It is from this exploration that the author looks to the ritual of baptism, as a central theme in the church design, since it is the common ground between all Christian denominations.

Rituals are at the foundation of social dynamics, it's a cultural interaction that is linked to symbols, signs and emotions that form the basis for beliefs, thinking and morality. (Summers-Effler, 2006: 135-154) The previous investigations into the churches history reveal the most important ritual pattern of baptism, and its symbolic use of water as the 'cleansing' agent. Baptism is a Christian rite of passage and adoption of conversion into the faith. (Romans 8:15, NIV) It is an ancient ritual that has become part of the universal language for the church and is prominent in the churches mission to save souls. (Acts 2:38, NIV) The ritual involves submerging the sinner into the water symbolically washing away your sins so that you emerge as a 'born again.' Your once lost soul is united into the identity of the body of Christ (the church) and your spirit is awakened. This ritual serves as a portal from the physical to the spiritual realm.

The baptism ritual is not a frequent event, therefore the allocated space for it is not always visible in the church architecture. In some churches, it's disclosed under a stage, or in the case of the cathedral, in a stone bath placed in the rear or side of the aisle. With it being such an important cultural event, the author argues why it is not emphasized enough and suggests that it should be something to be seen and celebrated, as a reminder of its sacred act. Furthermore, the ritual can only be practised in the realm of the church (body of Christ – not the building) with a pastor/priest present. This emphasizes the importance of spatial requirements for this ritual, as the community comes together to witness and celebrate the act of initiation into the faith.

Converting this understanding of ritual into built form, architecture now plays a role in manifesting the sacred ritual of baptism through the water as a significant symbol of re-birth and narrative that stimulates a deeper sense of place and spiritual awareness. Looking to the phenomenological properties of water, Holl (1994) describes its refraction phenomena as poetic and mystical, especially in sacred spaces (Holl et al. 1994). The notion of water as a boundaryless fluid infiltrates anything in its path, its temporality, sound, scent, colour and coolness, are properties envisioned for the architecture that figuratively crosses the boundaries between secular and spiritual spaces and reawakens the spirit of place.

"The sacred is approached and experienced through religious practices, rituals and symbols. The role of the experience is to bring a better understanding of oneself and a revelation of the sacred in order to establish, maintain and develop a relationship with the sacred." (Pretorius, SP: 2008)

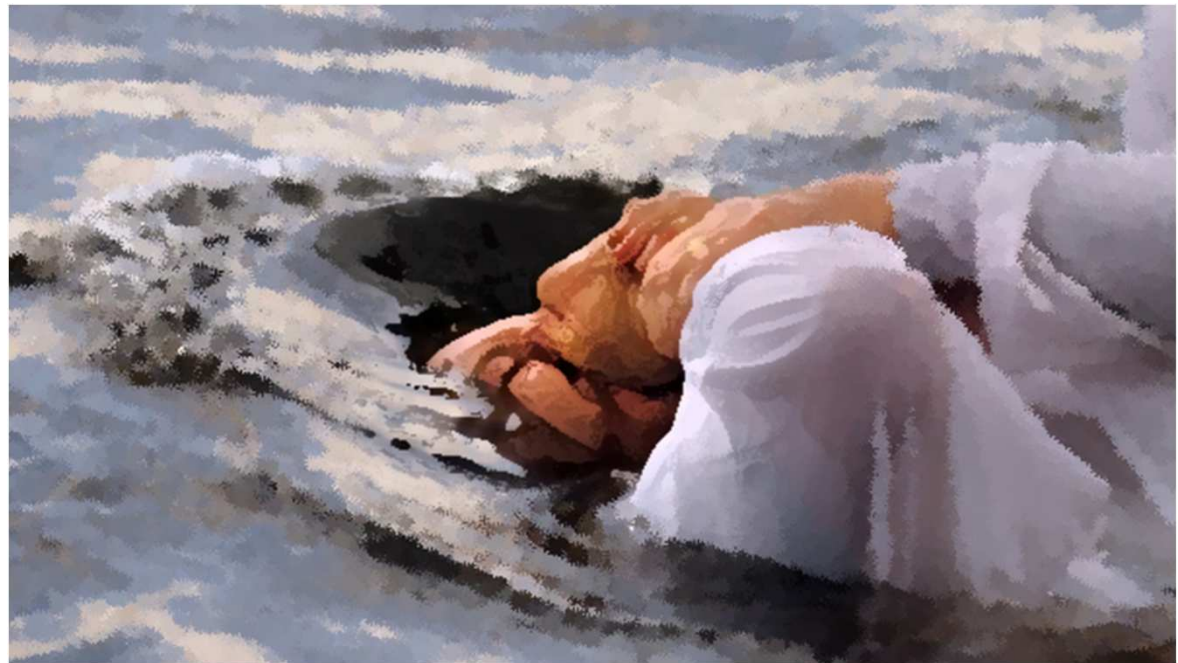


Figure 3.29: Submerged in the Baptism Ritual

© First Baptist Church cleveland.com (2021)

WATER AS TRANSITIONAL SPACE

*"Come!" Let the one who is thirsty come; and let the one who wishes take the free gift of the water of life."
(Rev:22:17, NIV)*

This research is centred around this powerful verse for many reasons. Paul ends the bible with this invitation, setting the tone for the church's mission to invite anyone who is spiritually thirsty to come and quench their thirst through Christ and accept God's gift of salvation for us all to be 'made new'.

Water permeates through many bible stories; it is the powerful element that brings chaos and order or destruction and rebirth (think of the story of Noah and the Arc). Furthermore, it plays a pivotal role in the symbolism of rebirth, and Christian right of passage. Water holds symbolic meaning to both Hebrew and Christian rituals and the symbolic 'water of life,' gives deeper meaning to the design philosophy for this project.

During the baptism ritual, your body is submerged into the water, and for that moment, you're neither here, nor there. Symbolically, the water is the space between crossing worlds and allows your soul to move between the boundaries of physical and spiritual realms. Crossing worlds through this ritual and movement through water, is a physical as well as an emotional and spiritual act, that connects your soul with God, as you become one in Christ and with the church. The element of water when charged with the knowledge of Christian meaning, therefore, has the cognitive ability to transcend one into a spiritual realm, with its mystic properties.

David Canter (1977) explains, referencing a three-component model, that a *"place is the result of relationships between actions, conceptions and physical attributes"* (Canter 1977). By making the church facility a landmark through its symbolic form, gives the place a physical attribute that manipulates the psychology and experience of place that can be viewed by its community from two different perspectives, secular and spiritual.

Furthermore, creating a sense of place with water as the main element makes a strong argument for the facility reviving the movement of water through the site as a semiotic notion and place-making tool to transform the lives of the community.

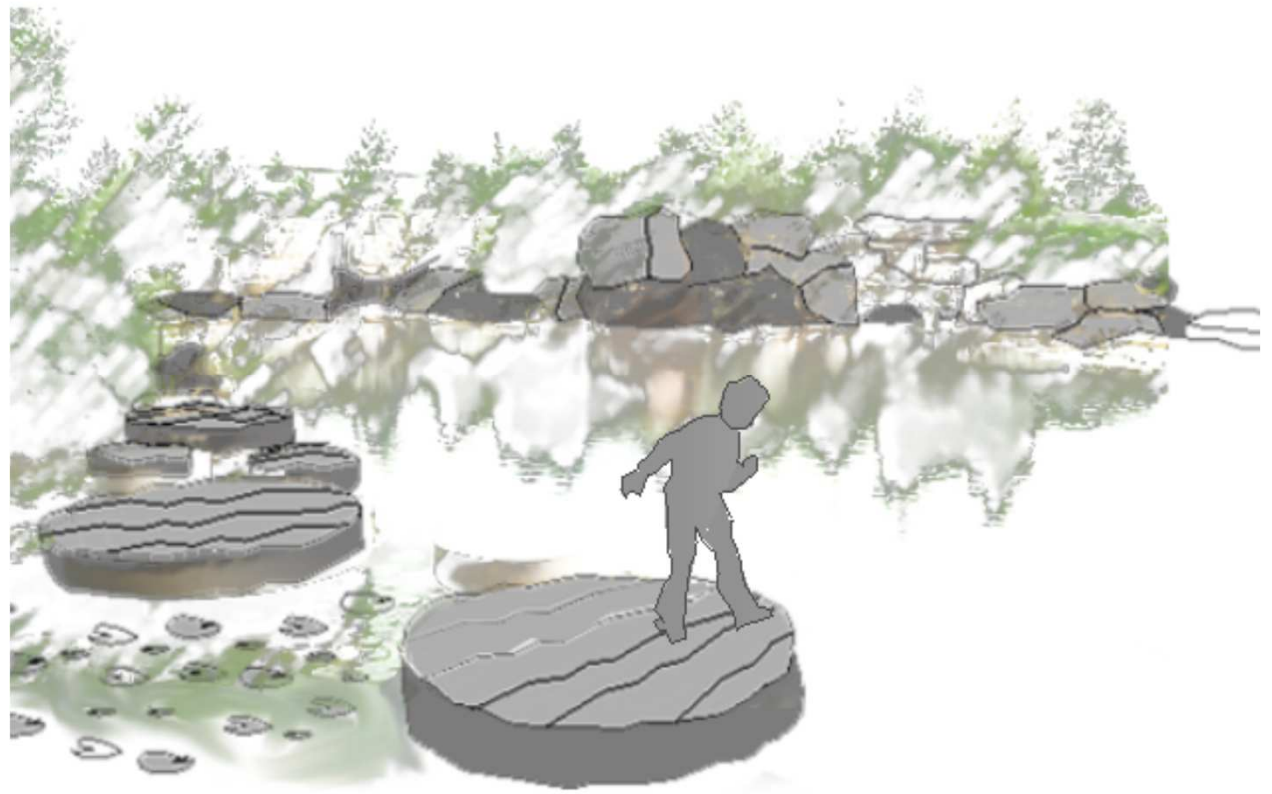


Figure 3.30: Water as place-making tool (Author, 2021)

FORM FINDING STRATEGIES – HYBRID TENSIONS

Geometric forms of architecture have been with us from the beginning, encoded through texts for us to understand and build theory on, such as Vitruvian rules of classical order, '*structural stability, utility, and beauty*'; or as per Wotton's interpretation (1624) '*firmness, commodity, and delight*'. These were all linked to human proportion, cosmology, and experience; More importantly, when these principles are merged with cultural knowledge, it presents an architecture of meaning.

Architecture adds cultural value to place, and through this, we can begin to understand the importance that architects hold in shaping society. The revolutionary architectural styles are resultant from changing social, cultural and political scenarios. Architecture's various styles and forms are seen through a series of movements throughout time, skilfully using facets of historical design processes to formulate new architectural languages. It was particularly after the modern movement when architects began experimenting with *deconstructivism* threatening the very traditions of Architectural theories. By experimenting and breaking rules of geometric form and composition into 'impure' forms it began to change the art of building (Jodidio, 2012), which opened new ideas, approaches and theories.

From a religious point of view, this same pattern can be seen in Christianity today. The evolution that Christianity experienced since the reformation resulted in a fragmentation of understanding of Christian spirituality, debates and further splitting of the faith into different denominations.

While it is not the intention for this research report to resolve conflicts about Christian faith, the idea is to provide an inclusive architecture and embrace these complexities that society presents, not focusing on one aspect but on many, such as in this projects case; ecology, sustainability, culture, rituals and faith. This leaves an open-ended dialogue between user and building and gives the user the freedom and authorship to choose their journey and experience.

Economou (2015) cites Patrik Schumacher's (2012) thesis proposition's which states, "In a society without a control centre, architecture must regulate itself and maintain its mechanisms of evolution" (Economou, 2015). It becomes apparent that Economou(2015) suggests we need to move beyond Sullivan's (1896) philosophy that "*form follows function*", since even the functions of buildings over time, could change. Buildings, therefore, must be designed to be more adaptable and fluid, and perhaps even hybrid in the 21st century to adapt to the cultural shift of the digital age, into a realm that architectural "form powers function" (Economou, 2015).

Schumacher(2011;2012 cited in Economou 2015) proposes a 'self-regulated' architecture termed '*autopoietic theory*', which he defines as a '*closed, self-referential [making of architecture], that reacts to outside sources as one*' (Schumacher 2011;2012, Economou 2015). In other words, a self-sustainable building system, that co-exists and may easily adapt to its context. It may not need to conform to its context aesthetically, but is 'elegant', both inside and out. (Schumacher 2012, cited in Jodidio, 2012)

Salingaros et al. (2007) in his journal report, *Restructuring 21st Century Architecture through Human Intelligence*, suggests that with technological advancements amidst, we must take these opportunities to create more human-type architecture that touches on human cognition, and generates awareness and meaning of place, that binds you to the complexities of the physical world around you (Salingaros & Masden,2007). This suggests a design framework that looks at taking old and new principles to develop a form-finding strategy, that unifies ideas and phenomena into a communication system that merges all the complexities presented.

Historically, the study of nature probed the significance of geometry. The belief that God was the creator of the world, and the geometer of all things, meant that architects and artists who were commissioned to create worship spaces had the honour of expressing God through their work. Architects charged these church buildings with symbolic meanings and mysticism by employing geometric figures that mimic nature. They made use of scale that gave an impression of monumental greatness and used the effects of light to express God's divinity.

From this understanding, the use of the *Ichthys* is suggested as the symbolic form of the church facility as a meeting place. Its deconstructed form suggests a deconstruction of the Christian faith, morphing itself into a symbiosis between tensions that is both spiritual and secular space, making the architecture a dichotomy of traditional and new, that looks up to heaven while making people aware of their impact on earth.



Chapter 4

SETTING AN URBAN SCENE FOR THE
MISSION FIELD H2O



Setting an Urban Scene for the Mission Field

MISSIONARY SPACES

The church begins with Jesus and his disciples who at the time of the New Testament, functioned within the society they found themselves in (Pillay J, 2017). It took Jesus three years of ministry to make an impact that would someday see a universal movement of Christian followers continue in his mission to be the change agent for the good of all men. He used no specific building to carry out his mission but encompassed outer temple courts, city gates and the outdoors as His 'mission field'. Jesus used nature in profound ways throughout his ministry to show his divinity. He met all sorts of ethnic and class groups, at rivers, lakes, and wells.

A bible story that sets the scene of one of these communal spaces is the story of Jesus and the Samaritan woman. Water is used as a point for discussion. As Jesus embarked on a day walk in the blazing heat, he sits and encounters the Samaritan woman coming to the well and asked for some water. She was surprised that a Jew would approach her, although this did not matter to Jesus. What did matter was that he shared the gospel of the love of God, and offered his *water of life* to the woman, to be *made new*.

Soon this water-well became the location where she would bring more people to Him to hear about the Good news.

The water-well in this story was not only a place to harvest and preserve water, but it also became a place to gather and fellowship. This sparked the notion that the church facility could be translated as the *water-well* that preserves the ecology of the wetland, harvest water through its form and becomes the meeting place, which opens up dialogue around its mission.

Jesus met people in all kinds of urban typology settings, and he did this while they were carrying out their everyday duties. *Mission Field H2O* aims at re-creating these similar typology settings for the church to carry on Jesus's mission.

In this chapter, urban design principles are investigated and adapted to create a socio-economic environment suitable for the Radiokop community and the church.



Figure 4.2: Byzantine-era pools discovered at the site of Ein Hanya, near Jerusalem, showing importance of water at the worship space.

©- Assaf Peretz/Israel Antiquities Authority (nd)
<https://www.timesofisrael.com>

PUBLIC AND DEMOCRATIC SPACES

Reference to Benjamin Stanley's (2012) journal article, *Urban Open Spaces in Historical perspective*, shares theories and principles of historical urbanism as a means to provide valuable perspectives for modern city urbanism.

Stanley's analysis begins with the standpoint that, open public spaces are highly valued when related to the "social, political, and physical health of urban residents and communities" (Stanley *et al*, 2012:1090). To formulate a well-functioned open space, Stanley cites historical political theorists Habermas (1962), suggests that democracy is strengthened when it functions in a public sphere and further cites Sandercock (1998) and Madanipour (2003) who encourages that these type of exchanges are imperative to gain a better understanding amongst diverse cultural groups (Carr *et al.*, 1992).

Furthermore, Jacobs (1961; Whyte, 1980 and Tibbalds, 1992 cited in Stanley *et al*, 1998) speaks of the importance of democratic public space to strengthen community ties and sense of place (Stanley *et al.* 1998), vital in the case for the Radiokop community.

PEDESTRIAN SPACES

The study on pedestrian movement in and around Radiokop revealed that many community members walk in the street rather than on pavement areas, due to very uncomfortable narrow walkways, or overgrown landscaping. However, the wetland has an abundance of space to walk over but is inaccessible and unapproachable.

Stanley speaks about the benefits of high pedestrian spaces that improve interpersonal connections among community members and the potential of intertwining between ethnic and class groups (Stanley *et al.* 1998). Pedestrian spaces in many of South African newer suburbs are insufficient. The Garden City movement initiated by Ebenezer (1898) speaks of the many health benefits and well-being of community members who can access green open spaces. While this may prove true, the ideology is not adapted very well in many parts of Gauteng. These green pockets lack maintenance, making it unpleasant to look at or walk through and have become ridden with crime.

MANAGEMENT OF PUBLIC SPACES - LINKED TO RELIGION/ PRIVATE ORGANISATIONS

Stanley *et al* (1998) raises a critical analysis of the management of public spaces and shares the sentiment that it favours a modern capitalist society that may exclude certain classes if these spaces are privatised. While this may prove true, in the context of South Africa, this kind of management model is required since local municipalities are under strain with basic service deliverables and will benefit if they worked in partnership with private organisations to manage these spaces.

Currently, tensions exist between the community, the city and private owners for the lack in management of these green open spaces. There is an overall concern about the responsibilities of these spaces, which becomes a burden on the community members who live around it. To a degree, that it becomes, as Wolch *et al.* (2005 cited in Stanley 2012) describes as, an "environmental justice concern" for all stakeholders involved (Stanley, 2012).

The ancient bible city highlights well managed public places such as the Greek agora that combined urban spaces with democratic spaces. The Roman forums and later, religious plazas are all good examples of open public spaces that encourage a sustainable socio-economic environment in support of socio-cultural activities. In this instance, these public spaces were managed together by government and private organisations and worked well as a sustainable management model, to encourage community involvement and discourse surrounding *urban sustainability and the conservation of the environment* as explained by Saunders (2010 cited in Stanley *et al*, 1998).

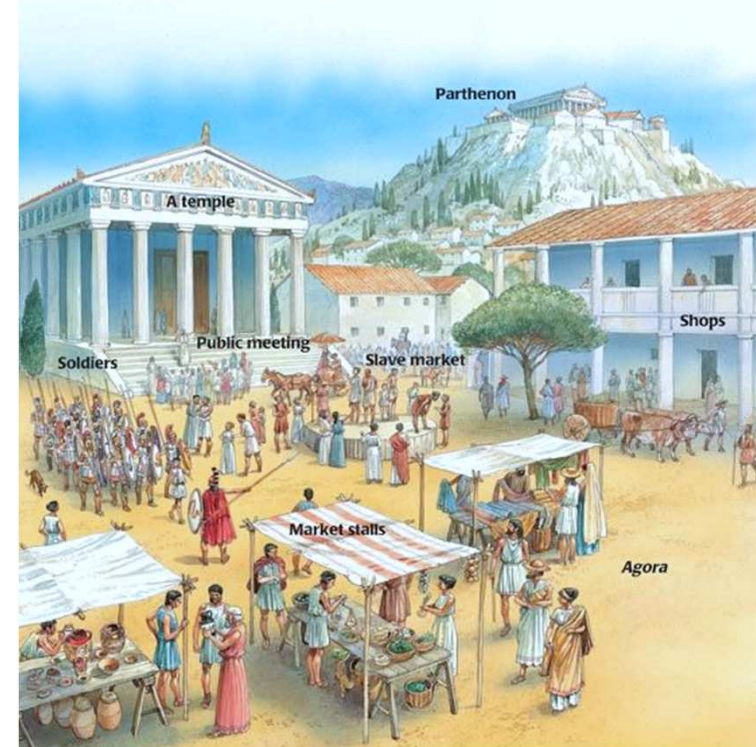


Figure 4.3: Greek Agora, Public democratic space ©Qfile.com

URBAN TYPOLOGY STRATEGIES AND LEARNING KNOWLEDGE SYSTEMS

To create a valuable cultural venue with popular activities, Stanley(2012) suggests a varied approach of urban typologies necessary for community building (Stanley B, 2012). This sparked an interest in choosing specific program requirements from Stanley's list of urban typologies adapted for the church facility. Typologies suggested for this facility includes a community vegetable garden, waste management facility, a public courtyard, an open amphitheatre, market space and leisure recreational spaces. Furthermore, the interpretation of Stanley's paper explains that the success of these urban typologies is not only influenced by the top-down/ bottom-up stakeholder forces but also suggests that a counterbalance of architecture exist in these open public spaces to define certain spatial usages (Stanley, 2012).

There is an extreme disconnect observed between the community, the wetland and the church. With a better understanding of urban spatial theories; the project can now be approached with these principles in mind to create more valuable cultural spaces. At first glance, it becomes clear that the disconnect stems from there being no importance or knowledge systems attached to the wetland site. The lack of management and sense of ownership over the wetland is also troublesome, as it directly results in its neglect and destruction from others. It is also of the opinion that the biggest cause for this disconnect is directly linked to the lack of accessibility and movement of the community members through the wetland, making it a target for illegals to camp, pollute and cut down trees, further raising concerns of security, for the community.

'CREATING GREAT PLACES'

There is, without doubt, a need to break down the barrier between man and nature, through good use of architecture and urban design. Cushing argues in her book, *Creating Great Places*, that "great places don't just happen, they are created." (Cushing and Miller, 2020) She mentions some contemporary challenges that speak of Obesity, ADD, anxiety, depression and overall reduced quality of life, arguing that biophilic design is a theory that connects man to nature, essential for our overall well-being, which promotes healthy living and mental health when we interact with nature. With an ever-increasing urban population, the connection to nature is becoming more important as it is slowly disappearing.



Figure 4.4. Sketch Gathering spaces: Landscaped Public square of St. Paul Cathedral, London (Author, 2021)

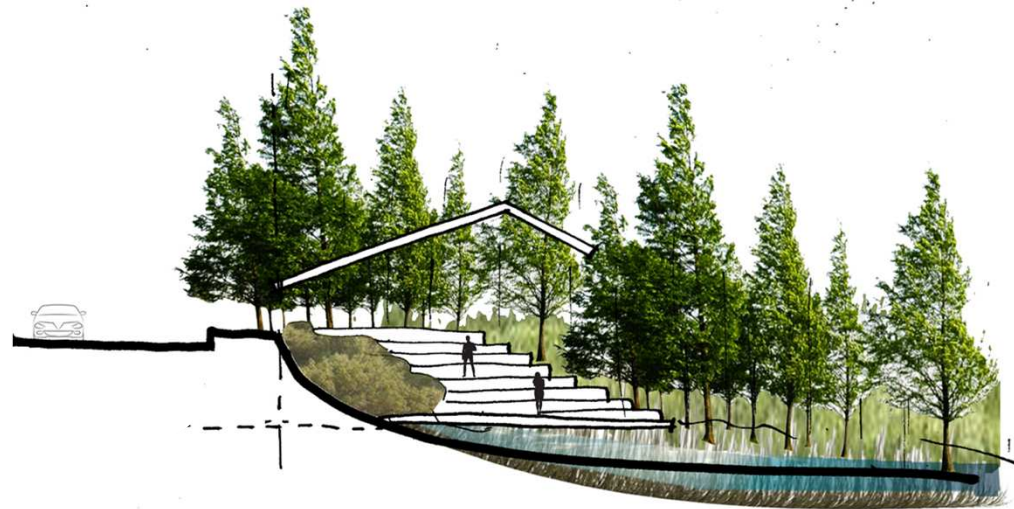


Figure 4.5: Sketch Gathering spaces: Amphitheatre Space encourages arts and crafts (Author, 2021)

In the case of Radiokop, not having free access to nature could escalate a lot of the above-mentioned issues. It is therefore imperative that the healing powers of nature and biophilia principles are fostered in the architecture to create a unique sense of place.

Biophilic principles in architectural design acknowledge the connection between man and nature but also looks at important factors, such as ecology, sustainability, and biomimicry - which is the study of nature's modelling systems that inform choices around the built form, material choices, patterns and textures that engage with the senses (Cushing, 2020). In this research, engaging with nature, ecology, and phenomenology principles merge as an integrated solution that supports the churches mission to connect man to God through interacting with the environment. Not only does this encourage and enlighten man's spiritual needs, but becomes an educational and research opportunity for the community to engage with the wetland as a natural asset with a unique ecology and natural treatment system.

DESIGN INTENT

All these factors mentioned, come together to inform a design intention that looks at creating a socio-ecological environment. The intention, therefore, is to;

- Upgrade the dilapidated catchments within the wetland,
- Incorporate the treatment of recycled and harvested stormwater that gets filtered down into the wetland.

- Merge a constructed wetland into the built environment that will mutually benefit the wetland eco-system and encourage wildlife habitats and nesting grounds within its realm.
- Blending the architecture into the ecological context of the wetland, while further incorporating recreational facilities for more social and multi-sensory interaction with nature to foster a unique sense of place.

THE CHURCH AS STEWARDS OF THE EARTH

The church building symbolically represents the unity between the community, the church and the wetland. Ecologically speaking, this unity is achieved through understanding biodiversity, where man and nature become each other's life support. The church thus brings this ideology together through a cultural value system instilled, using Bronfenbrenner's (1965) ecological theory stating that 'every action taken by man, affects every facet of life. (Cartwright, 2018).

History shows us a shared place of concern when it comes to the preservation of nature. It is not a religious movement but one of humanity. Merrit Jonathan, (Jonathan, 2010) in "Green like God" suggests that "Christians, after all, are stewards of God's earth." Her work is centred on ecological responsibilities and the spiritual practices of Benedictine Monasteries, whose religious ethics and sustainable structures formed a driving force in their faith through ecological practices (Aversano-Dearborn and Winkler, 2018). The life of the monastery, for example, consisted of monks or nuns who followed an ascetic lifestyle.

It began by living life in the wilderness isolated, with no distractions from the sins of the world, leading into a movement that formed a community to observe an ascetic life together (Rowling, 1968:125).

Cartwright (Cartwright, 2018) describes monastery life through his writings, explaining the community work involved and the architectural setting that supported it. Monks lived a sustainable life- they would farm for their food and shared their resources with anyone in need. In ancillary buildings close to the monks' living quarters, they would provide accommodation for the homeless, the aged and the sick. Furthermore, the monastery was built in the form of cloisters with central courtyards; these were vital for dialogue and exchange and daily activities. A central courtyard was important for fellowship and usually led off common spaces, such as dining rooms and a chapel. Their dining rooms were large and was used to fellowship with one another. A very important space was their library, which had the best light and would include a scriptorium to write and make books. A lot could be learnt from the program presented by these monasteries, who focused on sustainability, community building and who made a concerted effort to co-exist peacefully with nature.

There is a biblical emphasis on stewardship, in Gen 1:26-28 (NIV) and Gen2:15 (NIV) emphasizing the social responsibility that all men should take and their role to protect the earth, as it belongs to the Lord (Psalm 24:1, NIV) and not to its human inhabitants. *(Lev 25:23, NIV) "The land must not be sold permanently, because the land is mine and you reside in my land as foreigners and strangers."*

Figure 4.6 : Medieval Monastery Herb Garden, © Danièle Cybulskie

<https://www.medievalists.net/2018/04/tiny-edens-what-can-you-find-in-a-medieval-monasterys-garden/>



Closing argument

The evolution of Christianity began as an underground faith to avoid persecution and then became politicised and made public. The reformation evolved it into a modern faith where connecting with God was direct and not through any means of authority. Today, the modern Christian faith is practised from anywhere and by anyone. In a post-modern society, Christianity does not define our lifestyles or daily rituals as it once did before. The religion has been normalised, with 84% of South African's identifying as Christians (StatsSA, 2022). However, there is a difference between a Christian and a born-again Christian. Churches have become underutilised and our culture, fragile, in a time when people do not depend on faith alone, which has become the church's main area of focus and concern.

As seen in previous chapters, a certain Christian denomination played an influential role in endorsing South African apartheid until other Christian church forces began opposing the Apartheid law, putting an end to it. Taking precedent from the fact that everyone worked together, despite religious beliefs; South Africans were able to stand united toward a common goal for human rights. In a similar manner the common goal in Mission Field H2O is to preserve a wetland for future generations, which affects all of humanity, religion aside.

The church will play an important role as a change agent, especially as it will gain a reputation for the work that they do in the local community, which will become a prototype for many other wetlands in the region. The church thus will address relevant issues pertaining to the wetland as well as matters of their own faith, and will gain presence through their work. Having been established around the same time as the Radiokop community, the church owns the property and therefore is the most suited to facilitate this public space, and take on the role as a stable organisation that will manage the facility.

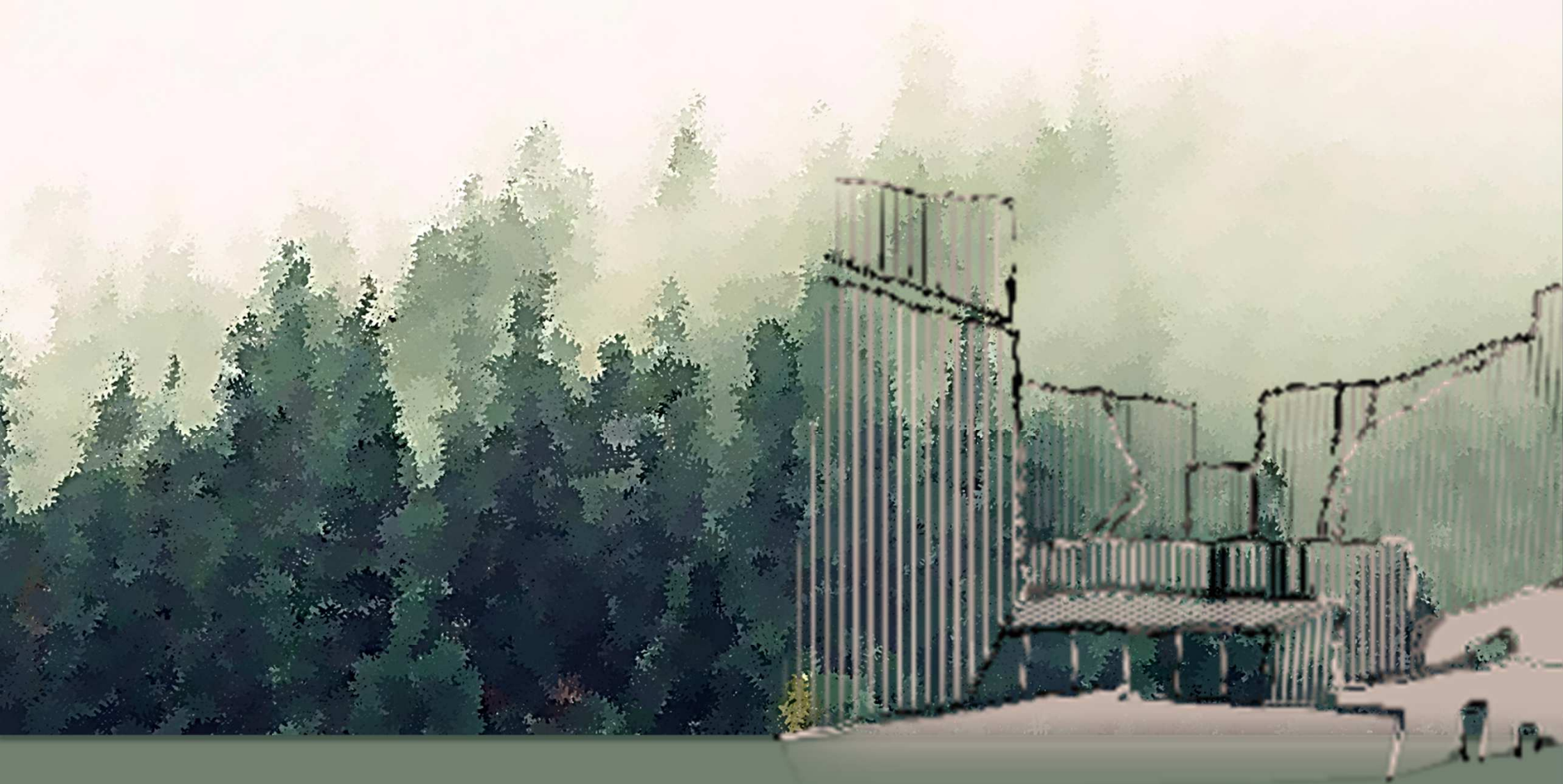
The church building thus runs in conjunction with the public facility, and contributes in the mission to educate and preserve the wetland. The research proves that public spaces are managed better under a private organisations care, referring to some examples such as the Agora/ Roman and Religious Plazas. Historically, well-functioned public places as these, were democratic spaces, where people came from all backgrounds and religious beliefs, to contribute to the socio-economic and diversity of a place.

Additionally, the survey also confirms that the majority of the people were comfortable attending a public space, run by the church. Therefore it is the opinion that having a public realm linked to a religion, is immaterial and shouldn't hinder the objectives for Mission Field H2O. Nonetheless, Christianity preaches freewill, and because freedom of religion is a human right, it will never be forced upon anyone, but rather portrayed as a faith run by love and humanity. Given the context, (like many other religions too) it encourages love and respect for all of God's creation.

The goal of this facility is therefore, to assist in cultivating spirituality and nurture the word of God, all while experiencing the wonder and importance of nature. It becomes a platform for democracy where community meetings are held, and becomes a place that shares a common goal to preserve the wetland and be knowledgeable of the environment, through recycling management plans, uplifting disadvantaged communities through funding entrepreneurship schemes, food drives and counselling.

With the project anchored around the wetland site, the wetland becomes the churches mission field, with water as a central theme and place-making tool that symbolically permeates the architectural form, supporting the idea of fluidity and movement between spiritual and secular spaces. This will result in a dialogue with architecture and its user, perceived as meaningful and symbolic, as the subtle architectural cues begin to speak to the human intelligence through phenomenological forces, nature, light, materiality and the procession of movement, to foster deep thought and introspection.

This place will be for everyone, humans are naturally spiritual beings, and there will come a time when God will connect with us through His spirit. When this connection is made, it usually initiates a journey in search of finding our purpose and meaning of life and the sense to belong. In this case, many turn to nature to rejuvenate, reflect or to meditate. This is where the gated community of Radiokop and neighbouring suburbs, could take a stroll across Mission Field H2O, and not only enjoy a journey of enlightenment, but find opportunities to engage with the church, or other people, for a more interconnected community.



Chapter 5



PRECEDENT STUDIES

- Water as place making tool 79
- Tactility, Nature and Light 82
- Spirit of Place 86
- Pure Beauty – The symbolic 90

Water as Place Making Tool



Figure 5.1: ©Google Map Image



Figure 5.2: Locality Map, (Author 2021)

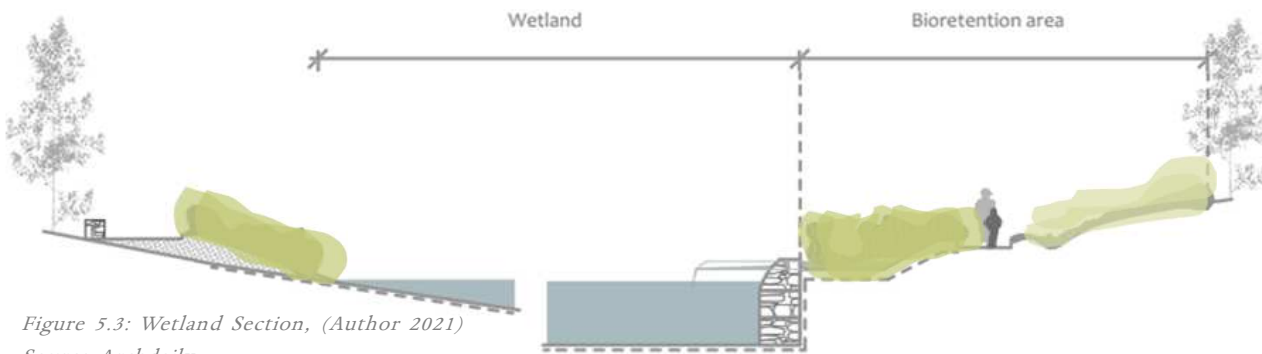


Figure 5.3: Wetland Section, (Author 2021)

Source Archdaily.

What was once a landfill site is now Australia's largest environmental project to date, sized at 16000 m². With a focus on urban water and desalination. 850 mega litres of stormwater is harvested per year and then purified in bio-filtration swales that are filtered throughout the park, supplying both the wetland facility and nearby industry with re-used water. (Turf Design Studio, 2019). Water becomes a place-making tool in the public space, by capturing and re-using water in a public setting, encourages recreational and sustainable educational opportunities for the community.

Sydney Water Park



Figure 5.4: © Ethan Rohloff Source: Archdaily



Figure 5.5: © Ethan Rohloff Source: Archdaily

Architect: Alluvium, Dragonfly & Partridge , Environmental partnership, Turf Design Studio, Turpin and Crawford .
Built: 2015 Sydney, Australia
Published on Archdaily, date n / a

Sydney Water Park

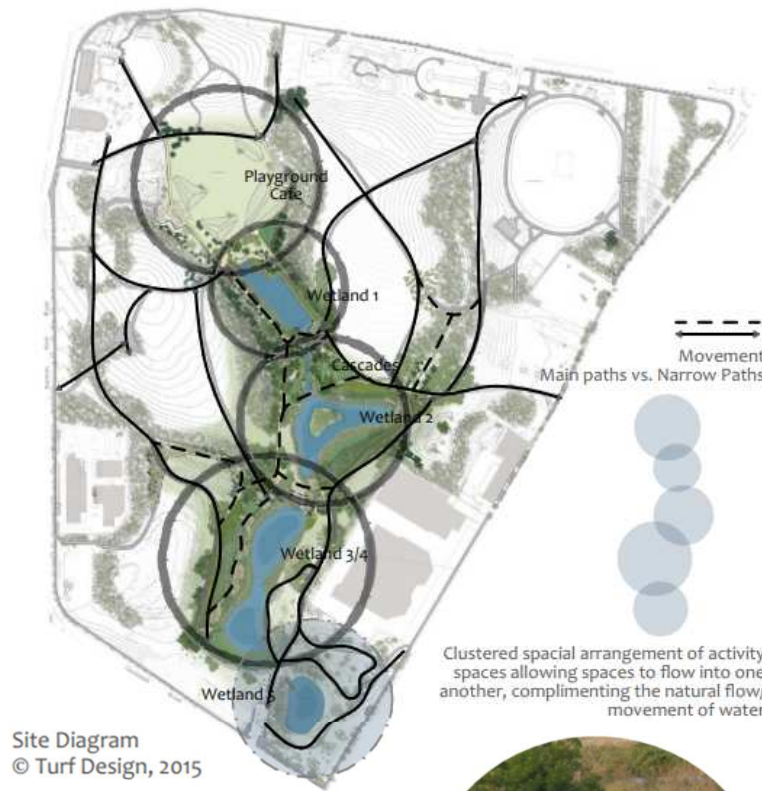


Figure 5.6: (above) Site Diagram
© Turf Design, 2015

Figure 5.7 (right) Steppingstones creates tactile experience ©Adam Hunter, Archdaily

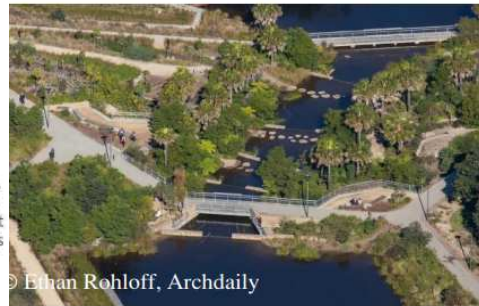


Figure 5.8 Drone Images, ©Simon Wood, Source: Archdaily

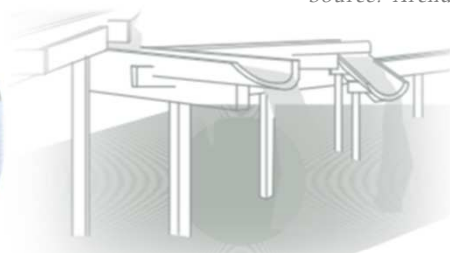


Figure 5.9 Terracotta Waterfalls, Author 2021

The elevated Terracotta falls form part of the artistic expression of the park but also serves both a scientific and ecological purpose. It aerates the running water into the larger body of water. The qualities of the sound of running water accentuate the sense of place, and the terracotta pipes themselves become birdbaths, forming part of the habitat. It is hard to believe that the Sydney waterpark was initially a landfill site and brick kiln from 1946 to 1965. It took nearly two decades to transform into a vibrant recreational park setting till its completion in 2018. The design team looked to water as an art, science and ecology as its element for place-making, which becomes very important for the design of the preservation facility. The once post-historic industrial setting is now revitalized by the picturesque waterscape, playing a vital part in connecting man with nature.



Figure 5.10 Historical Images of Landfill site
© Turf Design, 2015

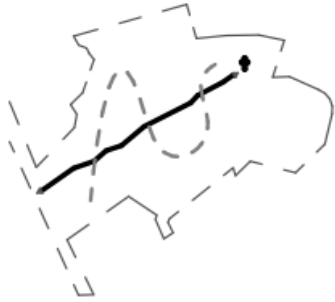


Figure 5.11: Main axis pathway



Figure 5.12: Meandering pathways

Circulation as pathways – Circulation with water as a featured element

The sensitive areas of the wetland help set the circulation zones. Like Sydney water park, these sensitive spaces will be accessible via narrower/ 'dispersed' paths that allow for a more intimate experience. These narrow paths meet at intermediate points that offer experiential/explorative and creative spaces that focus on water as a 'place-making tool, where the community can interact with it. Furthermore, the journey continues the church site, where water forms part of the circulation space as a multi-sensory element.

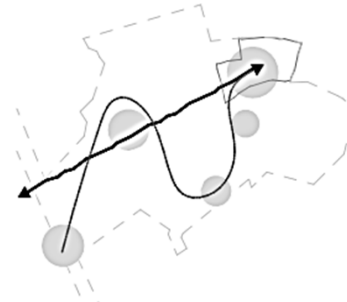


Figure 5.13: Exchange spaces along pathways

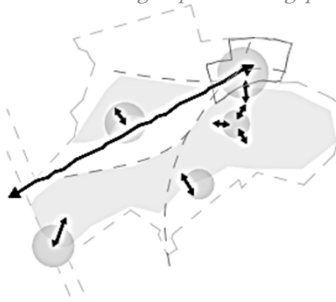


Figure 5.14: Exchange spaces interacts carefully with sensitive sites surrounding it.

A place to Exchange

The wider path will have a direct connection to the church. Offering pause areas, play spaces and viewpoints, perched above the wetland, within proximity to the granitic outcrop. Certain pathways may allow separation or compression of spaces that afford varying levels of interaction between nature and people.



Figure 5.15: Natural Occurrence of space along main axis, offers opportunity for programme along pathway.

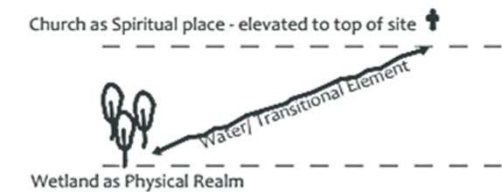


Figure 5.16: Wetland as transitional space

Movement and direct interface with the wetland

The outcome of this design project is to encourage movement. The wetland is quiet and is not currently active. Accentuating the element of moving water through the site and encouraging the community to use it more regularly in their daily routines for recreational purposes, will enhance its genius loci. It also becomes the physical realm that transcends residents upward toward the church, which is the spiritual place.

Tactility, Nature and Light



Figure 5.17 © Google Map Image



Figure 5.18 Locality Map, (Author, 2021)

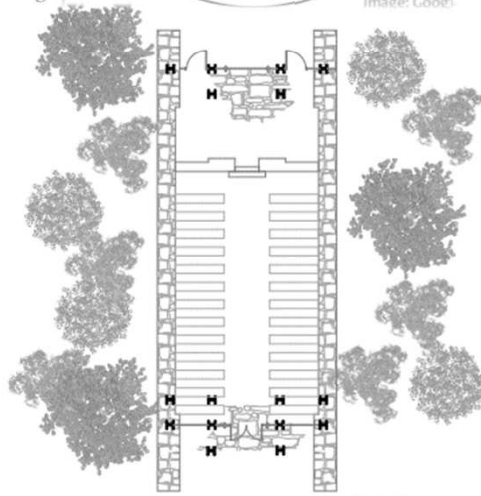


Figure 5.19: Simplistic flagstone base structure submerged into the topography of the site (Author, 2021)

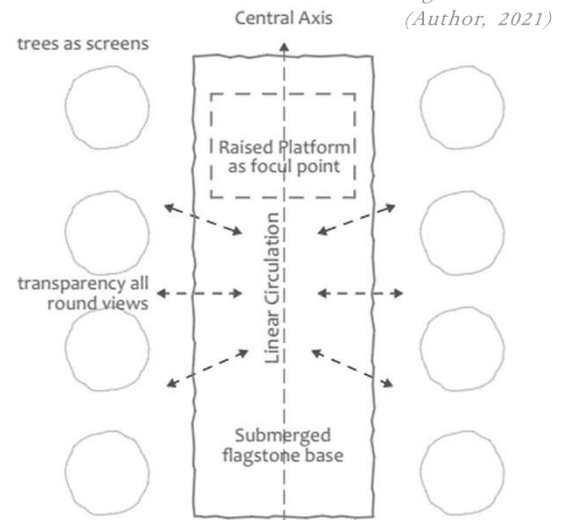


Figure 5.20: Diagram showing relation to outdoors and transparency seen all round (Author, 2021)

Thorncrown Chapel was built by hand using sustainable practices in the confines of a narrow forest setting. The choice of modular construction methods and local materials ensured easy logistics and assembly. The chapel is a non-denominational church designed for everyone to understand and appreciate it as a spiritual place, with an added element of mysticism. This precedent speaks to my envisaged design for the church to engage with its context and embrace its natural surroundings. It should be an all-inclusive space where people gather to find peace, regardless of faith. The main principle behind the design for the wetland preservation church facility is to preserve and protect the adjacent tree-lined wetland. The challenge is to create spaces that incorporate its natural landscape and make use of local materials. Nature, in this case, must take centre stage.

Thorncrown Chapel

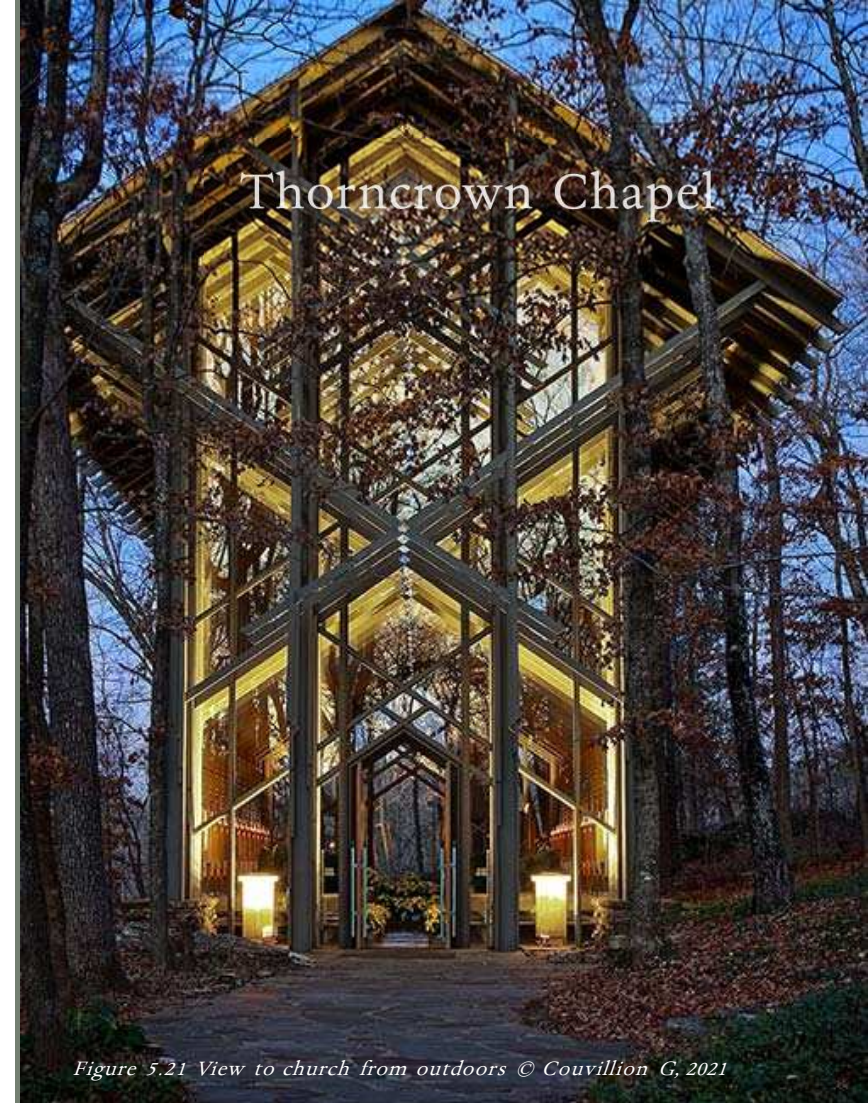


Figure 5.21 View to church from outdoors © Couvillion G, 2021

Architect: E. Fay Jones

Built 1980

Owner: Jim Reed Location: Eureka Springs, Arkansas, US

Approach by foot

The chapel is in the woods and is only accessible by foot, indicated on the map (top left). From the google satellite image (top right), the architecture is almost hidden away by the canopy of treetops, making the architecture a successful integration into the site. Upon approach, the only view of the building is its frontal view, with the sloping of the topography. Nature takes centre stage.

Natural light beam into the building, with the tree lined screen and canopy, creating variations of light filters.

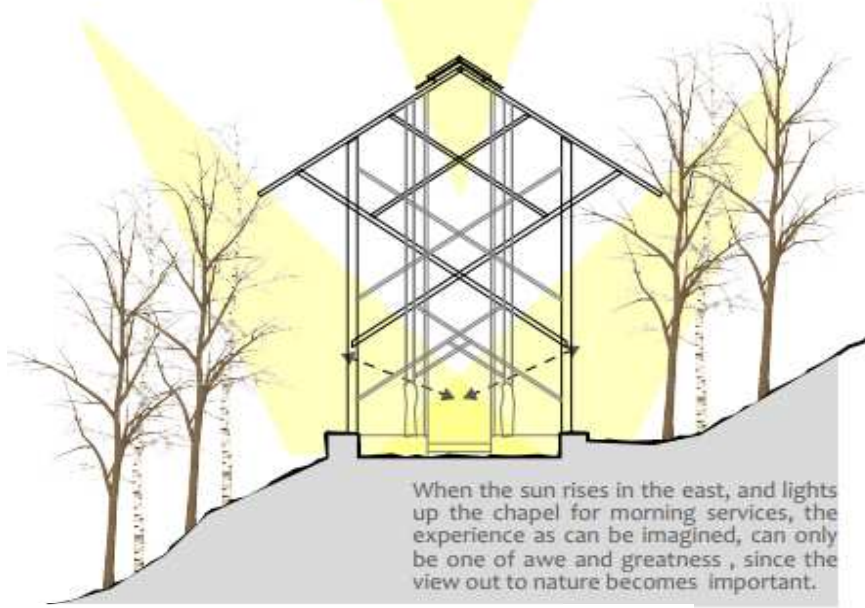


Figure 5.22: Topographic Section, (Author 2021)

Symmetry and Balance



Heavy Base contrasted with the light transparent facade

Geometry
Simple design with no other perspectives



Pure geometry in nature setting

Figure 5.23: Parti Diagrams (Author, 2021)

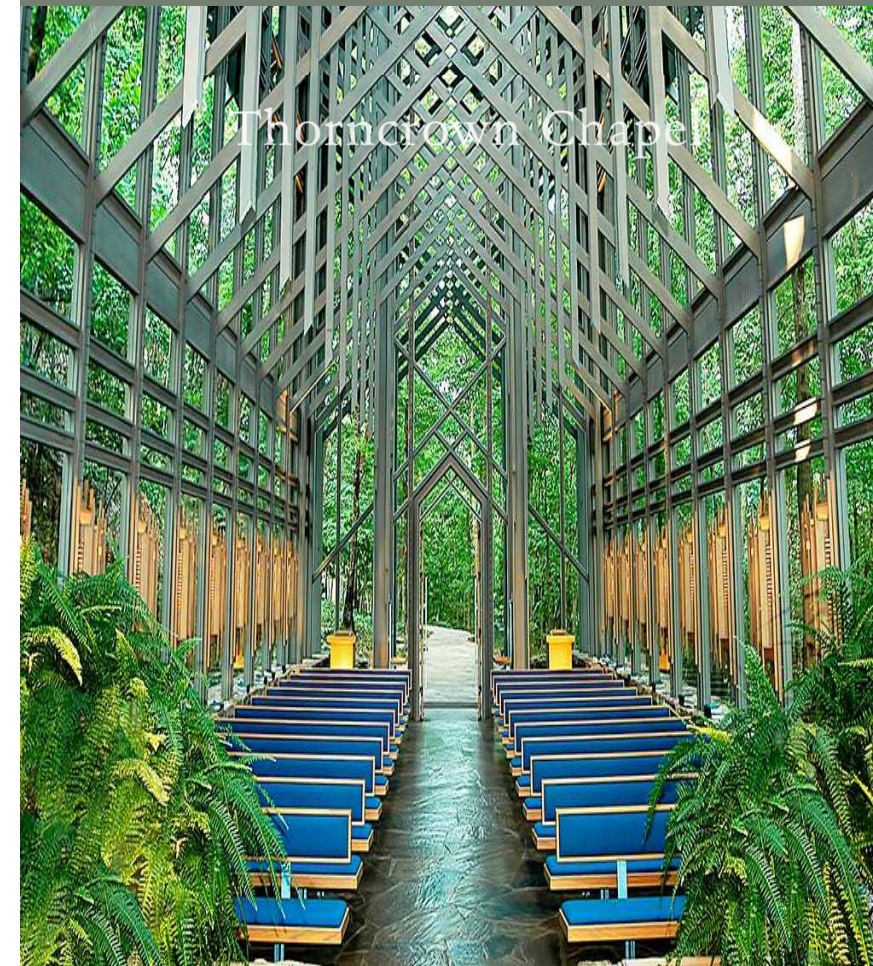


Figure 5.24 Interior spatial experience © Glen Couvillion, 2021

Natural Light

There is a qualitative difference in lighting effects between the screen of surrounding trees entering the church space defines the wooden lattice geometry, with varying levels of filtered light, that further accentuates the structural rhythm of the roof truss system. Thorncrown Chapel was built unconventionally; Usually, worship places are designed inwardly, with no connection to the outside world, but instead, this design invites the outside world into its space, through its glazed walls. The language between internal and external spaces speak to the purity of nature and God. Additionally, the wood lengths for the lattice system were sufficiently cut to size for two men to carry onto the site by foot, making the assembly of the church trusses easy.

Connection between spaces

The local materials of stone and pine wood creates a strong connection and relationship to nature, strengthening the chapel's structure and existence within its natural context. The integration of the flagstone floor base 'roots' the chapel into the hillside, the trees lined outside forms the opaque skin while the transparency of the glazed facade reinforces a connection to its sense of place.

Thorncrown Chapel

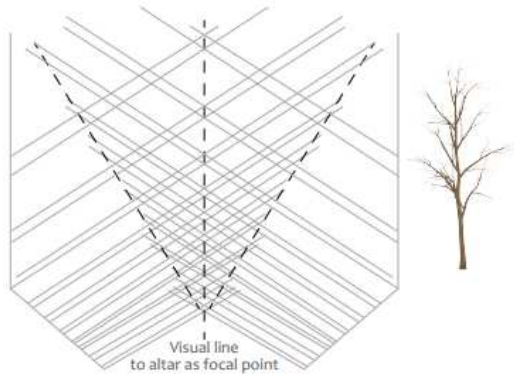


Figure 5.25: Truss system resembling tree branches (Author, 2021) Source Schwartz C, 2015

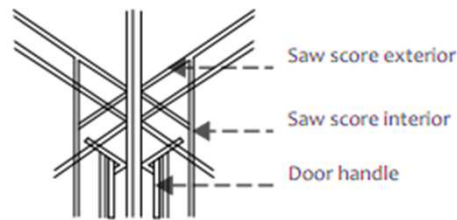


Figure 5.27: Door handle follows Rhomboid design (Author, 2021) Source Schwartz C, 2015

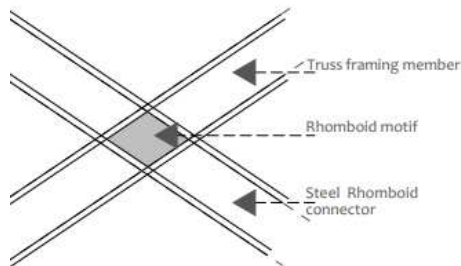


Figure 5.26: Structural truss connection with rhomboid void in the middle. (Author, 2021) Source Schwartz C, 2015

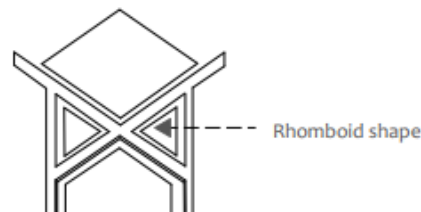


Figure 5.28: Highback chair follows same Rhomboid theme (Author, 2021) Source Schwartz C, 2015

Geometry / Tectonics

A striking design feature is a connection to the surrounding environment through creating a 3dimensional abstraction of the forest tree branches, which can be seen within the simple, yet intricate wooden lattice design. These wooden structures resemble the nave of the traditional church wrapping down the facade of the building to replace the masonry/stone walls of a traditionally built church. The rhomboid detail permeates throughout the building's structure. According to Schwartz, it can be seen in its furnishings and multiple junctions, making it the core characteristic of the architecture. (Schwartz, C; 2016) Below are a few examples of the rhomboid motif as highlighted by Schwartz in his journal. The repetitive nature of forms further accentuates the rhythm in the design.

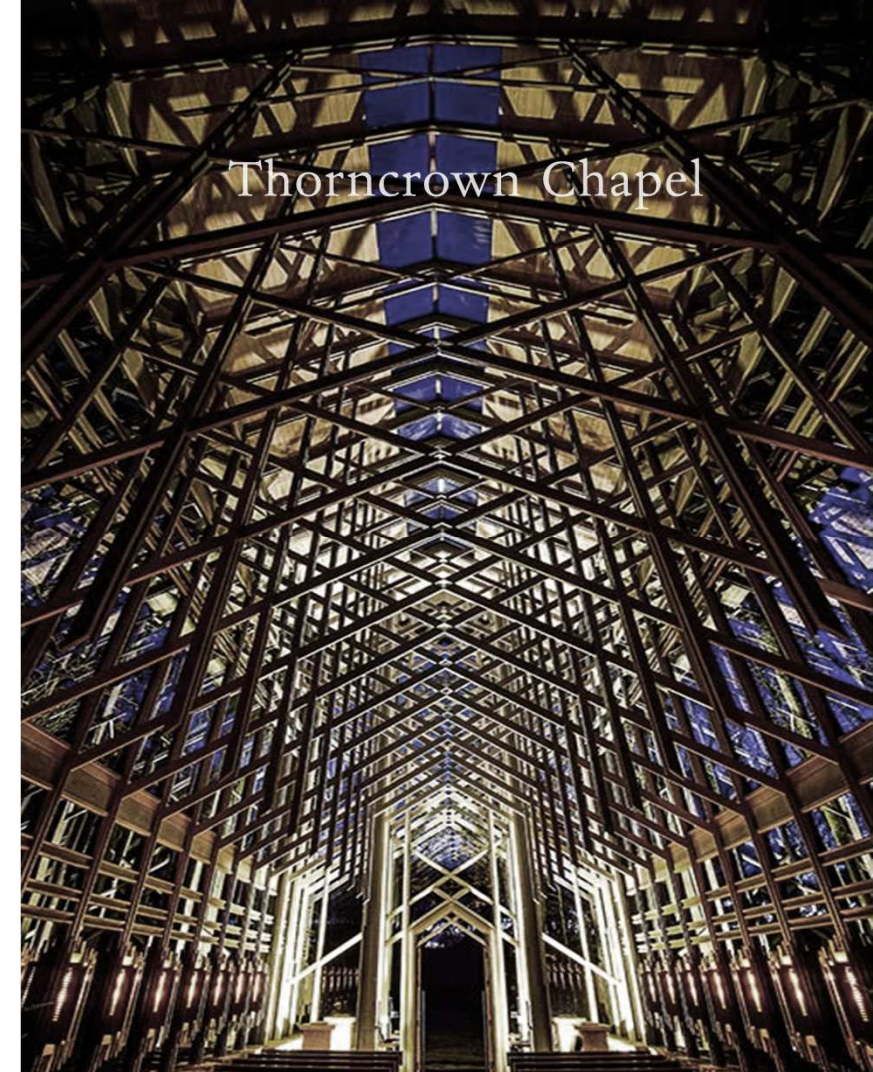


Figure 5.29: Night-time spatial experience © Glen Couvillion, 2021

Phenomenology

Given the natural setting of the site, the lattice wood structure and surrounding trees are accentuated by the movement of the sun, allowing the chapel's appearance to constantly change throughout the day, and with the seasons. This ever-changing quality that the sun offers, according to Morgan Stackman "produc[es] a dynamic spiritual quality for both visitors and clergy. (Stackman, M; 2011)

Thorncrown Chapel

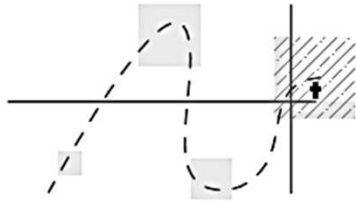


Figure 5.30: Moving beyond boundaries (Author, 2021)

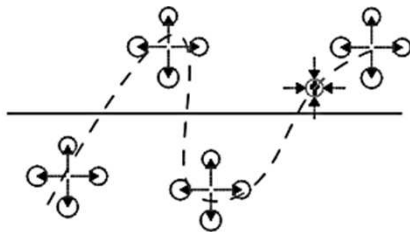


Figure 5.31: Public/Private Relations (Author, 2021)

Beyond Boundaries

The approach to the church can be accessible by foot. Boundaries are blurred between built form and nature. The program allows the church to run its activities past its site boundaries. Additionally, the design looks to elements of nature to dominate its form. Recreational spaces: An all-inclusive urban design encourages a socio-environment that is sustained through play parks and meeting spaces, accessible by foot, offering a sense of safety to the community.

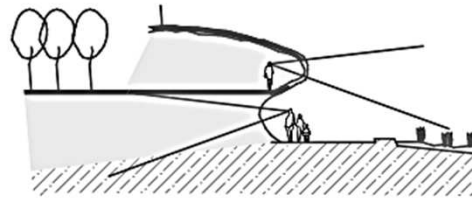


Figure 5.32: Vista's and Views (Author, 2021)

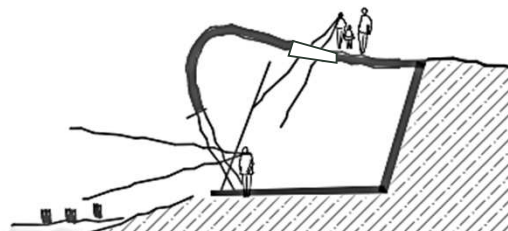


Figure 5.33: Controlling Views Out and Views In (Author, 2021)

Views Out, Views In

The Thorncrown Chapel is transparent while slightly submerged into the ground. The filtering of the trees become the opaque screen for the building, bouncing reflections and shadows from the tree branches into the church space, accentuating the spiritual experience. This inspires a connection between inside and outside spaces, offering varying degrees of privacy. A good way of achieving varying views in and out and past the building, requires taking full advantage of the topography of the site, partially submerging portions of the building into the ground.

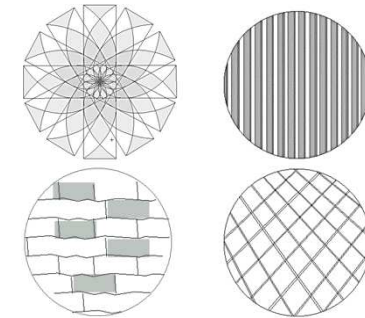


Figure 5.34: Proposed Textures and Tectonics to enhance phenomenology experience, crossing over beams, wood paneling, perforated bricks, tension rods. (Author, 2021)

Tactility & Tectonics

To construct a timeless relationship between built form and nature requires materials that compliment the site, that is locally found, such as stone, wood, glass and other local materials. Inviting nature into these spaces through materiality would accentuate the sensory and tactile experience of space and encourage awareness of the environment to enhance man's well being and connection with nature.

Project Narrative Approach _ Parti Diagrams

Spirit of Place

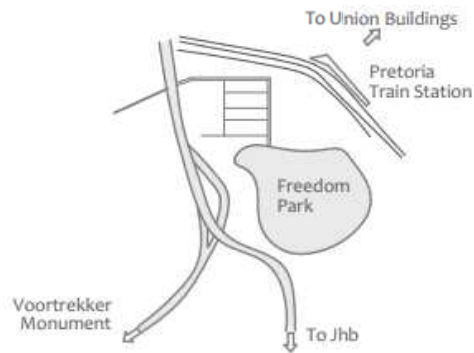


Figure 5.35 Locality Map, (Author 2021)

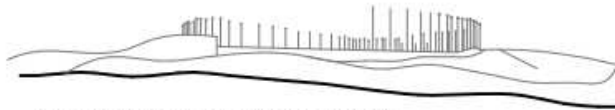


Figure 5.36 View of Freedom Park on Approach from N14 (Author, 2021)

Symbolism and Meaning

On approach, the only visible element seen at Freedom park is its steel rods representing the African reeds that connect the earth to the sky. This contemporary political symbol is very different from the older politically charged monuments, as it pays tribute to those fallen and remains to be a respectful and spiritual place. The //hapo building similarly works in sync with the rest of the parks scheme that blends in with its natural surroundings. It resembles the rocky outcrop, and the 'copper' facade speaks to a broader narrative of time and change. Copper is a local material that changes in its appearance over time. It is widely used by its locals for its healing properties and to offer a better-balanced life. However, in a political context, the copper could stand as a wider narrative of finding balance after a country that was built on oppression and is undergoing change as it heals.



Figure 5.37 Aerial Photograph, ©Google Maps

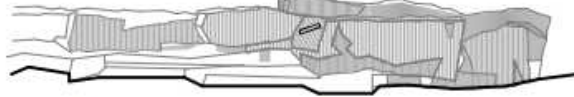


Figure 5.38 Hapo // Resembling boulders against the rocky outcrop hillside (Author, 2021)

Sense of Place through a landscaping journey

The landscaping journey experienced throughout the site is likened to a labyrinth, which offers time for introspection and awareness of indigenous systems. The unique architectural forms expressed throughout the park symbolise a collective South African identity, rich in cultural value and raises awareness of its urban context, history, material culture, and traditions. The architecture successfully integrates into the landscape, and respectfully acknowledges its history and triumph against the politically charged oppressive Voortrekker monument architecture, ironically located opposite the site.

Freedom Park



Figure 5.39: Misty Hills © Graham A Young (2014)

Project Info:
Architects: GAPP + Mashabane Rose Architects + MMA
Location: Pretoria, Gauteng , South Africa
Project Year: 2008
Photographs: Graham A young
Project Name: Freedom Park, Phase 1



Figure 5.40: Misty Hills © Graham A Young (2014)

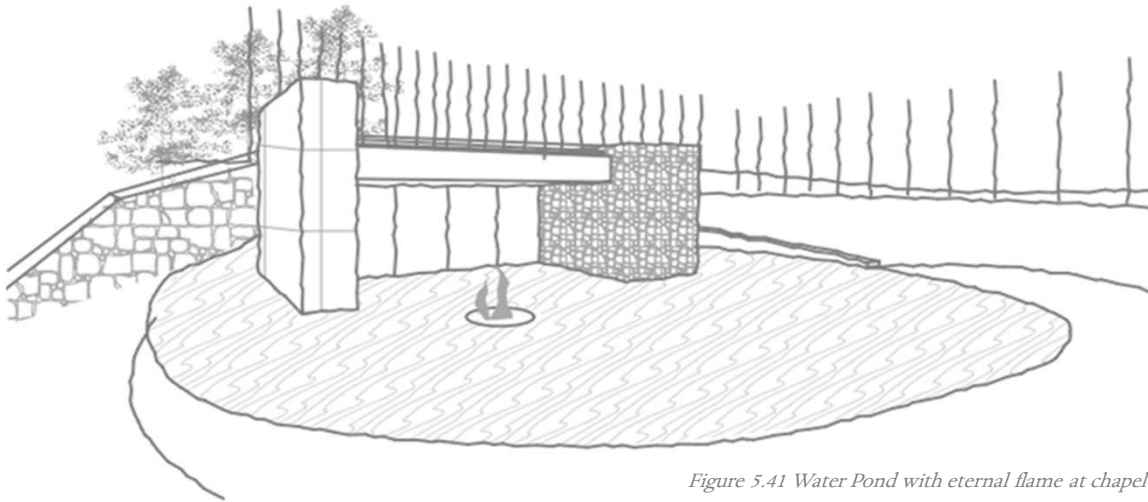
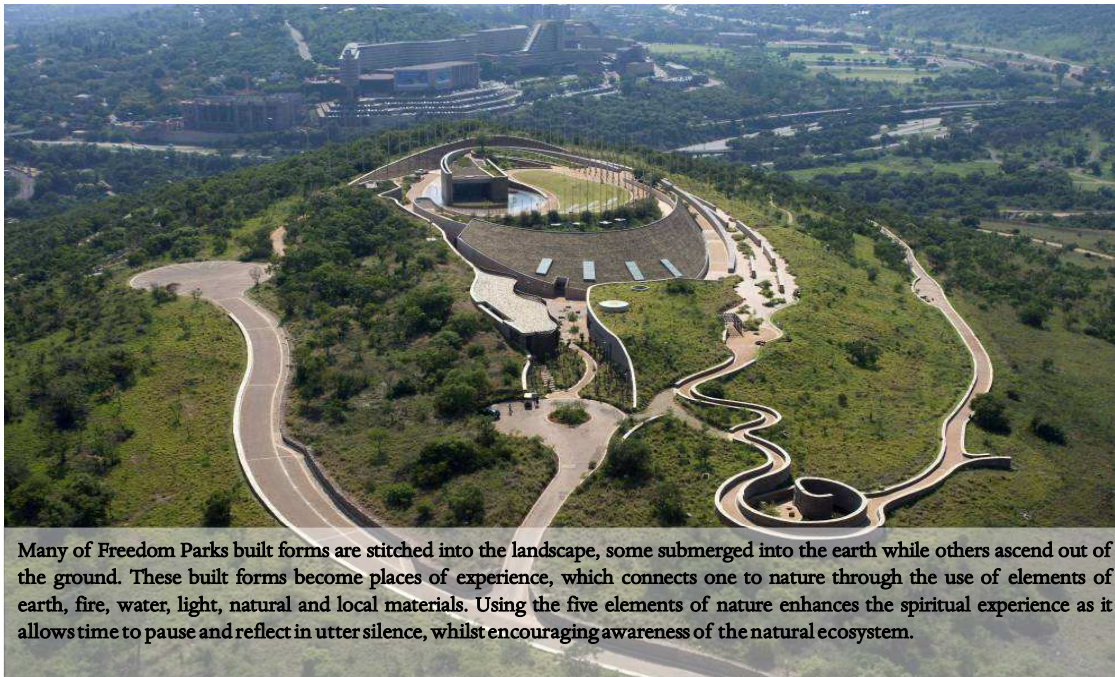


Figure 5.41 Water Pond with eternal flame at chapel



Many of Freedom Parks built forms are stitched into the landscape, some submerged into the earth while others ascend out of the ground. These built forms become places of experience, which connects one to nature through the use of elements of earth, fire, water, light, natural and local materials. Using the five elements of nature enhances the spiritual experience as it allows time to pause and reflect in utter silence, whilst encouraging awareness of the natural ecosystem.

Figure 5.42 Aerial Photograph (2021) ©Aurecon, <https://www.aurecongroup.com/projects/property/the-freedom-park-museum-phase-of-the-heritage-site-development-site-tshwane-south-africa>

Freedom Park



Figure 5.43: Materiality © Graham A Young (2014)

Spirituality

Freedom park has become a place where multiple faiths are drawn to these serene spaces for contemplation and reflection. Its spaces are all drawn from the notion of African cosmology. The use of the water elements speaks to the narrative of cleansing and healing. It is seen and used throughout the park, in streams, and misty pools, setting a scene of tranquillity and the idea of the steam rising, representing liberation. According to Graham A Young, (Makhene, B; 2019) The materials used, such as stone, water, fire, and indigenous plants are part of the healing science of the site. The pond showcases an eternal flame that honours the ancestors of South Africans who had a role in sacrificing their lives for freedom. The African beliefs are that departed spirits find refuge in water (Makhene, B; 2019) and the reason behind placing the eternal flame in the water. The volumes of water seen thus speak volumes of all the spirits that reside there.

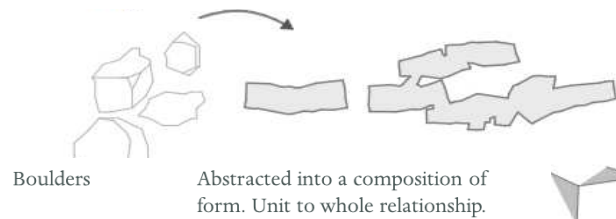


Figure 5.44 Concept Analogy (Author 2021)

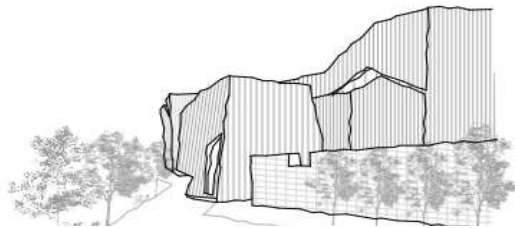


Figure 5.45 Perspective Sketch to entry

Concept_

The concept of the “boulders-scheme” for //hapo derived from the traditional healer's homestead garden. The healing properties of the rocks were placed in a circular pattern, surrounded by indigenous ‘healing’ plants that became the metaphor for //hapo. The monochromatic skin and the multi-faceted cluster of boulders that protrude from the side of Salvokop's natural hilly landscape, bear a resemblance to the continuous ‘amorphous’ rock surface found on the site. This analysis raises awareness of the physical characteristics of the site and its natural context. It invites the user to be one with nature as you experience the dynamic form from all perspectives. The narrative of South-African history is carried throughout the design of //hapo as each ‘boulder’ represents an Epoch, that unfolds through storytelling.

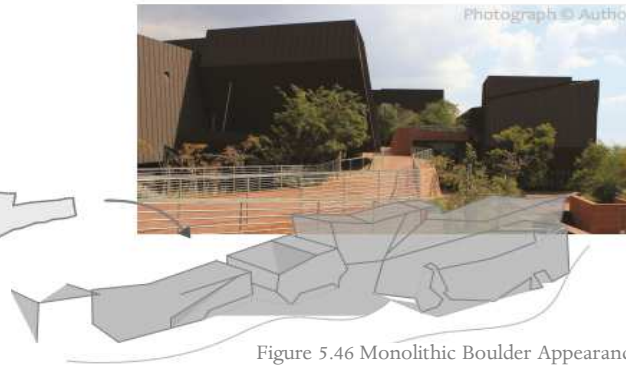


Figure 5.46 Monolithic Boulder Appearance (Author, 2021)



Figure 5.47: Sketch showing how glazed mullions break down the scale toward the entry point, guiding its visitors (Author, 2021)

Geometry/ Mass

The geometric form created from the solid ‘boulder’ mass is fragmented into various geometric units. Through a process of subtraction, each built form becomes unique in its shape and form. When these units are placed together, they interlock to form a whole. The subtraction portions are represented by glazed elements that resemble the crevices in a cave or rock formation. These allow for varying levels of light and an empirical interior quality of light.



Figure 5.48: Subtraction South Elevation



Figure 5.49: Subtraction North-Elevation

Spirit

The monumental scale of the //Hapo building appears as a heavy mass floating above the brick plinth, casting a shadow over the ground, as if it was a spirit trying to ascend. There is something particularly haunting about the building, once entered, the narrative unfolds the country's tale to its visitor. It, therefore, becomes apparent why this built form resembles a ‘heavy’ mass because of the burdened story it tells, that sits heavy on our hearts but as you reach the end of your journey, the play on light and openness of the architecture implies a weight, lifting off our shoulders as a nation in healing and reconciliation.

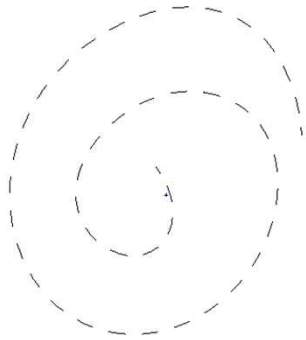


Figure 5.50 Journey remains curvilinear in circulation similar to a Labyrinth Experience

Beyond Boundaries

The built form should encourage the 'journey' from the wetland into its circulation spaces of the facility, as one journey and along its path, allow pockets of spaces to pause and reflect.

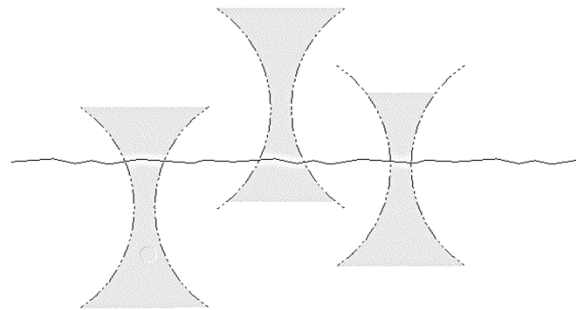


Figure 5.51 Stitching built form into the landscape

Invisible / Visible

Stitching of Built form into landscape submerged to reduce scale, but still monumental through its connection to nature.

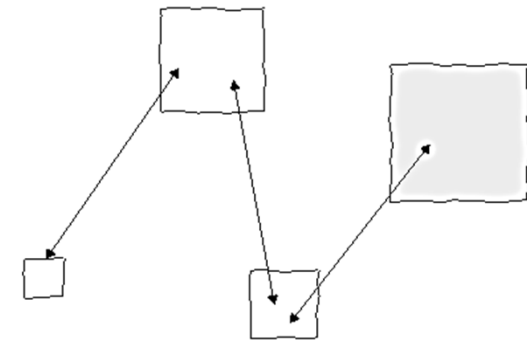


Figure 5.52 Hierarchy of Spatial experience build up to church

Hierarchy

Provide a build up of pockets of experiences before arriving to the Church facility. The movement through the wetland site becomes an important activation and journey of introspection. Certain spaces along its journey will allow for interaction with architecture and nature alike. The journey builds up the experience of arrival to the facility which takes you to your spiritual place.

Pure Beauty – The Symbolic



Figure 5.53: Frontal View © Adam Letch, 2016

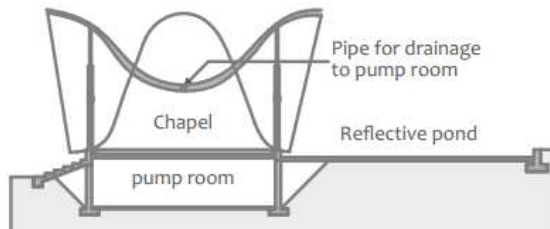


Figure 5.54: Section 1, Author 2021, Source Archdaily

The curvy Bosjes chapel is a local architectural design emerging from the Cape Winelands. It pays tribute to the spiral forms of the Cape Dutch gables that are seen on the horizon of the rural farm landscapes. Bosjes has become an iconic building that many go and visit to experience its architectural space. A sense of purity is achieved through a neutral material palette that creates framed views of its natural surroundings when looking out. The simple rectangular floorplan is met with the complex roof structure. The basement serves as a storage and pump room under the plinth. Each raised roof peak is met by glazed walls, centrally joined with a crucifix, symbolising the Christian faith.



Figure 5.55 Concept of Flock render © Steyn Studio, (2016)

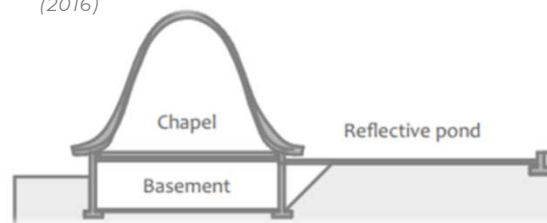


Figure 5.56: Section 2, Author 2021, Source Archdaily

The high-polished floors reflect the light and bounce it against the underside of the white roof form to carry on the properties of the reflective pond outside. The thin concrete shell is poetically derived from the bible verse (Psalm 36v7, NIV) "How precious is Your lovingkindness, O God! And the children of men take refuge in the shadow of Your wings." The architect focused his form on the idea of 'flocking' birds, as can be seen in his 3d form analogy, like wings taking off. The structure is perched upon a raised platform that allows its form to appear as if it was touching the skies, becoming the focal point upon approach. At its base, the flat body of water reflects the roof as if it was supernaturally floating on the water.

Bosjes Chapel



Figure 5.57. Reflective pond effect, 2016 © Steyn Studio

Architect: Steyn Studio
Location: Western Cape, South Africa Team: Stan Field, Jess Field (Design Principals),
Project Area: 430m²
Built: 2016 Team: Sika, Terrazzo&Marble, PG Smartglass, Shotcrete
Published on Archdaily, date n/a



Figure 5.58. Soft Curves resembling the mountain backdrop, 2016 © Adam Letch

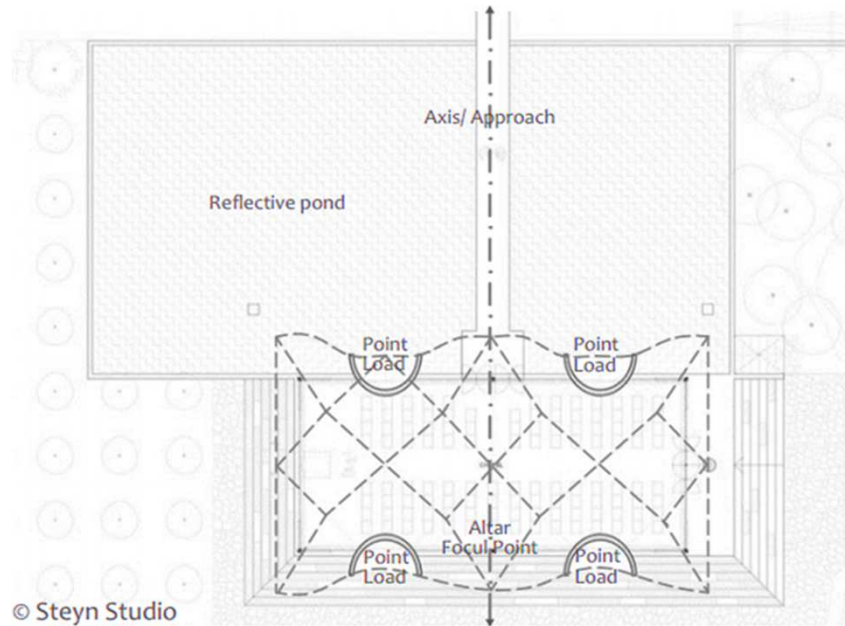


Figure 5.59: Roof Plan, Author 2021

Water Collection roof shell sends water to the pond below via a sump system built into the shell.

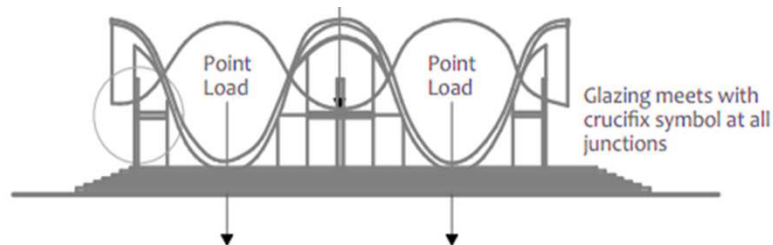


Figure 5.60: Elevation, Author 2021, Source Steyn Studio

The roof was constructed of a thin cast concrete shell that is supported at four points, where the curved roof drops down to the floor. The construction method was particularly interesting, using a shotcrete method that gets hosed onto a prefabricated shell made of plywood. Additionally, the roof shell in the middle becomes a water collection cup that is dispersed back into the water pond via a sump/pump system in the basement and out into the water pond. While it may not have been the intention of the architect to have created a water collection system, the method becomes an interesting harvesting method for my design, as the roof will take on similar characteristics of becoming part of the water collection and harvesting system.

Bosjes Chapel

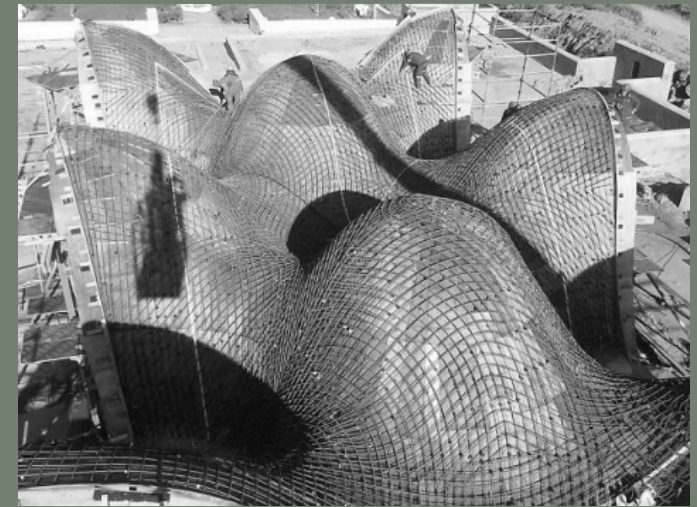


Figure 4.61 Formwork Preparation © Peri Formwork preparation, <https://www.peri.co.za/projects/cultural-buildings/bosjes-chapel.html>

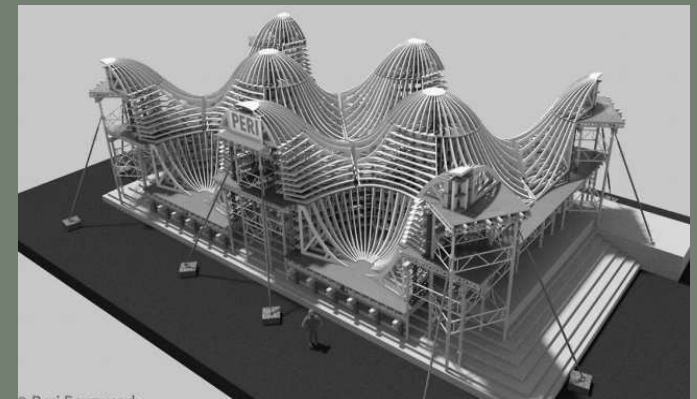


Figure 4.62 Peri Formwork, Structural formwork render © Peri Formwork, <https://www.peri.co.za/projects/cultural-buildings/bosjes-chapel.html>

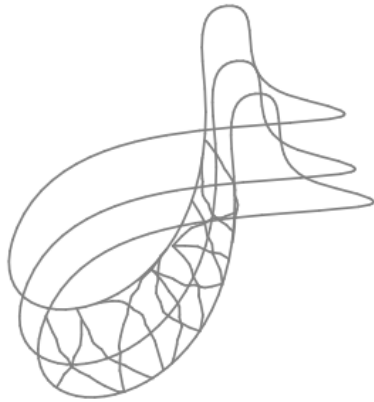


Figure 5.63: Formation of building, like a Fish

Symbolic Form

There is an artistic complexity that we see in the design of the Bosjes chapel, with the play between a rectangular floorplan and the curvy roof structure. The curved roof design can only be appreciated when understanding its origins from the bible scripture that inspired its form. For the design of the wetland/church facility, the building takes on the form of a deconstructed fish (Ichthys), that in a similar way to the Bosjes chapel, will have its significance for the Christian faith.

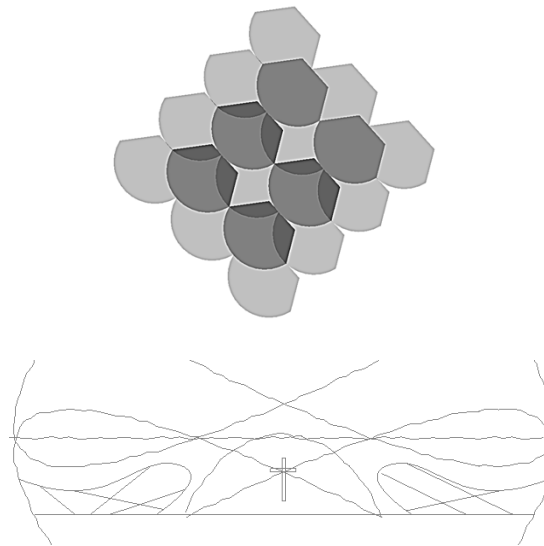


Figure 5.64: Parametric and soft curves

Roof Space

The roof becomes the water collecting mechanism that disperses the water into the streams and retention ponds around the building complex. The idea of scales will come through the parametric lightweight steel tension design of the church roof that sweeps gently in varying directions.

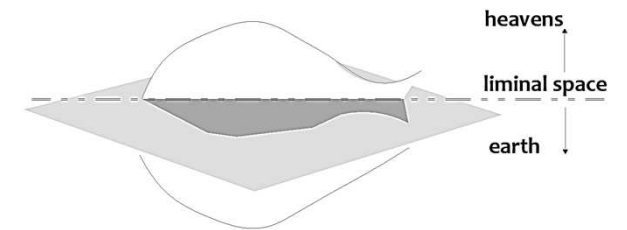


Figure 5.65: Reflective pools to emphasize building

Heaven on Earth

Water becomes the transitional space and essential element throughout the journey. The water reflects the built form at its base, that gives the building a mystical feel. The concept thus is to submerge the building on earth in the water, with water as the liminal space, that transcends the building up to the heavens, like a spirit.



***"...Let the one who is thirsty come; and let the one who wishes,
take the free gift of the water of life" (Rev:22:17) "***

Figure 6.1: Artist Impression Concept Analogy, Author 2021

Chapter 6



DESIGN FRAMEWORK AND CONCEPT

CHARETTE

The historical enquiry into Christian semiotics raised interest in the ichthys symbol, which is the sign of the fish using two arcs. The element of water and the fish surfaces as most significant and symbolic in Christian bible stories, rituals and understanding.

Jesus' ministry was associated with fish and water, and he used these elements in profound ways to show his divinity. He chose fishermen for disciples, calling them 'fishers of men' and offered us his gift of life through his waters. Symbolically, just as a fish finds refuge in the water, so could every man find refuge in God's symbolic water.

This narrative of the fish and the geometry of the arc and circle, is particularly important for the charrette exploration and design framework for the form-finding process.

The charrette exploration looks at ways in which water is preserved in nature and uses elements found in the wetland, such as the Aloe Ferox leaf, to achieve 3D abstract forms.



FORM FINDING

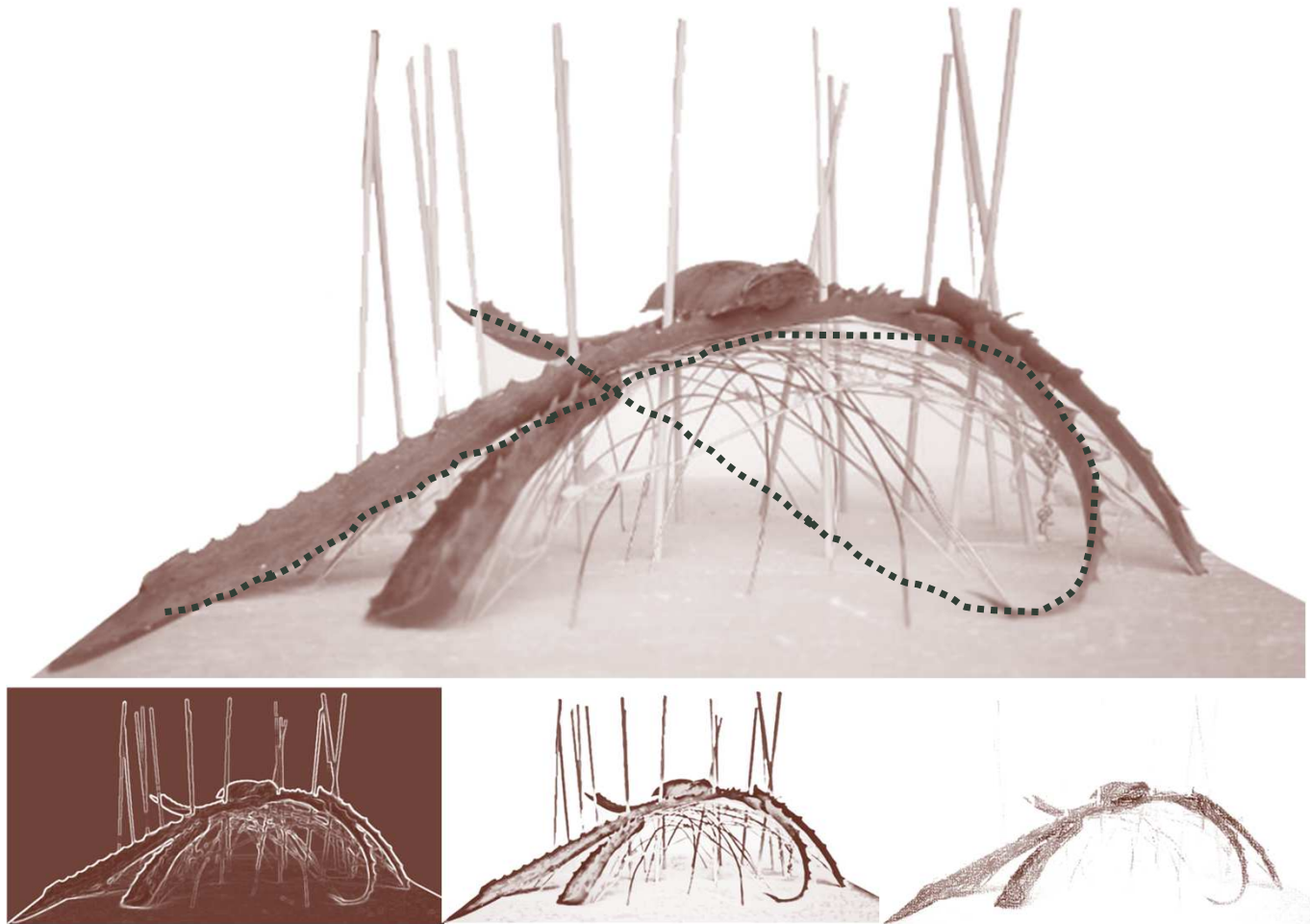


Figure 6.2a: Charrette 1: Resembling the Ichthys in elevation, (Author 2021)

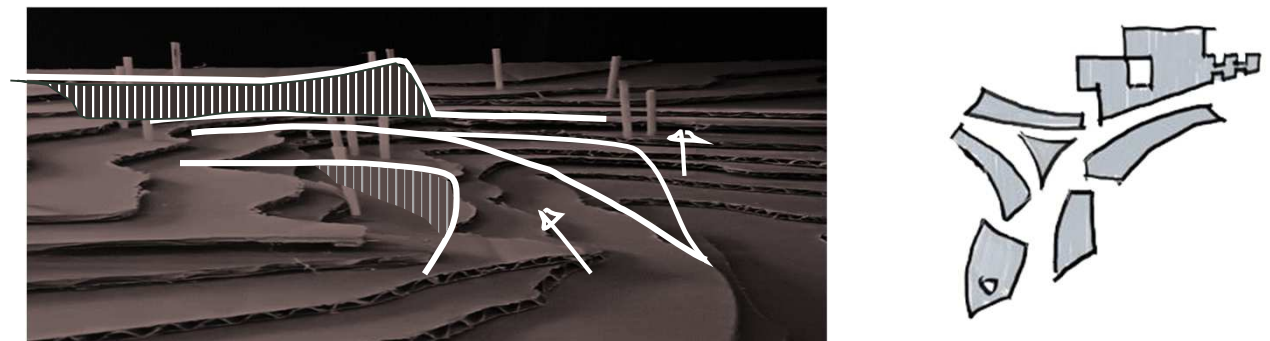


Figure 6.2b: Charrette 1: Translating the de-constructivism of the Ichthys in plan and on the model, (Author 2021)



Figure 6.3 Aloe Leaf Structure: Arched form allows water to run down to the ground quickly (Author 2021)

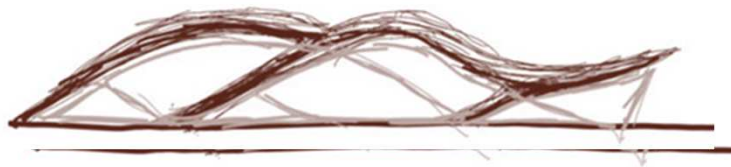


Figure 6.4: Form Analogy – Roof scape allowing movement of water to flow over it. (Author 2021)

HOW DOES NATURE PRESERVE WATER?

The Aloe Ferox plant leaves are long and waxy to allow water to run rapidly to the core of the plant. Its spikey tips assist in dissipating water to the soil where the roots are. The waxy leaf does not allow for easy transpiration, which makes this plant one of the best species to withstand drought. The sectional view of the aloe leaf resembles the concave arc, which also acts as a basin for the water to fill up and be diverted down to the soil. This sparked an interest for the roof form to curve up from the ground, as an accessible roof-scape, serving a dual purpose as a water catchment device.

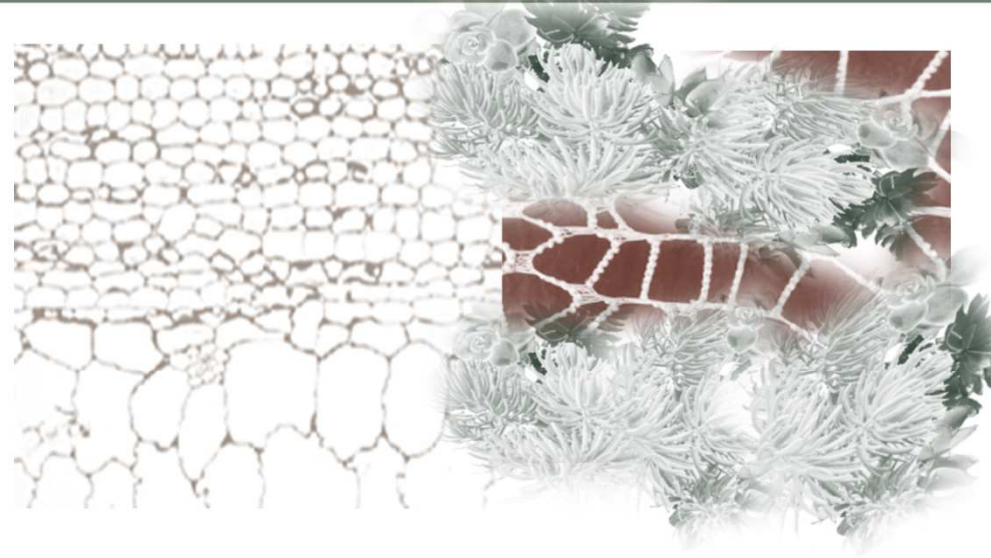


Figure 6.5: Charrette 2 Gel Formation inside the Aloe Plant - Inspires parametric pavilion facade. (Author 2021)

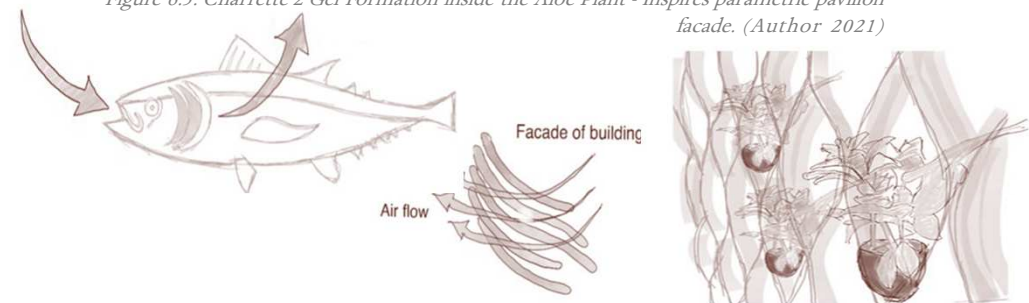


Figure 6.6: Breathing Parametric Skin Analogy for pavilion, (Author 2021)

THE SKIN: A BREATHING FACADE

The gel found inside the aloe plants had an interesting web-like formation that inspired a parametric form for the architecture.

Additionally, the respiratory system of the fish takes water through its gills, and extracts the oxygen from the water to breath. The idea is therefore, to adapt this respiratory system onto areas of the façade of the pavilion/ building, allowing plants to grow on the façade, providing oxygen to the internal spaces.

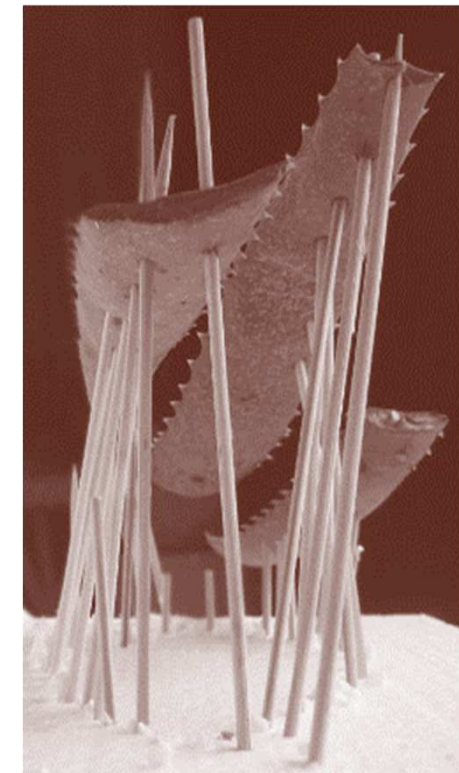
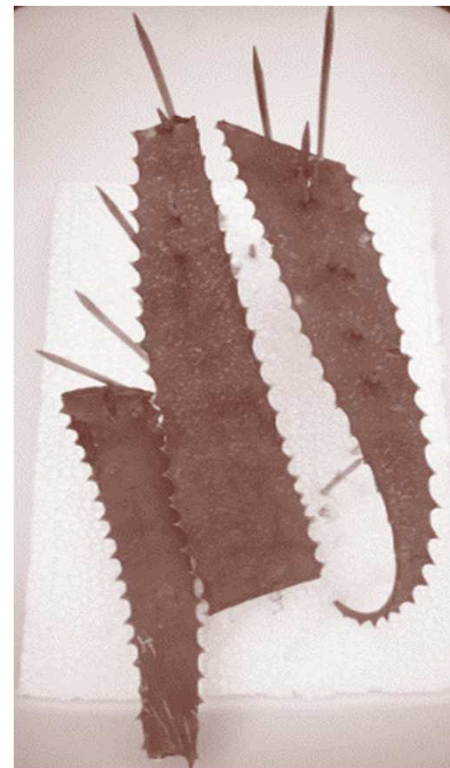
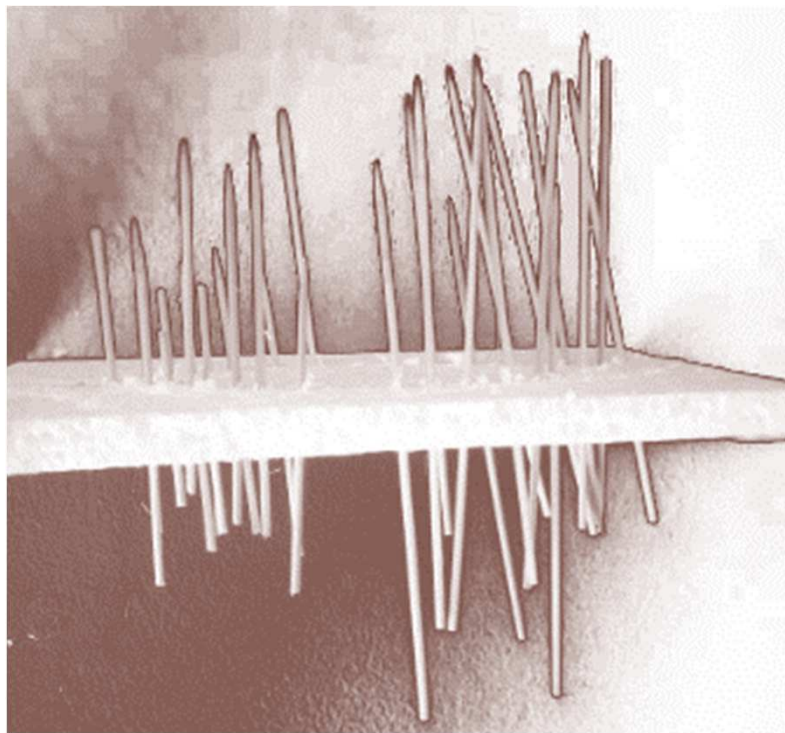


Figure 6.7: Charrette 3. Sticks depicting swaying grassland placed in an arc form at various heights and directions, (Author 2021)

TREADING LIGHTLY

The Aloe Ferox is an indigenous species found on the site. The sticks represent the tall flowing grass species at various heights as it appears on the site, as it sways in its left and right directions. The Aloe leaf in comparison to the grass is a much heavier mass. Yet in reality, when the aloe leaf is placed over the grass, the grass cushions it, protecting impact with the soil. The act of treading lightly on the site is an important design consideration, with the stick representing the grass as a lightweight structure of the building, holding up the roof-scape which is the aloe leaf.

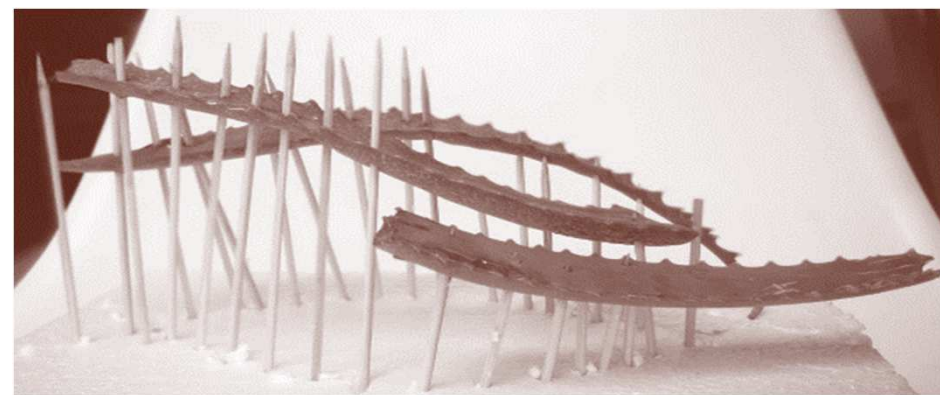


Figure 6.8: Aloe Ferox (heavy mass) held up by the thin lightweight structures, (Author 2021)

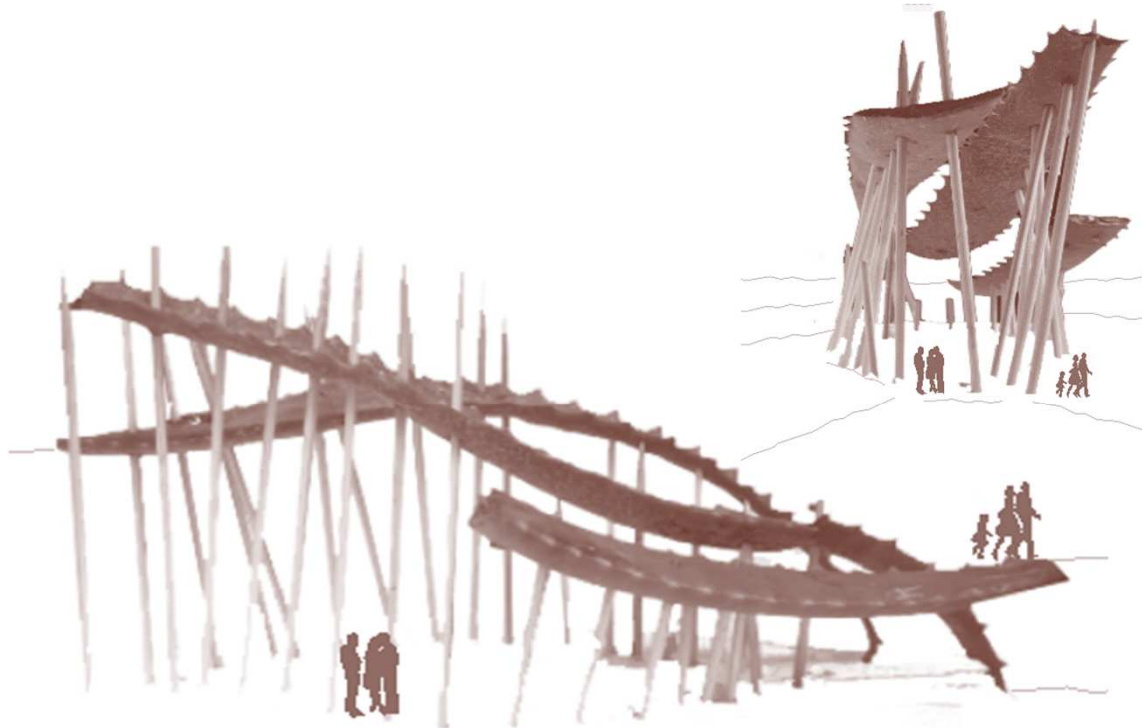


Figure 6.9: Form Representation: Sticks depicting swaying grassland holding up the aloe roof, (Author 2021)

ROOFSCAPES

The topography of the site should be taken advantage of for the roofscape. The aloe above illustrates how users can be linked from one space to another, at various levels on the site. This inspires the notion that the building's roof space should be explored continuously with the site, blurring lines between built form and nature, yet remaining conscious of the ground.

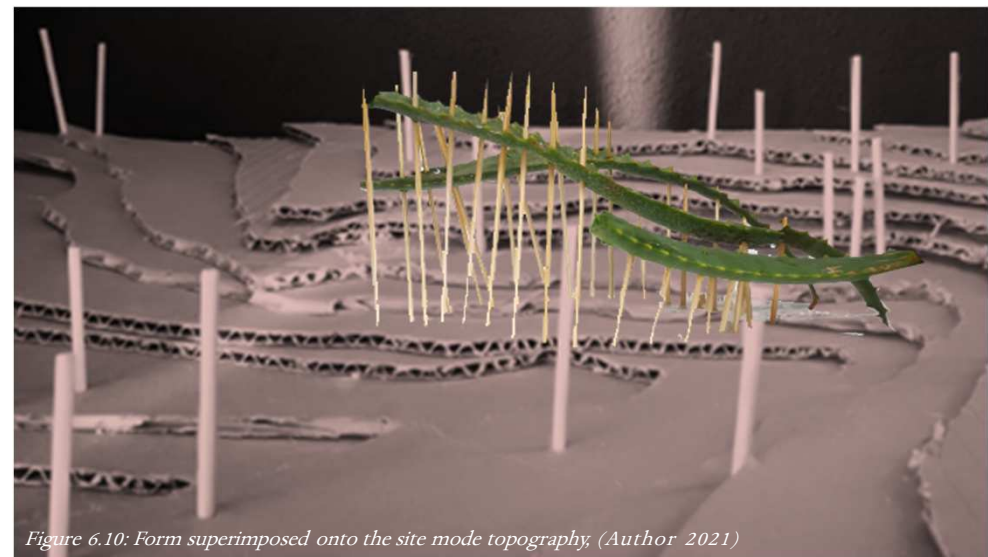
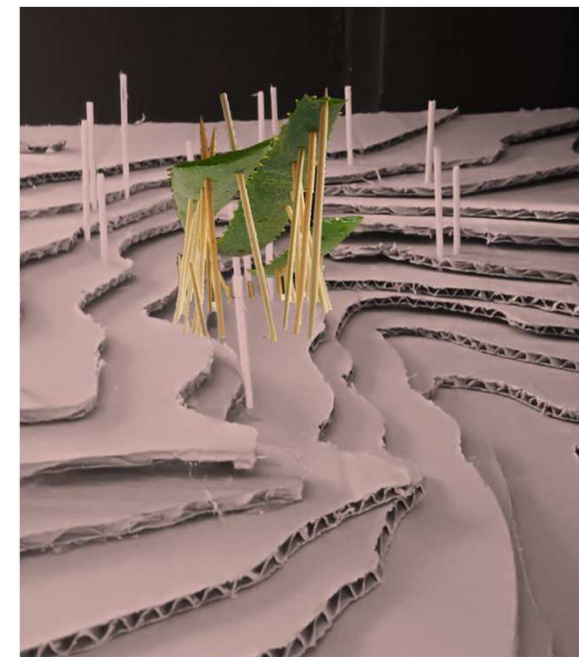
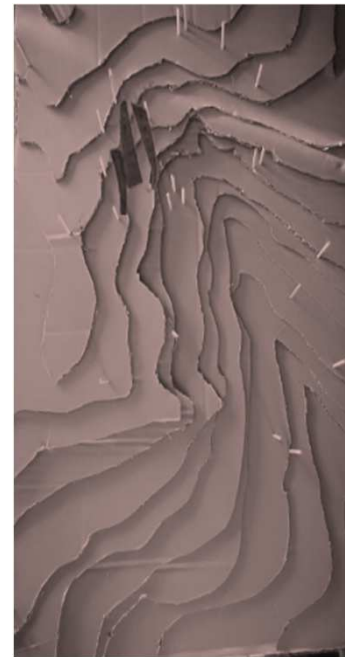


Figure 6.10: Form superimposed onto the site mode topography, (Author 2021)



Figure 6.11: Charrette Exploration 4 using wire - Wire formation following the arc geometry, creating a dome.. (Author 2021)

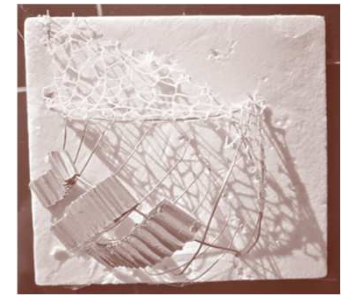
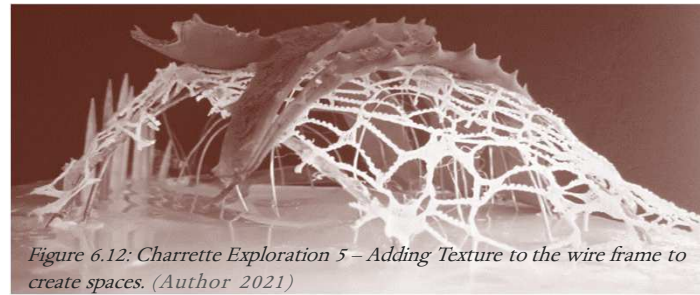
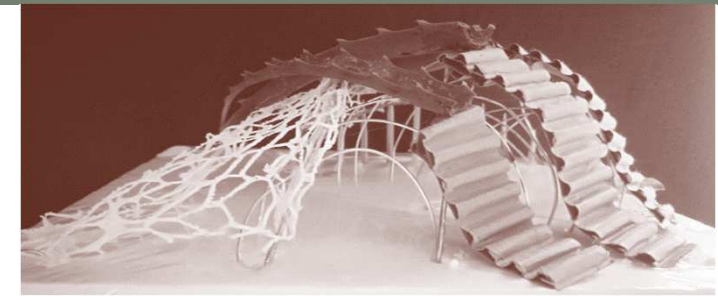
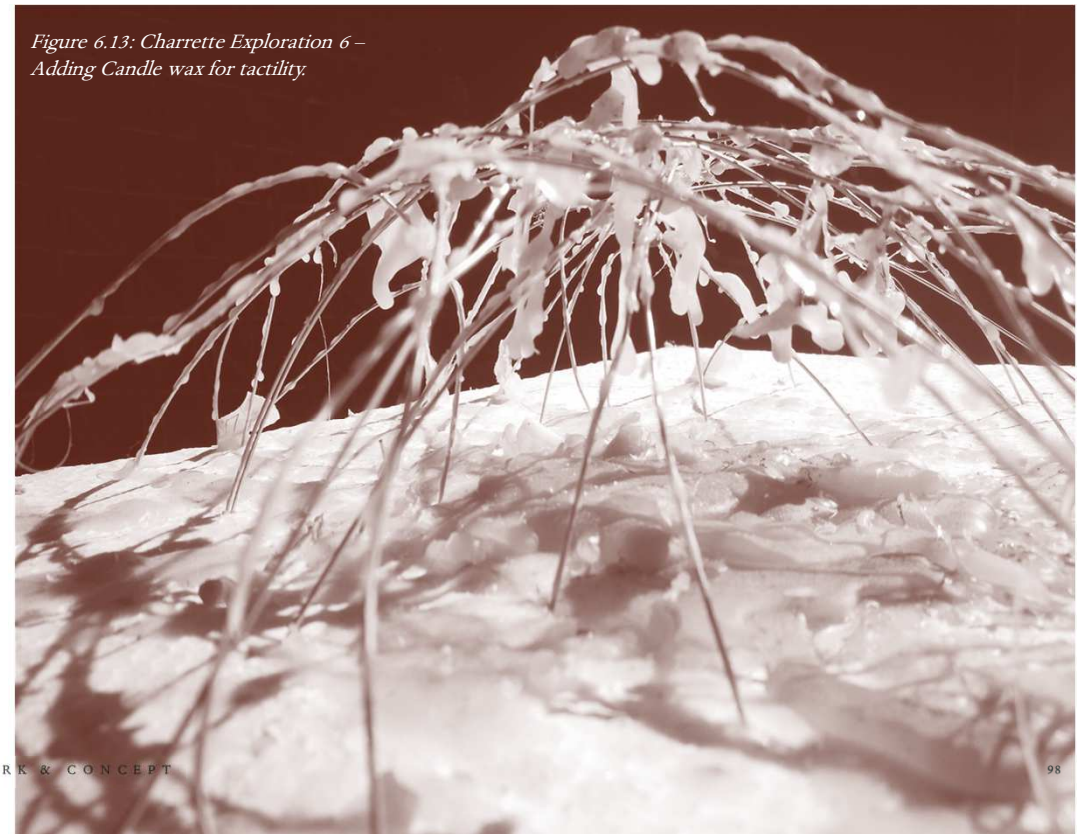


Figure 6.12: Charrette Exploration 5 – Adding Texture to the wire frame to create spaces. (Author 2021)

Figure 6.13: Charrette Exploration 6 – Adding Candle wax for tactility.



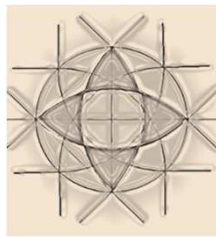
GEOMETRY, TACTILITY & TECTONICS TO CREATE MYSTICISM

The 'divine circle' in the Christian faith resembles God's perfection. It has also been depicted as a crown or halo in Christian art and text. The idea of the halo and its illuminative properties are elements needed to be brought through in the design.

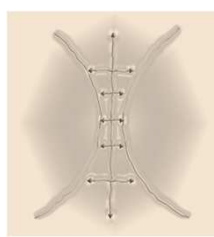
I began by drawing a repetition of 2-dimensional arcs, mirrored, and rotated along the same x-y axis. To create a 3-dimensional experience I lined it with wire arcs, to create 3Dimensional spaces around this circle. The lightweight and reflective properties of the wire deflects the light in all direction, offering an illuminating and complex tectonic experience. Further explorations using other materials, such as aloe leaves, cardboard, melted wax and mesh was used to understand the tactile and visual experience that these 3D 'arc' spaces created.



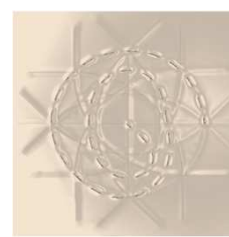
FLUIDITY



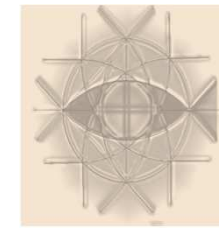
PORTAL



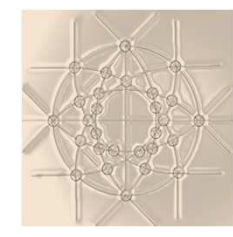
TRANSITION



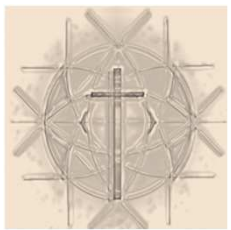
PATH



*SYMMETRY/
AXIS*



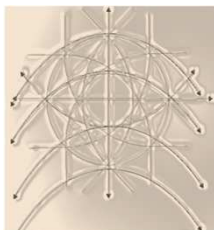
NODES



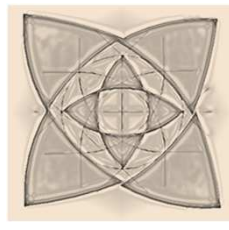
LIGHT/FILTER



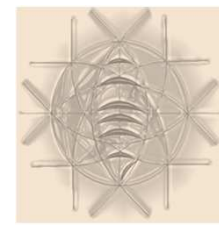
MONUMENT



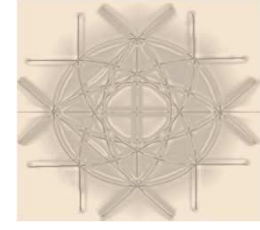
MOVEMENT



PROPORTION



TECTONICS



UNIT TO WHOLE

Figure 6.14: Design Principles Iconography (Author 2021)

ICONOGRAPHY: A LEXICON

The theological research developed an interest in iconography that interrogates a formula for design ideas. The arc form rotated on its axis begins to represent an array of beautiful patterns and geometries that each characterises a design principle. These abstract design 'stamps' were created as a way to inspire the shape, patterns and forms of the architectural language, which is hoped to begin a dialogue between one's experience of architecture and of nature to enlighten mysticism.

Iconography in the traditional churches was a sacred form of art that spoke to the sacred text. Ultimately these sacred art forms and geometries developed outstanding church architecture of our time. To capture the essence of the theory, I experiment with ideologies to develop more meaningful architecture using the above design principles to outline design rules based on theoretical research.

Design Ideologies

BLURRED LINES: BIOMIMICRY

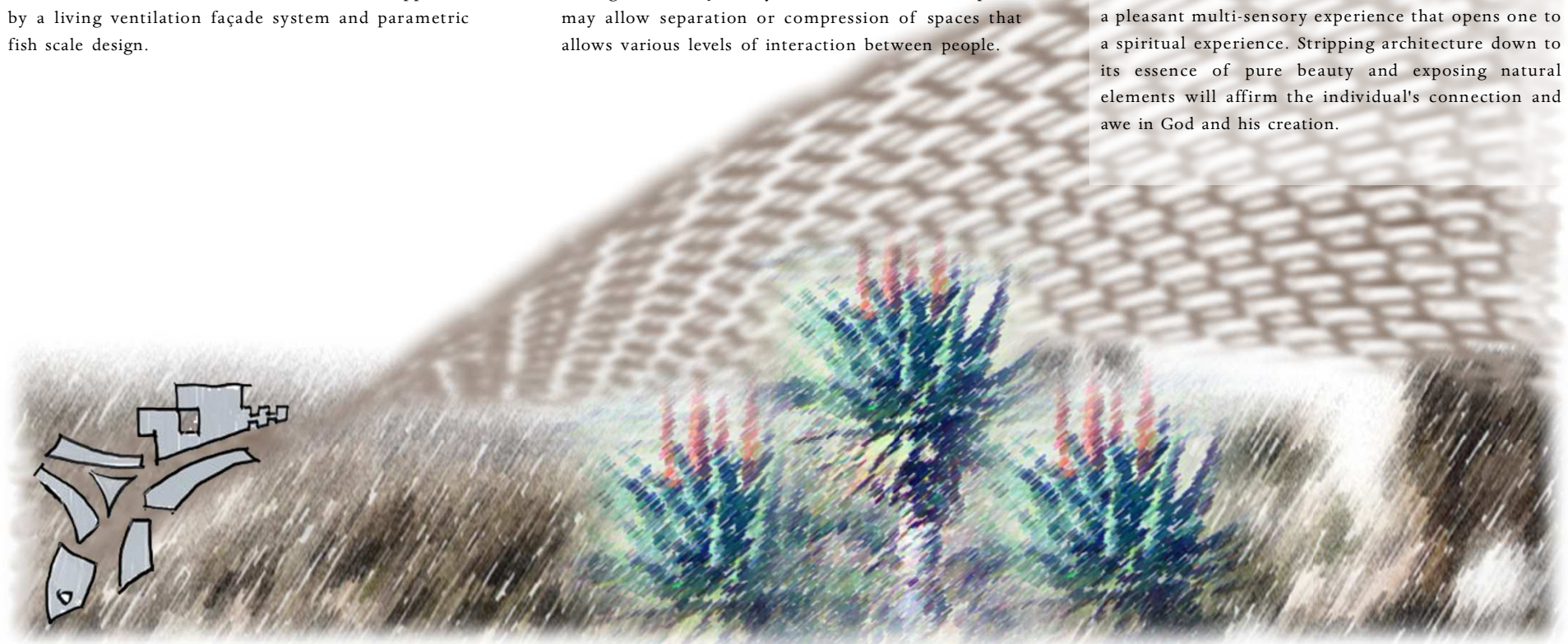
The idea is to blur boundaries between built form and the landscape by using forms, shapes and scientific systems found in nature to inform the design and encourage the connection between nature and man. The geometry of the fish and the aloe ferox, naturally tends to use the 'arc' geometry which lends the design of the built form to be more organic and fluid. The idea for the design is to complement the environment by mimicking the behaviour of the aloe leaf as a roof water catchment area further supported by a living ventilation façade system and parametric fish scale design.

THE JOURNEY: RITUAL THROUGH MOVEMENT

Urbanisation is linked to depression and mental illness. Studies have shown positive cognitive effects of walking through nature and the need for more natural settings within urban environments to improve mental well-being. The Radiokop community can be activated through renewal of natural spaces, that encourage and celebrate the ritual of movement and use of pathways as a therapeutic process to revitalise minds, with water as a constant element throughout the journey, certain transitional spaces may allow separation or compression of spaces that allows various levels of interaction between people.

PURE BEAUTY

One's perception of spaces using light, shadow, scale, rhythm and the temporal element of water are important attributes for the design of the church as a vehicle to captivate one's experience of place and heightened spiritual awareness. Nature has been scientifically proven to have positive effects on our brains, as it calms and enlightens us. Thereby, inviting the physical realm of nature and its elements into the worship space, it is believed that these could have a positive effect on our cognitive processes and result in a pleasant multi-sensory experience that opens one to a spiritual experience. Stripping architecture down to its essence of pure beauty and exposing natural elements will affirm the individual's connection and awe in God and his creation.



CONCEPT NARRATIVE

COMPLEXITY AND ORDER

Adapted by the tenth biophilic principle that looks at rich sensory information that adheres to a similar experience in nature. (Browning, Cushing et al, 2020) The illustration on the right represents this idea of complexity and order where the arc line was used to form the Ichthys symbol that is repetitively copied in a circular motion and may appear as something complex. However, in unison, it conforms to the central circle, which became the focal point and central courtyard of the design, holding together everything and embodying the living water. Here the water constructs a symbiotic spatial journey bringing together complexities in unity

The 'rose' pattern seen on this image, is similar to that found in nature, and used often in church stained glass designs symbolising the 12 disciples.

The architectural form in plan becomes a deconstructed Ichthys – pointing in different directions, but held together by the divine circle and the water of life in its centre. The deconstructed form, draws one through the site and points you into the direction of the wetland, encouraging you to continue the journey.

The design of the facility trades the traditional church design with new materiality and technology for the 21st century, combining old and new.

Figure 6.16: Form Analogy and Concept, (Author 2021)



* SYMBOLIC: DECONSTRUCTING THE ICHTHYS *

* COMPLEXITY VS. ORDER *

* LIVING WATERS *

CONCEPT APPROACH

LIVING WATERS

The design explores water as the transitional space and offers a significant Christian perspective of God's "living water." The theoretical enquiry exposes it as a divine element that brings life and has the power to unify man, nature and God.

Water permeates through the built and natural environment, along circulation routes, captivating the senses, and bringing together the hybrid tensions between secular and religious programme.

Crossing boundaries has become an important design approach for the facility, that uses the boundless nature of water to tie together the wetland, the church, and the community through its movement, activating these three entities.

The church's intangible mission also adapts to the idea of 'crossing boundaries,' to spread their missionary work into the wetland where the community may be, for recreational purposes.

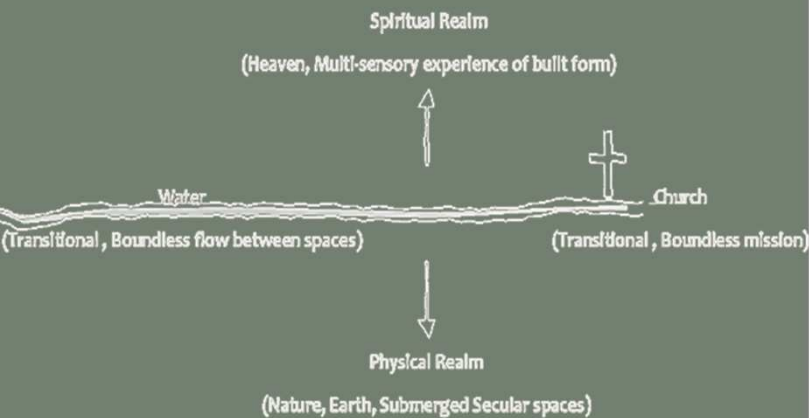


Figure 6.17: Parti diagram exploring water as liminal space between Heaven and Earth, (Author 2021)

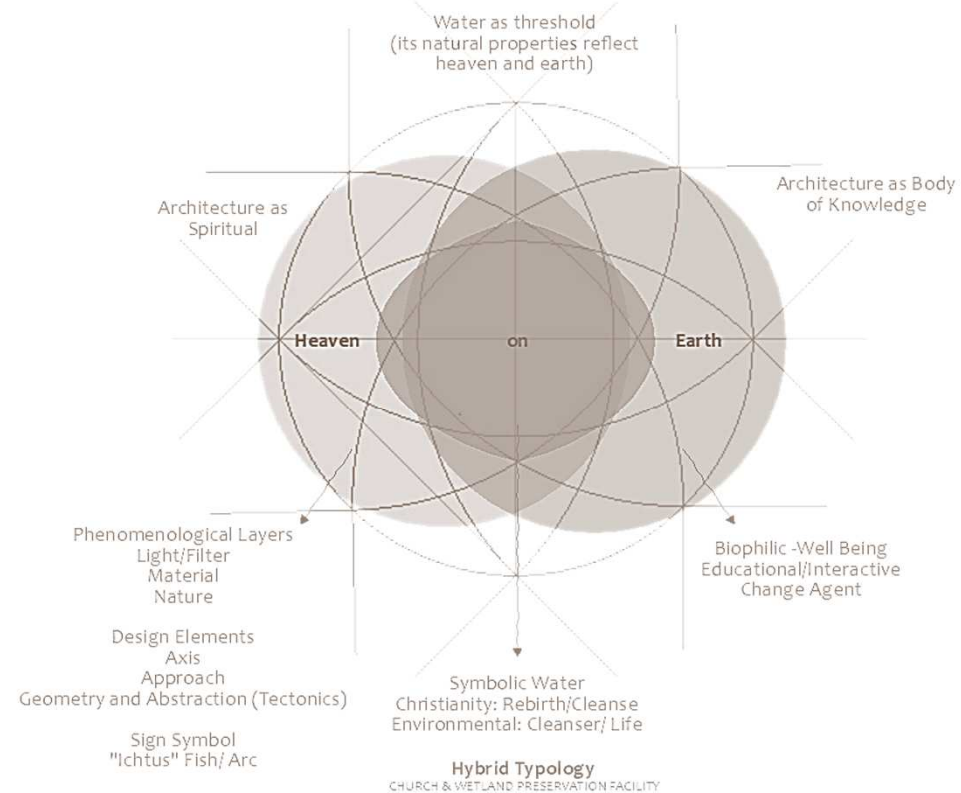


Figure 6.18: Heaven on Earth _ Parti Diagram (Author 2021)

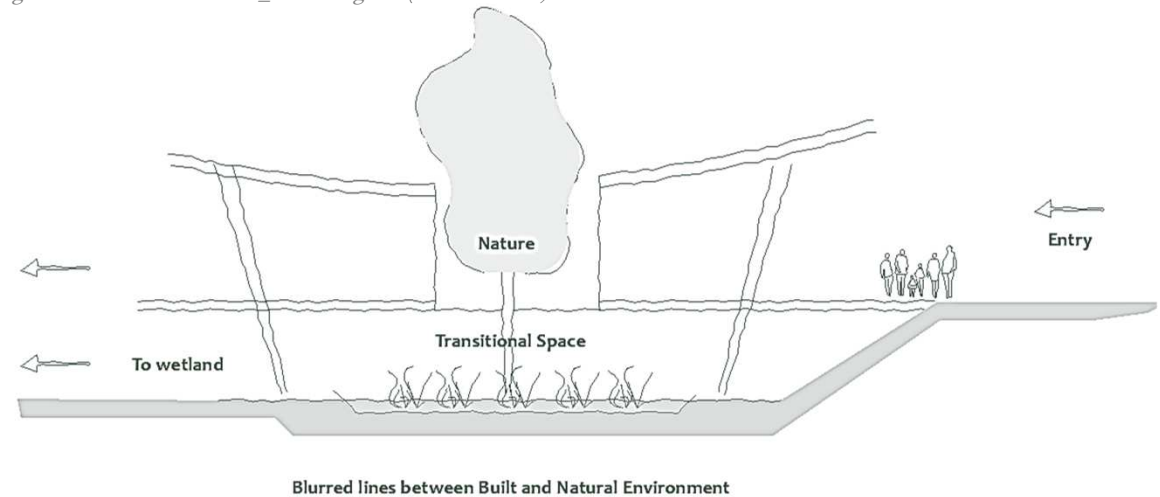


Figure 6.19: Concept Sketch: Blurring Built and Natural Environment, (Author 2021)

DESIGN ANALYSIS

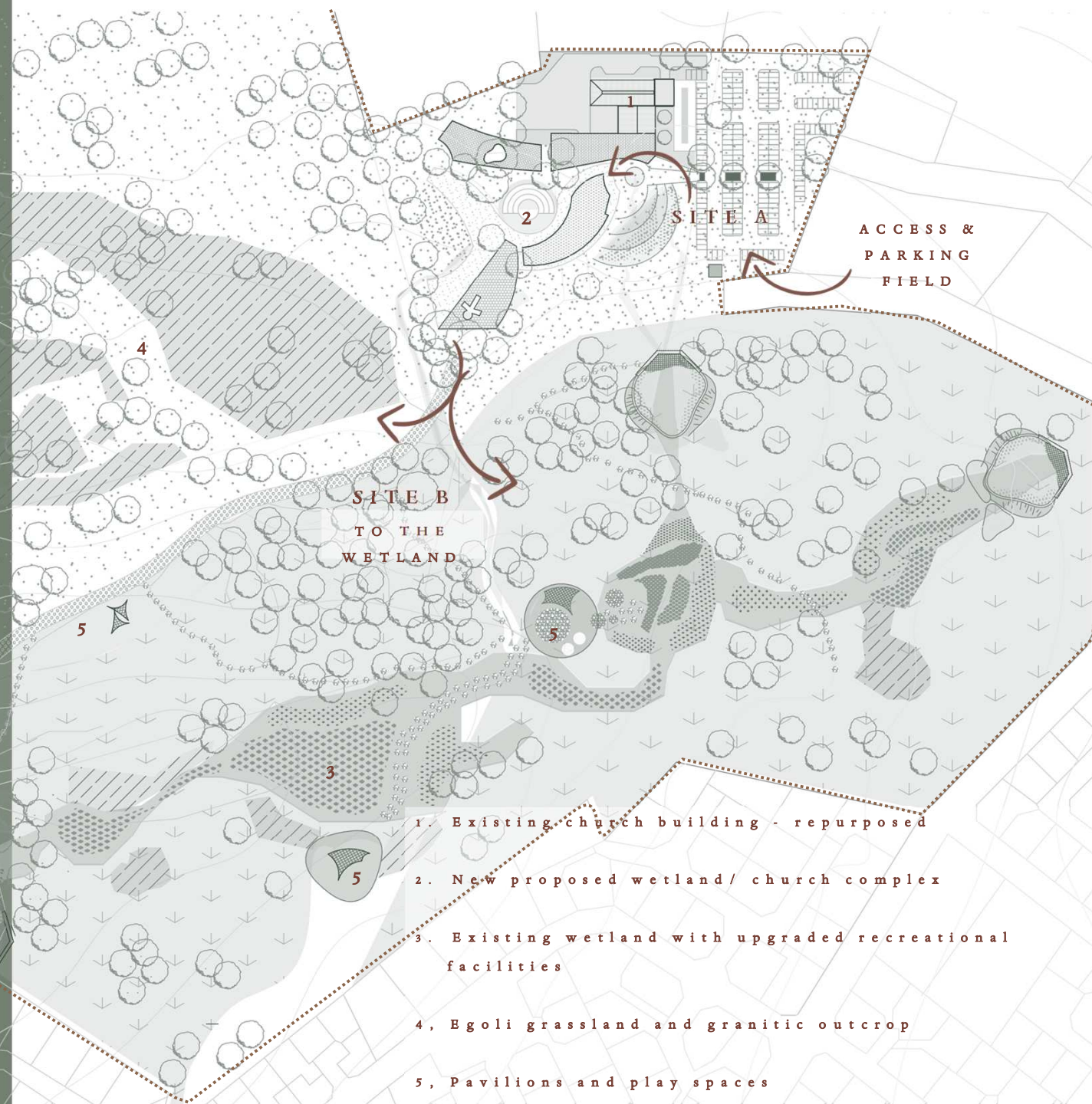
SITE PLAN PROPOSAL AND ACCESS

The site plan shows the proposed wetland preservation development on Site A, adjacent to Wetland Site B. The main access is from the street which is the only access point to the facility. Most of the program is clustered onto Site A as a way to first communicate the importance of the wetland to the visitor, offering an educational exchange before exploring the wetland. The church is the focal point for the design, as it stands in its monumental scale being the 'merging' point where everything intersects.



AXIS / APPROACH

Figure 6.20: Site Plan showing Approach, (Author 2021)



DESIGN ANALYSIS

MOVEMENT

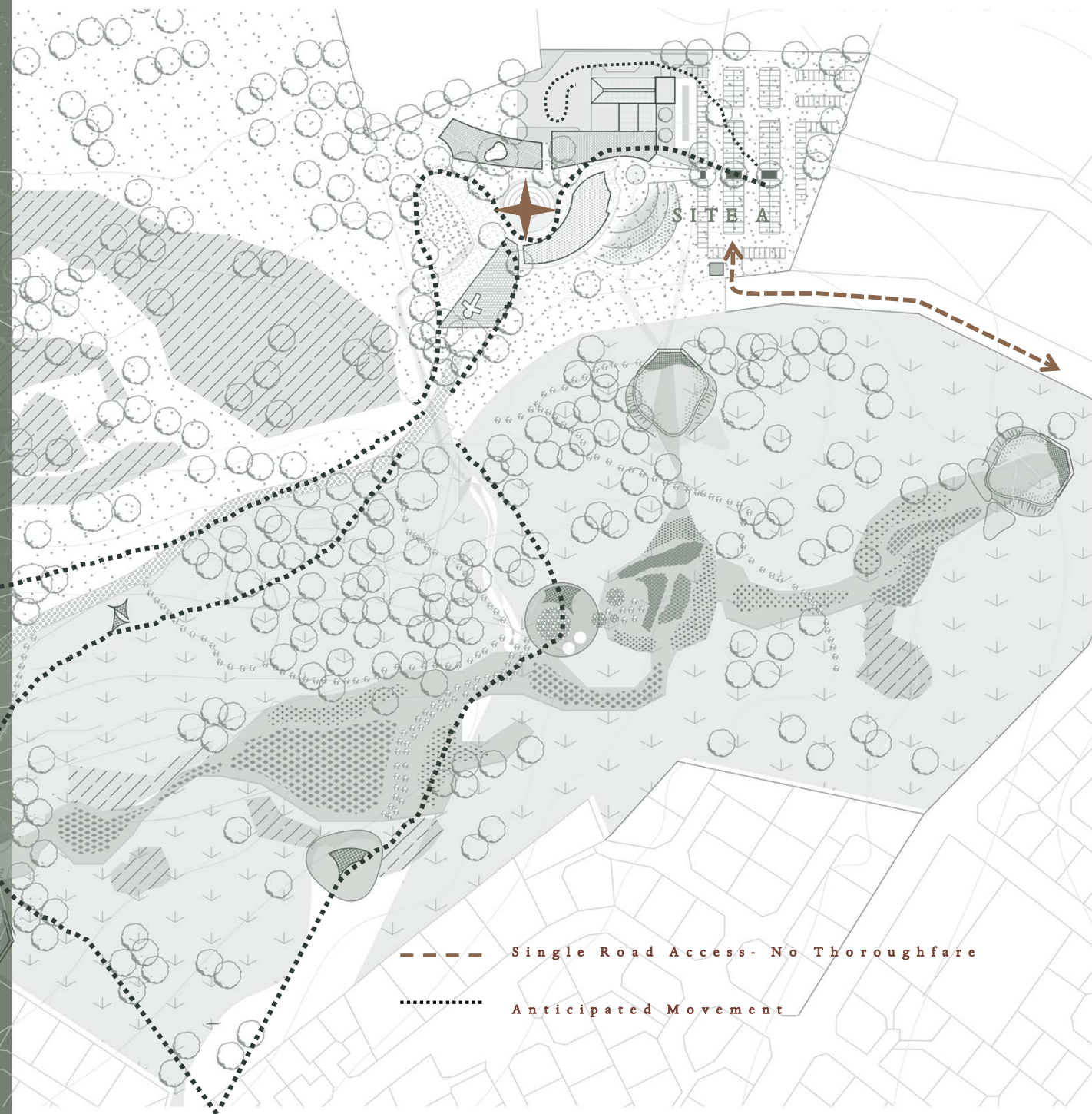
The design responds to the current movement over the wetland. The position of the Church at the bottom corner of the site encourages movement through site A, drawing one's journey down toward the wetland. While if you were approaching the church from the wetland, it would be your first point of entry. Whichever approach is taken, it ends in the church being the focal point. Note: The church is located higher than the wetland in elevation, which still makes it visible to the community across the wetland.

The movement and build up of activities all converge at the wetland church facility establishing it as an important node for the community. The water element becomes the boundary-less element as can be seen that moves across the boundaries of the two sites..



MOVEMENT

Figure 6.21: Site Plan showing Movement (Author 2021)



DESIGN ANALYSIS

PRESERVATION AND PATHS

The formation of the built form encourages unobstructed movement and paths to ensure a continuous journey through the site. Additionally, the form that the building takes minimise the removal of trees. As can be seen, only a few trees (highlighted in green) will be affected by the development, and the original church will be included into the program, and not removed.



PATH

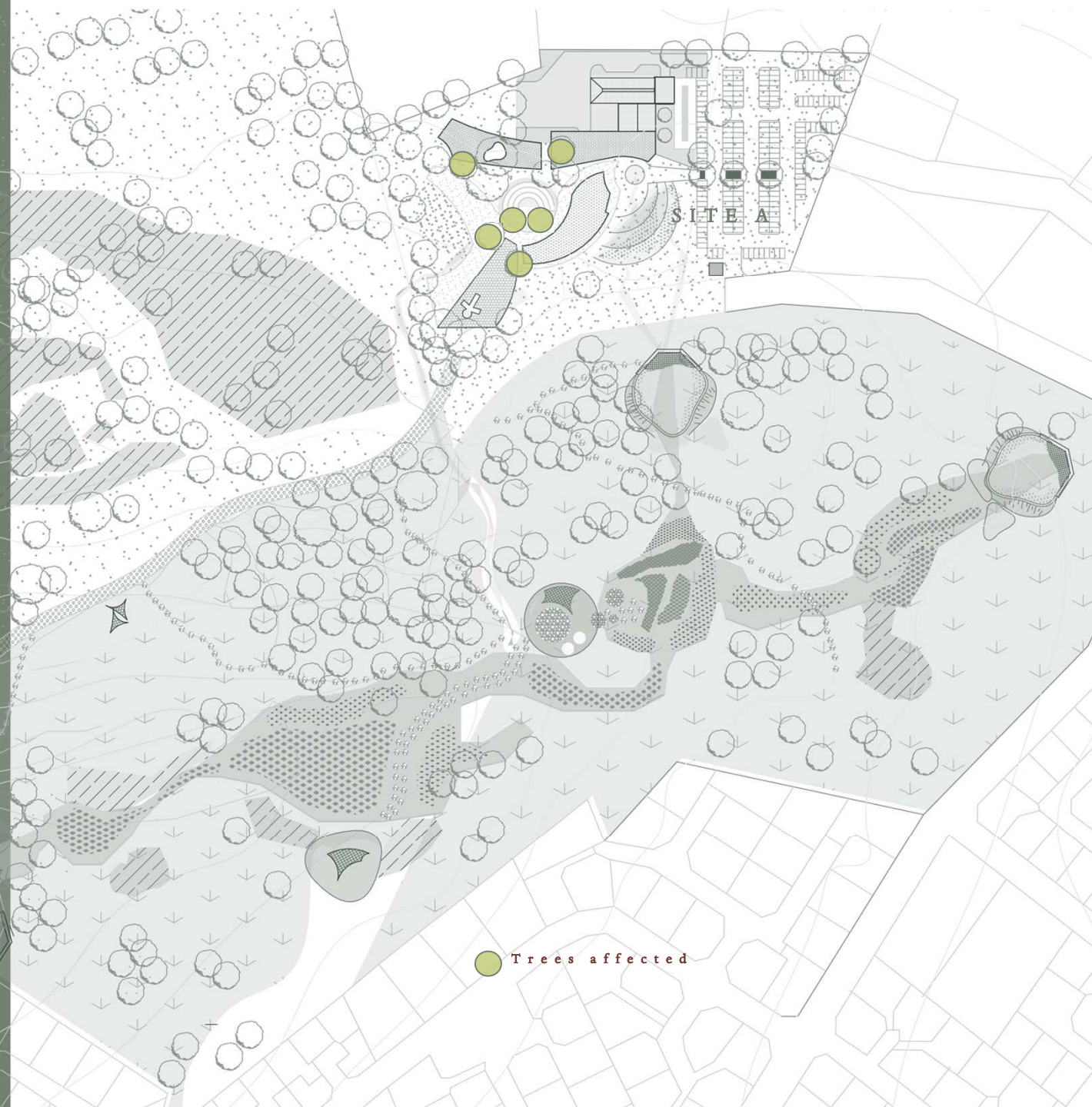


Figure 6.22: Site Plan showing Pathways and preservation of trees
(Author 2021)

DESIGN ANALYSIS

WATERSCAPES

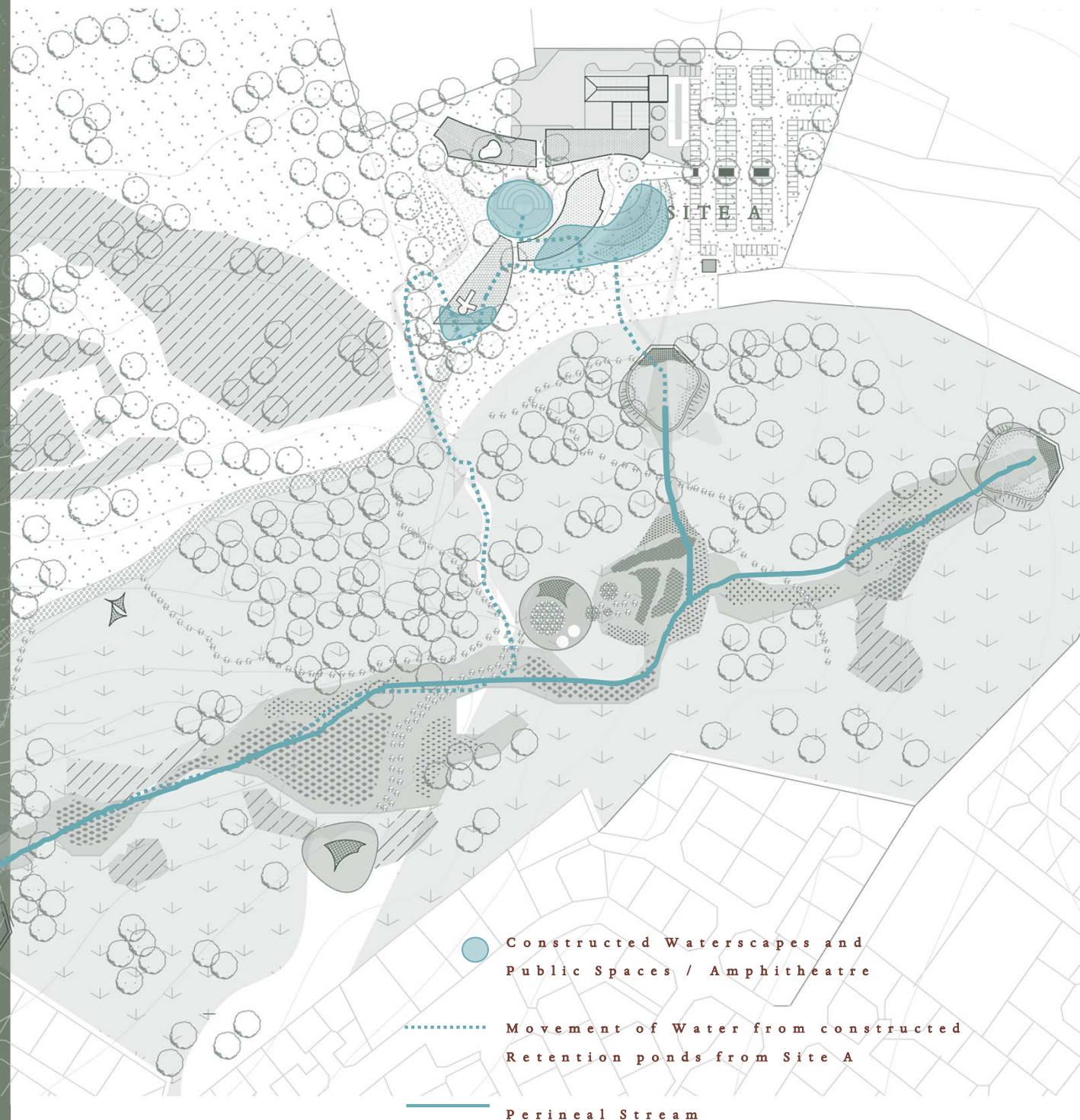
The public square in its circular form is considered the 'portal' of water that starts the journey into the wetland. The water permeates the built form and exhibits a variety of fauna and flora along its landscaped pathways, evoking the senses.

Water is the prominent feature throughout the site and the wetland, and with its mystical properties, becomes the portal to the spiritual realm.



PORTAL

Figure 6.23: Site Plan showing Water elements as a portal to the spiritual place (Author 2021)



Constructed Waterscapes and Public Spaces / Amphitheatre

Movement of Water from constructed Retention ponds from Site A

Perineal Stream

DESIGN ANALYSIS

JOURNEY

PROCESSION VS PROGRESSION

The procession into the chapel offers a sensory experience that takes you from the outer layer (public space), to the middle layer (foyer space), through to its inner space (chapel), using a combination of materiality, monumental scale and lighting, to emanate the spirit.

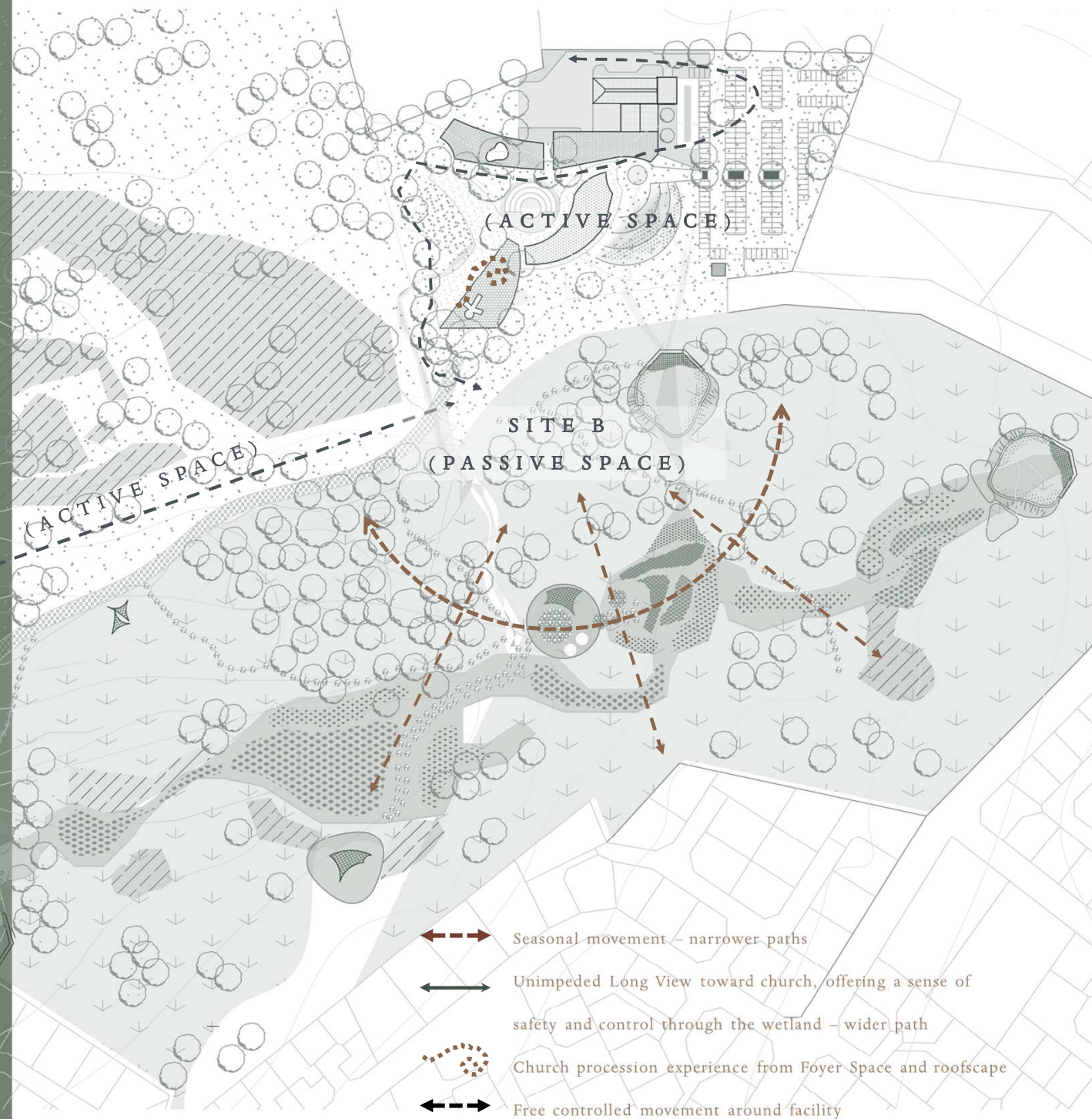
ACTIVE VS PASSIVE SPACE

Additionally, the spatial progression from the facility into the wetland itself will entail pathways that are seasonally accessible, depending on the water levels at the lower end of the wetland. The passive spaces are regarded as seasonal, while the active spaces are more useable throughout the year.



PATH

Figure 6.24: Active vs Passive spaces (Author 2021)



WETLAND UPGRADES

REHABILITATION

The current catchment pits will require upgrading to function properly. A slower seepage of the water into the wetland with the right amount of rock beds, vegetation and overflow pools, allows the water enough time to cool down and filter through the vegetation in the marshlands.

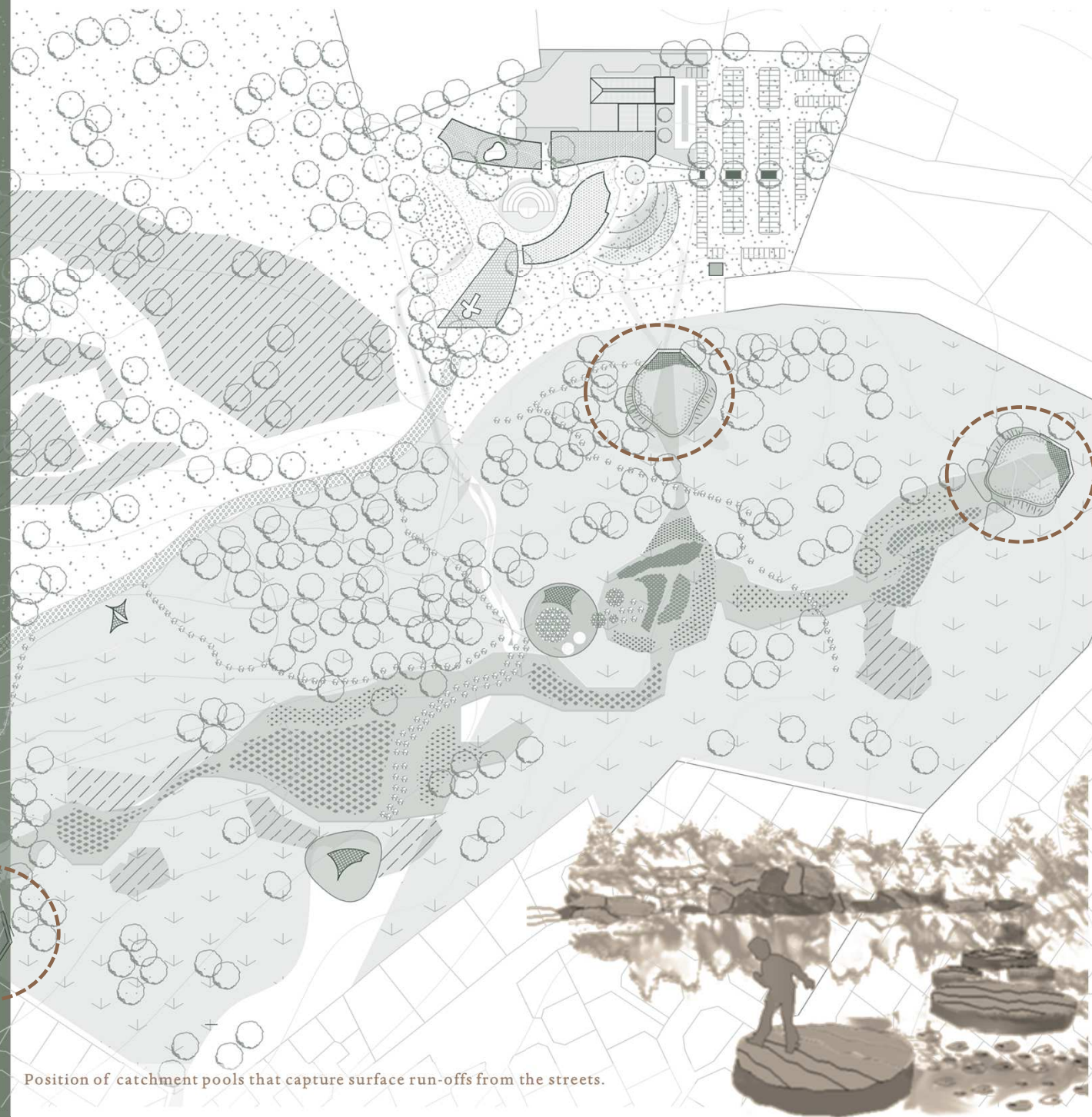
Activity nodes will be provided along the pathways. Some pathways will have stepping stones that allows access seasonally, as a protective measure during rainy seasons when aquatic habitats are breeding..

NODES



NODES

Figure 6.25: Rehabilitated spaces (Author 2021)



Position of catchment pools that capture surface run-offs from the streets.

DESIGN ANALYSIS

SPATIAL ARRANGEMENTS

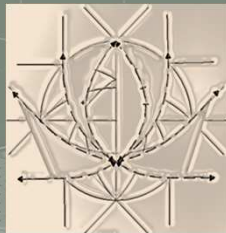
The gestalt of clustered buildings offer different programs but are interlinked to perform as one unit.

The church chapel can be used for large seminars, and its foyer as a gallery for expedition space. The studio spaces can be used for Sunday school activities, as well as recreational spaces in the week. The fellowship hall can be used on Sundays to gather, while at other times, it can be used as a function hall or permanent coffee shop.

The wetland resource facility doubles as a 'public living room,' offering a coffee shop, educational material and lectures.

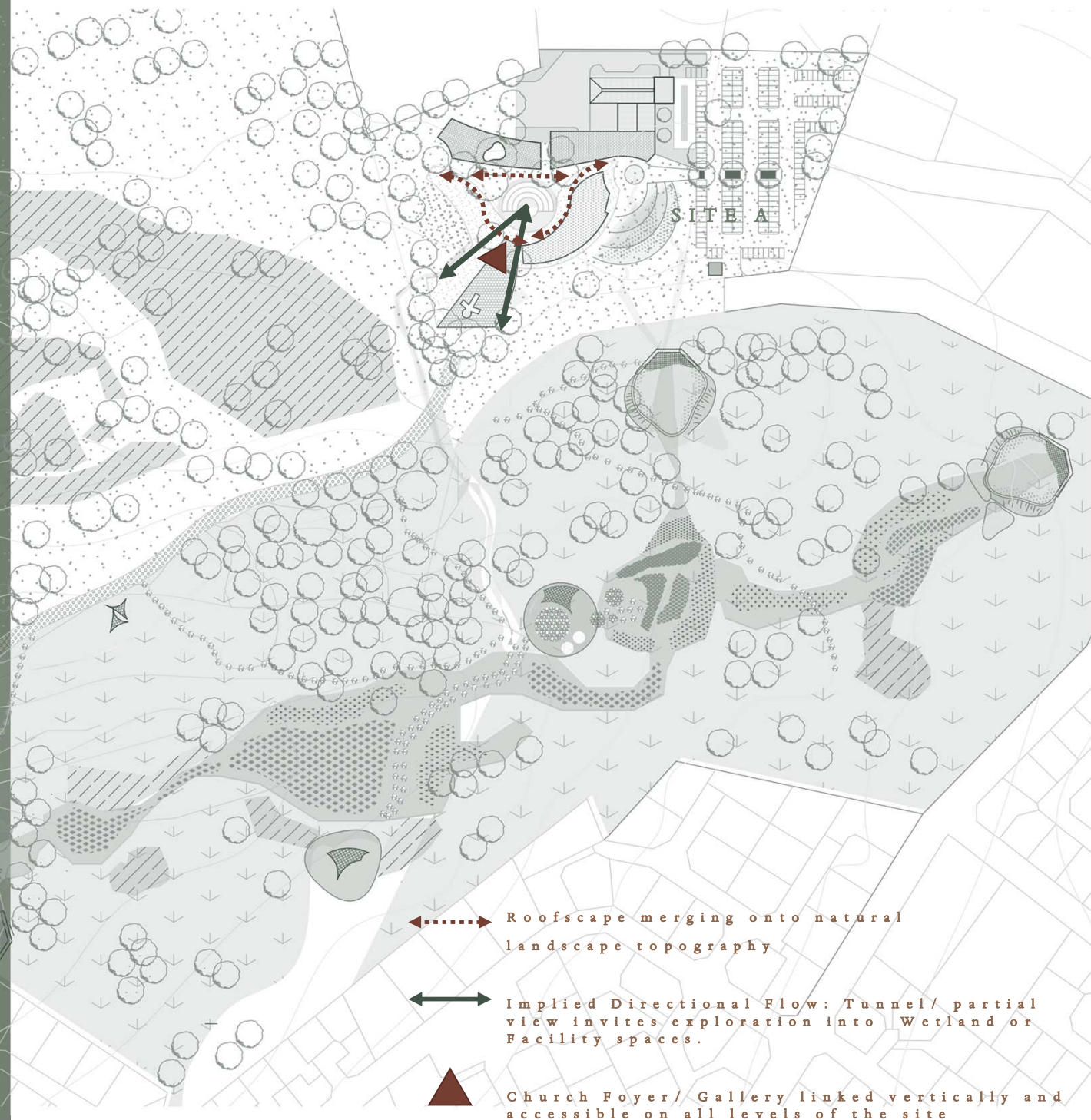
The outdoor amphitheatre can be used for concerts, outdoor church sermons and can serve as a forum space.

The roof-scape is integrated into the natural environment and can be a multi-purpose space for community markets and retail spaces. All built masses offer a view out onto the wetland. The partial views through the tunnel spaces from the central courtyard into the mission field, offers a hint of mystery and invitation to explore.



FLUIDITY
UNIT TO WHOLE

Figure 6.26: Spatial Arrangements (Author 2021)



PLANNING

PROGRAM STRATEGY

The facility is divided into 5 masses, unified by the central water element that is visible from the circulation spaces. It is the focal point that moves water through the site, via swales and smaller retention ponds that filter into the wetland seasonally.

The visitors enter from the parking lot into a landscaped arrival space that forms part of the wetland preservation/resource centre, and allows free movement through to the wetland. All facilities are linked to the centralised public courtyard. All buildings have uninterrupted views out to the wetland.

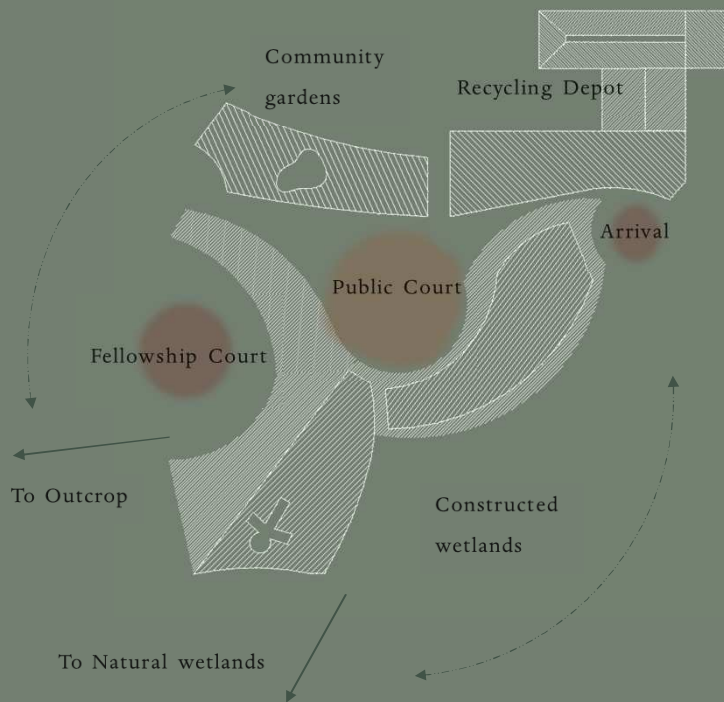


Figure 6.27: Program Strategy showing relations between built form and wetland, (Author 2021)

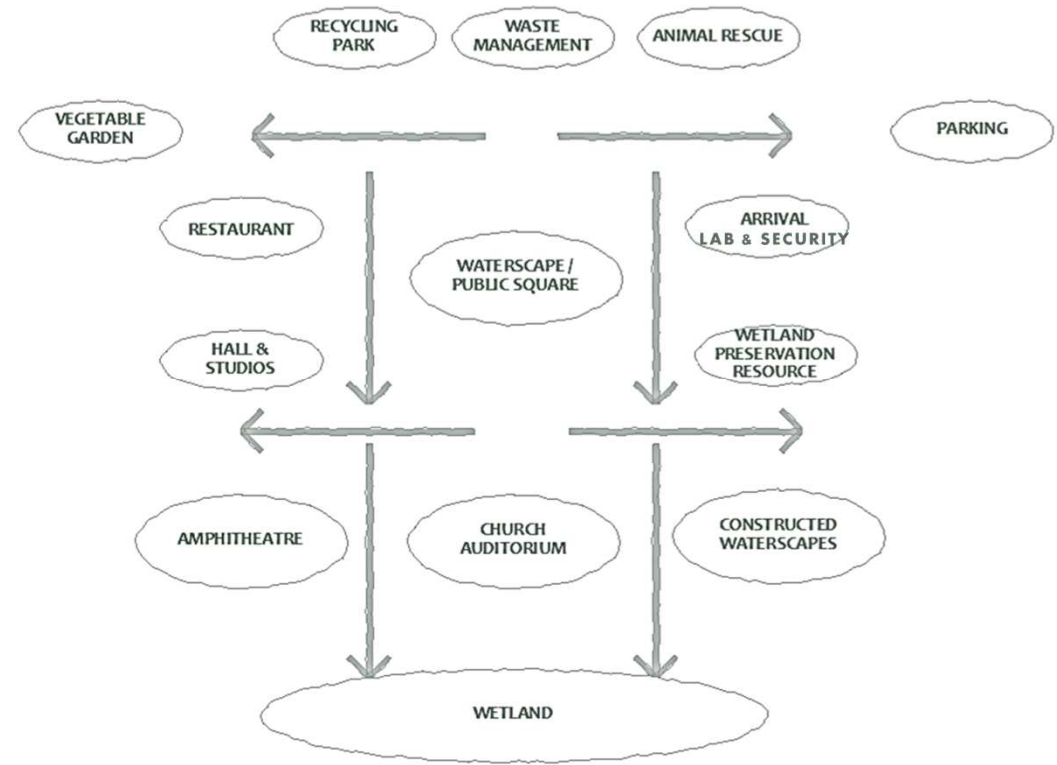


Figure 6.28: Program Strategy I, (Author 2021)

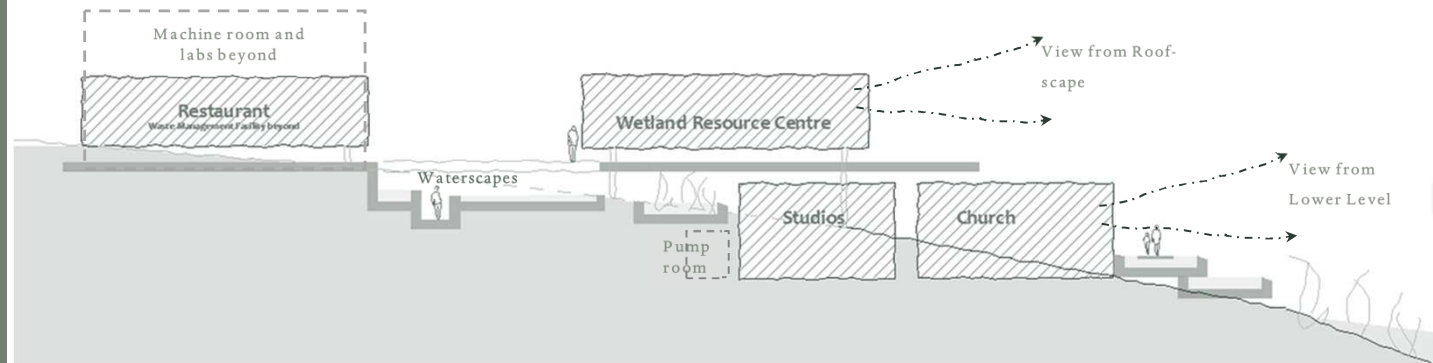


Figure 6.29: Program Strategy ii, (Author 2021)

SPATIAL RELATIONSHIPS

CLOSED SYSTEM VS. OPEN SYSTEM

Most modern churches are seen as isolated from the community, surrounded by perimeter fencing and basement parking, turning themselves away from the world. The approach to the church in this design, invites the world and landscape into its realm and offers a layered approach towards its core worship space.

The church is surrounded by public gathering spaces on the exterior layer, with public amenities and multiple foyers from all sides and levels of the church, welcoming anyone from all directions. The approach to these foyers are around bends, and tunnels, offering a sense of mystery for the visitor, whilst evoking a spiritual journey on the internal spaces that uses natural lighting effects, as they progress toward the chapel which is the inner most layer.

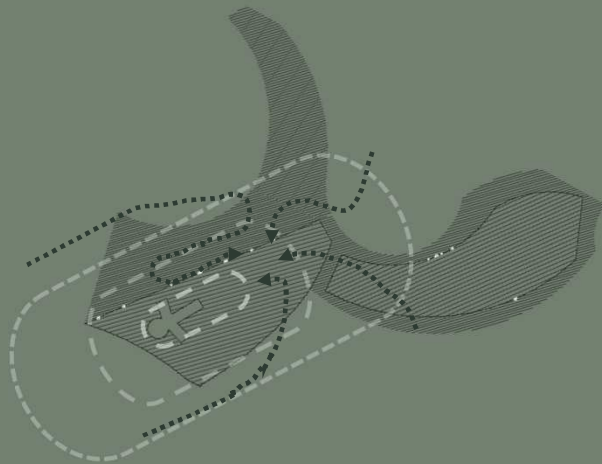


Figure 6.30: Illustration Closed System vs Open System. the site, completely separated from the public, while on the lower floor, offering a learning opportunity for the public to engage and learn from their operations.

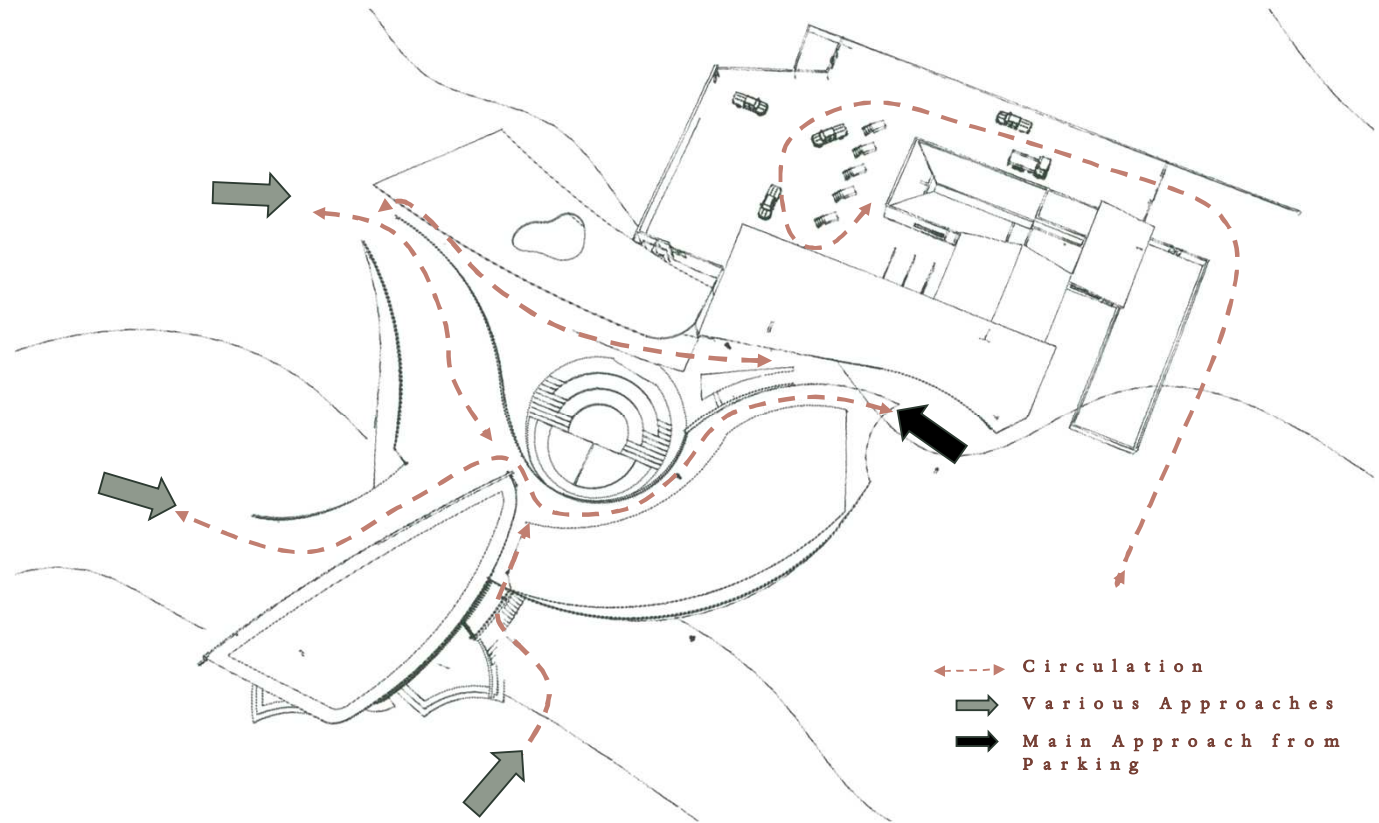


Figure 6.31: Illustration - Circulation, (Author 2021)

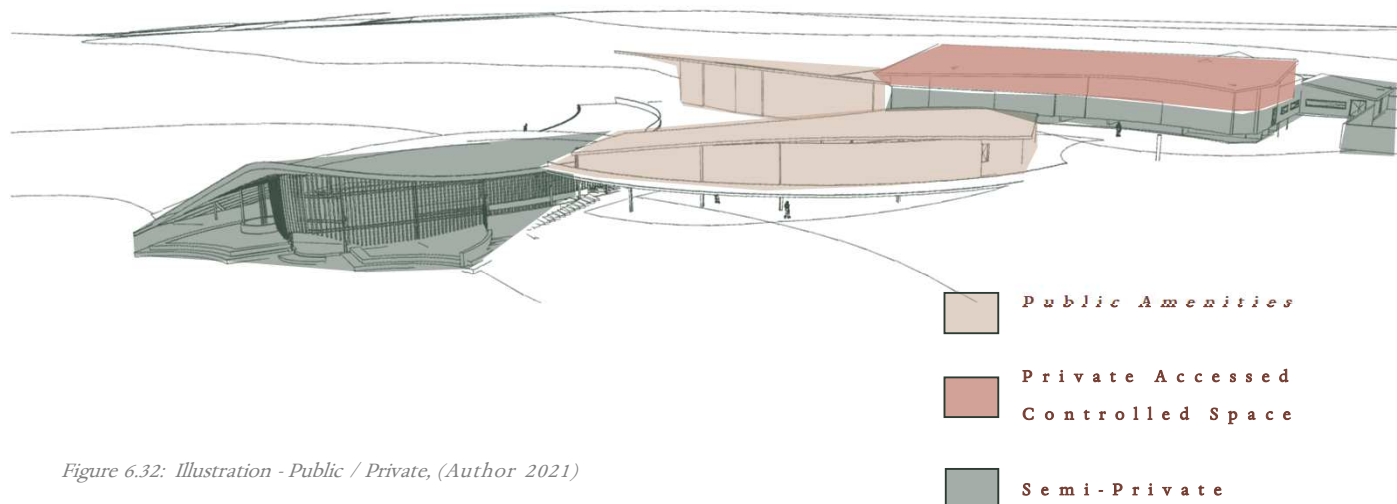


Figure 6.32: Illustration - Public / Private, (Author 2021)

SPATIAL ORGANISATION

FLOORPLANS

1. CHURCH WETLAND ENTRANCE
2. CHAPEL
3. DOUBLE VOLUME FOYER & STAIR
4. OFFICES
5. ABLUTION FACILITIES
6. KITCHEN
7. MEETING ROOM
8. WALL OF REMEMBRANCE
9. WATERSCAPE & BAPTISM POOL



Figure 6.33 (right): Floorplans at basement level, (Author 2021)

SPATIAL ORGANISATION

FLOORPLANS

1. MINI LECTURE HALL
2. SUBMERGED WALKWAY THROUGH
CONSTRUCTED WETLAND.
3. GALLERY SEATING
4. ENTRANCE OPTIONS
5. FOYER
6. FELLOWSHIP CAFÉ
7. STUDIOS



LOWER GROUND FLOOR PLAN

Figure 6.34 (right): Floorplan at Lower Ground Level,
(Author 2021)

SPATIAL ORGANISATION

FLOORPLANS

1. ENTRANCE COURT
2. CONSTRUCTED WETLAND
3. WETLAND INFORMATION CENTRE & COFFEE BAR
4. AMPHITHEATRE / WATERSCAPE
5. ROOFTOP GARDEN
MARKET/MULTIPURPOSE SPACE
6. RESTAURANT
7. PLANT ROOM / GREY WATER
RECYCLING



GROUND FLOOR PLAN

Figure 6.35 (right): Floorplan at Ground Level, (Author 2021)

SPATIAL ORGANISATION

FLOORPLANS

1. PROCESSING YARD
2. ACCOMODATION FACILITIES AND RECEPTION
3. ANIMAL RESCUE CENTRE WITH EXAMINATION ROOM AND SURGERY
4. TRAINING ROOM
5. SECURITY/ WETLAND MONITORING
6. LAB RECEPTION
7. BOARDROOM
8. EDUCATIONAL LAB
9. PLANT ROOM
10. ON-GRADE PARKING
11. RECYCLING YARD
12. COMMUNITY GARDE

Note: the church will be re-used for the recycling depot and animal rescue centre.



Figure 6.36 (right): Floorplan at Upper Ground Level, (Author 2021)

SPATIAL ORGANISATION

FLOORPLANS

1. LAB FACILITY WITH OFFICES ,
SPECIALISED ABLUTIONS WITH
CHANGING FACILITIES.



FIRST FLOOR FLOOR PLAN

Figure 6.37 (right): Floorplan at First Floor Level,
(Author 2021)

Form — Reinterpretations / sketches

SOFT CURVES

The conceptual form is derived from many explorations that made reference to the Ichthys and the geometric arcs, while remaining conscious of the ground. The charrette exploration was quite abstract, but as the design developed, the textures, the form and many of the ideas was translated into the design.

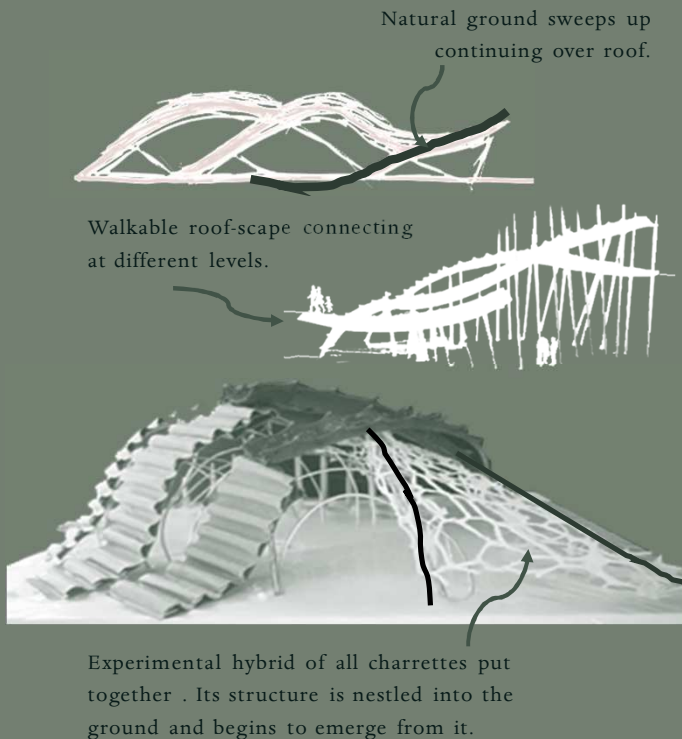
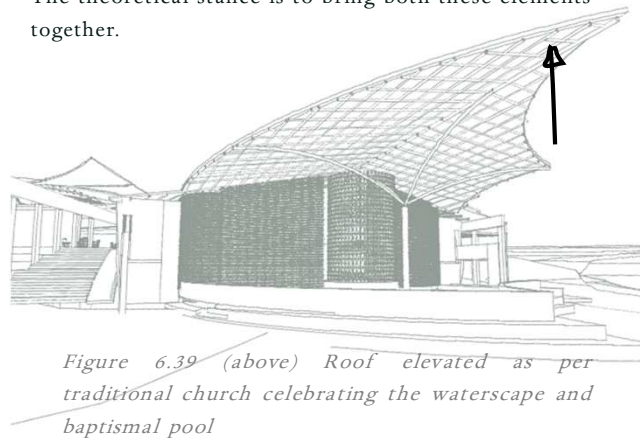


Figure 6.38 (above): Charrette explorations, conscious of the ground. (Author 2021)

DESIGN ITERATIONS

The two iterations below are prototypes exploring the roof of the church building. One speaks to the traditional church which is elevated to the heavens with a structure that is light, glorious and welcoming and has presence. While the other submerges into the ground, more natural and brings man back to earth. The theoretical stance is to bring both these elements together.



COMBINED FORM

Design Dichotomy: Its monolithic appearance offers a sense of mystery. One half emerging into the ground, hosting a partially buried baptism chamber symbolic of being one with Christ in death before new life, while the other half of the roof elevates to the heavens.

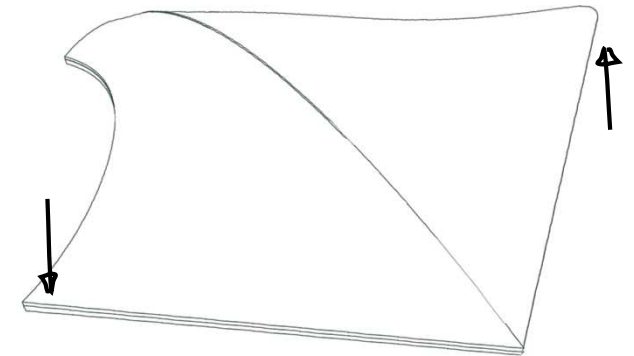


Figure 6.41: (above) Hybrid of both design iterations

Sketch Designs

Heaven on Earth

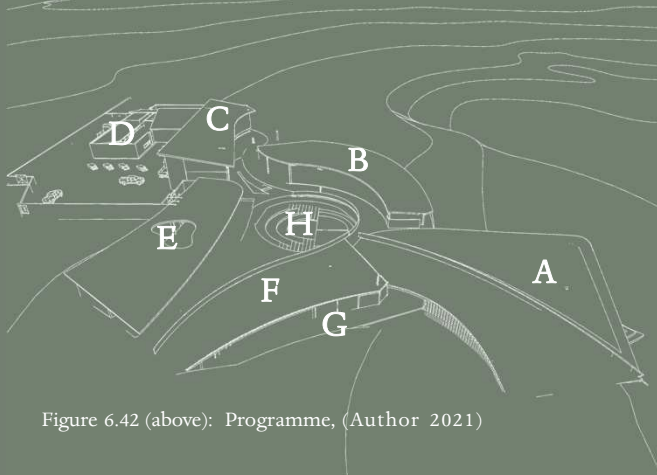


Figure 6.42 (above): Programme, (Author 2021)

HYBRID FORM

The theoretical stance looks to the church as a place of spiritual symbolism but also as a place that is symbolic of the preservation of the wetland. The design brings together different programs that assists in giving the church a presence while at the same time highlighting nature's beauty. The form brings together traditional church architecture that is light and grandeur, offering a moment of awe as you approach it from the street. The approach from the wetland blurs building with nature, offering a moment of surprise as you ascend its roof-scape. Symbolically the ritual space where the baptism takes place is hidden under the lowest part of the roof, with the effect that once you are submerged and is lifted from the water, your eyes meet the sky as it follows cues from the sweeping roof, that illuminates your spiritual experience

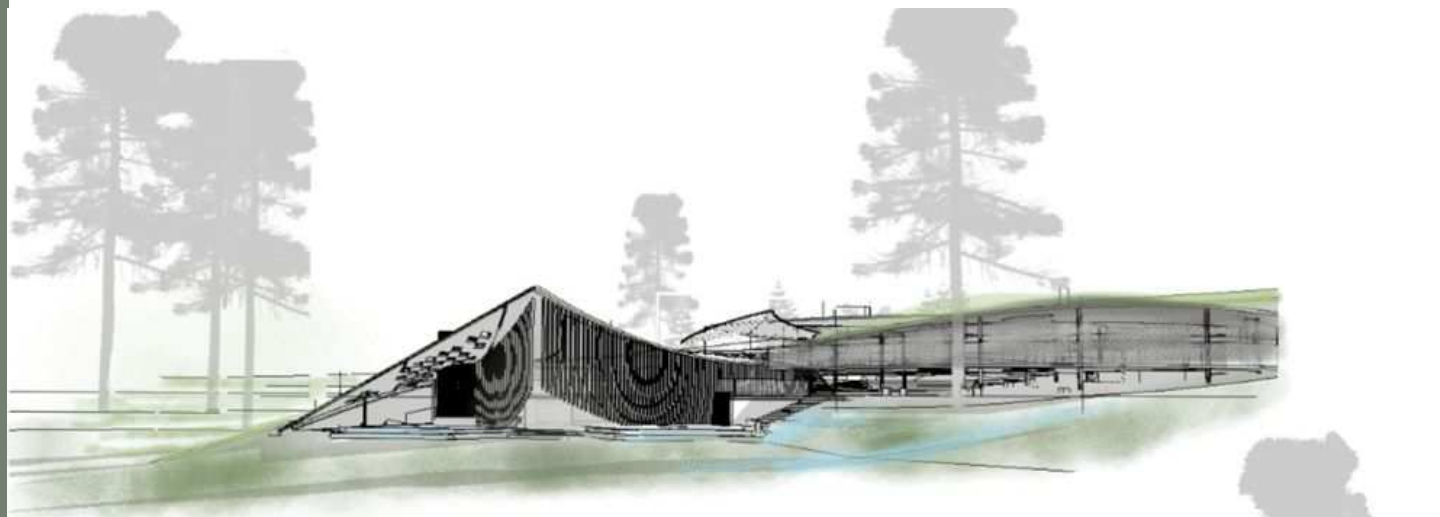


Figure 6.43 (above): Approach from street, (Author 2021)

- A – CHURCH**
- B – INFORMATION CENTRE**
- C- LABORATORY**
- D –RECYCLING YARD**
- E – RESTAURANT**
- F – ROOFTOP MARKET ON GRADE**
- G –RENTAL STUDIOS BELOW**
- H- WATER AMPHITHEATRE.**



Figure 6.44 (above): Approach from Wetland

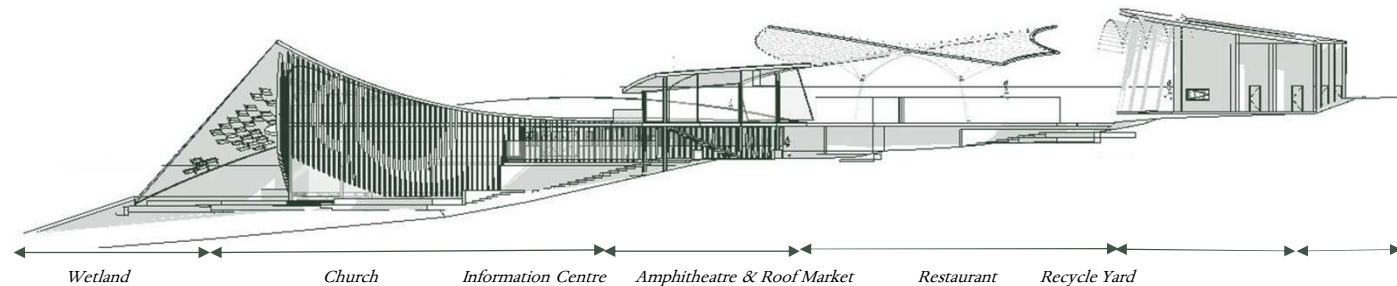


Figure 6.45 (above): Section through site, (Author 2021).

Sketch Designs

Design Development Progress drawings
Soft curves: Plans to elevation relation

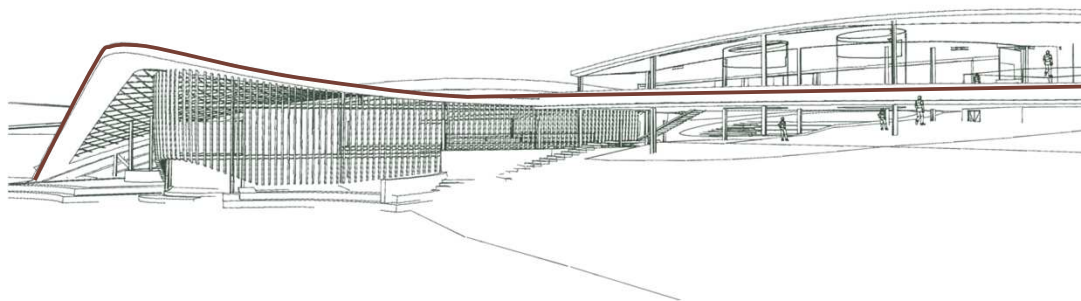


Figure 6.46 (above): Street View toward Church (Author 2021)

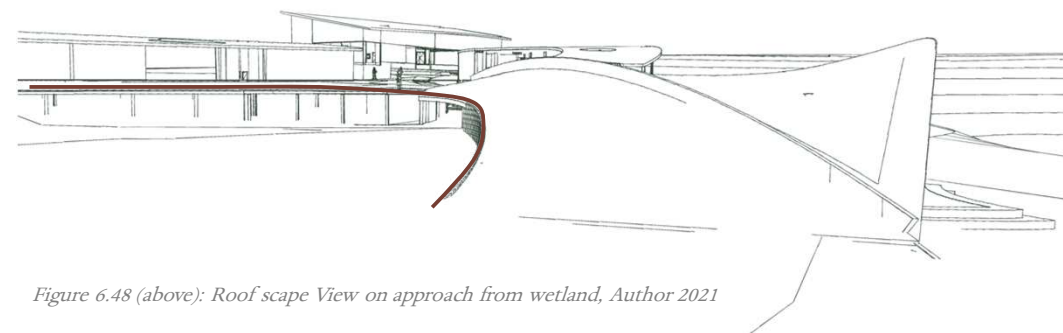


Figure 6.48 (above): Roofscape View on approach from wetland, Author 2021

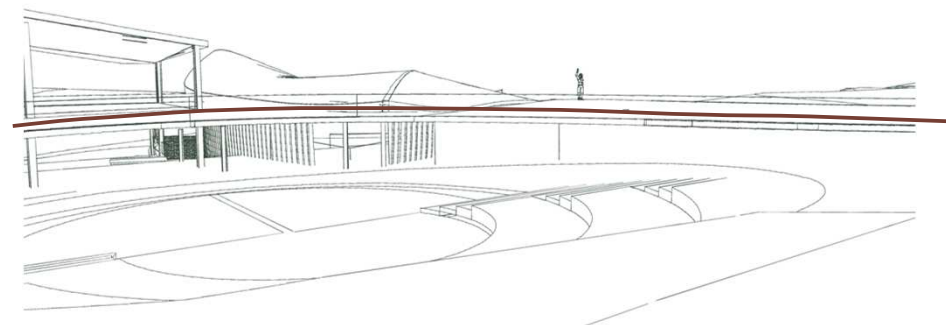


Figure 6.47 (above): Central Amphitheatre / Waterscape Unobstructed view into wetland (Author 2021)

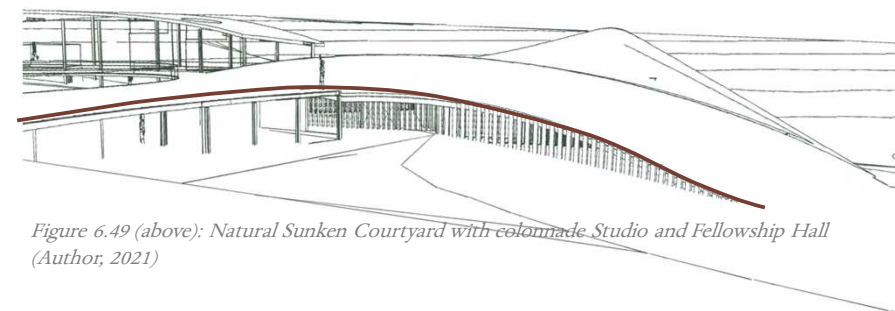


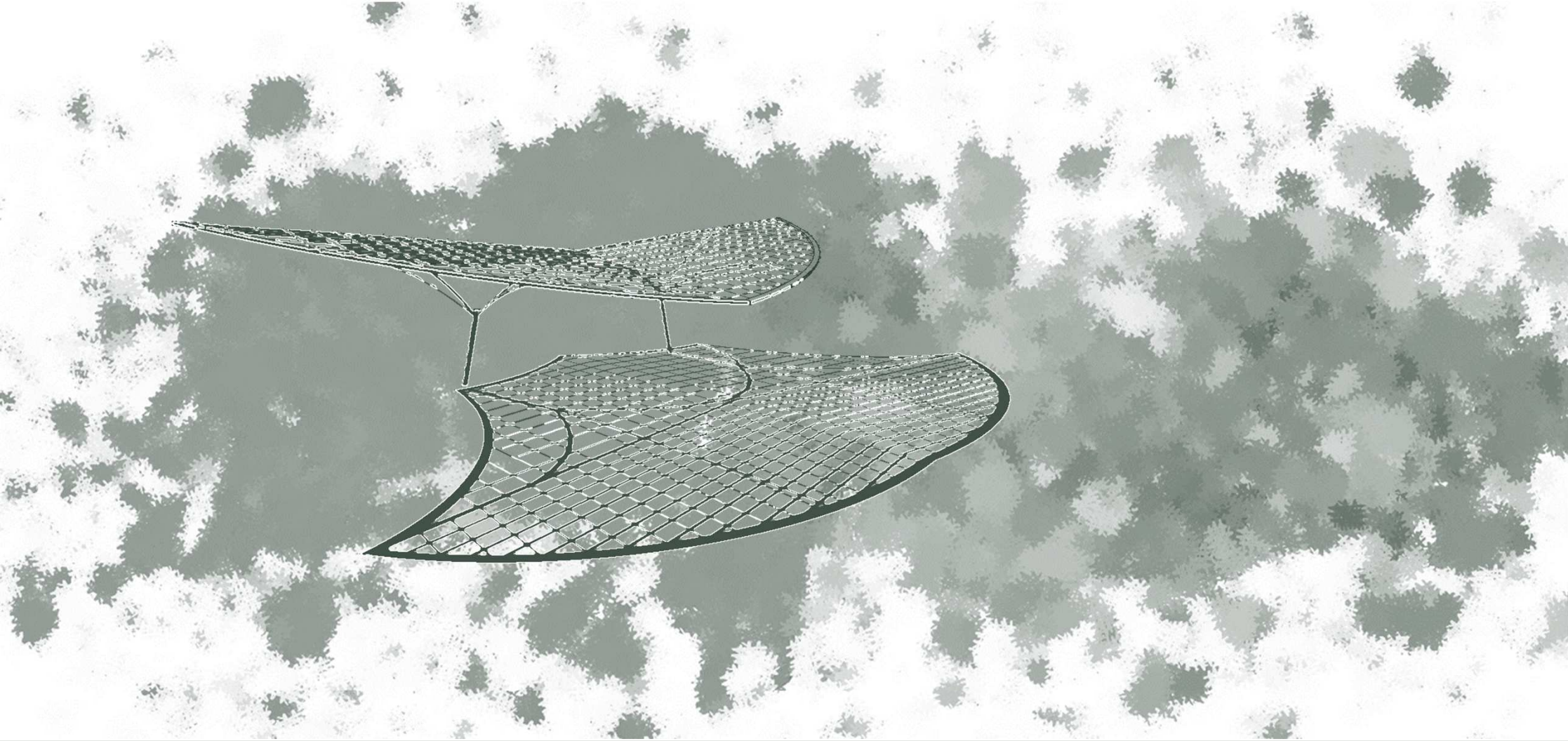
Figure 6.49 (above): Natural Sunken Courtyard with colonnade, Studio and Fellowship Hall (Author, 2021)



The incorporation of nature, light and water combined with a soft natural palette of wood, brushed steel and concrete textures, will give the right amount of mysticism and spirituality to calm the senses .

Figure 6.50: Materiality Collage

Materiality



Chapter 7



TECHNICAL SYSTEMS

STATEMENT OF INTENT

As an attempt to 'tread lightly,' the construction methods and material choices for this project are important aspects to provide a greater awareness to support the narrative of preserving and protecting nature.

The green building council warns that buildings and construction contribute to 39% of all carbon emissions (gbcsa.org, 2019), challenging the idea to be cognisant of a buildings carbon footprint, both during the construction phase and its lifespan.

By reducing waste production, environmental impact and using locally sourced materials supports the concept of a 'circular economy' for a sustainable building and further helps develop ideas around choosing the right sustainable products, construction and [de-] construction methods towards transformation into a sustainable future.

The following material study show some innovative products that will be considered for the project.

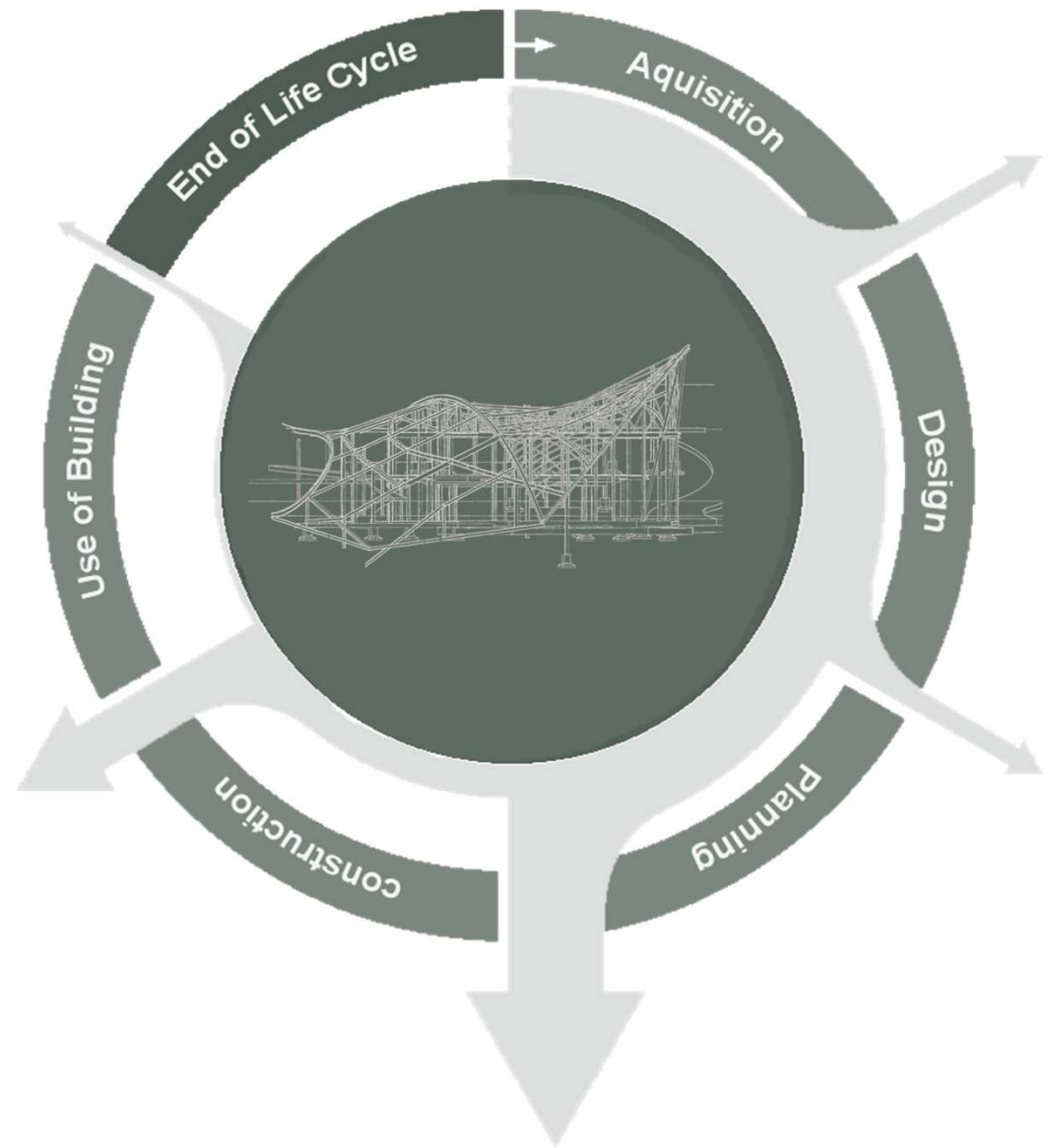


Figure 7.1 (top): Life Cycle of Building Infographic

Material Study — Reduce, Re-use, Recycle.

STEEL

Steel is central to society. It is used in every industry and is made of iron which is a natural source attained from the environment. Given the population growth and demand for steel in everyday use, steel has proven itself a sustainable material that has an infinite life-cycle with the uniqueness of never losing its properties, no matter how many times it is recycled, it is considered appropriate for the demanding needs of society (metalframeconstruction.ie). It also has the potential of low impact on the site environment as it can be prepared offsite and quickly assembled or disassembled.

Advantages:

- Long Span
- Accuracy
- Recyclable
- Manufactured off-site (low impact)

Opposing Concerns:

Wastewater production in the manufacturing process



Figure 7.2 : Steel I Beams and energy performance,
<http://www.metalframeconstruction.ie/sustainability/>

RECLAIMED WOOD

Due to wood's natural aesthetic, it has the biophilic properties to enhance our well-being. Without the need to be felled, processed, or transported, reclaimed wood will be used to clad certain steel beams and beautify interior spaces. Wood has good thermal properties and sound absorption properties which is ideal for the church/auditorium. Wood is an organic material, meaning that it omits low volatile compounds (VOC's) provided it is not processed. (Terramai.com) While wood is not highly attainable in South Africa, there are a few companies dedicated to collecting reclaimed wood, that could be sourced for this building's material.

Advantages:

- No deforestation required
- High Insulation rating
- Biodegradable Beautiful

Disadvantages: Highly susceptible to moisture. Requires annual treatment.

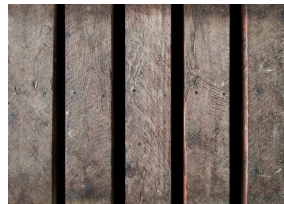


Figure 7.3 : Wooden Slat Beams/ Cladding,
https://www.freepik.com/premium-photo/wood-slat-old-brown-textured-background_16196312.htm#&position=21

CLAY BRICKS

Clay-fired bricks have a long-standing history in the South African construction industry as early as 1656 (claybrick.org, nd). The Clay bricks envisioned for the design will be used for perforated walls and therefore can be recycled units collected off-site from some of the demolition work as well as can be sourced from salvage yards. With the bricks being re-used, a process of brushing debris and washing off bricks and straightening or rubbing down of chipped edges can be done by using a gritstone.

Advantages:

- No processing required
- Traditional
- Pleasing weathered appearance

Disadvantages:

- Labour Intensive to clean
- Clay bricks easily absorb chemicals from certain environments, and this alters the composition of the bricks. Sourcing of these bricks needs to be done with care.



Figure 7.4 : Perforated Brick wall,
<https://gosmartbricks.com/7-totally-innovative-famous-buildings-made-with-bricks/>

Material Study — Innovation, Strength and Stability, Sustainability

GEOPOLYMER CONCRETE

Concrete has flexibility, permanence and good thermal properties. An alternative to the traditional concrete is the geopolymer concrete which replaces the usage of cement and uses 52% less fuel usage than the traditional Portland cement, decreasing the CO₂ emissions. (Assi et al, 2018) It uses waste materials from other construction materials. Can be crushed and recycled.

Advantages:

- Coolant
- Protects water bodies from contamination due to Fly Ash disposal.
- Fly Ash increases lifespan.
- Resistance against water.
- Higher compressive strength



Figure 7.5 : Geopolymer Concrete,
<https://www.tunneltalk.com/TunnelTECH-Jan2014-Sustainable-Earth-Friendly-Concrete-for-high-durability-tunnels.php>

HYDROMEDIA™

Hydromedia by Le Farge provides an efficient and sustainable advanced urban drainage system that minimises flash floods and rapidly drains water with its high permeable surface. It will be used in areas such as amphitheatre spaces and steps in landscaped areas where drainage down to the ground can flow at a rapid rate into the groundwater storage system underground and ultimately into the constructed wetlands around it.

Advantages:

- No need for underground piping, reducing costs.
- Easily placed
- Can be coloured to desired shade of colour.



Figure 7.6 : Porous Concrete,
https://www.lafarge.co.za/sites/zarevamp/files/documents/HydroMedia_Brochure2013.pdf

GLAZED CURTAIN WALLS

Glazing technology is an essential element in modern architecture, used to define spatial qualities both inward and outward. It has undergone a radical change, that not only separates spaces with a visual link but can now also function as a structural element with thermal insulator properties to assist in creating a comfortable low energy building. The design uses mostly glazed walls to take full advantage of the views. Glazed curtain walls that face north, west and eastward are Low E glass, protected by wooden screen facades and perforated brick wall panels, to offer an interesting play of lighting effects.

Advantages:

- Lowers the need for artificial lighting
- Minimal environmental impact, as it is manufactured using low water, raw materials and is recyclable.

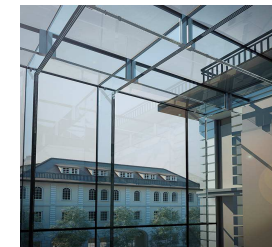


Figure 7.7 : Glazed Curtain Wall,
<https://www.glasscon.com/products/structural-glass-facades/structural-glass-facades>

Technical Systems

DETAILS OF INTEREST

The purpose for the technical workshop was to explore and refine the physicality of the design. We were required to extract details of interest and investigate how these areas will be constructed. The next few pages will clarify some of these connections and will be developed further as the design is refined. The cross-section to the right is taken from Section A-A on Figure 7.16.

The roofing system was an important exploration, as it formed part of the ideology to 'blur lines' between built form and nature, thus the vegetated roofing system was used as a predominant feature. A tensile structure was explored for the church space, to add to the illuminance of the space. Steel connections and lightweight formwork was explored cognisant of the idea to 'tread lightly'. Being a pre-manufactured material, supports the idea of having as low impact as possible on the site.

Embracing water was vital in the design, therefore certain elements, such as a skylight water stream, gabion planter gutter systems, and waterscapes were considered as systems to collect water, for an interesting experience.

Natural lighting effects will be explored in the design, through using perforated brick walls and wood cladded systems for a play on light, that could filter and create shadows in the interior space of the church.

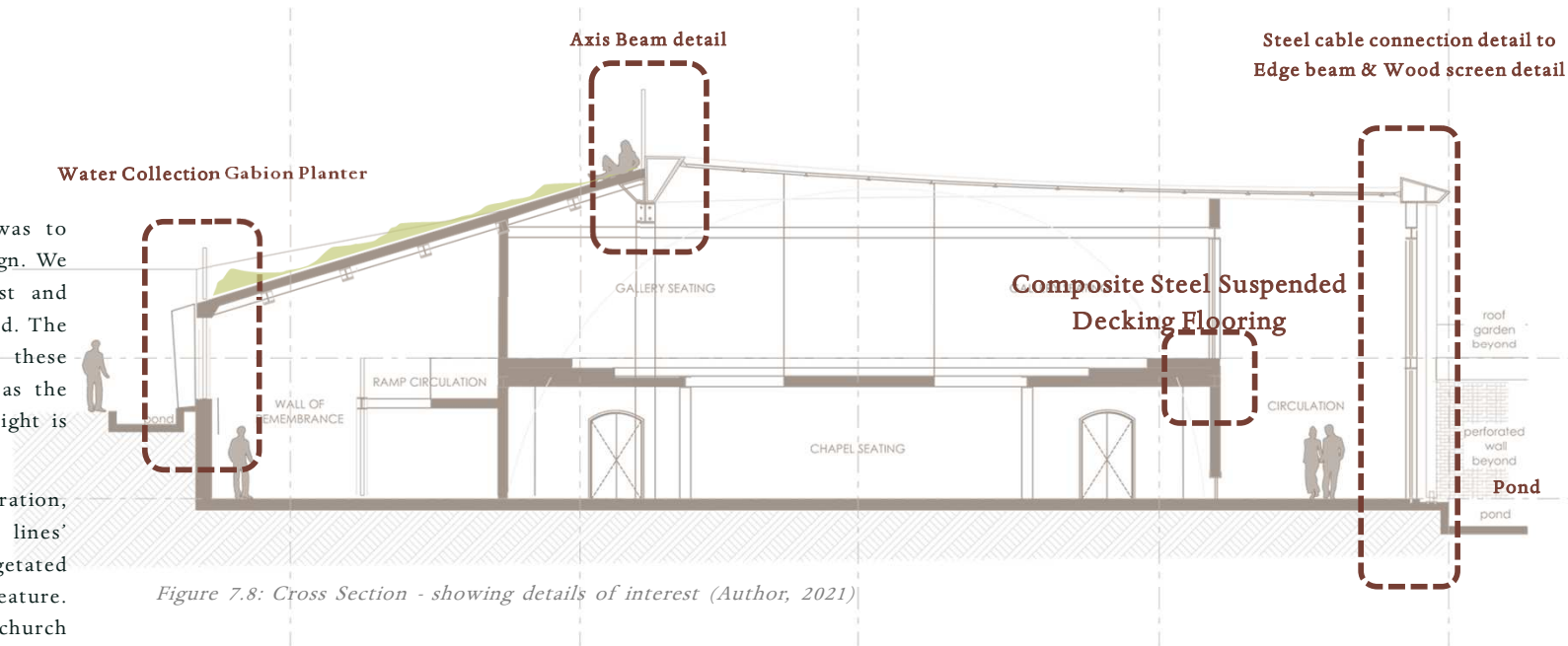


Figure 7.8: Cross Section - showing details of interest (Author, 2021)

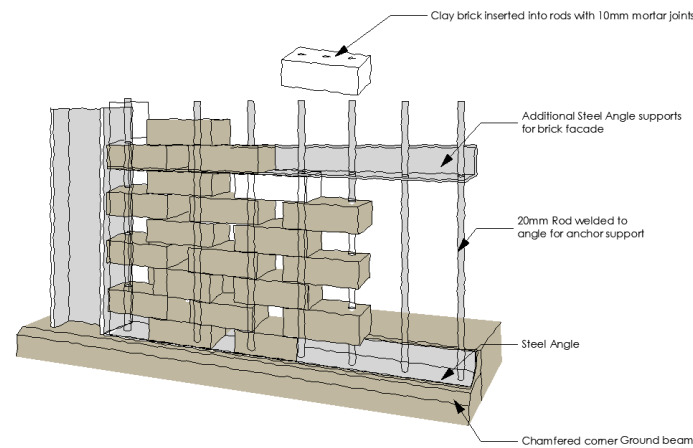


Figure 7.9: Perforated Clay Brick wall composition (Author, 2021)

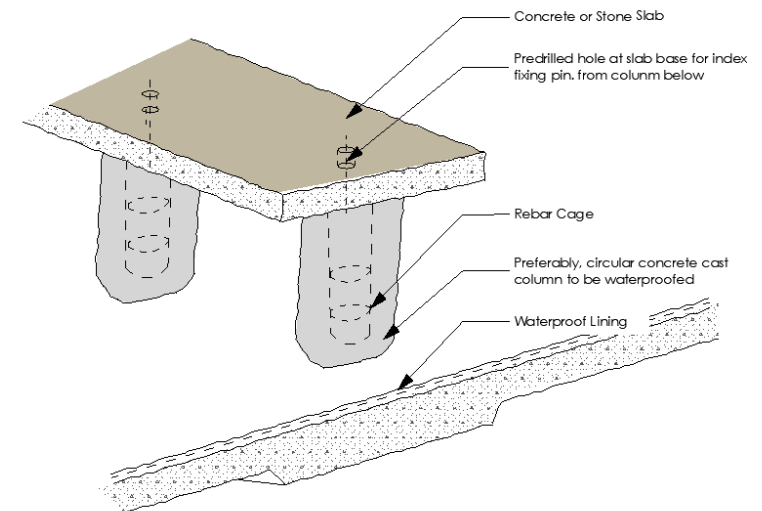


Figure 7.10 Floating stepping stone details in the waterscapes (Author, 2021)

Roofing System

Construction methods

TENSILE STRUCTURE AND ETFE COVERS.

Tensile roof structures is a structural system that is applied by interlacing cables in two directions in tension with lightweight covers that cover large spans. The flexible, stretchy cover is a manmade material, composed of ethylene-tetrafluoroethylene that is a non-stick, and recyclable material resembling glass. **Advantages of steel cable structure:**

- Lightweight and durable
- Prefabricated and Installation is quick.

Advantages of ETFE Material:

- Ultraviolet, high temperature and Fire resistant, It has self-ventilation properties to reduce heat build up.
- Found safe for the ozone layer due to its chlorodifluoromethane which is not a petrochemical derivative.

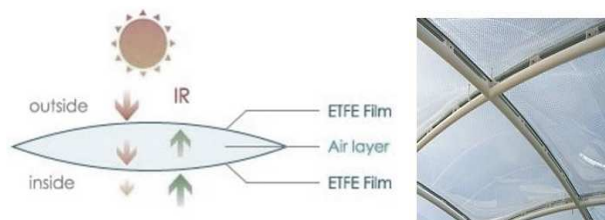


Figure 7.11 : Showing ETFE triple layer installation

<https://theconstructor.org/building/etfe-properties-applications-building-construction/14940/>

PRECEDENT

The VW Customer Centre in Wolfsburg, created a Canopy to resemble a leaf fallen on the ground. Cables connect orthogonally at intersections using steel cables between 20-24mm thickness.



Figure 7.12: 'Leave in the landscape' ©Tobias Hein(nd



Figure 7.14: Segmented steel plates

The intriguing beam edge consists of varying prefabricated planar steel section plates differing between 16mm and 30mm width, faceted to form the curve. The beam was transported to site in 15m lengths.



Figure 7.13: Cable and fork connectors with threaded fittings along edge beam.



Figure 7.15 Manufactured at 15m lengths at a time.

[Figures 7.12, 7.13, 7.14, 7.15 all sourced from: <https://www.researchgate.net/publication/320101296>]

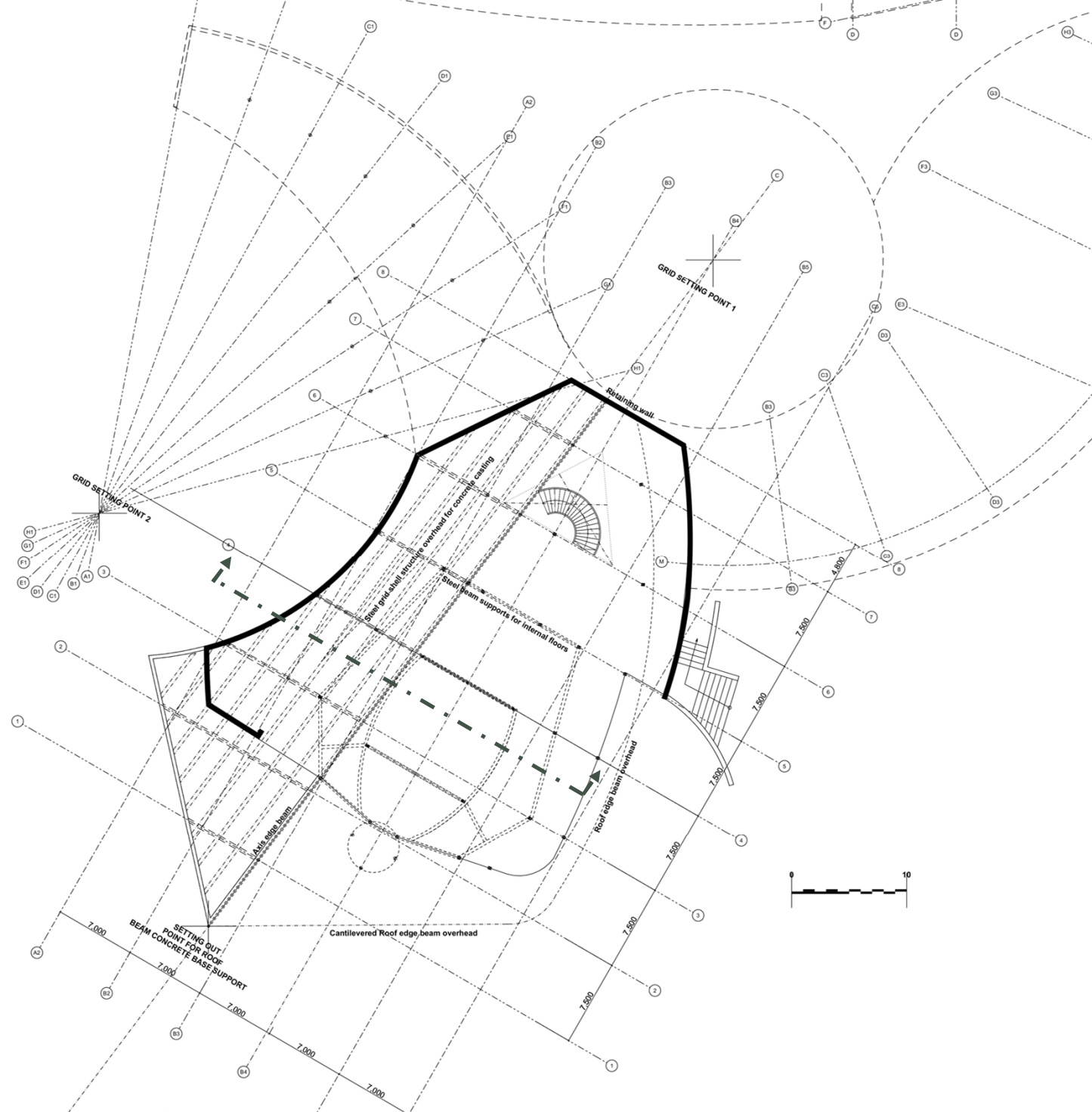
Steel Formwork

FRAMEWORK AND PORTALS

The steel column spans and overall structural design system was presented to Mr. Lloyd Feshete for comment, a registered Engineer.

He was impressed with the complexities of the design and how the structural systems came together. He suggested Geopolymer concrete for the composite decking and a waterproofing additive such as Penetron in the concrete on green roof areas. He also suggested that a building of such a scale and complexity, would require a team of engineers and specialists to further assist the architect to develop more refined junction details.

While I do acknowledge that some of these junctions, or details stop short of refinement; there is a basic understanding of the many intricate systems researched, and according to Mr. Feshete, successfully came together for its intended purpose for this project.



Steel Formwork

FRAMEWORK AND PORTALS

The framework consists of steelwork with a tectonic assembly that engages with the spaces beneath it to form an interesting experience of space. The bottom half roof assembly will have a vegetated roof surface that blends in with the steep hill-type topography. Composite steel deck flooring can be applied on the slight convex curve. The other half of the roof uses a different pre-tensioned tensile structure. Steel cables connect orthogonally at intersections and fixed to edge beam using fork connectors. (As an extra support, Steel columns are beneath the edge beam for glazed curtain walls and could double up as support to the edge beam). Anchor points are highlighted with an 'x'.

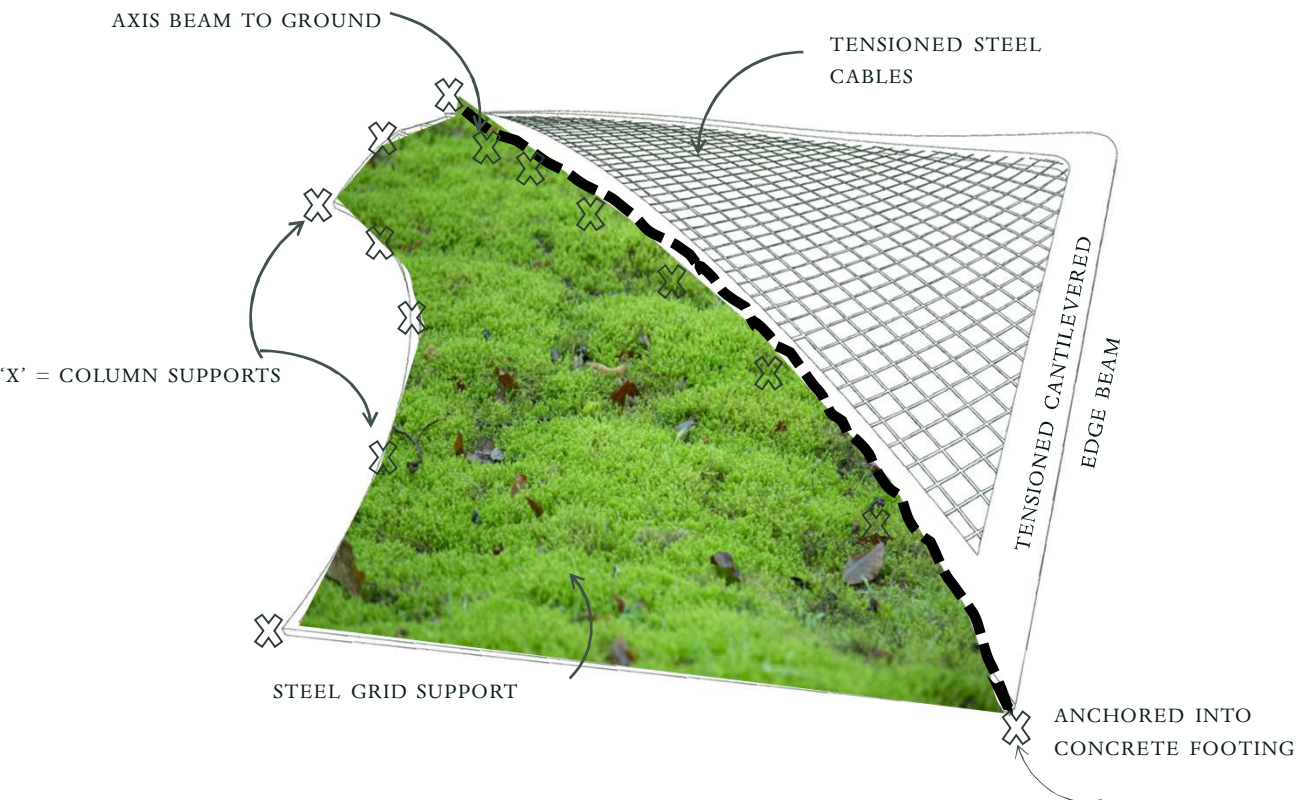


Figure 7.17: Two opposing structures meet at the central axis, (Author, 2021)

TECHNICAL SYSTEMS

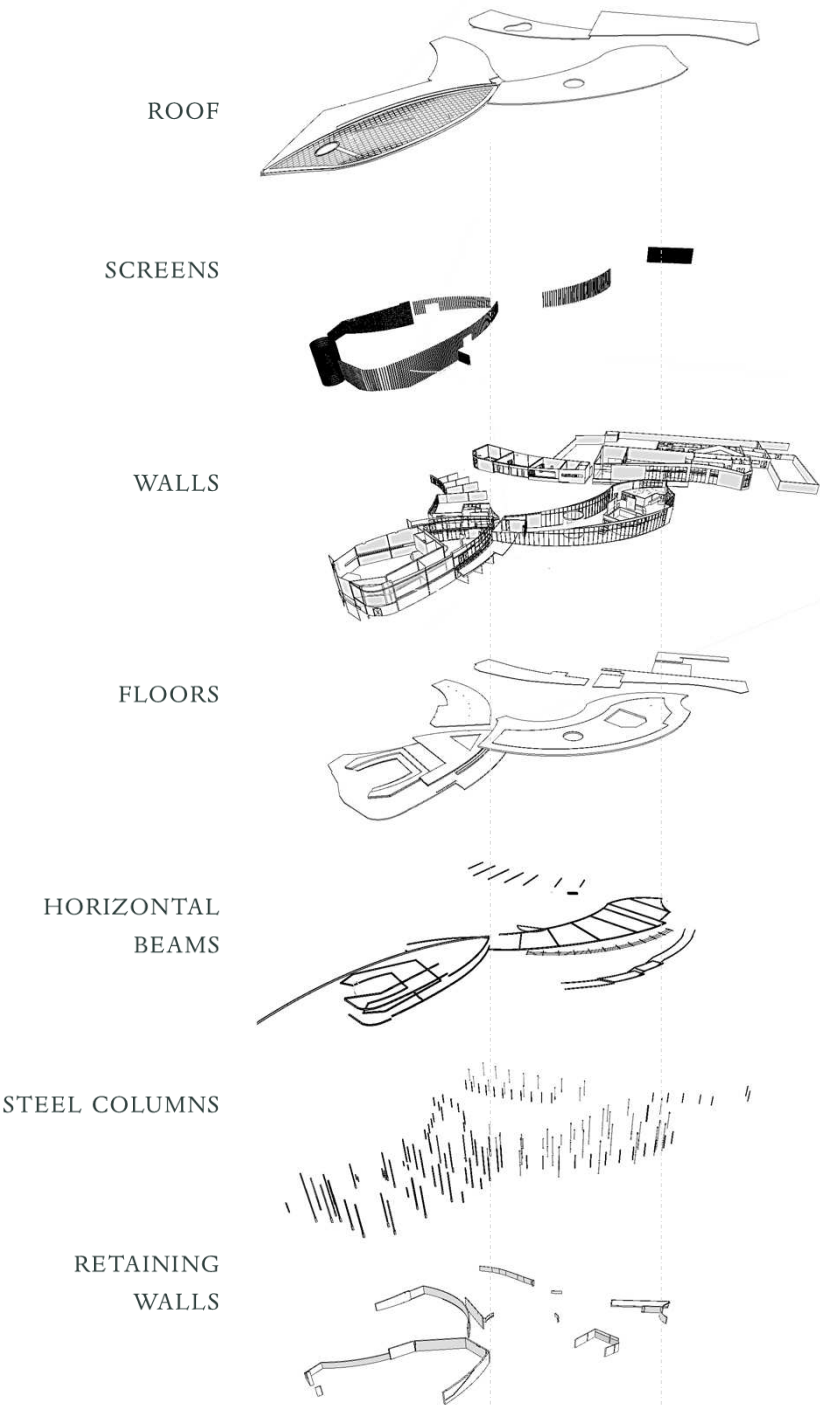


Figure 7.18: Structural composition: Exploded Axonometric, (Author, 2021)

Steel Formwork

CONNECTIONS

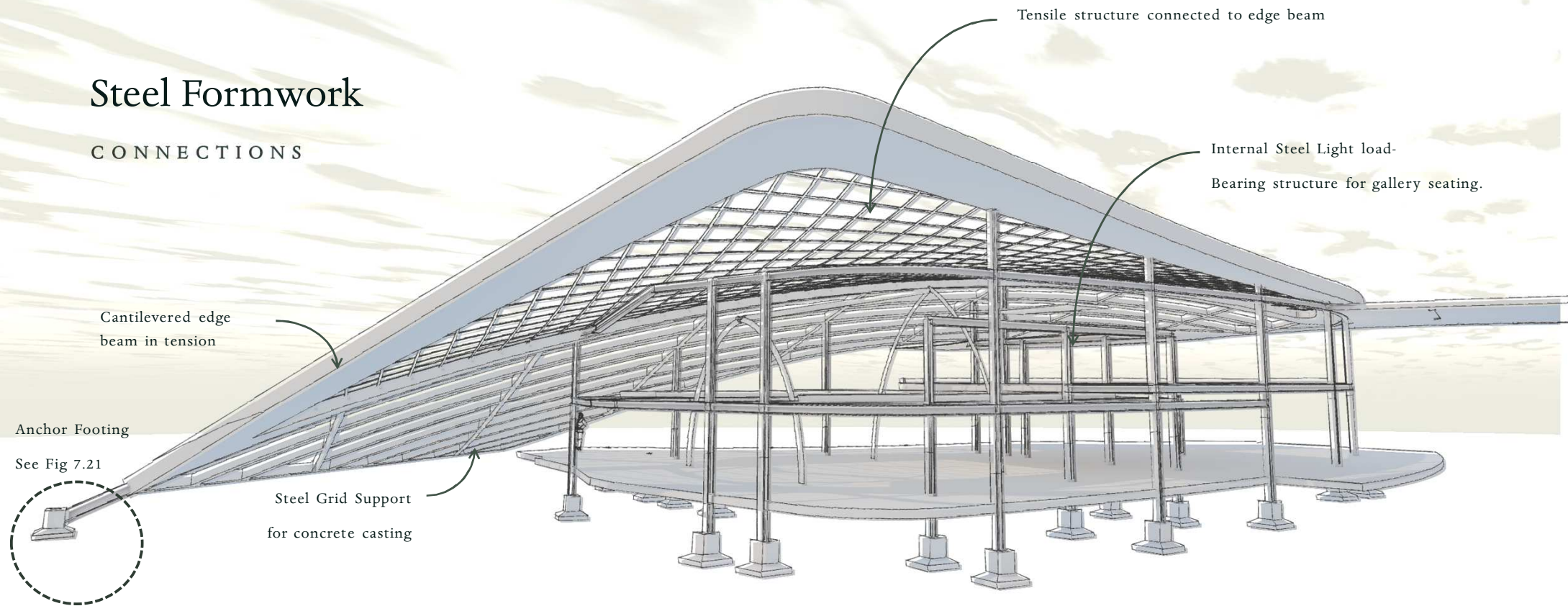


Figure 7.19: Perspective of steel framework construction methods.

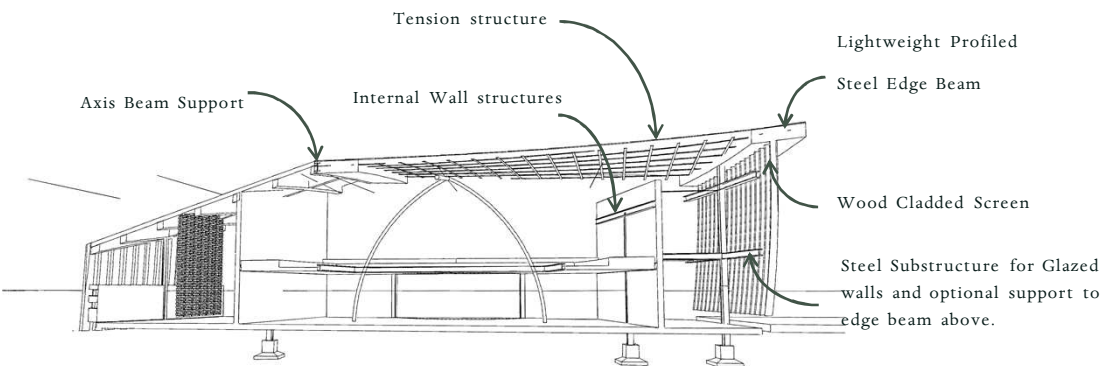


Figure 7.20: Section A-A Model generated, (Author, 2021)

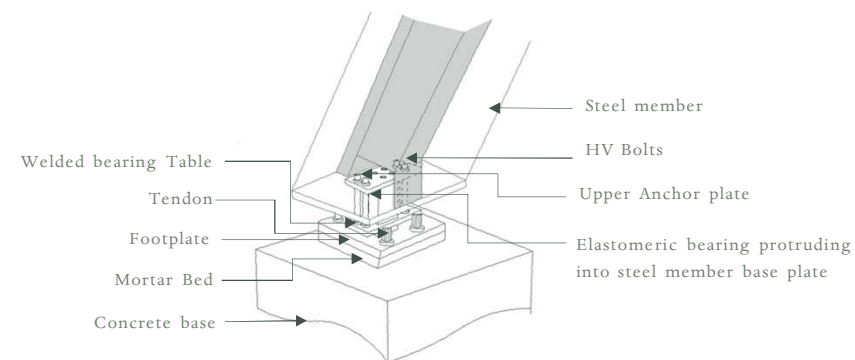


Figure 7.21: Typical Anchor Footing base detail adapted from Porsche Pavilion bearing of the monocoque shell, (Author 2021)

Sourced: <https://www.researchgate.net/publication/320101296>

Technical Systems

VEGETATED ROOF

Burying the building into the ground has a pleasing visual effect on the eye and supports the ideology of blurring lines between the built environment and nature, blending in with the natural ecology of the site.

Advantages:

- Good thermal properties
- Welcomes diverse habitats on its roof scape
- Recreational space

Design Challenges:

- Intensive green roofs are heavier with lawns, and shrubs, while extensive green roofs are lighter for small aloe plants and herbs. A combination of these systems will be used.



Figure 7.22: RD House, Vegetated roof, Abreu Eduardo (2014)

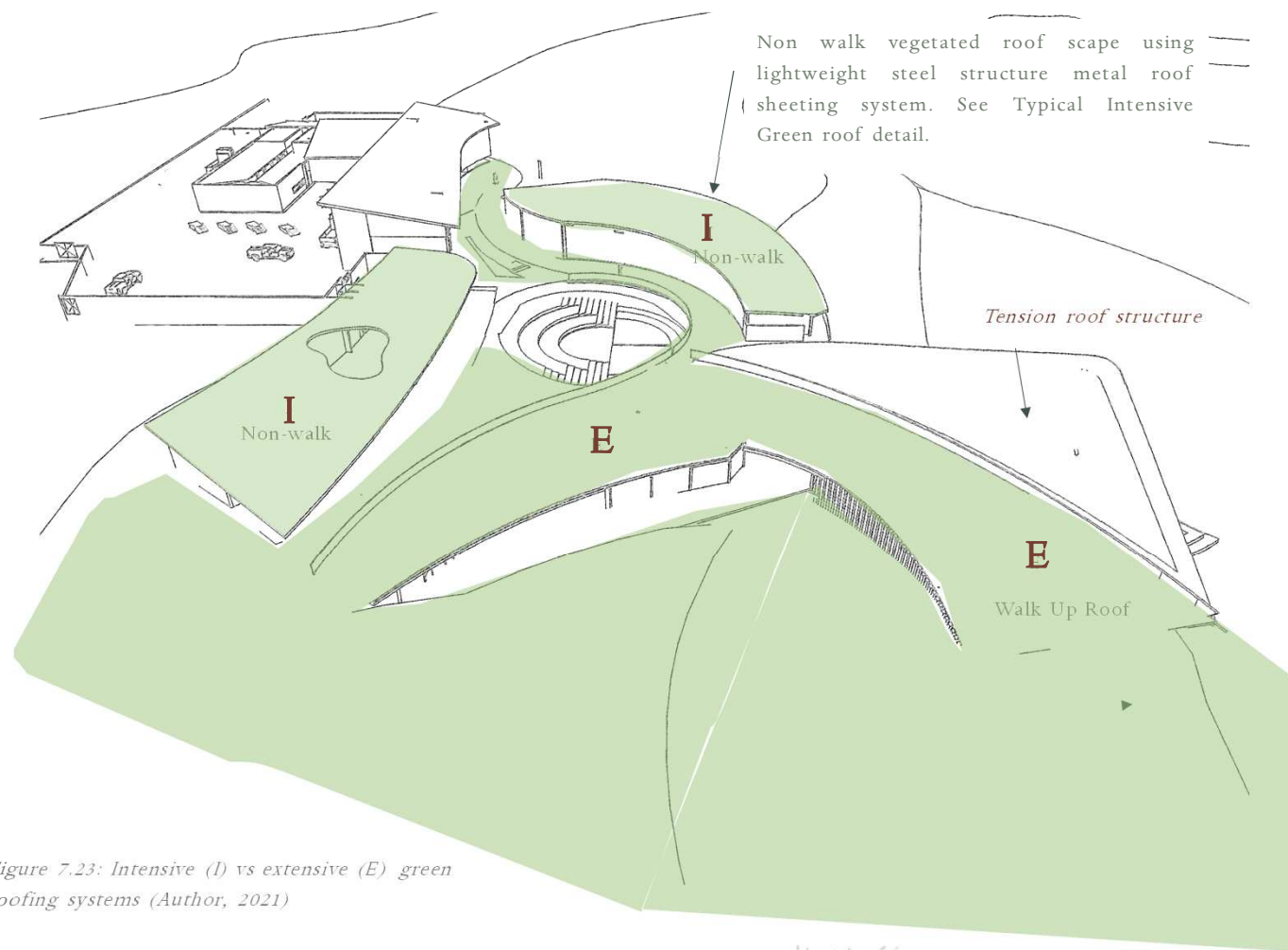


Figure 7.23: Intensive (I) vs extensive (E) green roofing systems (Author, 2021)

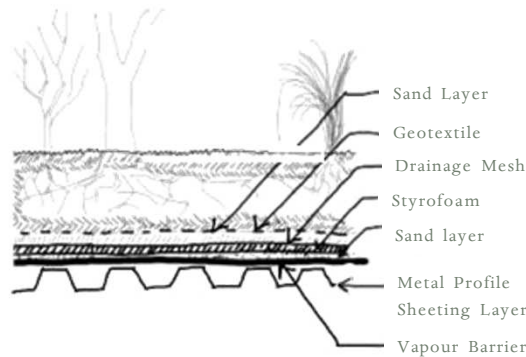


Figure 7.24: Intensive (I) green roof detail (Author, 2021)

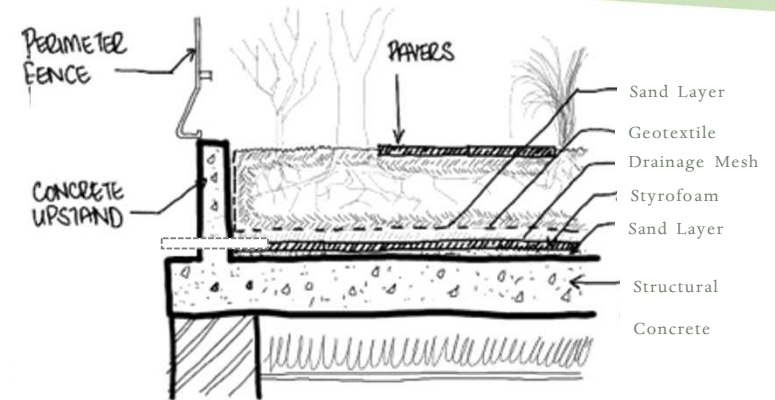


Figure 7.25: Typical extensive (E) green roof detail (Author, 2021)

Technical Systems

COMPOSITE STEEL DECK FLOORS

This lightweight shallow flooring system uses a metal deck profile from Global roofing solutions. Filled with in-situ concrete that slots into the I-Beam framework that forms part of the formwork and reduces the flooring thickness, with a minimum 50mm topping. This decking system could also be used for the vegetated roof on a convex shell form (to be casted in portions).

Advantages:

- Long Spans 6-12m depending on the depth of metal sheet.
- Lighter
- Less Concrete used

Design Challenges:

- Due to some floor perimeters being curved, the profile needs to be cut back to match the curved edge and capped with a metal edging piece. Due to the angled roofs, concrete segments need to be casted in phases.



Figure 7.26: Installation of Decking © Global Roofing (2019)

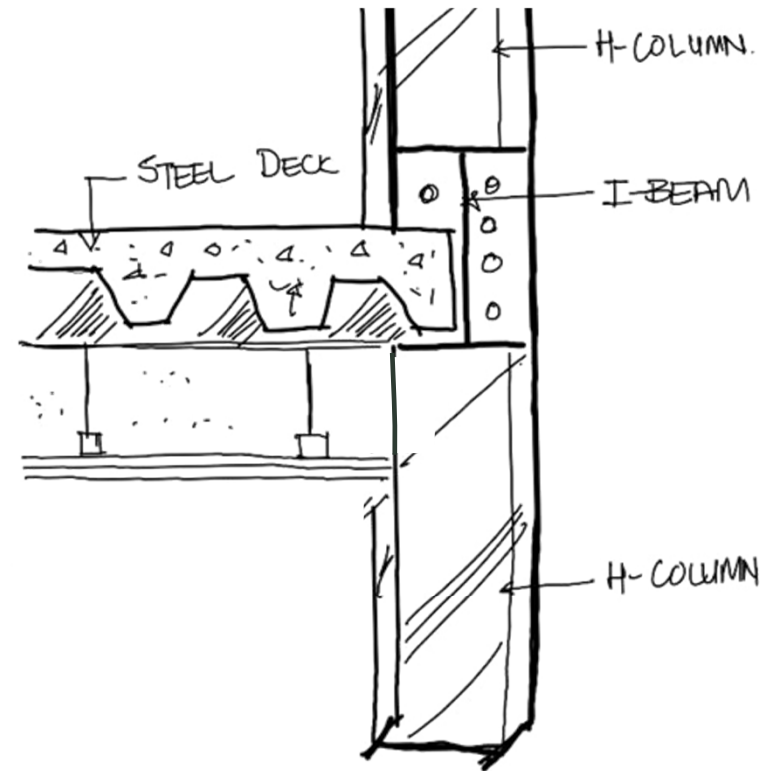


Figure 7.27: Typical steel decking detail (Author, 2021)

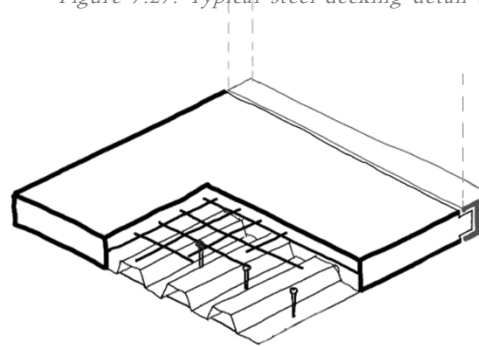


Figure 7.28: Detail Option 1: Beam support cast within slab (Author, 2021)

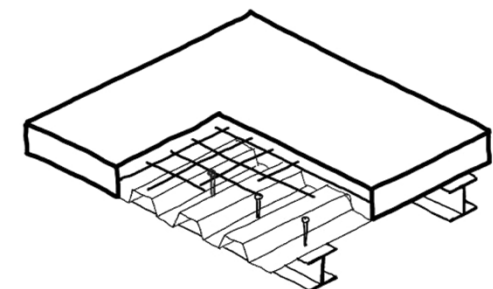
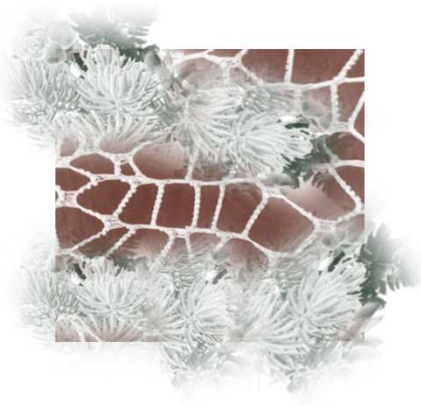


Figure 7.29: Detail Option 2: Beam support under composite decking (Author, 2021)

Perimeter Details

GABION MESH FAÇADE

The Gabion Mesh Façade is an extension of the green vegetated roof, and acts as a gutter system collecting water off the roof. One of the charrette explorations was to create a breathing façade that displays different colours seasonally, touching on one’s visual, tactile and sense of smell. The mesh wall could be planted with vegetation.



Upstand with overflow pipe into perforated gutter flashing dispersed water into green mesh and down into stormwater drain and retention pond.

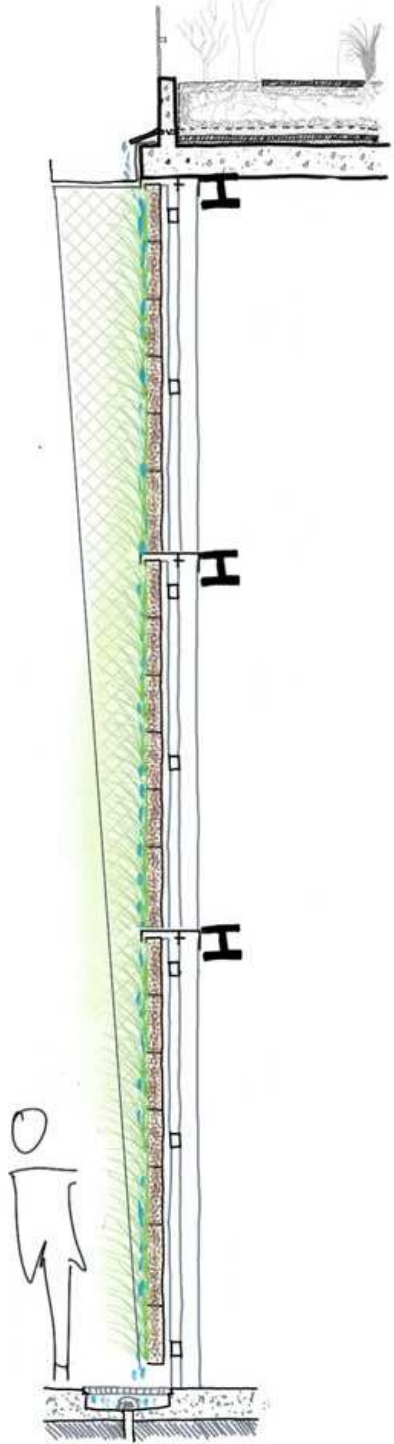
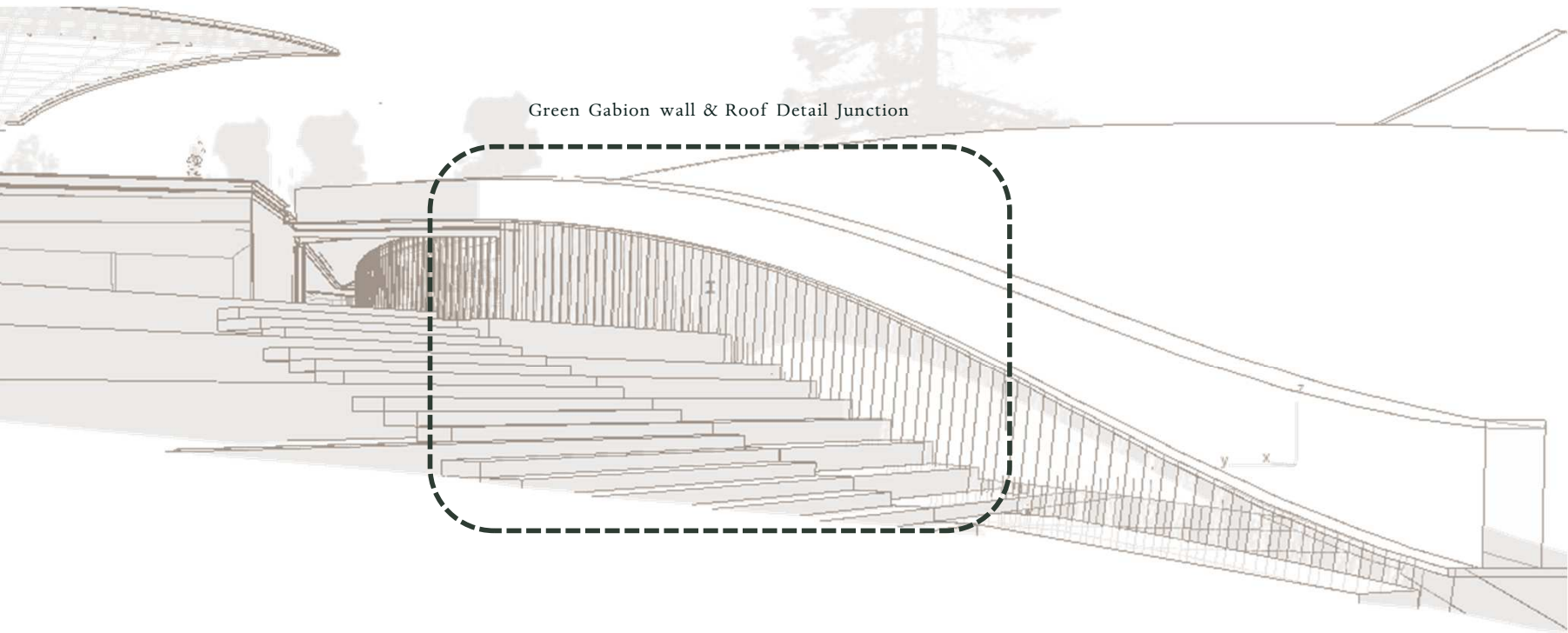


Figure 7.30: Gabion Wall section Detail, and 3D perspective (Author, 2021)

Perimeter Details

GLASS CURTAIN WALL AND WOOD SCREEN

The wood façade screen device appears to hold up the roof as the charrette below.



Charrette

Wooden Screen and Glazed façade detail

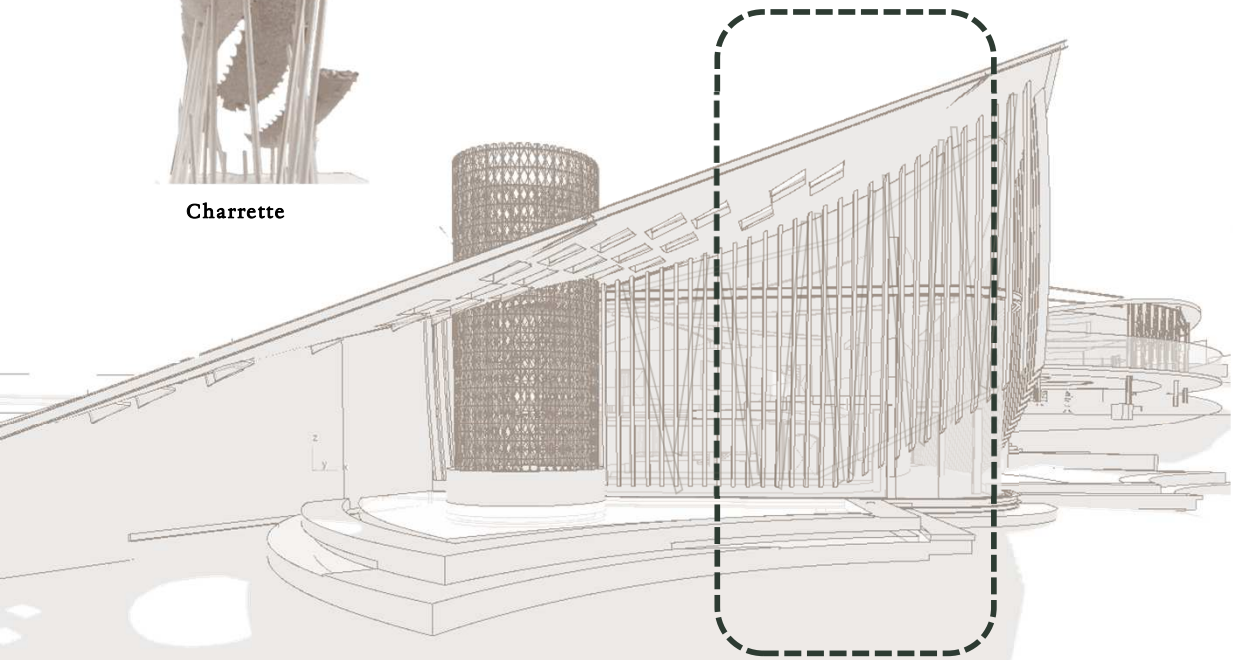
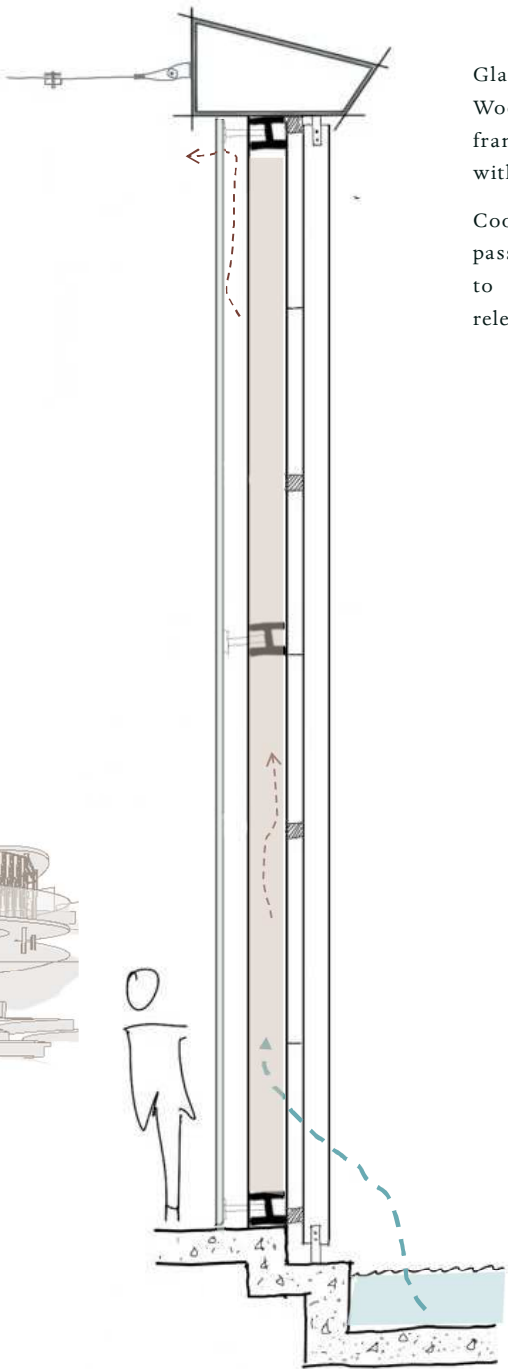


Figure 7.31: Wood Cladding Fixing Detail Section and 3D perspective, (Author 2021)



Glazed curtain wall fixed to steel structure. Wooden substructure fixed to steel portal frames to support the vertical wooden screens, with top rail and bottom rail steel supports.

Cool air from water pond below assist in passive cooling of façade with heat rising up to the roof space where the tensile cover releases the heat.

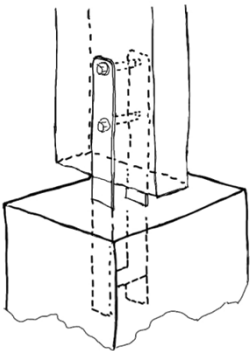


Figure 7.32 Wooden Clad bottom rail detail

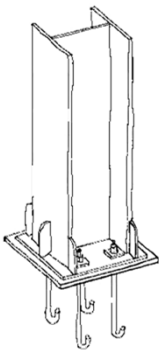


Figure 7.33 Cast-In anchors for Steel portal base detail

Technical Systems — Built environment and wetland sharing an ecology

CONSTRUCTED WETLANDS

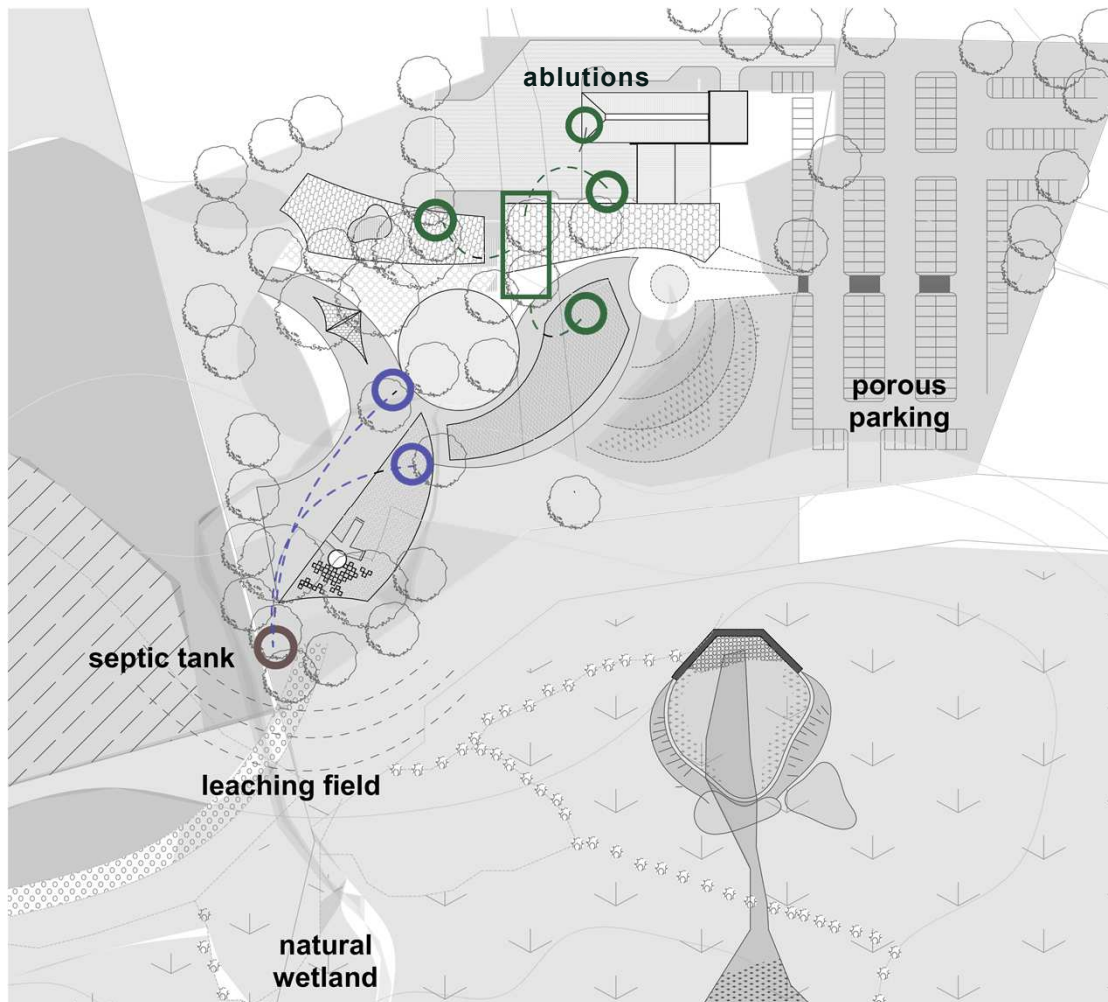


Figure 7.34: Water Harvesting and Purification operations, (Author, 2021)



Figure 7.35: Grey water tanks will be provided in the laboratory machine room (green square), to collect and purify grey water (illustrated by green circles) Water recycled for toilet cisterns and vegetated roof irrigation. ©Pure Aqua, Inc. <https://pureaqua.com/water-treatment-plant/>

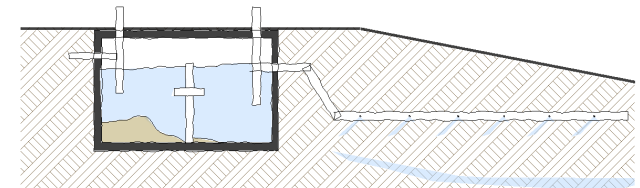


Figure 7.36: Septic Tank receiving black water and waste from all toilets and lower-level ablutions (illustrated by purple circles) into the wetland via leaching field.



Figure 7.37: Left over purified grey water and purified water from septic tank can go into the wetlands via the leaching field (illustrated by arcs)

Wetland Pavilions

DESIGN EXPLORATIONS FOR WETLAND PAVILIONS

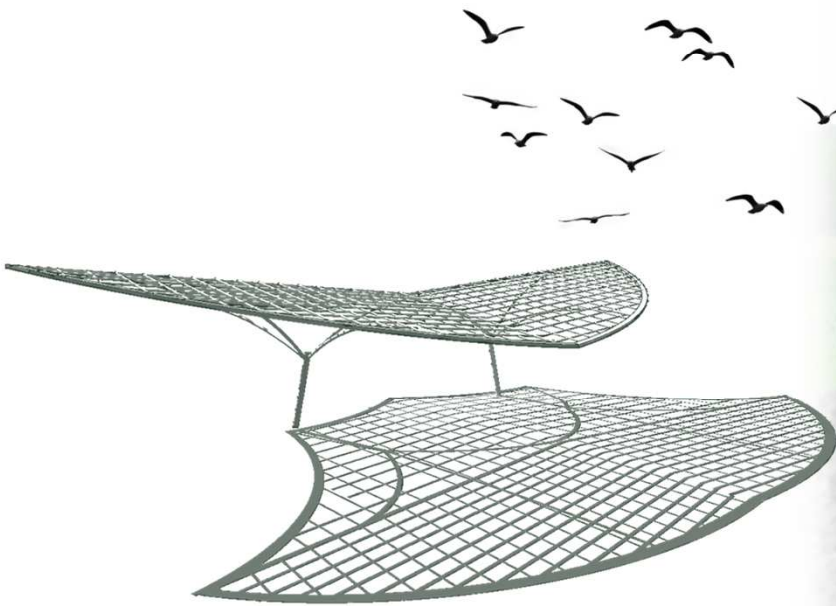
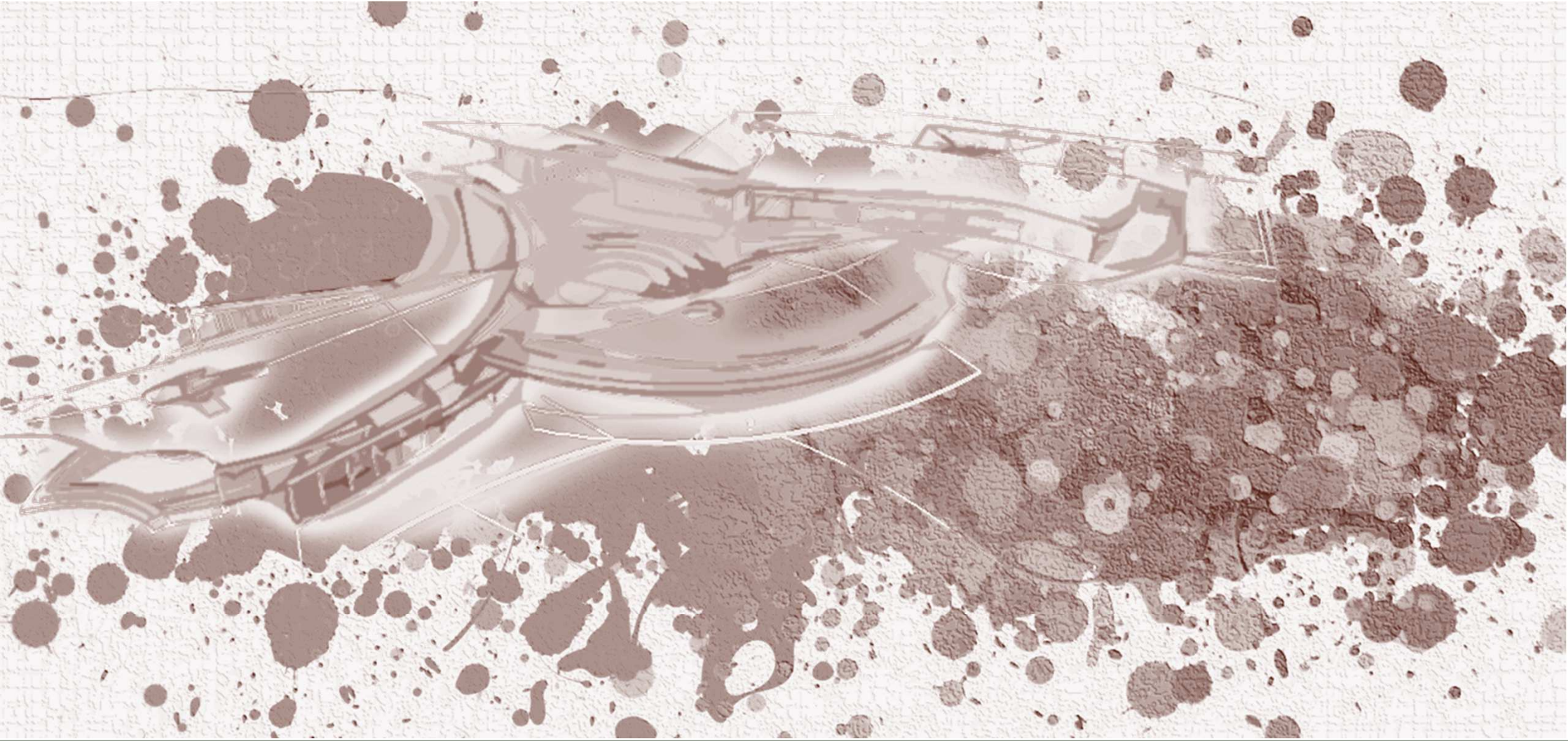


Figure 7.38: Wetland Pavilion Option 1- Tension structure. (Author, 2021)



Figure 7.39: Wetland Pavilion Option 2, (Author 2021) Low impact clip-on pavilion structure erected from recycled material.



Chapter 8



FEASIBILITY STUDIES



Feasibility Studies

MISSION FIELD H2O

Project Information

Current Building Name:

Ridgecrest family church

Property Address: 7 Erasmus Road

Suburb, City: Radiokop, Johannesburg.

Erf Number: Erf 44.

To be consolidated with Portion 4 and Portion 3 (donated land) and neighbouring the Wetland on Erf 208.

The feasibility study is based on the early conceptual design phase and will explore current market data, which will attempt to meet the identified needs of the community, and the current government state of affairs regarding degraded wetlands. Wetlands have been recognised as important natural occurring assets that offer the “free service” of purifying water. In 2002, the government established a national wetland rehabilitation programme that combats the increase of urbanisation, and its adverse effects on the ecosystem, to encourage bio-diversity.

INVESTORS

The co-operation between the departments of Department of Water and Sanitation, Environmental Affairs (DEA), and Department of Agriculture and Forestry and Fisheries (DAFF) have spearheaded the “Working for Wetlands” initiative in 1996, that integrates the protection of wetlands whilst providing employment. The objective of a strategy like this is to revitalise the wetland while addressing socio-economic relations that support small business and skills development.



forestry, fisheries
& the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Figure 8.1 (above): Main departments who form part of the ‘working for wetlands’ programme

The programme provides a platform for training and enterprise development that partnered with the Department of public works, Small business enterprise development agency (SEDA), and Construction industry training board (CIDB) provide support to small medium and micro enterprises (SMMEs). These beneficiaries will receive training in wetland development that is accredited with the Sector of Education and Training Authority (SETA). The projects will be implemented by the Department of infrastructure who will ensure that the standards required are complied with.



public works

Department:
Public Works
REPUBLIC OF SOUTH AFRICA

seda
SMALL ENTERPRISE DEVELOPMENT AGENCY
an agency of the dsibd

cidb
Construction Industry Development Board

DEVELOPMENT THROUGH PARTNERSHIP

Figure 8.2 (above): Supporting departments who form part of the ‘working for wetlands’ programme

With the ‘Working for Wetland’ programme already in place, funding for this project can be motivated and secured, as it addresses the need for Cultural recreation, social upliftment, bio-diversity and employment.

STAKEHOLDERS

The project may be profiled as high risk since the wetland is registered as a ‘Class 2’ protected area. The stakeholders involved are Ridgecrest family church, Radiokop Community, SPCA, Waste pickers and Environmentalists (see Figure below). These stakeholders will be involved in every stage of the development to ensure that the processes followed, are consistent with the interest of the community and the environment. Additionally, involving the community will ensure that the approval process will not be met with opposition. Public participation will provide the community with a sense of ownership and build support for the project.

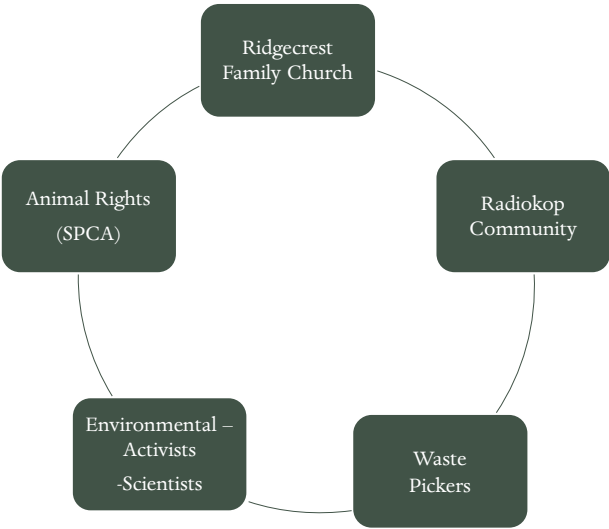


Figure 8.3 : Stakeholders of the wetland facility

The project will depend on a public-private partnership that operates through collaboration with government entities and private sector developers. As mentioned previously, there is funding available that has been earmarked by the government for the rehabilitation of wetlands.

The magnitude of labour required in the rehabilitation of a wetland attracts the opportunity to earn an income, and this creation of employment and poverty reduction is something that the expanded public works programme (EPWP) are invested in. Furthermore, this project targets social groups, such as women, and the youth, thereby ensuring public investment and promotion of government departments that offer financial and political support. The wetland is privately owned but the land is protected from development. The owners of the wetland have been approached to give the church power of attorney to manage the site with an option to purchase in the near future since the site cannot be developed.

The church already owns the three consolidated sites above the wetland, but require funding to build the facility. Furthermore, they will require start-up funding from both public and the private sectors. The intention is for the church to gain ownership of the wetland and facilities within ±10 years.

ROLES OF NGO’S

The wetland site will be entrusted to Ridgecrest family Church trust. Once the development is completed, the trust will be required to establish three departments within their existing structure. The proposed departments will tend to facilities management, environmental affairs of the wetland and church affairs. Each department overseeing various programmes at the facility –refer to Figure below for a breakdown. The operations director, will be appointed as the companies representative to monitor the implementation of the project life and oversee the development process while under construction. Any profits made by the NGO will be ploughed back into the trust towards ministry and outreach projects.

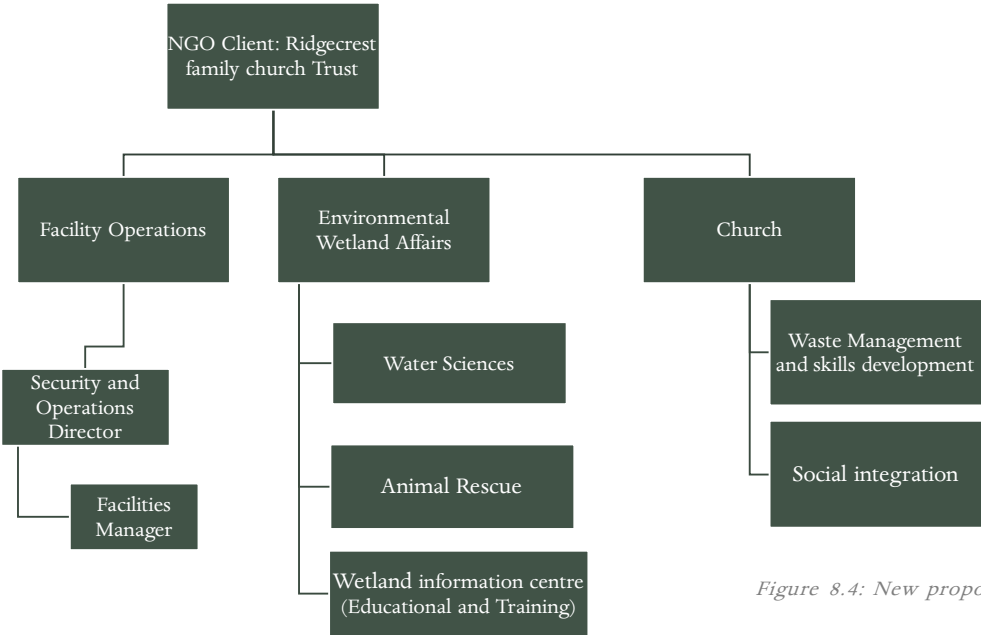


Figure 8.4: New proposed structure

MISSION STATEMENT

Mission Field H2O seeks to support South Africa’s vision of enhancing job creation while protecting its natural assets. To sustain the social cohesion through education, skills development and public awareness toward the wetland ecology and the importance of bio-diversity.

FINANCIAL STRATEGY

The ‘Working for wetland’ programme will be funded by the government sector and will kick-start the rehabilitation of the existing wetland. Additional funding will also be required from the government for the construction of the wetland information centre and laboratories. The church, which is a private entity will be responsible for the construction of the chapel, studios, fellowship hall and restaurant and recycling facility. The Baptist Union of Southern Africa will financially back the construction of the new church facility that doubles up as a training, auditorium, and gala for annual conventions.

The research/information centre and lab facility will be leased to an end-user through the department of environmental affairs for the training and development of skills, as set aside by the programme. There are many government sectors, enterprises and institutions that can benefit from this initiative, from social development to education.

‘Pick-it-up’ is the cities waste management service provider who will assist in keeping the wetland clean, and will be required to partially invest in the training, machinery and operations of the recycling facility. While the church offers the building for these operations, and temporary two-overnight stay for the waste pickers who work in the area to collect recyclables from the suburbs bins on collection day. (This to avoid squatting in the wetland)

PRIVATE / PUBLIC FUNDING PARTNERS

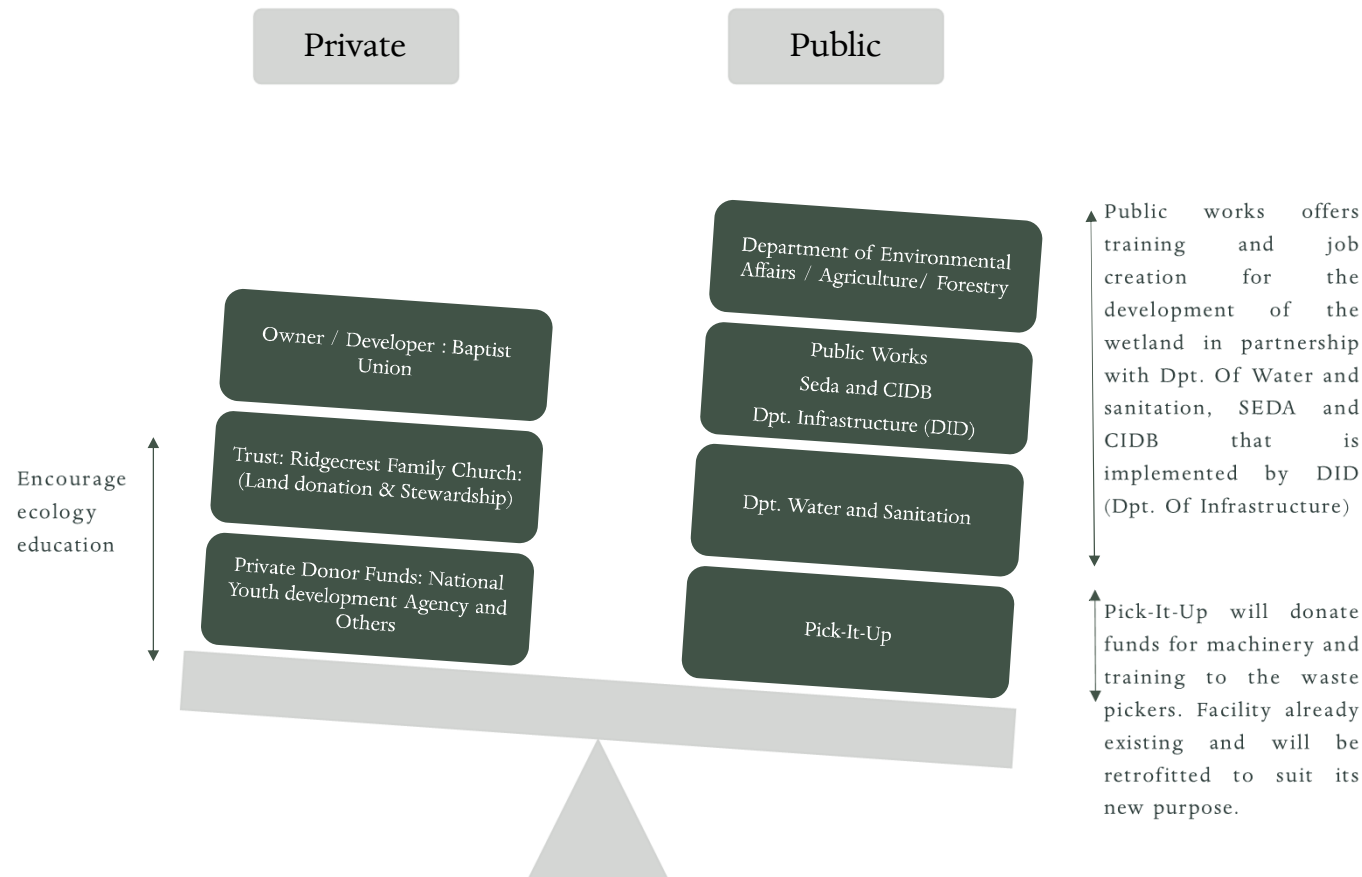


Figure 8.5 : Private Public Funding Infographic

AREA SCHEDULE (CIRCULATION SPACES INCLUDED IN TOTAL SQUARE METRE ONLY)

Recycling Facility (all existing)	Total: 336m²	Additional Services	Total: 2269m²
Accommodation	61m ²	Security Office	155m ²
Exist Ablutions	54,6m ²	Animal Rescue Centre + kennels	2114m ²
Exist Reception	21m ²		
Existing Office	22m ²	Information Centre	Total: 733m²
Existing Kitchen	31,5m ²	Internal Coffee Shop	58m ²
Partially enclosed Yard	145m ²	Ablutions	72m ²
Laboratory/ Learning Labs	Total: 1000m²	Library Space	498m ²
Learning labs / Training rooms	543m ²	Mini Lecture Hall	105m ²
Ablutions	41,2m ²	Restaurant	Total: 725m²
Private labs	394m ²	Kitchen	56m ²
		Bar	75m ²
Church	Total: 1508m²	Ablutions	19m ²
Foyer 1 st Floor (Gallery space)	215m ²	Lounge	165m ²
Foyer Gr. Floor (Gallery Space)	230m ²	Covered Porch	410
Chapel	330m ²	Fellowship Hall/ Cafe	Total: 311m²
Ablutions	46m ²	Kitchen	68m ²
Multi-purpose rooms / Offices / Prayer rooms	330m ²	Hall Space	177m ²
Gallery	198m ²	Covered Porch	66m ²
Communal spaces	Total: 725m²	Studios	Total: 278m²
Shared Ablutions	44m ²	Studio 1	59m ²
Amphitheatre	681m ²	Studio 2	56m ²
		Studio 3	64m ²
		Studio 4	92m ²

Figure 8.6 : Area Schedule

PROGRAM AND SPACE ALLOCATION

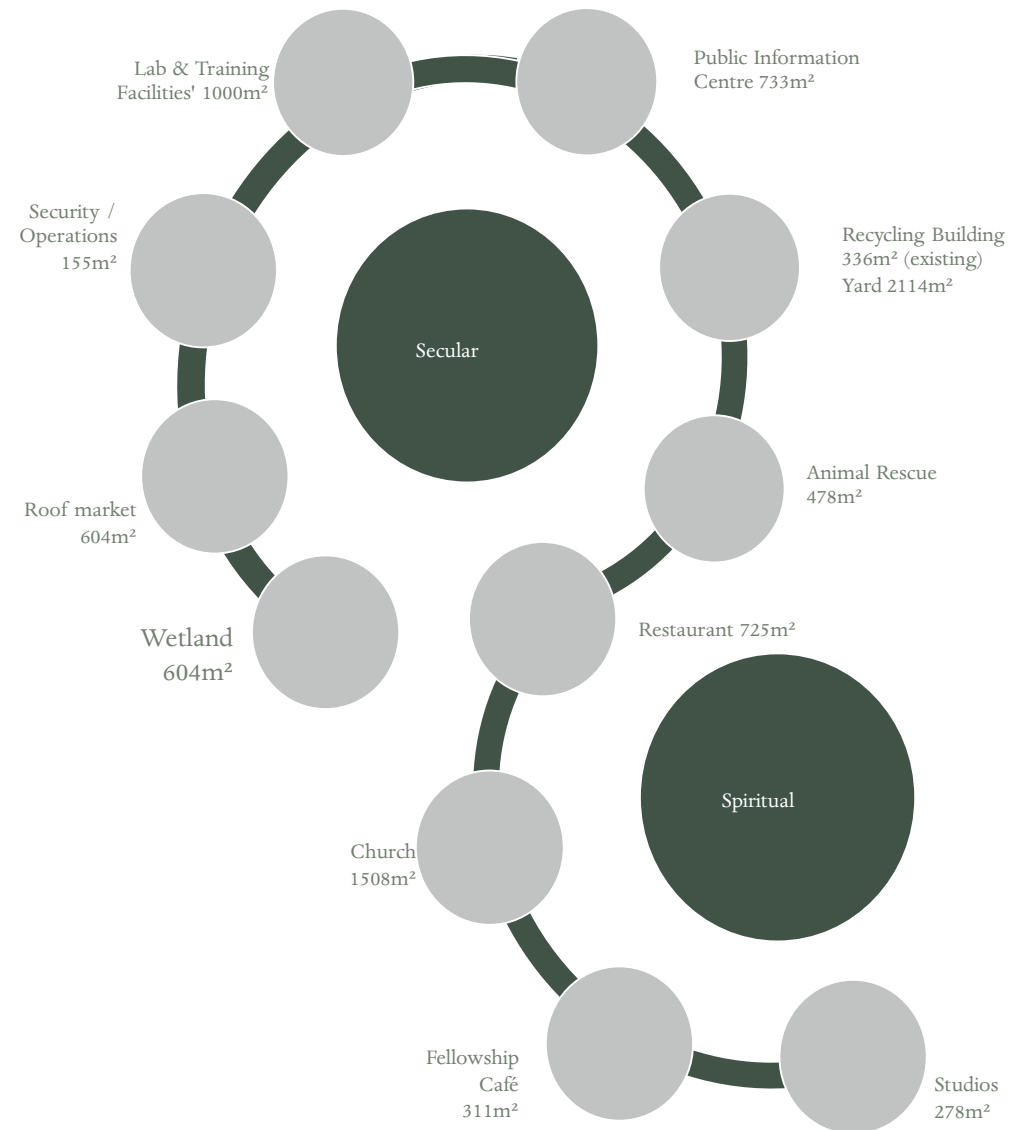


Figure 8.7 : Program and square meterage allocation

FINANCIAL OVERVIEW

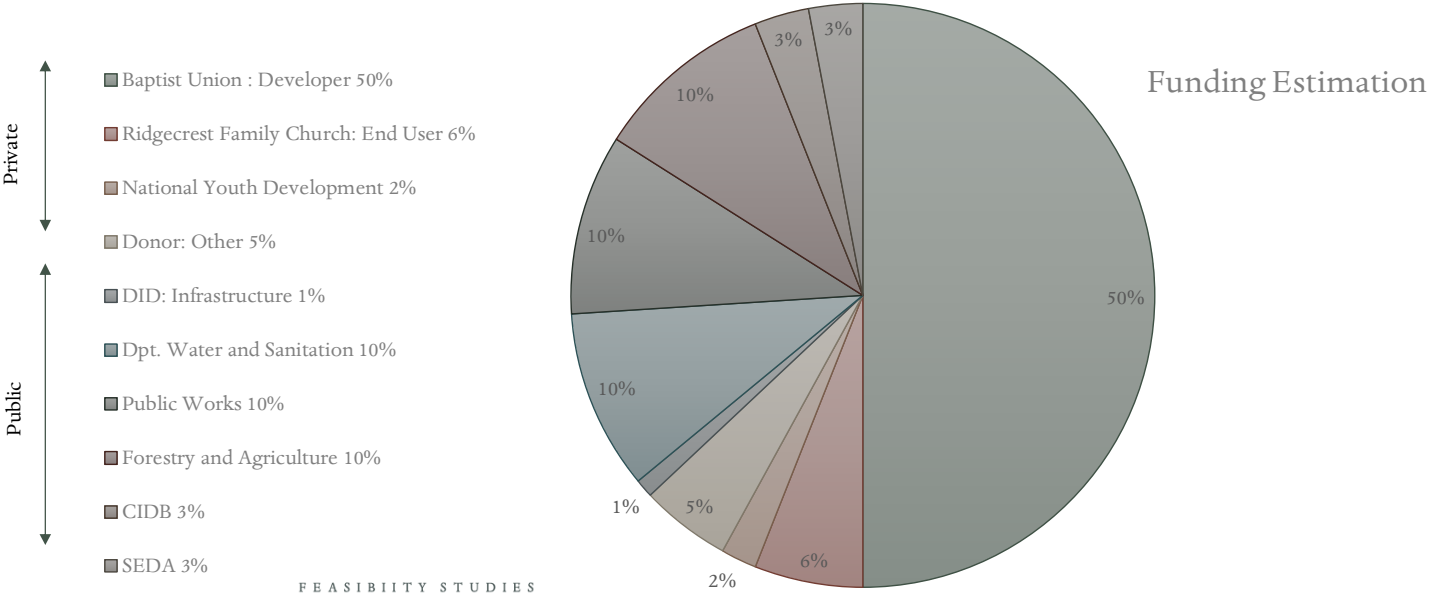
The estimated construction cost refers to the building costs based on R12500 per square metre. Professional fees are worked on 10% of the total building cost. The income per month is R556 772, 00 and over a span of 10 years, accumulates with an annual increase of 10%, to R15 754 071, 26. The contributions made by the private sector works out to 64%, while the government contribution is 36%. The capital expenditure breaks even at the end of year 10. (See Figure: “Projected Income”) This means that the developer gets an additional 5 years where he acquires profit before handing it over to the NGO Client. (This proposed terms, is, of course, optional, and can be renegotiated between the two entities).

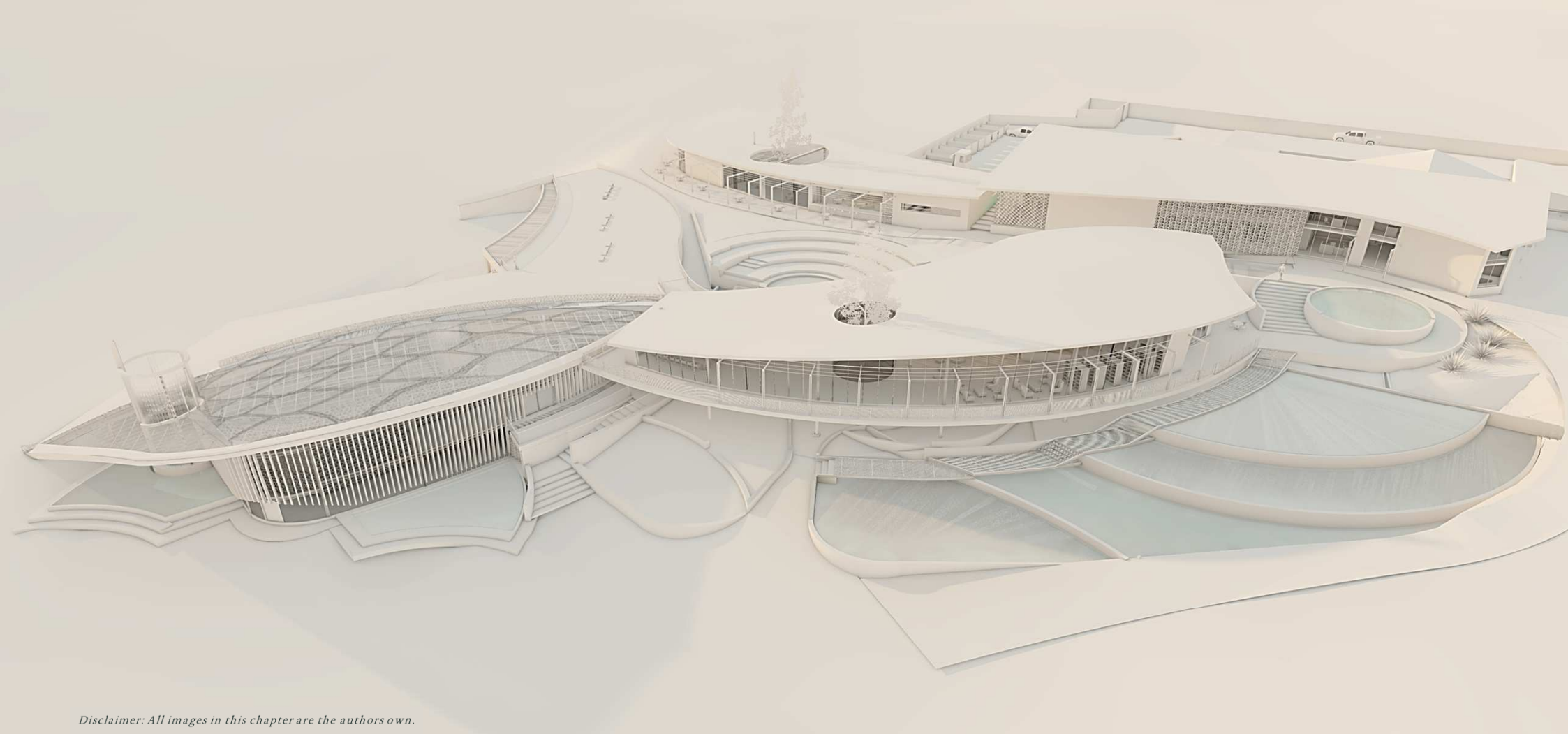
The proposed programme for the Mission Field H2O facility is thus concluded to be feasible.

Summary	
Estimated Construction Costs	R 82 366 885,50
Professional Fees	R 9 060 357, 41
Capital Expenditure	R114 713 701, 24
Income per month	R 556 772, 00
Projected Income accumulation over 15 years	R 212 280 341, 31
Expenses per month	R 185 485, 08
Total donated contributions received from government departments	R 42 444 069,46
Total donated contributions from Private Sectors and NGO’s	R 72 269 631, 78

Figure 8.8 (top right): Financial Summary

Figure 8.9 (bottom right) Pie Chart showing funding percentages





Disclaimer: All images in this chapter are the authors own.

Part 2: Final Design

Mission Field H2O

Roxanne Norton-Esau

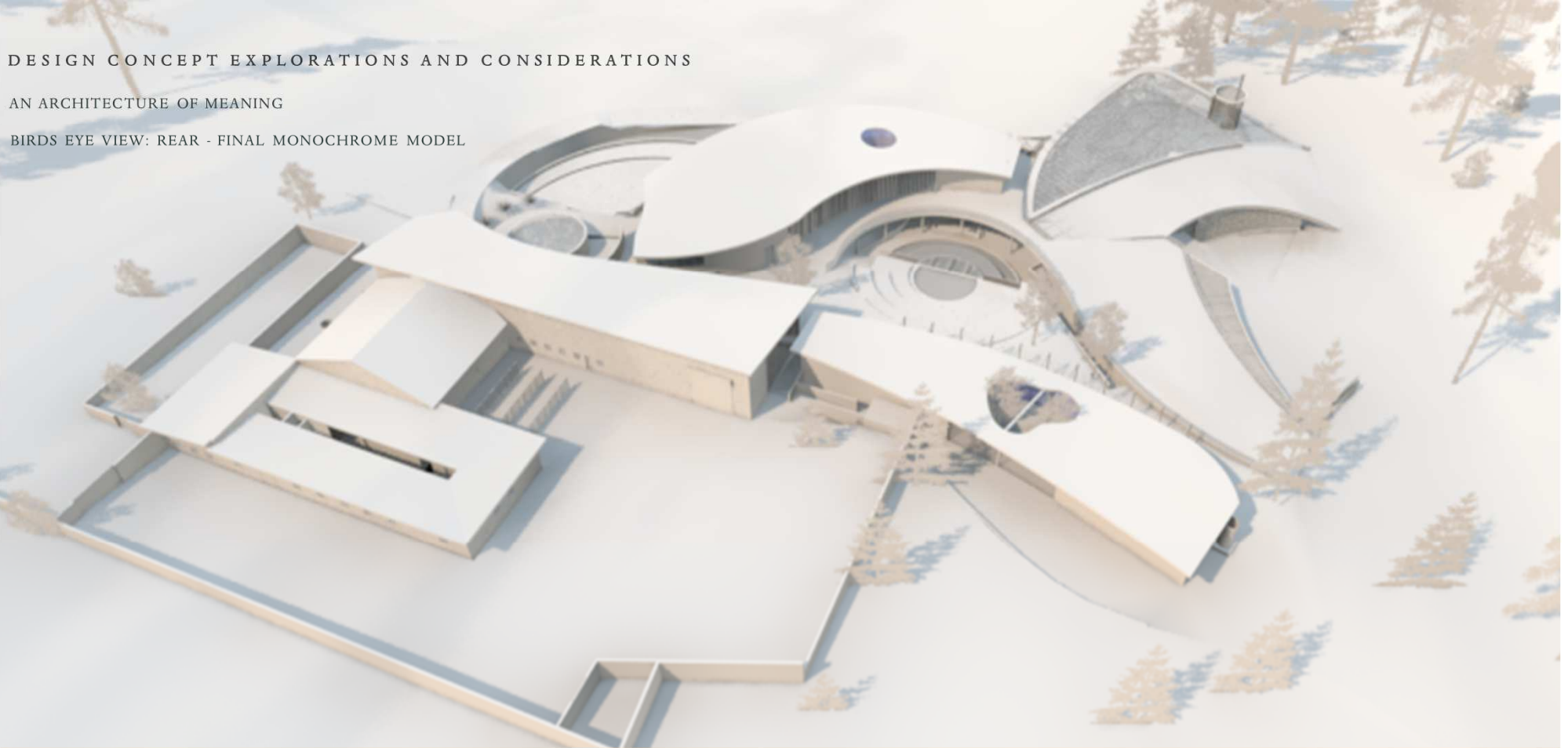
DESIGN EXPLORATION	142
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SITE SCHEME	144
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DESIGN CONCEPT EXPLORATIONS AND CONSIDERATIONS

AN ARCHITECTURE OF MEANING

BIRDS EYE VIEW: REAR - FINAL MONOCHROME MODEL



ICHTHYS – LIVING WATERS-RITUAL - ENVIRONMENTAL AWARENESS



SYMBOLISM

The Ichthys is a Christian symbol that originates from the baptism ritual and supports the notion for Christians to be the 'Fisher's of men'. The architecture thus expresses itself as a semiotic symbol for Christianity. It serves a dual purpose of revealing God as the symbolic 'living water' while awakening the living waters of the wetland.

DIVINITY - UNITY



SACRED GEOMETRY

The circle is an important symbol used to show God's divinity. The central courtyard embodies this notion and becomes a space of unity and order. Pure beauty in architecture is achieved when geometric forms fuse with light, revealing the divine through its spatial narration and order and offering an experience of transcendence and delight.

OPEN ENDED PROGRAMME - DISCURSIVE SPACES

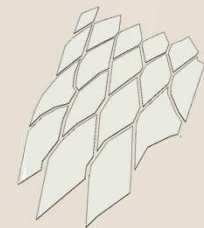


FORM & CONTENT

The concept comes through as a deconstructed fish, finding its home in the water. Deconstructing the fish allows for an open-ended programme spread across the site with free movement and fluidity.

Incorporating water within the design facilitates the church as a discursive space that encourages social cohesion through Environmental awareness.

LEVELS OF TRANSPARENCY SPIRITUAL AWARENESS.



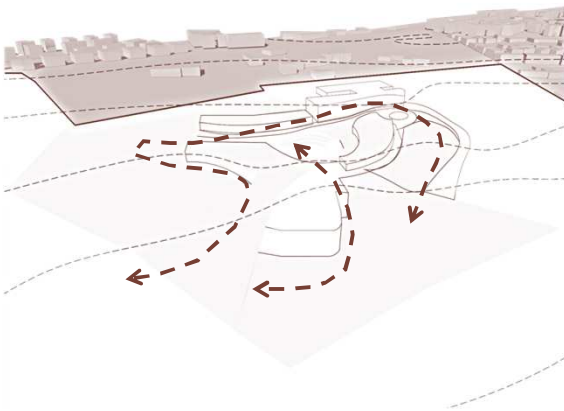
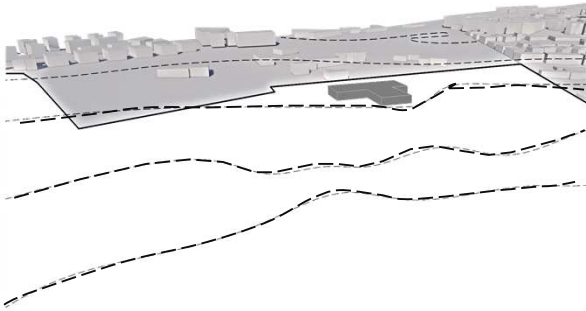
SKIN

For centuries sacred spaces used the effects of light as a direct analogy of the light of God. Texture, sculpture and light are encapsulated through the skin of the built form to promote spiritual illuminance, connecting the physical to the spiritual realm.

DESIGN RESPONSE

EXISTING TOPOGRAPHY & CHURCH FOOTPRINT

The steep church site has 5m interval contours. The illustration shows the existing church building perched at the rear end of the site, allowing an opportunity for new building programmes to sprawl across and down towards the wetland. The church building will be repurposed as a recycling facility.

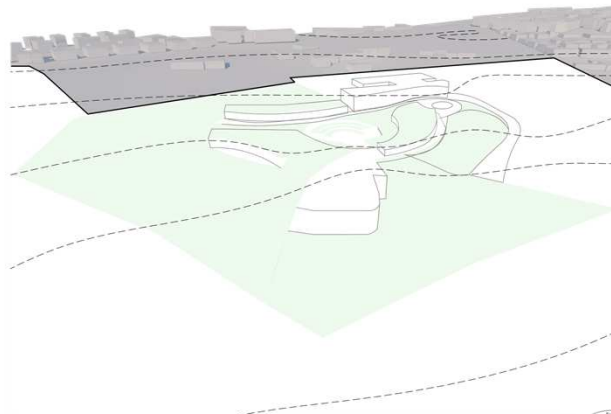
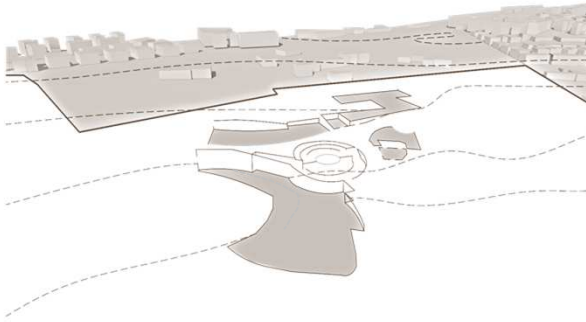


CIRCULATION PATHS

The circulation spaces intersect and link the different levels, becoming the threshold between private and public spaces. The intertwining between, under, and over certain spaces, makes for an interesting and mystical experience through the site.

NEW PLATFORMS BLENDING WITH CONTOURS

The planning strategy was to have minimal impact on the site's vegetation. The built form sweeps between the existing trees with platforms at various levels, gently carved into the ground, or floating above ground level.

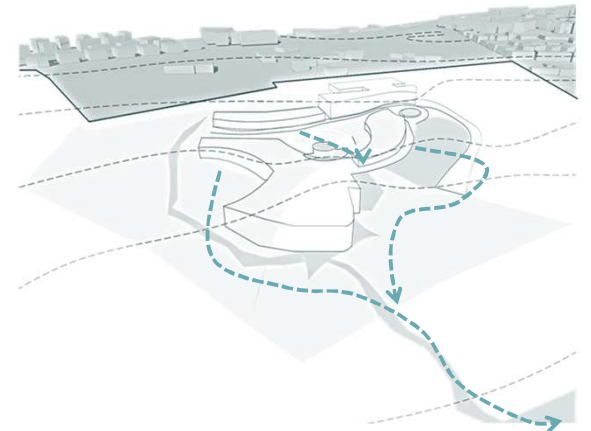
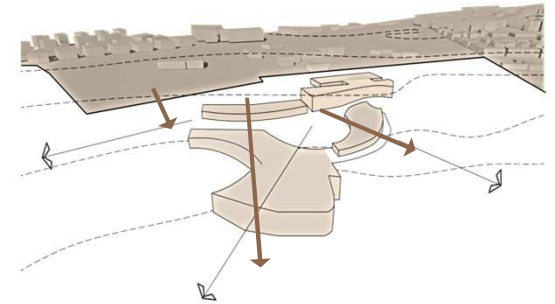


BLURRING NATURAL AND BUILT ENVIRONMENT

Blending green spaces between the built form activates the ecology of the area and support the biophilic principle to encourage bio-diversity.

DESIRED VISUAL CONNECTIONS

The topography allows for each built mass and programme with unobstructed views into the wetland.



WATER AS TRANSITIONAL SPACE

Circulation spaces are integrated with the water and indigenous landscaping, as an extension of the natural environment.

SCHEME

The new building footprint breaks away from the generic square footprint of the existing church building (below in grey). Charged with the symbolic form of the Ichthys, the five built masses embodies movement (below in red).



Each curvilinear formed mass, provides a variety of programmes that support the needs of the community, into the following categories.

- a. Educational
- b. Recreational
- c. Spiritual
- d. Preservation



The circulation is organised around a radial architectural pattern that allows free movement toward the central court, without any restriction. All levels connect and cross each other via stairs and ramps. The movement through these circulation spaces follows the natural contours of the site, encouraging an experience that builds relationships between the user, the architecture and nature.

SITE PLAN



Fellowship Hall and Colonnade



Extra-Mural Studios



Hall of Remembrance



Restaurant



Chapel



Learning Labs and Training



Recycling facility



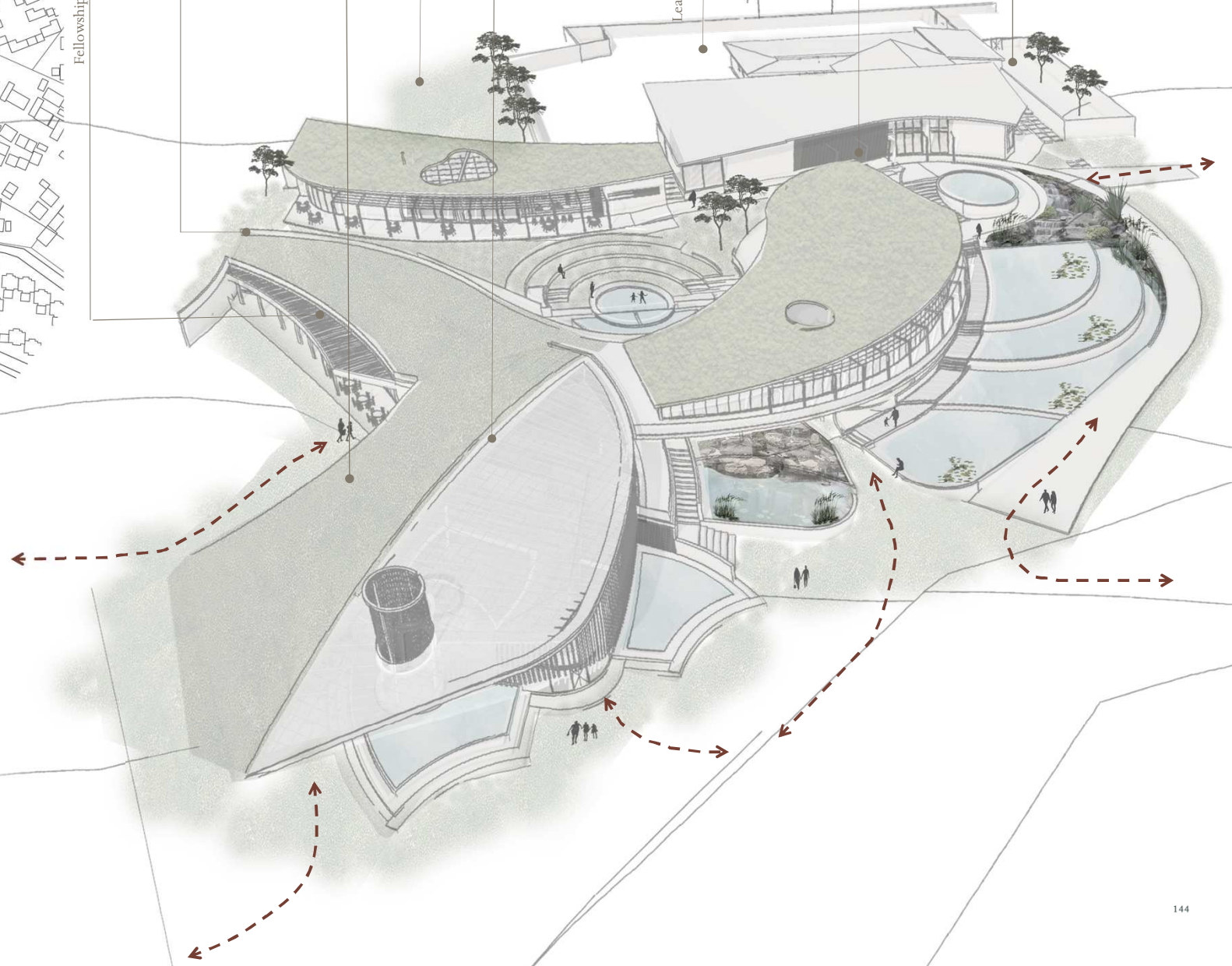
Information & Library



Animal Rescue Centre



Security

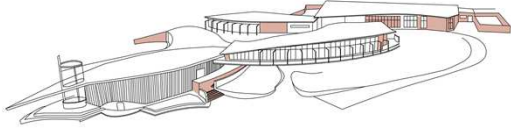


MATERIALITY



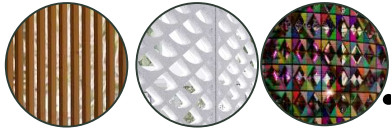
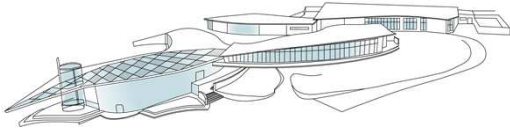
Skin

Consists of perforated clay brick walls, stone cladding and white concrete that resist temperature increase. These materials blend in with their natural context, becoming grounded into the landscape, offering interesting visual and tactile experiences within the interior and exterior spaces.



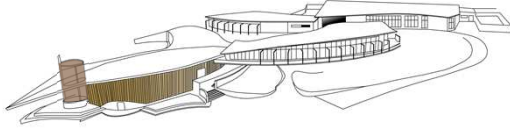
Transparency

Glazed curtain walls offer uninterrupted views into the wetland, all strategically facing South for minimal Conductance and Solar heat gains. A UV-resistant, water-resistant and breathable ETFE tensile roofing material is used to diffuse direct light. A fish-scale pattern shading device is suspended under the structure to provide an interesting play of light.



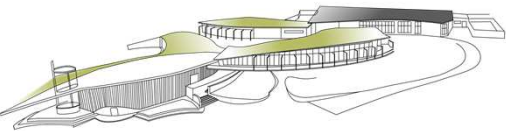
Filter

Wooden screens, plant creepers over steel pergolas, and specialised concrete perforated blocks will be used as screens to counter the direct sunlight whilst offering a delightful shadow effect to internal spaces. The round tower at the chapel is made of steel panels infilled with stained glass.

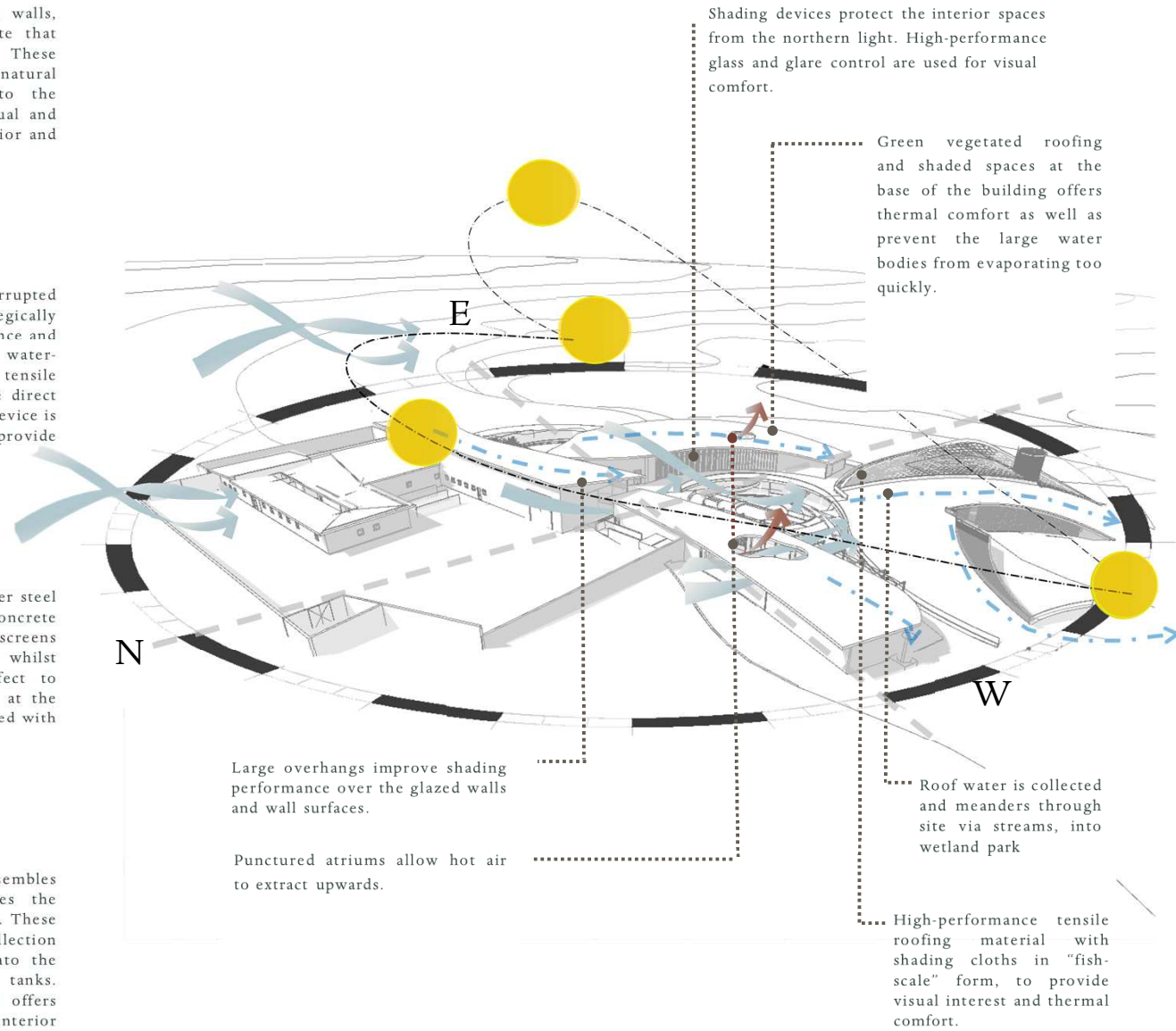


Roof-scape

Curvy green vegetated roofing resembles the hilly landscape and becomes the extension of the wetland landscape. These roof forms allow for rainwater collection points that naturally run back into the wetland park and water tanks. Additionally, the vegetated roof offers excellent thermal comfort to interior spaces.



SUN STUDY



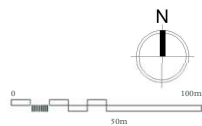
SITE ZONING

- Zone 1:** Church and preservation facility Wetland
- Zone 2:** Egoli Granite Ridge
- Zone 3:** Conservation Wetlands with owl sanctuary, aquatic habitat and indigenous plants.
- Zone 4:** Residential Areas surrounding

- a) Activity nodes and learning play spaces
- b) Main wetland corridor
- c) Refurbished catch pits and rif- raf

SITE ZONING

-  Nocturnal Sounds
-  Day Time bird sounds
-  Aquatic Sounds

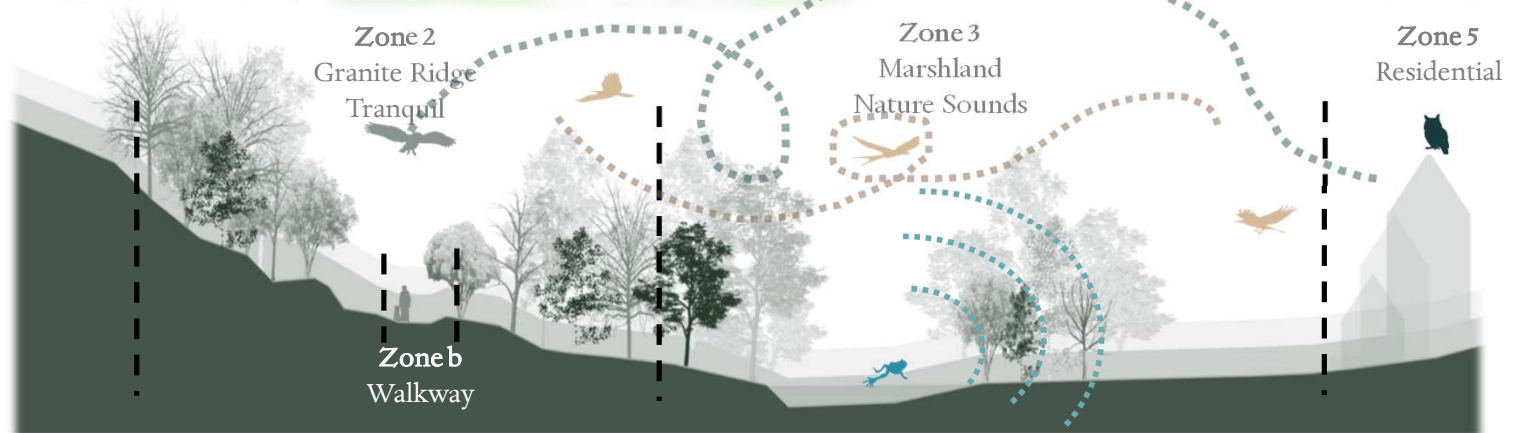


MASTER PLAN

The site plan shows the relationship between the built facilities against the broader scale of the wetland.

As a way to retain the natural environment, the facilities are concentrated on the church site at the top right corner above the wetland. Controlled pathways and play spaces are provided in the wetland with most of it kept in its natural state.

The existing pathway (zone b) across the wetland will be widened but maintained as the main axis between the church and the community.

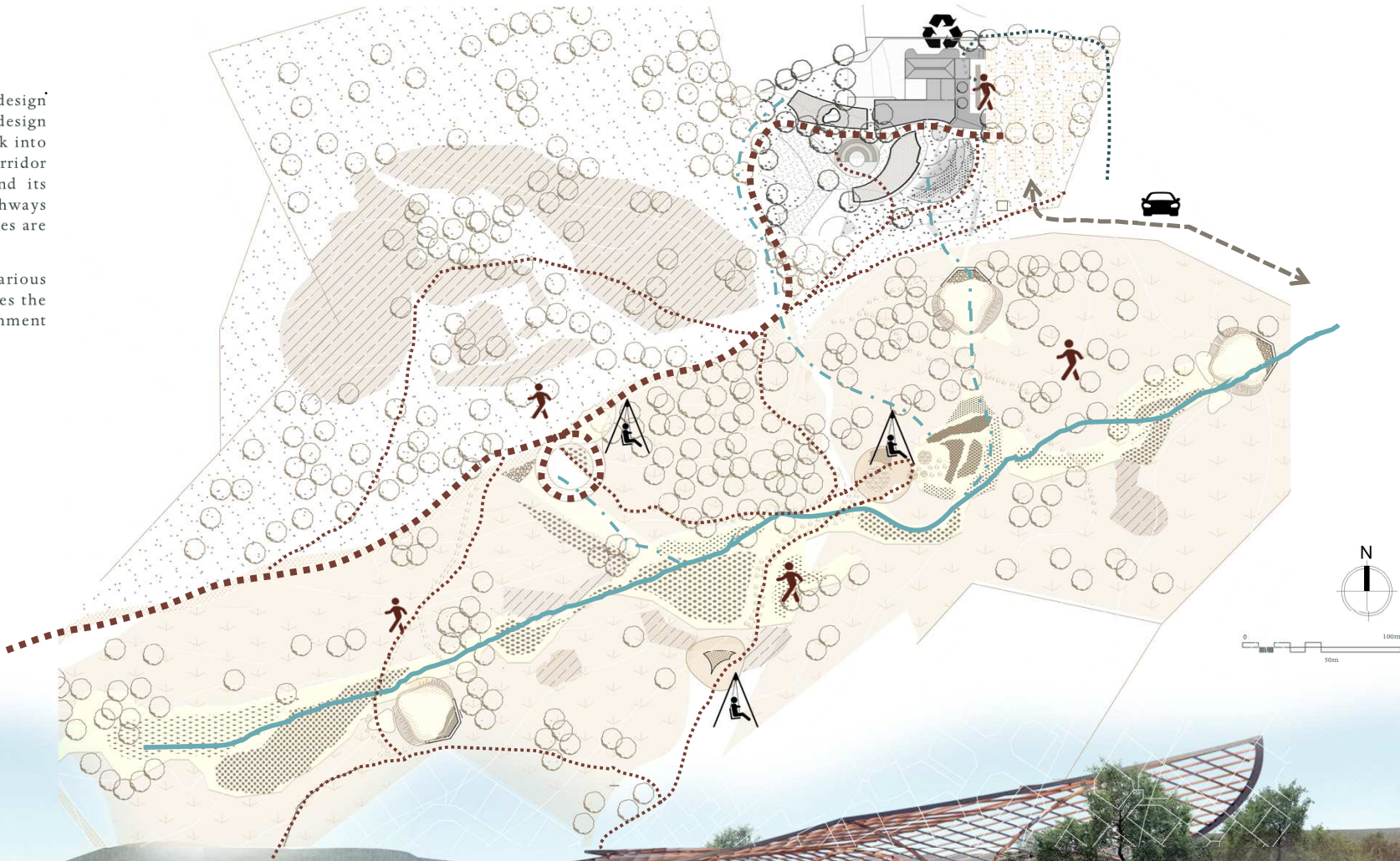


ACTIVATING THE SITE

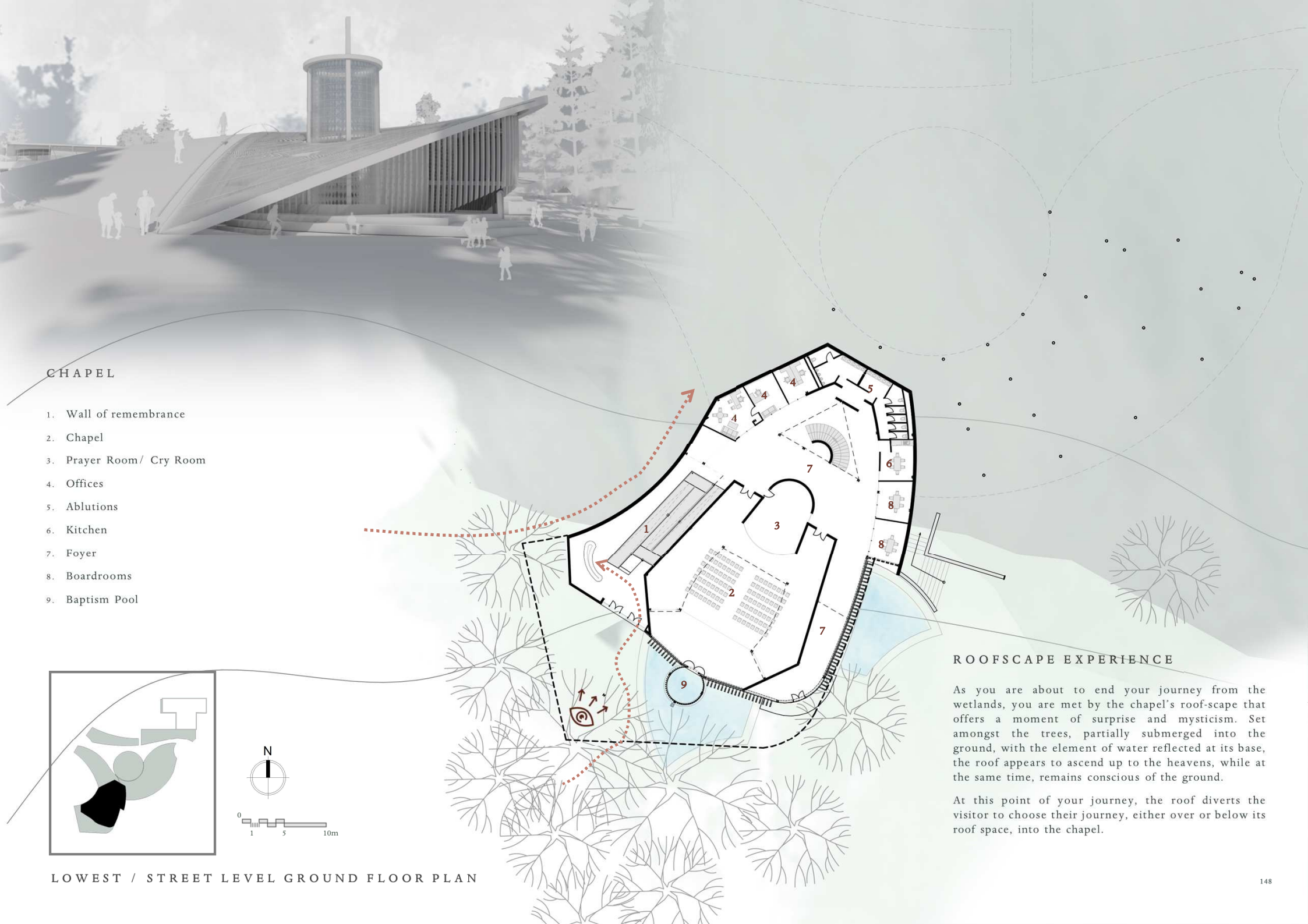
The site is activated by allowing urban design interventions that encourage movement. The design proposal shows the street being incorporated back into the landscape and forming part of the wetland corridor which is the main link between the church and its surrounding suburb. Smaller 'controlled' pathways meandering between the tall grass and water bodies are accessible seasonally.

The journey through the wetland offers various perspectives and sensory opportunities that enables the visitor to enquire or ponder about the environment they find themselves in.

-  Recycling facility
-  Play space and activity nodes
-  Pathways

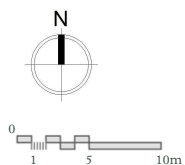
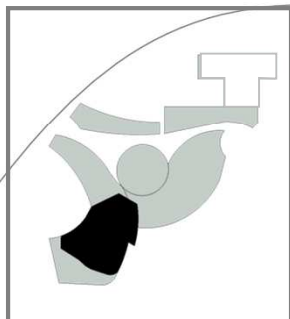


WETLAND CORRIDOR AND ACTIVITY NODE

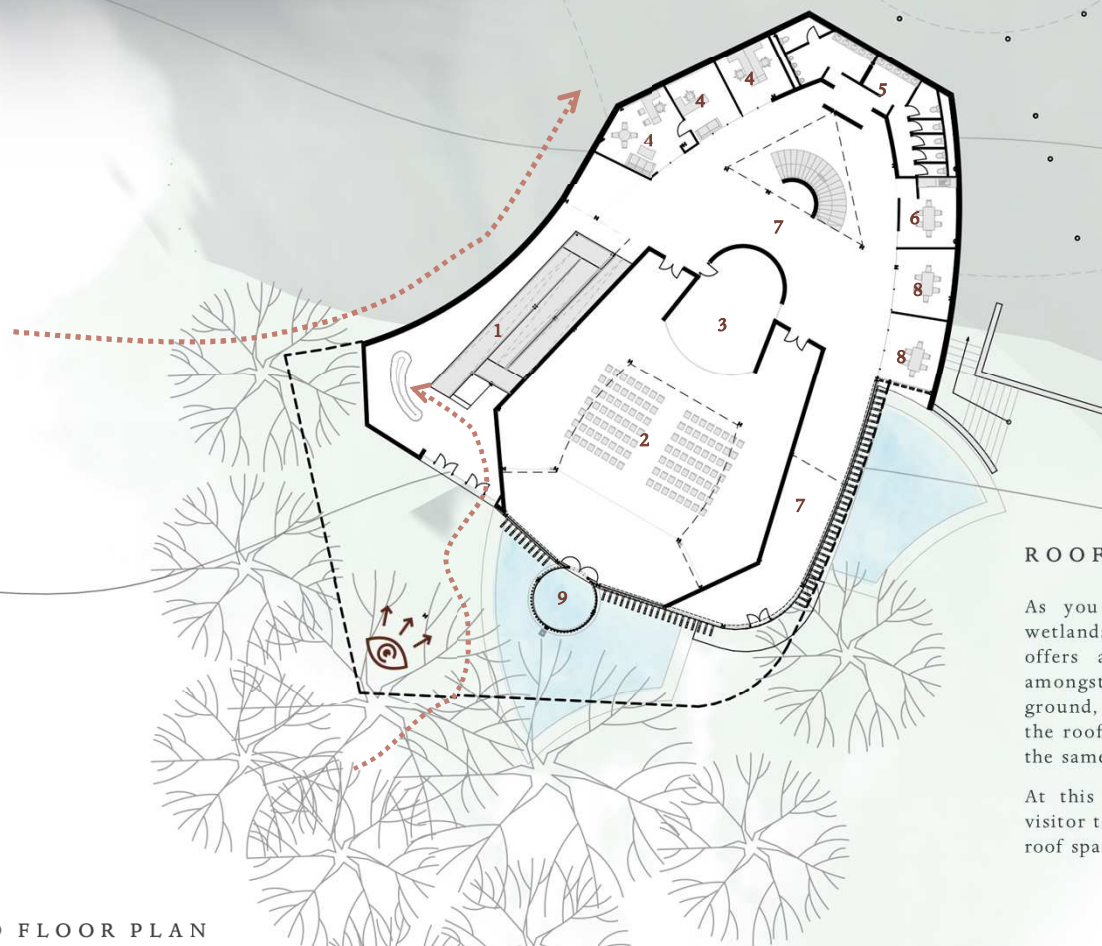


CHAPEL

1. Wall of remembrance
2. Chapel
3. Prayer Room/ Cry Room
4. Offices
5. Ablutions
6. Kitchen
7. Foyer
8. Boardrooms
9. Baptism Pool



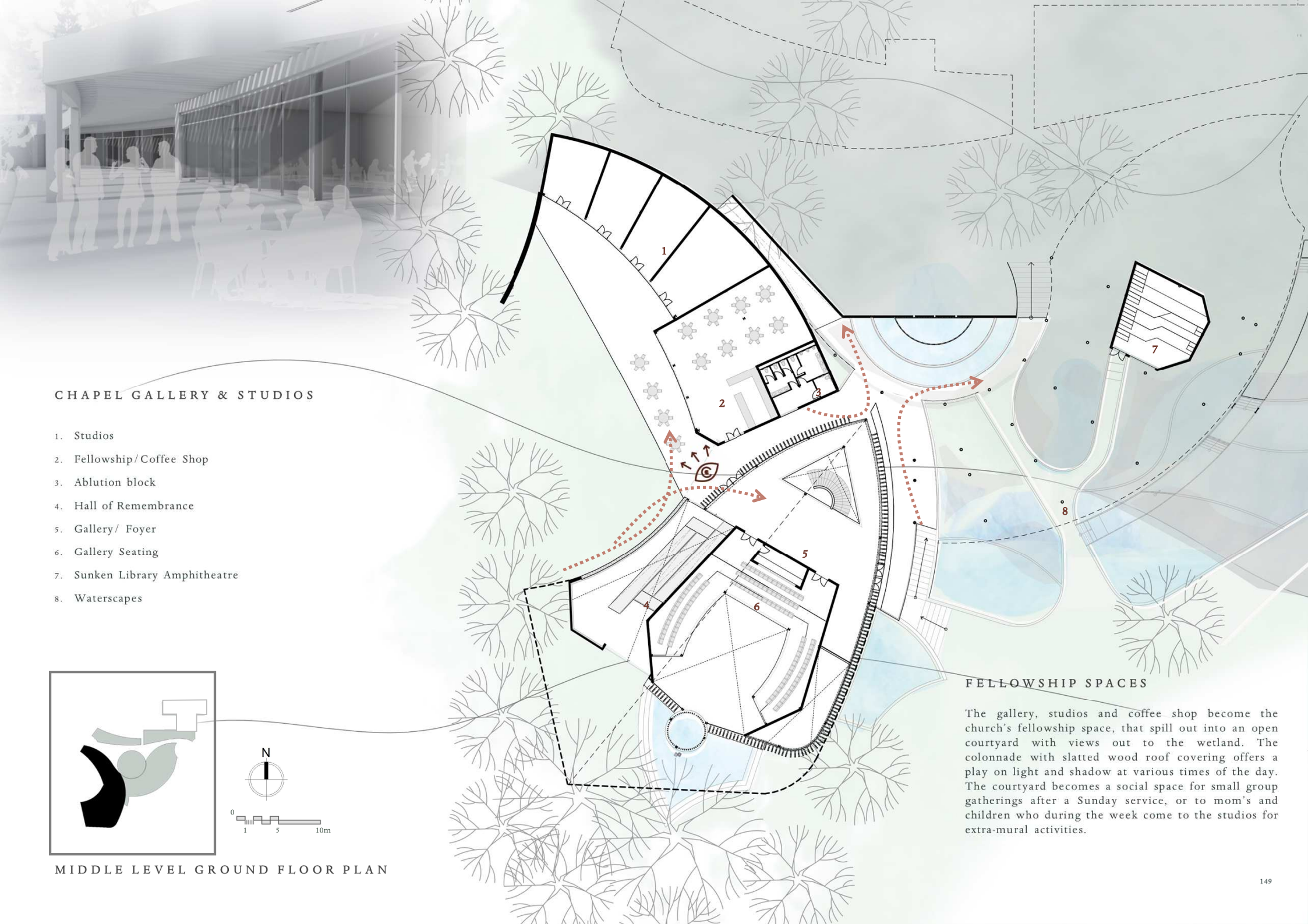
LOWEST / STREET LEVEL GROUND FLOOR PLAN



ROOFSCAPE EXPERIENCE

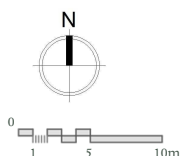
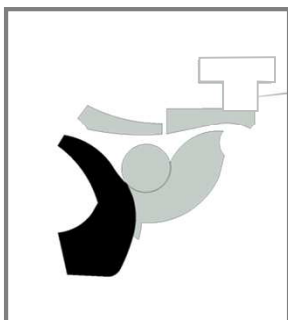
As you are about to end your journey from the wetlands, you are met by the chapel's roof-scape that offers a moment of surprise and mysticism. Set amongst the trees, partially submerged into the ground, with the element of water reflected at its base, the roof appears to ascend up to the heavens, while at the same time, remains conscious of the ground.

At this point of your journey, the roof diverts the visitor to choose their journey, either over or below its roof space, into the chapel.



CHAPEL GALLERY & STUDIOS

1. Studios
2. Fellowship/Coffee Shop
3. Ablution block
4. Hall of Remembrance
5. Gallery/ Foyer
6. Gallery Seating
7. Sunken Library Amphitheatre
8. Waterscapes



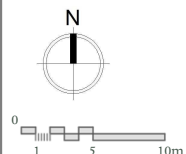
MIDDLE LEVEL GROUND FLOOR PLAN

FELLOWSHIP SPACES

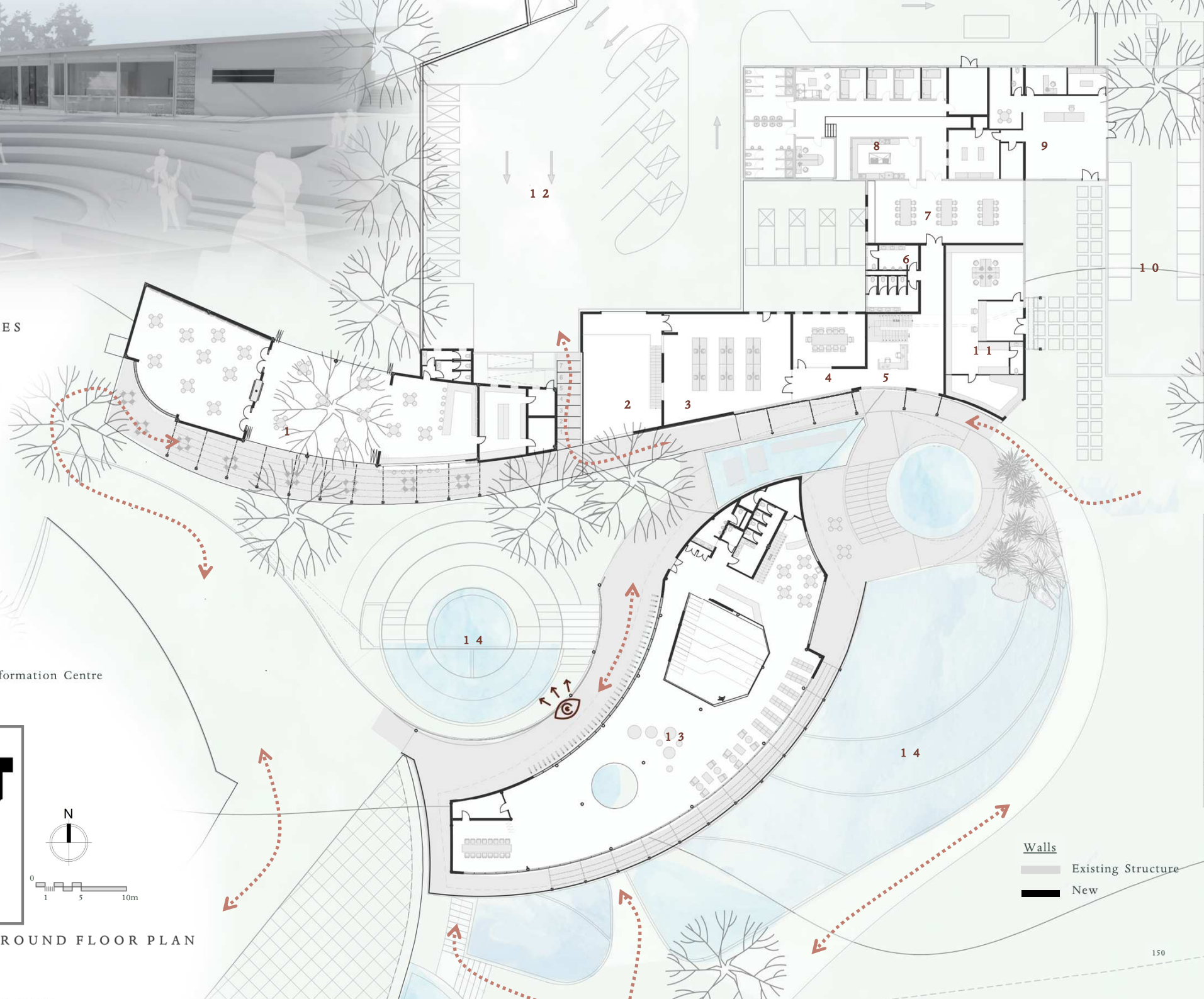
The gallery, studios and coffee shop become the church's fellowship space, that spill out into an open courtyard with views out to the wetland. The colonnade with slatted wood roof covering offers a play on light and shadow at various times of the day. The courtyard becomes a social space for small group gatherings after a Sunday service, or to mom's and children who during the week come to the studios for extra-mural activities.

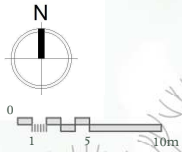
PUBLIC FACILITIES

1. Restaurant Court
2. Machine room
3. Learning Laboratory
4. Boardroom
5. Reception
6. Ablutions
7. Shared Training room
8. Existing building
9. Animal rescue centre
10. Kennels
11. Security Office
12. Recycle Yard
13. Library & Wetland Information Centre
14. Constructed wetland



UPPER LEVEL GROUND FLOOR PLAN

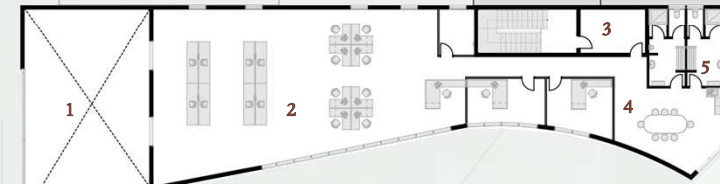




LABORATORY FIRST FLOOR PLAN

1. Double volume machine room
2. Lab and Offices
3. Security Lobby
4. Staff Room
5. Change Rooms and Ablutions

The laboratory on the first floor is a more private space for working. Although this space is separated from the public space, it maintains a clear view over the roof-scapes and the public central courtyard, allowing the user a continuity of the outside space into their work environment.

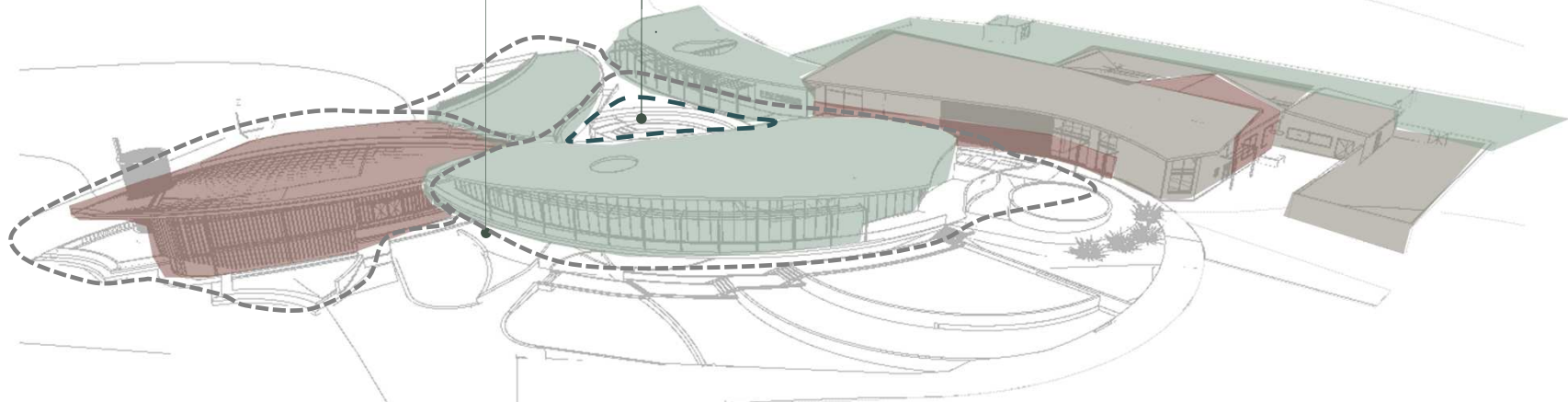


PUBLIC VS. PRIVATE REALM

There is a dialect along the circulation routes between private-public realms allowing visual connections between programmes through the use of permeable screens and transparent walls.

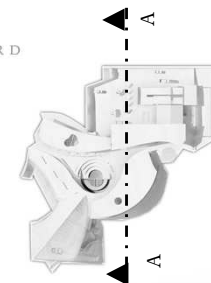
The central courtyard becomes the common public and circulation space that connects all programmes. This central court becomes the transitional space between programmes and a great place to meet and exchange.

- Public
- Semi-public
- Private





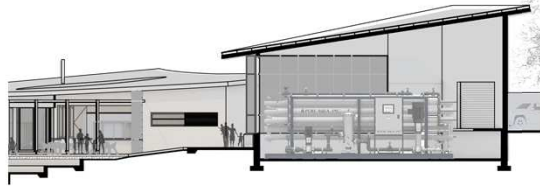
SECTION A-A



MAIN ACCESS

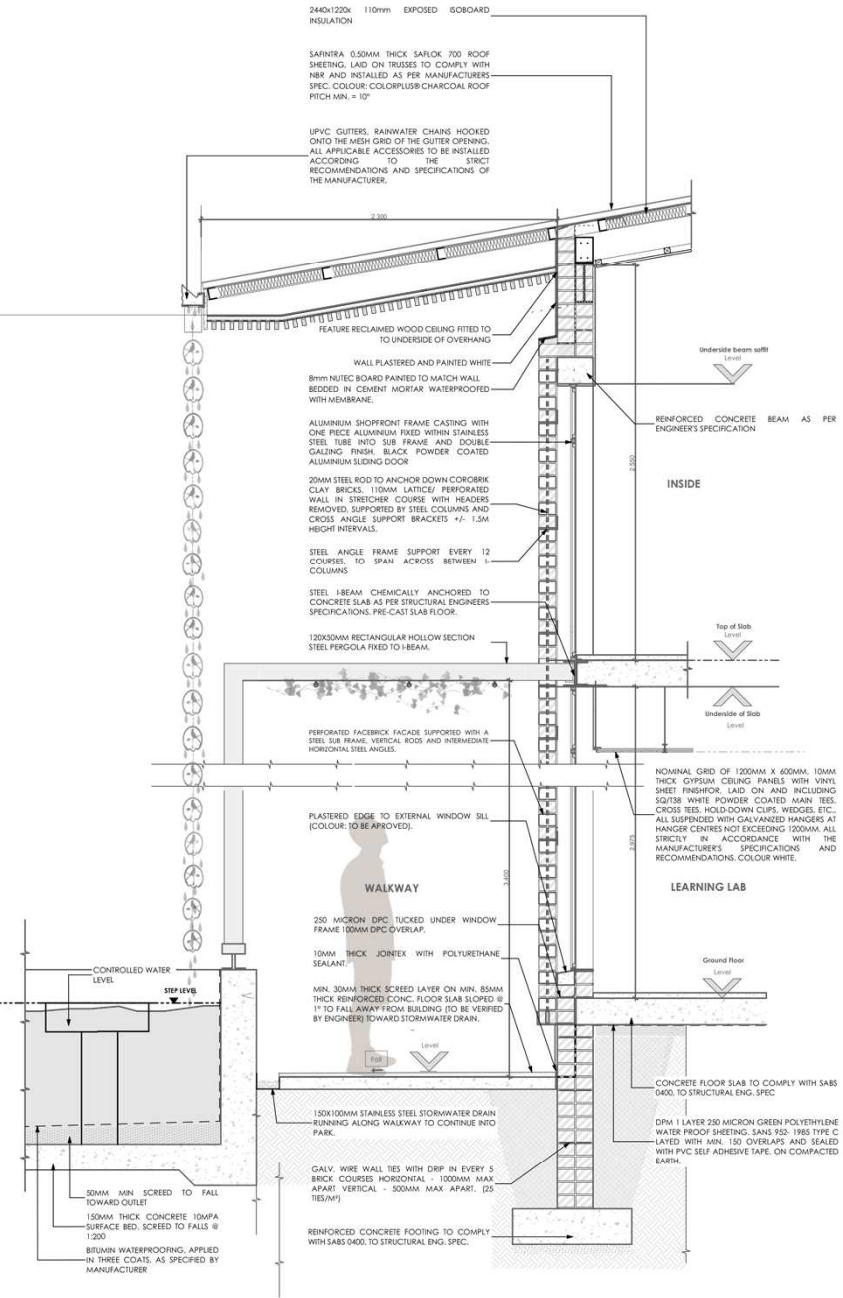
With a variety of access points to the site, the laboratory was placed closest to the parking for direct access. The scent, colour and visual experience of the landscaped entrance courtyard entice the journey further into the site. Large glazed walls and perforated screens along the circulation route allows for an interpenetration between internal and external spaces and offers a learning experience.

LEARNING THROUGH SEEING

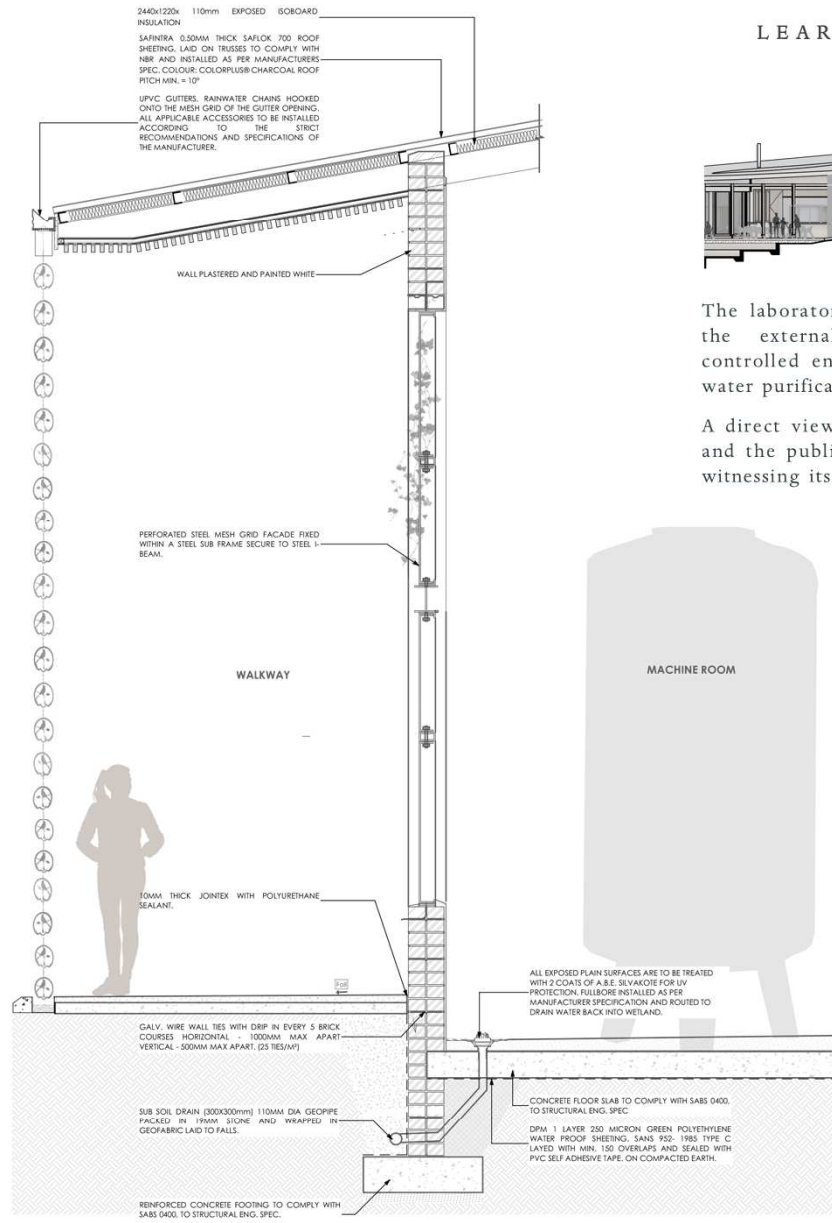


The laboratory design offers transparency from the external circulation spaces into the controlled environment of the laboratories and water purification machine room.

A direct view into these spaces invites students and the public an opportunity to learn through witnessing its operations.

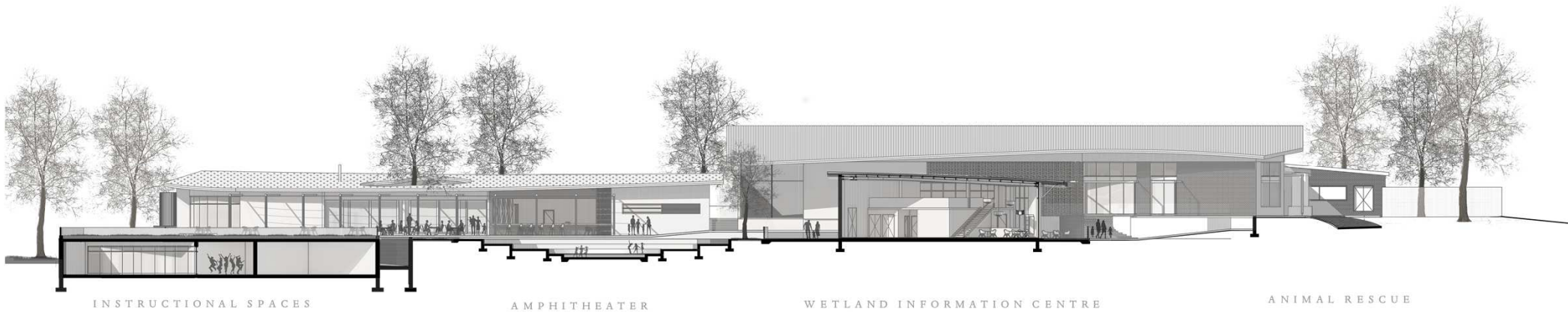


DETAIL 1 - PERMEABLE BRICK SKIN

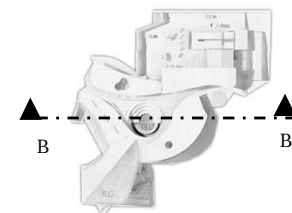


DETAIL 2 - MESH SCREEN





SECTION B-B



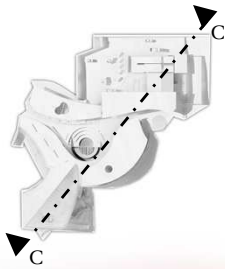
UNITY

The amphitheatre becomes an organised space and focal point that brings the separate built masses together as a whole. Its landscaping incorporates the topography creating interesting spaces, ramps and plateaus that allow people to sit, lean and interact with the architecture as well with each other.





SECTION C-C



BIRDS EYE-VIEW ACROSS WETLAND

The design stance is a dichotomy between traditional church architecture that elevates up to the heavens, while remaining grounded to its natural environment, as a reminder to man to respect God's creation and preserve it for future generations.

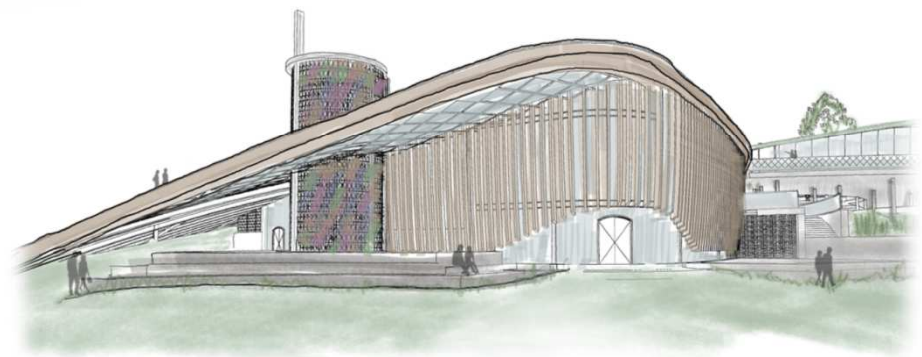


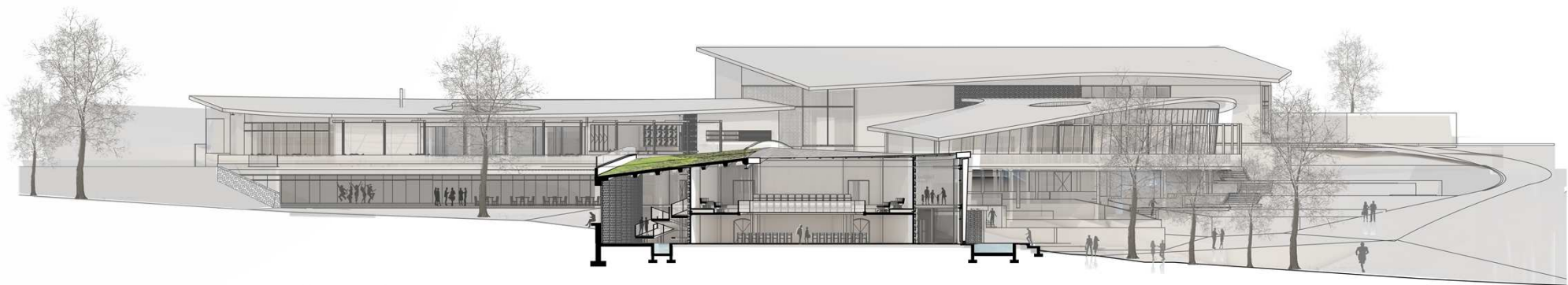


SYMBOLIC ARCHITECTURE

The architectural dialogue is symbolic of the ritual space for baptism. Bodies are submerged into the water, burying old life, and ascends out of the water as 'new' spirits born into the religion;

The sweeping roof design simulates the baptism ritual by ascending from a place of burial upward towards the heavens, illuminating the spiritual experience of the space.



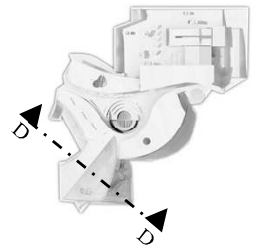


RESTAURANT
INSTRUCTIONAL SPACES

CHAPEL

WETLAND INFORMATION CENTRE

SECTION D-D



ALTERNATIVE APPROACH TO THE CHAPEL

When considering the architecture for the church, studies of the procession were important to ensure a spiritual journey that moves you from the outside world, into the heavenly destination of the chapel space which is the innermost layer of the architectural scheme. While the design encourages flexible use of spaces, the church needed to maintain its spatial properties as a sacred and silent space when it functions as such.

The use of perforated screens and light were important elements to consider to enlighten one's journey, as one progresses from the outside world into the chapel space.

The hall of remembrance is buried into the ground allowing for niches and plaques at the base of the wall. The ephemeral luminance of natural light that floods through the perforated walls, are orb-like, to imply the spirits of our loved ones. The water under the ramp is a reflective medium to enhance the space at various times of the day, offering a sense of tranquillity with its sounds and sight.





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sed do eiusmod tempor
incididunt ut labore et dolore.

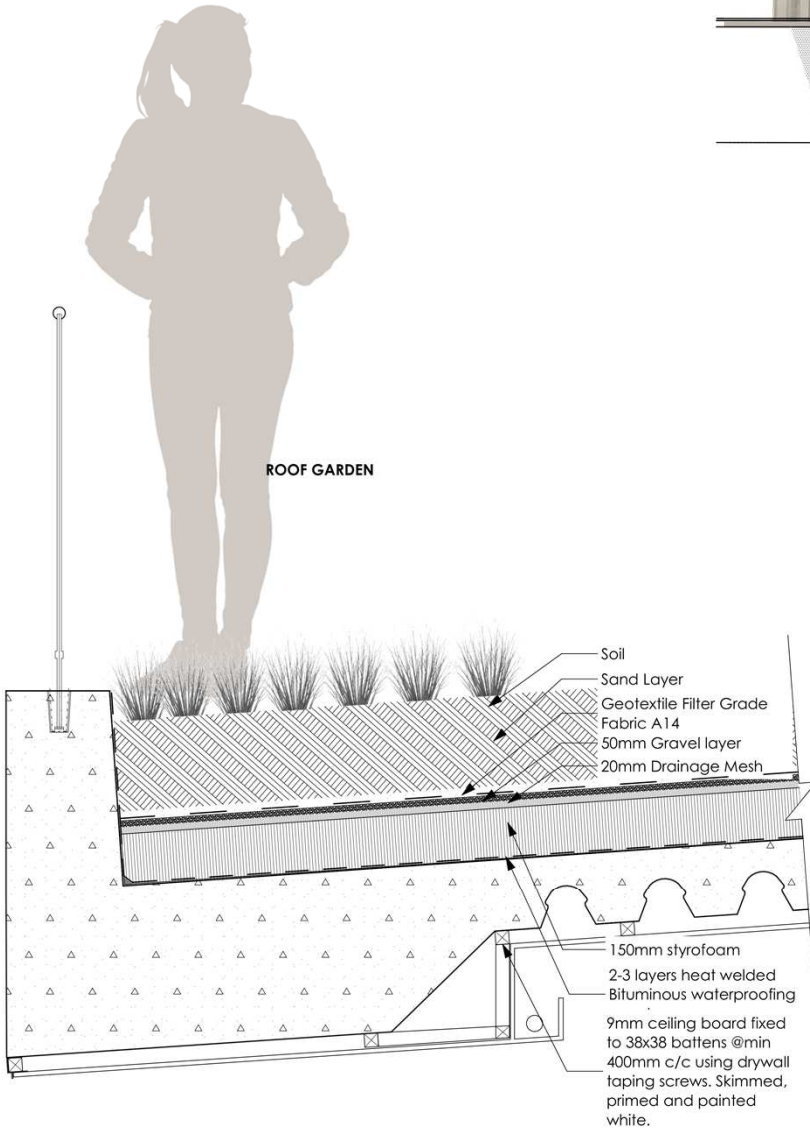
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sed do eiusmod tempor
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GLORIOUS LIGHT

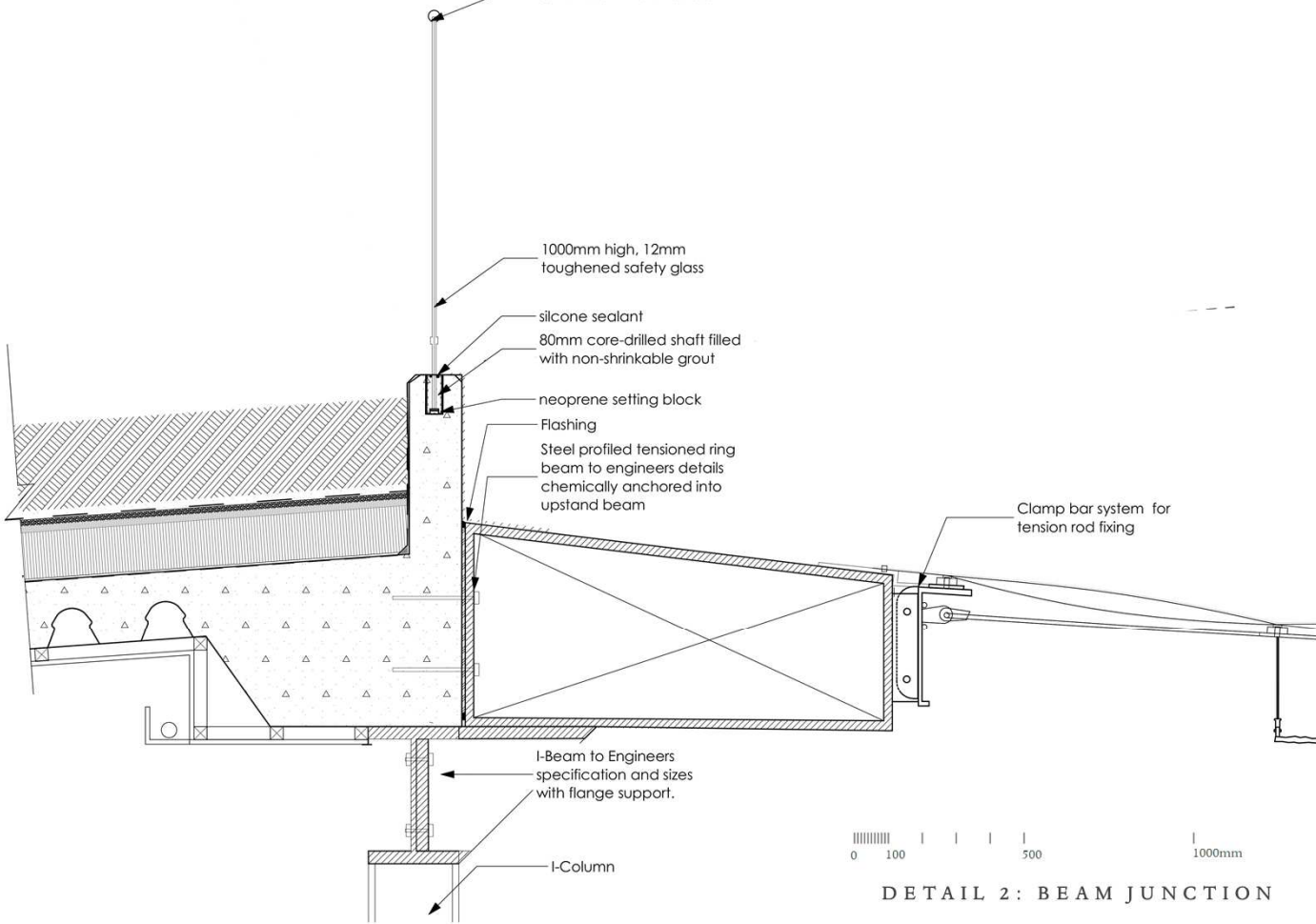
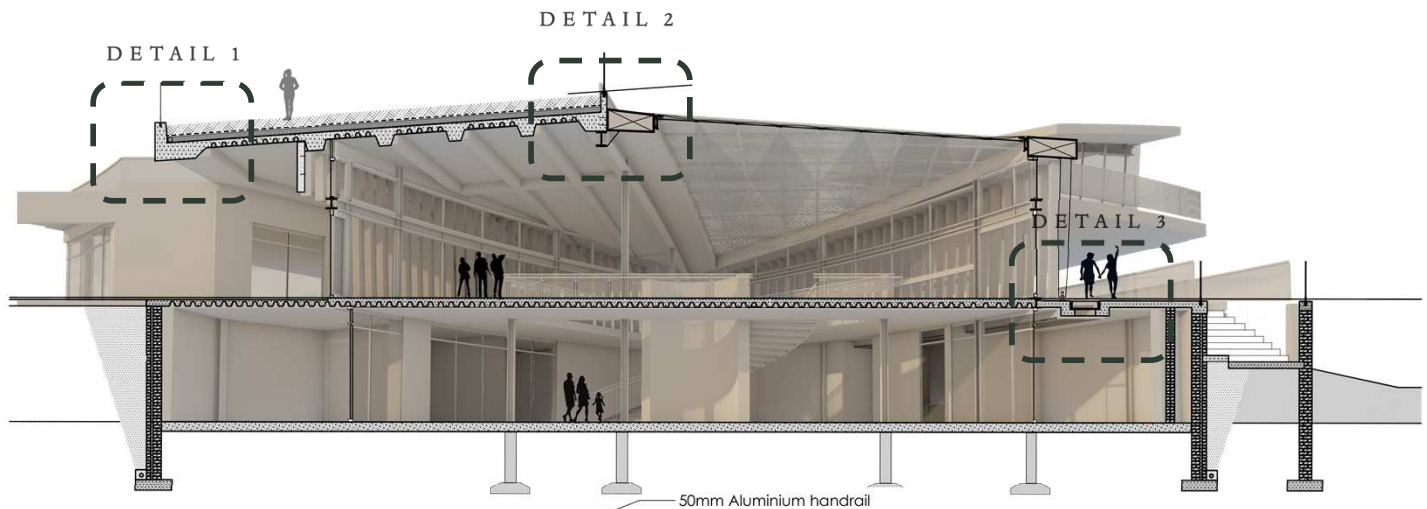
Stepping into the realm of the chapel intensifies one's imagination and awe of God in that space. A glimpse of the subtle fish-scale detail on the roof and stained glass tower, plays an imperative role in the perception and spatial dimension of the space, as the movement of light awakens the mysticism and the acknowledgement of God.

STRUCTURAL DESIGN : PHYSICAL
VS SPIRITUAL REALM

The design detail demonstrates the junction where two opposing structures meet. This continues the narrative between the spiritual realm represented by the lightweight and natural illuminated structure, as opposed to the physical realm, represented by the heavy concrete roof grounded to the earth.



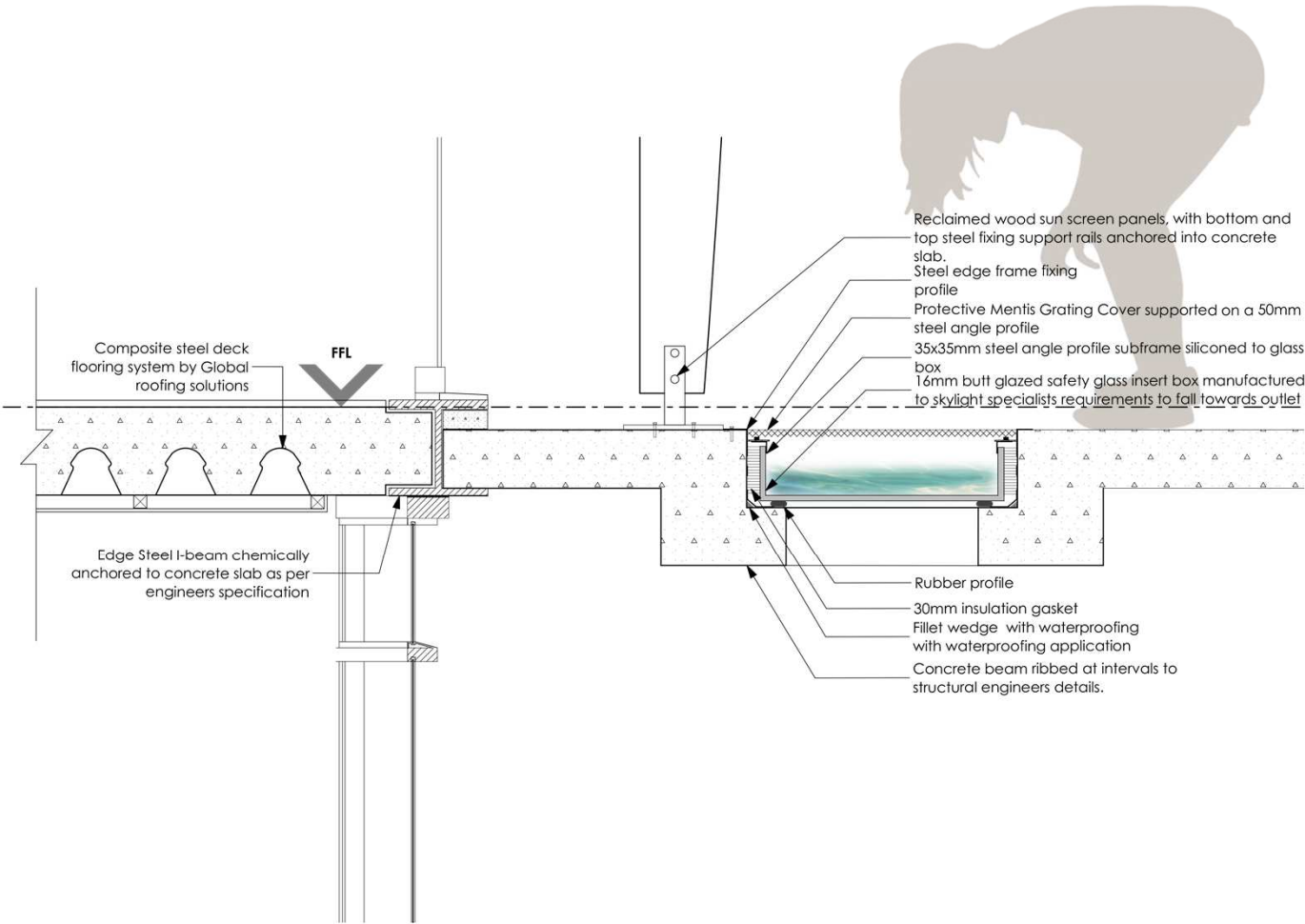
DETAIL 1: ROOF GARDEN



DETAIL 2: BEAM JUNCTION



RENDER SHOWING PLACEMENT OF SKYLIGHT
COLLECTING WATER FROM RAIN CHAINS
FROM UPPER ROOF LEVELS

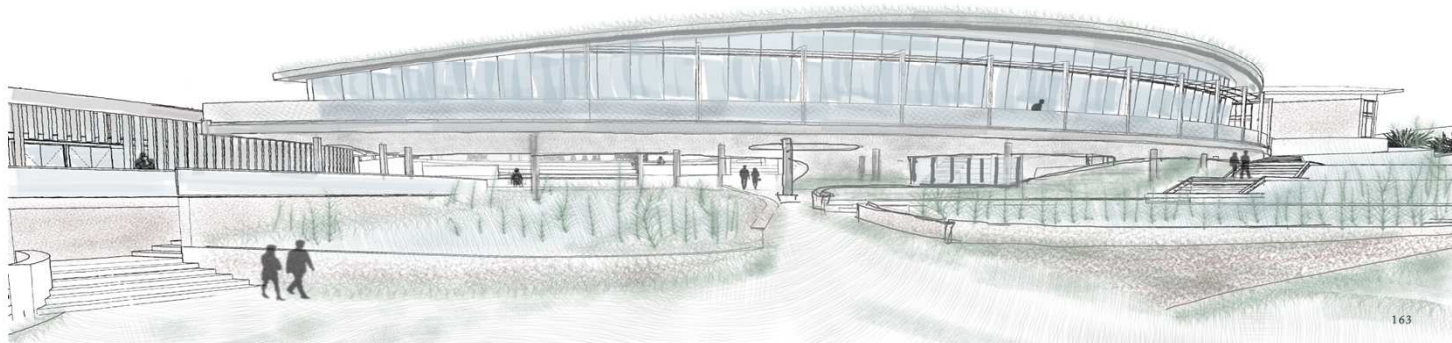


DETAIL 3 :
SKYLIGHT STORMWATER DETAIL





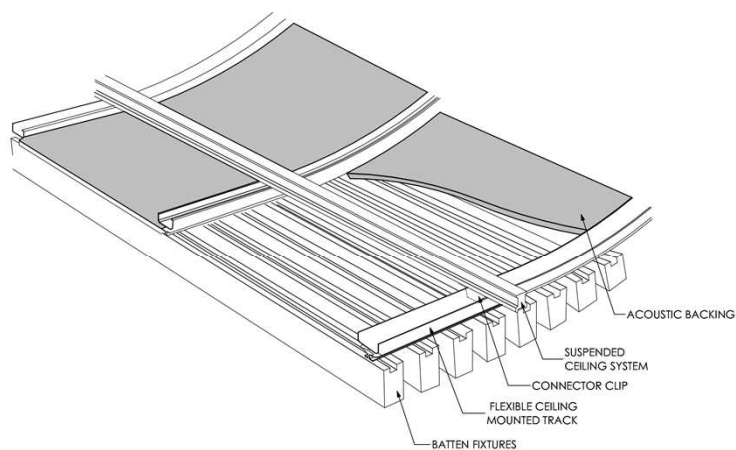
The gallery space seen here can function as a multi-purpose space with an architectural language that speaks to fluidity and lightness. The relaxed library and lecture spaces, invites the public into the realm of science to encourage societal advancement, while leisurely enjoying a cup of coffee.



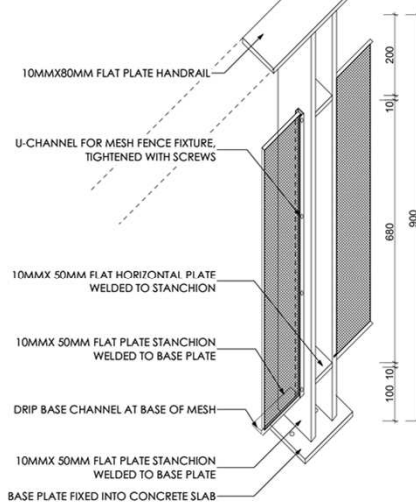


DAILOGUE WITH ARCHITECTURE

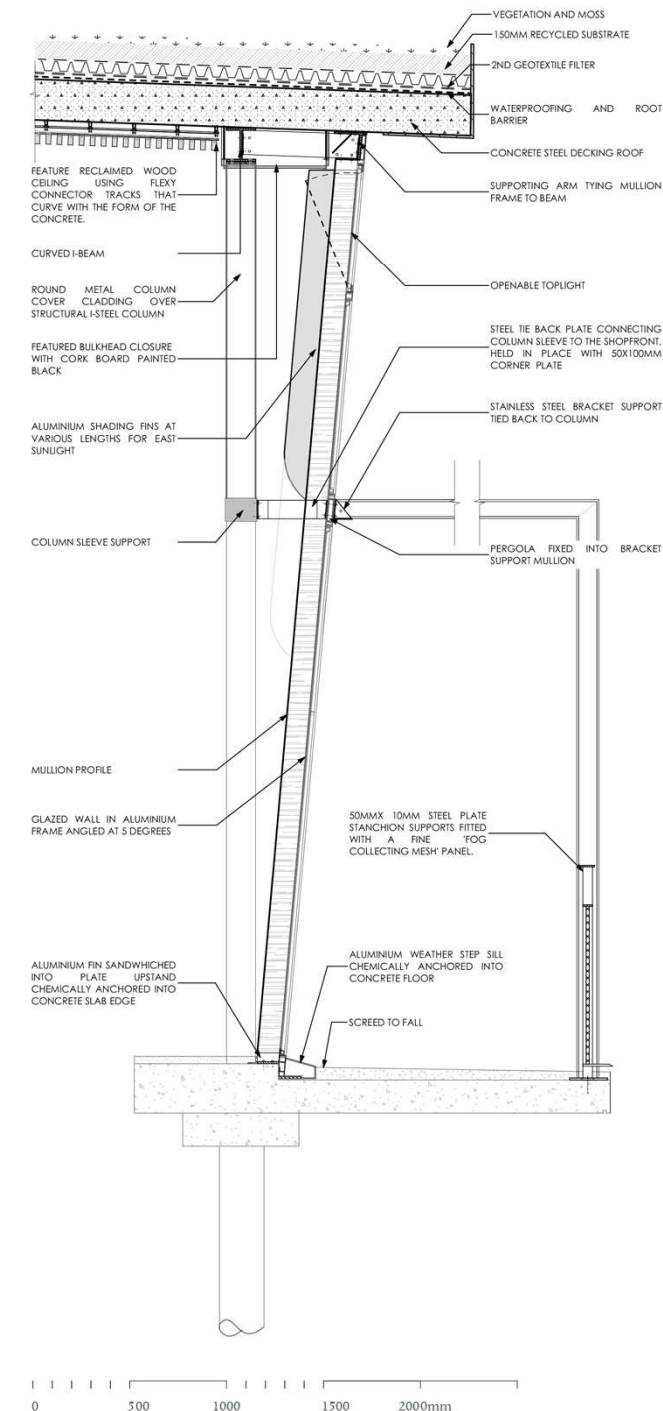
Fully glazed slanted walls offer cohesive views over the wetland, creating a subliminal experience. For an architecture to be interactive, transitional spaces need to entice the user's experience through sight, sound, scent and tactility. The corridor and punctured atrium between the library space and constructed wetlands provides an opportunity to observe and learn about the natural surroundings from varying perspectives.



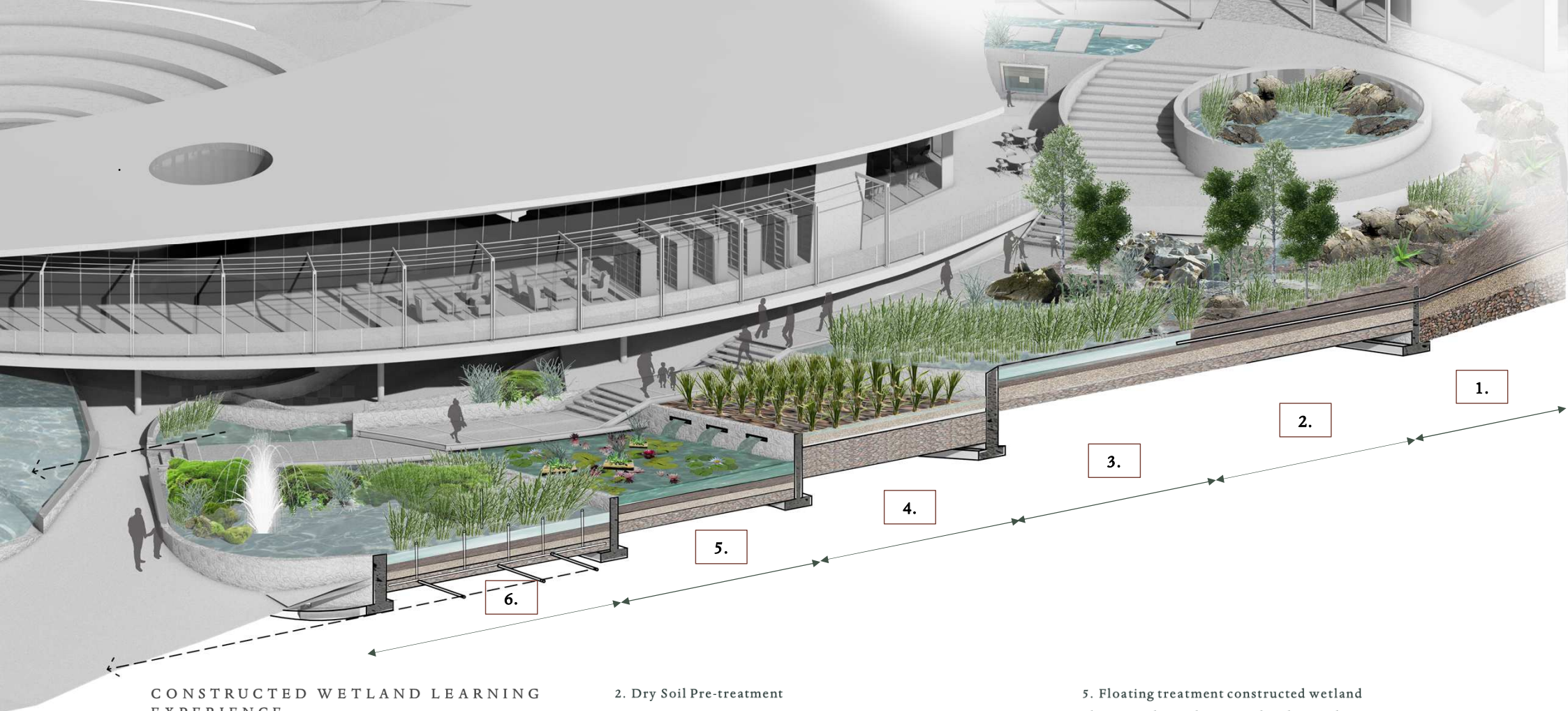
CURVED CEILING CLADDING DETAIL



FOG CATCHING BALUSTRADE



SECTION THROUGH CORRIDOR



CONSTRUCTED WETLAND LEARNING EXPERIENCE

Water offers a unique tactile experience in and around the building, communicating its significance and meaning that is linked to the wetland.

In this design, the constructed waterscapes encourage a bio-diverse ecological site. It provides interactive spaces where visitors can walk through, learn and experience the water life cycle, supporting the biophilic rules that offer a sense of risk, unity and delight.

1. Underground Inlet from surface run-off

2. Dry Soil Pre-treatment

Boulders, Aloes and Indigenous Tree species allows for water cool-off & remove the heavy metal in soil.3. Free water constructed wetland

3. Free water constructed wetland

30-40mm soil with common reeds, 10-50mm water bed, geo-membrane/clay material to stop seepage into groundwater. Good for Polishing of effluent and surface runoff water.

4. Horizontal sub-surface flow constructed wetland

30-100mm gravel combinations with Typha and Scirpus grass. Water flows under a pebble bed geo-membrane/clay material underlay, to stop seepage into groundwater. Easier removal of organic matter.

5. Floating treatment constructed wetland

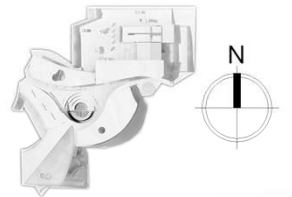
Floating plant elements develop a deep root system in water beds. Water beds consist of an organic sand layer known as the benthic zone where organic organisms thrive in its ecosystem. This type of wetland is also suitable for fostering shallow pond habitats, such as frogs or fish etc.

6. Aerated constructed wetland

Consists of a water bed via a vertical flow system from above ponds. Consists of sand and gravel on the concrete surface bed with aerated pipes connected to a pump system to oxygenate the water. These drain into other pools or into groundwater. It is known to have the best purification system.



SOUTH ELEVATION



CREATING LIFE

The built form brings life to the site, as it becomes the extension of the wetland and encourages life to exist in, under and on top of it.

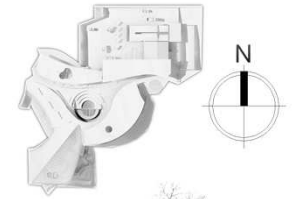
Architecture in this instance creates life and becomes the manifestation of God as the creator that gives life to all things.

Charged with the principles of Biophilia and phenomenology theory, man can now find sanctuary in an innovative, more socially responsible hybrid architectural typology that cohesively expresses itself as a symbol for Christianity, while symbiotically forming part of the ecology of the wetland, becoming a place of environmental and spiritual awareness.





EAST ELEVATION



WEST ELEVATION



DESIGN INTENTIONS

- Assist the church in its ministry using the wetland as their mission field.
- Address the harvesting of water
- Initiate renewed movement through the site.
- Support the waste management of the area
- Raise environmental awareness
- Inclusive spaces – tying a liquid society

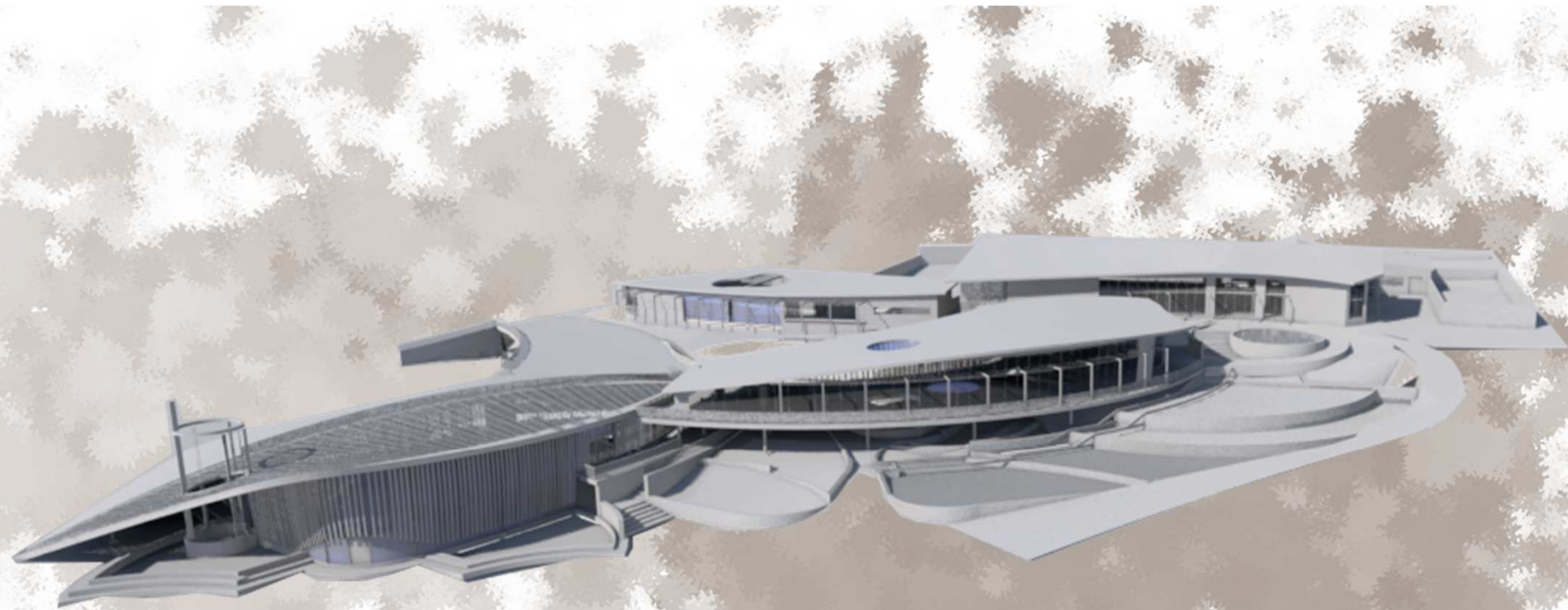


DESIGN OUTCOMES

The architecture serves a dual purpose by embracing the element of water as the liminal space between physical and spiritual realms.

Using the biophilic principle of 'complexity and order', the architecture attempts to engage with the complexities that society and the site present, using the precious element of water to bring order, unity and fluidity to the site.

The architecture thus expresses an elegance of ordered complexity, revealing the divine through an architectural composition and spatial language that speaks to human intellect and spirit, awakening the church's identity as a change agent and making new the spirit of place.



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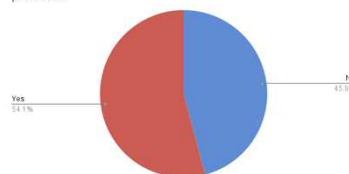
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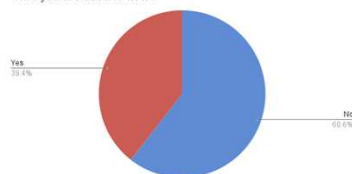
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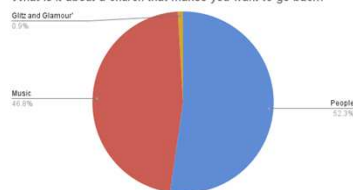
Would you prefer a church to be held outdoors due to Covid19 protocols?



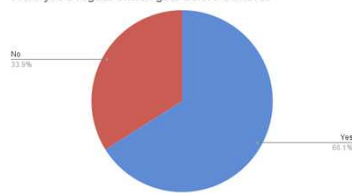
Would you appreciate a beautiful designed church, compared to what you are used to now?



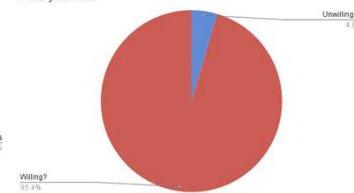
What is it about a church that makes you want to go back?



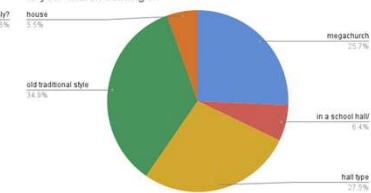
Were you a regular church goer before Covid19?



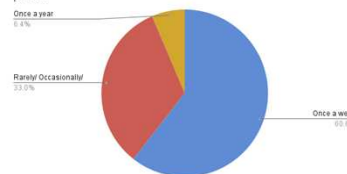
Was your visit



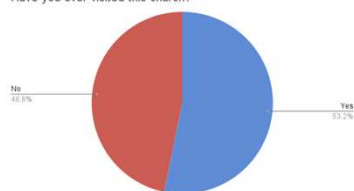
Is your church building ...



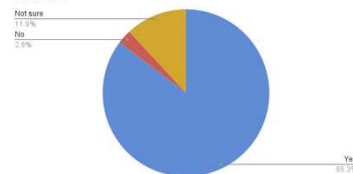
How often before Covid protocols, have you visited a religious place?



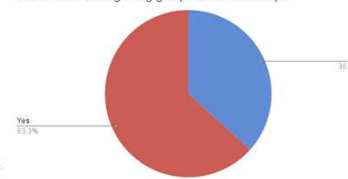
Have you ever visited this church?



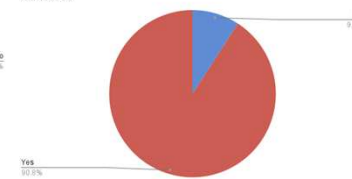
Do you think fellowship is important for your growth as a Christian?



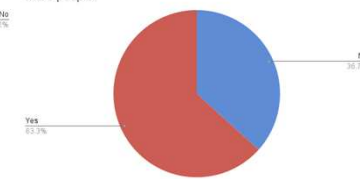
Do you think Covid has changed your mindset around going to church and meeting in big groups or for fellowship?



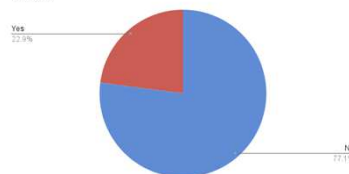
Do you think Covid has changed the church membership numbers?



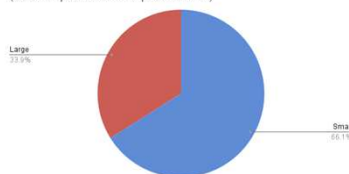
Do you think a beautiful designed church building would attract more people?



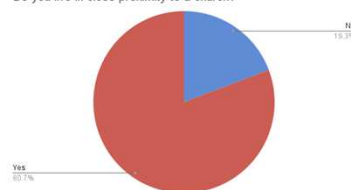
Do you prefer joining church online, than having to go in to church?



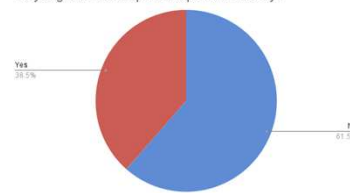
Do you prefer attending large churches or small churches? (Assume pre-covid19 or post covid19)



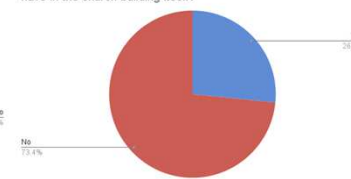
Do you live in close proximity to a church?



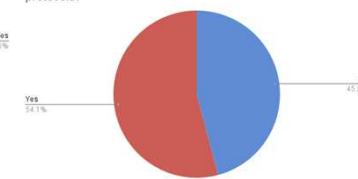
Do you get the same spiritual experience virtually?



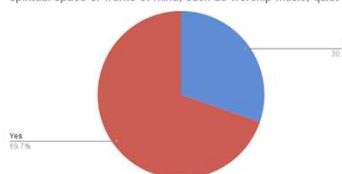
Do you feel as connected to the church virtually, as you would have in the church building itself?



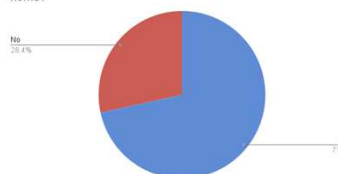
Would you prefer a church to be held outdoors due to Covid19 protocols?



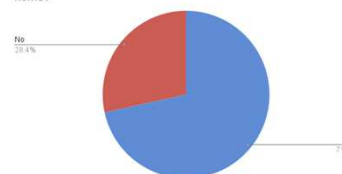
Do you need external factors to better help get you into a spiritual space or frame of mind, such as worship music, quiet



Is your spiritual experience of church better at church than at home?



Is your spiritual experience of church better at church than at home?



Appendix

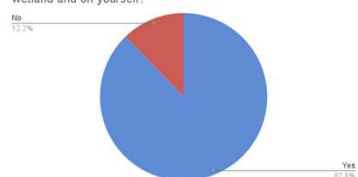
Research report

Survey 1:

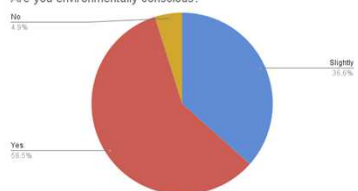
Experiencing the Church

109 responses

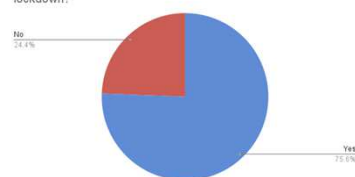
Are you aware of the impact of pollution on the water in the wetland and on yourself?



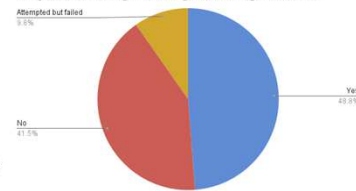
Are you environmentally conscious?



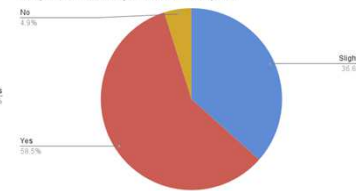
Did you notice a change in the environment/ nature during lockdown?



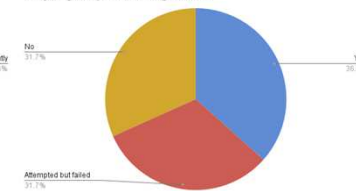
Did you start walking/ exercising more during Lockdown?



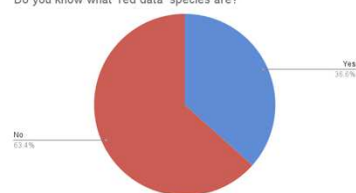
Do you care about your carbon footprint?



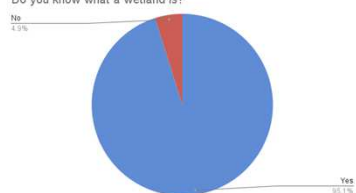
Do you grow your own vegetables?



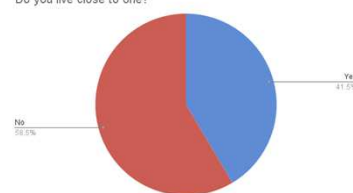
Do you know what 'red data' species are?



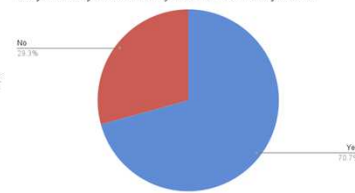
Do you know what a wetland is?



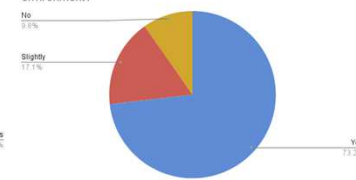
Do you live close to one?



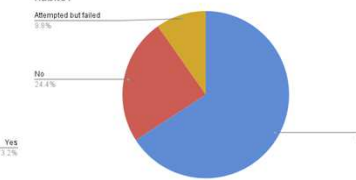
Do you think your community needs a community centre?



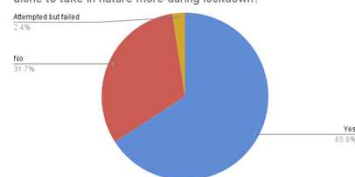
Do you understand the importance of the wetland on the environment?



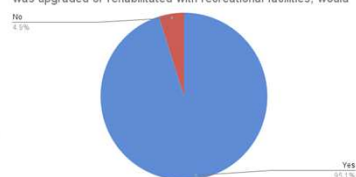
During Lockdown did you consider changing your sustainability habits?



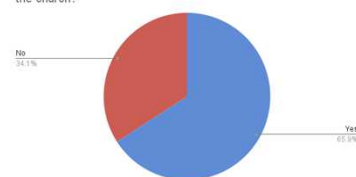
Have you started to embrace wildlife/ bird-watching or sitting alone to take in nature more during lockdown?



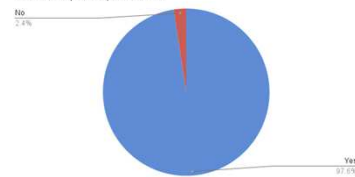
If the community you lived in, had a greenbelt or wetland, and it was upgraded or rehabilitated with recreational facilities, would



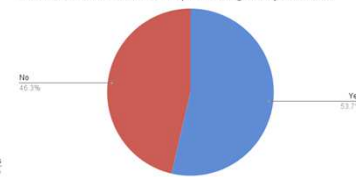
Religion aside, would you visit a community centre that is run by the church?



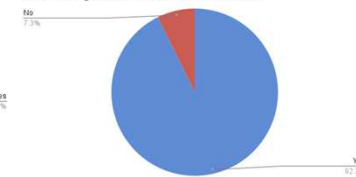
Would you be interested in a recreational space in our area? Bike/walk paths/ parks etc.?



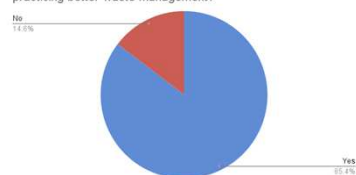
Would you be interested in joining an outreach program about environmental awareness, despite it being run by a church?



Would you be more accommodating to the waste pickers if they were managed and formalised into the area?



Would you invest your time in assisting the community by practicing better waste management?



Appendix

Research report

Survey 2:

Socio-Environment Research

41 responses

Mission Field H2O

Project Budget Draft 1

22-Aug-21

DESCRIPTION	Construction Cost	Rate Per m²
Building Cost (4891m² x R12 500)	R61 137 500,00	R12 500,00
Preliminaries @ 9%	R5 502 375,00	R1 350,00
Total Benefits	R66 639 875,00	R13 850,00

SUB-TOTAL	Construction Cost
Contingency (20%)	R13 327 975,00
Sub-Total	R79 967 850,00

ESTIMATE OF CURRENT CONSTRUCTION COST	Construction Cost
Pre-Contract Escalation - allowance	R719 710,65
Post-Contract Escalation - allowance	R1 679 324,85
Estimate of Current Construction Cost	R82 366 885,50

ESTIMATE OF ESCALATED CONSTRUCTION CONSTRUCTION COST AT COMPLETION DATE	YEAR
Professional Fees including Disbursements	
Professional Fees 11%(Construction Cost)	R9 060 357,41
Construction Management Fee (included with Prelims)	R0,00
Disbursements	Included
Estimate of Escalated Construction Cost at Contract Completion Date	R9 060 357,41

ESTIMATE OF ESCALATED CONSTRUCTION COST INCLUDING PROF. FEES	Column1
Legal Fees (Attorney fees for administration work)	R90 000,00
Plan Approval (Council Submission - Scrutiny Fee)	R120 000,00
NWBC Registration Fees (Compulsory for Contractors Licensing who deliver housing)	R400 000,00
Interim Rates & Taxes (Developer must pay this, for utilizing services on site)	R80 000,00
Marketing & Promotion (marketing of development eg. Banners, adds, billboards)	R150 000,00
Transfer Costs and Consolidation	R233 148,00
Bond Registration Costs	R300 000,00
Land Cost (Donated)	R0,00
Town Planning (consolidation of erven)	R130 000,00
Traffic Engineer (TIA-Traffic impact assessment)	R140 000,00
Land Surveyor (Survey site, and accurately set out the pegs)	R80 000,00
Geotechnical Investigations (To test earth, to inform engineers design.)	R150 000,00

Bulk Contributions (Paying for upgrading of infrastructure - sewer, water, fibre, electrical, stormwater)	R700 000,00
Environmental Impact Assessment (Assist with the implementation EMP (Environment Management Plan)-how the construction impacts the area)	R60 000,00
General Costs	R2 633 148,00

ESTIMATED DEVELOPMENT COST EXCL. DEVELOPERS FEE & FINANCE CHARGES	Construction Cost
Development Value (excl. bank charges)	R 94 060 390,91
Development Management Fee (1%)	R940 603,91
Estimated Development Cost Excluding Developer's & Finance Charges	R95 000 994,81

ESTIMATED DEVELOPMENT COSTS EXCLUDING FINANCE CHARGES	Construction Cost
Finance Charges (Bank Charges, Transaction Costs)	R4 750 049,74
Interest on General Costs (over a period of 18 Months @ 11.51%)	R332 503,48
Interest on Construction Costs (over a period of 12 Months @ 11.51%)	R427 504,48
Estimated Development Cost Excluding Finance Charges	R99 751 044,55

ESTIMATED CAPITAL EXPENDITURE	Construction Cost
Interest on Construction Costs (15%)	R14 962 656,68
Estimated Capital Expenditure (Inclusive of VAT)	R114 713 701,24

Note:
Rentalescalation: 6.5% per annum
Expenses escalation: 10% per annum
Interest on junior debt capital: iBBA @ 7.52% per annum
Interest on senior debt capital: 11.0% per annum (Prime plus 100 bases points)
Weighted average interest on debt capital: 9.45% per annum

INCOME	Construction Cost	Area	Column2	Column3
Church (Ground - 1090m2 & Mezz Floor - 418m2) / Functions	R 120 000,00	1508 m²		
Public Information Centre (Library)	R 109 950,00	733 m²		
Leasing Facilities (Studios) @ R50 per hour on 50% Rental	R 22 410,00	278 m²		
Exhibition Entrance Fee R20 pp x 1000 People	R 20 000,00			
Restaurant	R 108 750,00	725 m²		
Fellowship Café	R 46 650,00	311 m²		
Learning Labs	R 100 000,00	1000 m²		
Recycling Building	R 50 400,00	336 m²		
Less: Vacancy @5% (in the event rentals are not 100% occupied - float)	R 21 388,00			
Total Cash Inflow	R556 772,00	4891		

Expenditure (Expenses excluding Bond Repayments)	Construction Cost	Column1	Column2	Column3
Property Management	R 33 406,32	6,00%		

Utilities	R77 948,08	14,00%
Cleaning (Company servicing the building.)	R16 703,16	3,00%
Bad debts (Previous outstanding Rates & Taxes, etc.)	R11 135,44	2,00%
Rates & Taxes (Monthly)	R13 919,30	2,50%
Building Insurance	R4 454,18	0,80%
Maintenance	R16 703,16	3,00%
Security	R11 135,44	2,00%
Total Cash Outflow	R185 405,08	33%

Gross Operating Profit	Construction Cost
Gross Operating Profit (Inflow - Outflow)	R 371 366,92
Loan Repayments	
Bond Repayment - Interest	R245 102,17
Bond Repayment - Principal	R122 551,08
Surplus / (Deficit)	R367 653,25

Column4	Construction Cost
Debt Service Coverage	78,00%

Column4	Construction Cost
Debt Service Coverage	12,05%
	R187 898,08

Accommodation	Construction Cost	Column1	Column2	Column3
Church (Ground - 1090m2 & Mezz Floor - 418m2) / Functions	R 226 200,00		1508 m²	
Public Information Centre (Library)	R 109 950,00		733 m²	
Leasing Facilities (Studios) @ R50 per hour on 50% Rental	R 41 700,00		278 m²	
Exhibition Entrance Fee R20 pp x 1000 People	R 2 000,00		m²	
Restaurant	R 46 650,00		725 m²	
Fellowship Café	R 46 650,00		311 m²	
Learning Labs	R 150 000,00		1000 m²	
Recycling Building	R 50 400,00		336 m²	
Security Office	R 23 250,00		155 m²	
Animal Rescue	R317 100,00		2114 m²	
Rental Income	R673 550,00		4 891 m²	
Rental per square metre @	R150,00			

Funding Overview	Construction Cost	Fund Portion
Public		
Department Infrastructure Development	R1 147 137,01	1,00%
Department of Water & Sanitation	R11 471 370,12	10,00%
Department of Public Works	R11 471 370,12	10,00%
Department of Forestry, Fisheries & the Environment	R11 471 370,12	10,00%
CIDB	R3 441 411,04	3,00%
SEDA	R3 441 411,04	3,00%
Private		
Developer's	R57 356 850,62	50,00%
Ridgecrest Family Trust	R6 882 822,07	6,00%
National Youth Development Agency	R2 294 274,02	2,00%
Donor	R5 735 685,06	5,00%
	R72 269 631,78	
Surplus / (Deficit)	R186 983 333,02	100,00%

Estimate of Current Construction Cost	R82 366 885,50
Professional Fees 11%(Construction Cost)	R8 236 688,55
Specialist Consultants	R2 633 148,00
Total Building Cost	R114 713 701,24

Projected Rental Income over 15 years	Construction Cost	Column1	Column2	Column3
Per Month income	R556 772,00			
Year 1 rental income (12 months X 10%)	R6 681 264,10			
Year 2 rental income (12 months X 10%)	R7 349 390,51			
Year 3 rental income (12 months X 10%)	R8 084 329,56			
Year 4 rental income (12 months X 10%)	R8 892 762,52			
Year 5 rental income (12 months X 10%)	R9 782 038,77			
Year 6 rental income (12 months X 10%)	R10 760 242,65			
Year 7 rental income (12 months X 10%)	R11 836 266,91			
Year 8 rental income (12 months X 10%)	R13 019 893,60			
Year 9 rental income (12 months X 10%)	R14 321 882,96			
Year 10 rental income (12 months X 10%)	R15 754 071,26			
Year 11 rental income (12 months X 10%)	R17 329 478,38		Break Even	
Year 12 rental income (12 months X 10%)	R19 062 426,22			
Year 13 rental income (12 months X 10%)	R20 968 668,84			
Year 14 rental income (12 months X 10%)	R23 065 535,73			
Year 15 rental income (12 months X 10%)	R25 372 089,30			
Rental Income over 15 years	R212 280 341,31			

Appendix

Feasibility Breakdown of Costs

21 September 2021

Faculty of Engineering and the Built Environment:

Ethics clearance letter:

Dear Roxanne Norton-Esau (1446903), this letter confirms that your ethics application has been cleared. Your clearance/protocol number is SOAP024/2021

Yours sincerely

Lerato Nkosi

