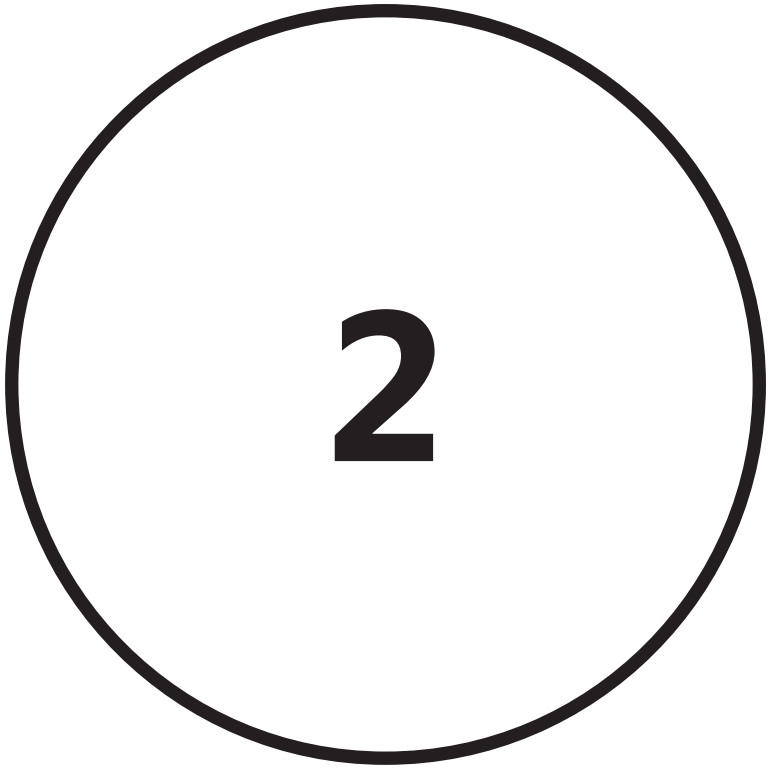


DESIGN RESEARCH

THEORETICAL BACKGROUND TO CONCEPTUAL APPROACH

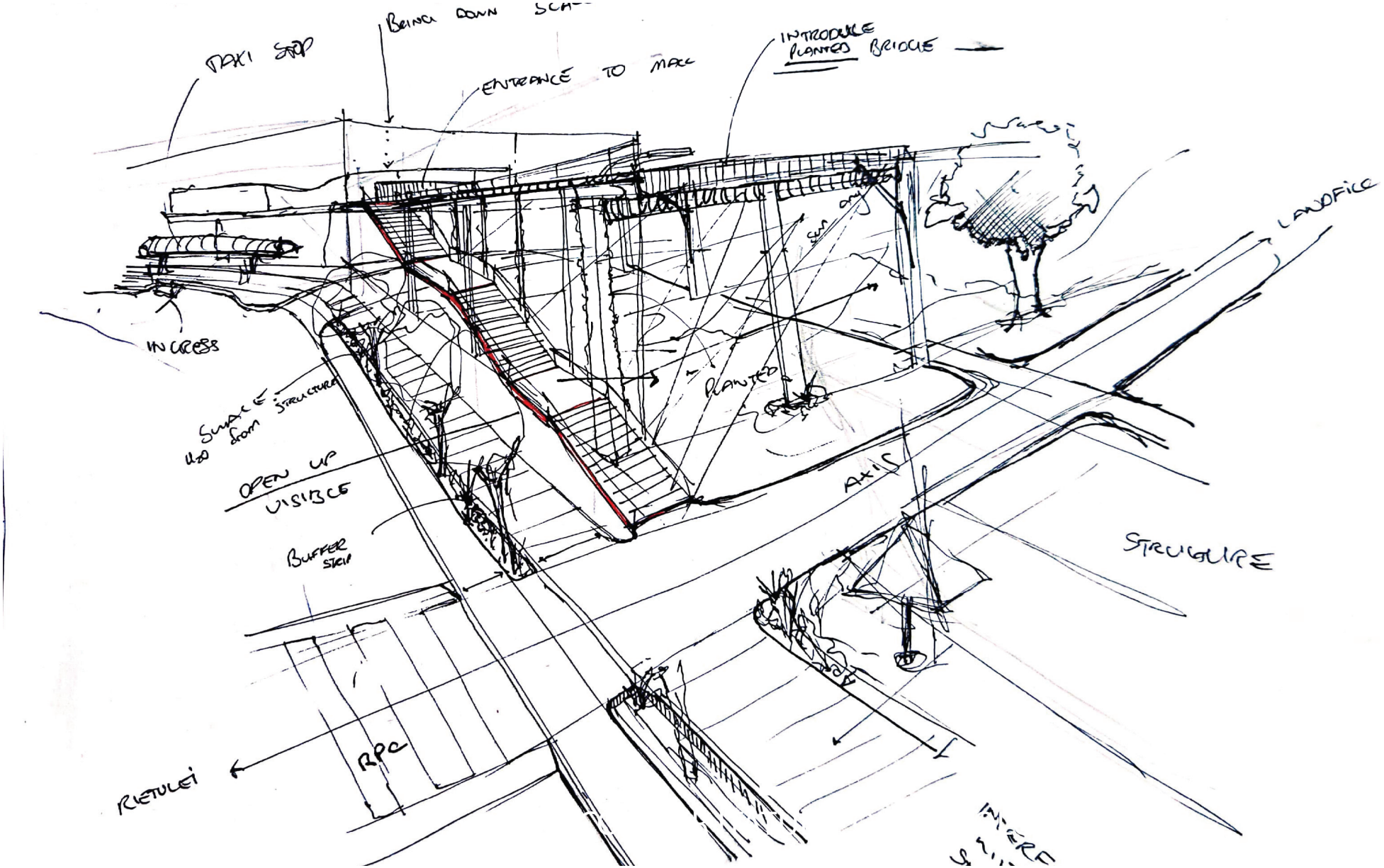


Figure.37: FLYOVER CONCEPTUAL SKETCH (AUTHOR 2021)

2.1 INTRODUCTION

The concept of reconnecting humans with the natural world is not a new idea. Throughout history humans have sought to create this connection, in some of the cases it might not have been directly planned for. For instance, in Egypt the Nile flooded its banks and humans took advantage of this to produce better agriculture. In the modern day the focus falls more on conservation of existing natural systems rather than restoration of ecosystems (Urbanska 2000). It is much easier to safeguard the natural areas you have, than to create new ones, but by doing so there will be a slow decline in natural spaces.

The built environment needs to accommodate ecosystems if we are to protect and conserve this natural resource. These two systems working together in a symbiotic relationship can be how ecosystems are reintroduced into the urban fabric, in an eco-centric approach towards design and development The question is then: can an ecosystem be introduced to a complex human system (building) and still allow the ecosystem to flourish and the building to complete its function?

2.2 HUMANS & NATURE

History has shown that since the beginning of mankind, humans have had a profound relationship with nature. Starting out as primitive nomadic hunter-gathers, which lived by foraging the needed resources from the natural world (Ember 2020). Populations were small and compact, requiring only a small amount of resource to sustain these groups. A drastic change came about when humans developed into an agricultural species, historians note this as the true dawn of Civilisation. Settlements and cities were born out of the domestication of plants and animals (Milner 2019), from there the human race evolved to have massive centres of settlement. These settlement and cities include those found in Mesopotamia of 7500BCE, Alexandria in the Hellenistic era 323BC, ancient Rome 476AD and Constantinople 1453 AD. Jumping into more recent time sees us within the industrial revolution which came with an increased in the living standards of most of today's modern humans (Mailler 2021). Human population and our cities have grown considerably, in 2016 54% of human population lived in urban areas and this number is expected to increase (Ritchie and Roser 2019) (Fig. 38)) but at what cost to the environment do these developments remain ?

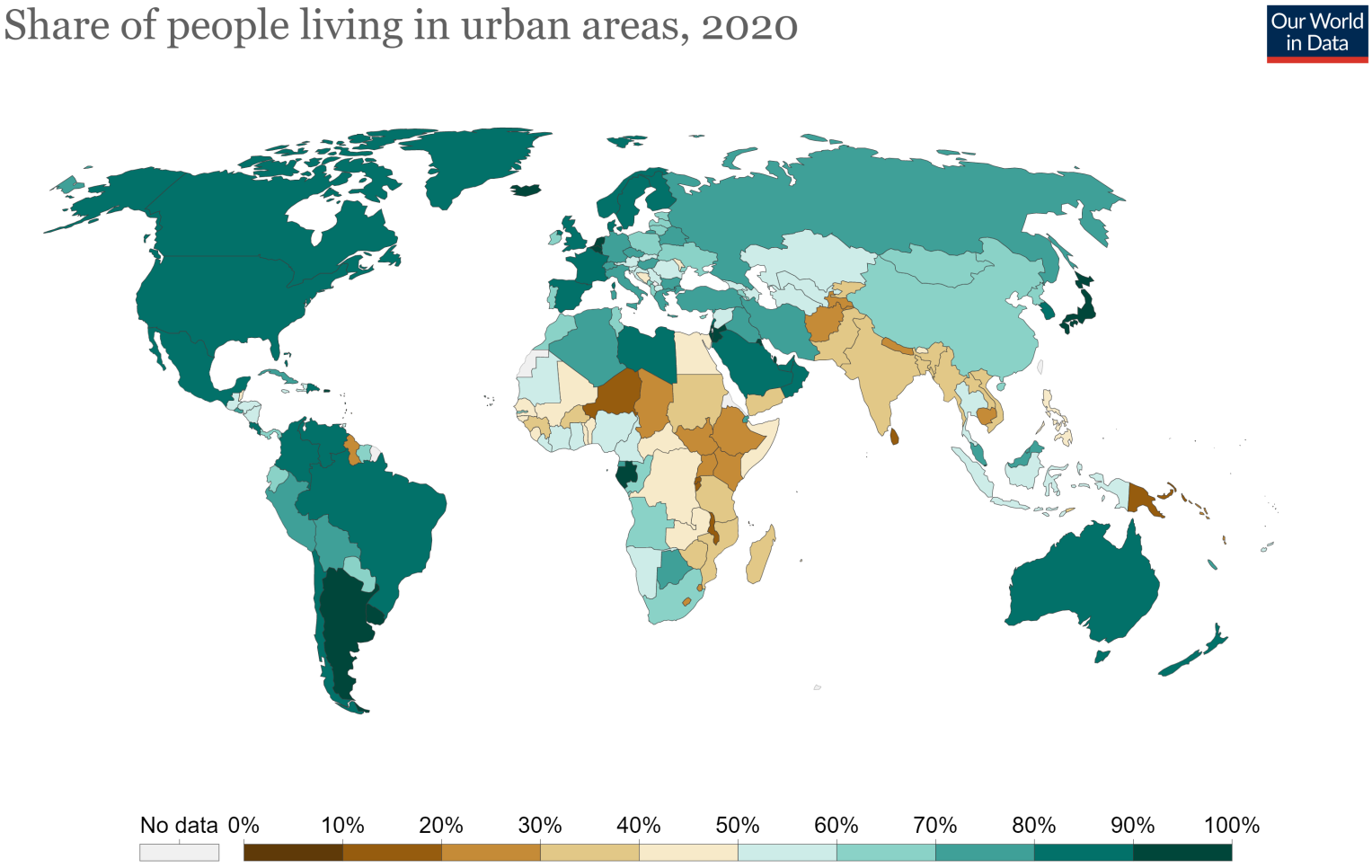


Figure.38: HUMAN POPULATION IN URBAN AREAS 2020

2.3 IMPACT OF THE INDUSTRIAL REVOLUTION ON THE ENVIRONMENT

With Human ingenuity came ecological destruction. Since the industrial revolution there has been a clear move away from sustainable development (Moghadam 2015) with the idea of bigger is better and an addiction to more, placing enormous strain on the environment (Patnaik 2018). Industrial activities from within this time period have affected the Earth's climate and environment in various aspects extending from a regional scale to a global scale, ranging from soil pollution, drastic changes in land use and vegetation across the last century (Mackereth 1966, Bradbury & van Metre 1997, Kim & Rejmánková 2001) .

In our modern sprawling mega-cities ecological systems barely exist apart from the introduced exotic street trees and areas of land we identified to protect. Our neighbourhoods, places that once were open veld, thriving with indigenous wildlife and floral species, now contain a fraction of the indigenous floral biomass and even less of the general fauna (reduced to mostly birds, or at least this is what the research is dominated by) that once dwelled here (Reichard and White 2001).

Modern cities have been shaped by a worldview in which the natural world is seen as disconnected from human beings and their habitat and rather seen as an element to be controlled (Peres, Barker & du Plessis 2015:1).

Previous urban planning led to the draconian ideas of building and developing open green spaces with no regard to ecological spaces, rather than the redeveloping of the existing urban fabric (Bor 1972:218).

"Instead of having to insert slowly and often painfully piece by piece new structure and roads into an existing urban fabric, we can build large areas comprehensively with all the necessary roads, buildings and open spaces within any major physical, social or economic disruption" - (Bor 1972:218)

Urban planning has come a long way since ideas such as this but ecological design within urban areas still lack in truly incorporating ecology into our developed centres. Changing how we approach projects is necessary if meaningful change is to be made.

2.4 THE DISCONNECT FROM NATURE

Society as we know it has gone through a separation period from nature, ranging from the non-use of natural reference in educative books for children, fiction writing, songs, poetry and film since the 1950s, with an increase in the number of terms used for human-made object (Kesebir & Kesebir et al 2017), to the ways our cities and neighbourhoods were/are designed (Bor 1972:218).

The disconnect has reason to cause concern, with studies showing what benefit natural green spaces have on human mental and physical well-being (Grima et al. 2020, Hes & Du Plessis 2014).

To reiterate, with the current misuse of resources and the destruction of natural systems, there has been a clear decline in the number of fauna and flora globally (Stokstad 2019). This has been caused by human factors (Corvalan, Hales & McMichael 2005).

This separation is problematic and a reconnect is of paramount importance, not only so that our species can have some sort of response to the current state of environmental degradation, but also for restoring human psychological and physical wellbeing (Hes & Du Plessis 2014:45).

Figure.39: DE VILLA BOIS EXPOSED REBAR AND INCOMPLETE COLUMNS (AUTHOR 2021)

2.5 PARADIGM SHIFT

A paradigm shift is required if we as humans are to live within this world, in harmony, and part of the natural cycle.

Returning to the image of the primitive hut by Laugier (Fig. 40). This figure, in a way points to a return to the natural world and the moving away from ornament and the "status quo" of the time, using architecture as the mediator between man and nature. In the same breath modern day humans should critically analyse our current situation and understand that a new approach (not only within the built environment but all walks of life) is required.

The Deep ecological platform from Arne Naess and George Session (1985) becomes a foundational idea from which this paradigm shift can be approached, various other facets form part of this approach, such as work from: The biophilia Hypothesis (Kellert 2005), Island Biogeography (Davis & Glick 1978), New Sustainability (Gibbons 2020) and the works of van der Ryn & Cowan (2007).

Figure.40: LAUGIERS PRIMITVE HUT (LAUGIER 1753)

2.6 THE APPROACH -THE ECOLOGICAL PARADIGM

The approach should then be: an interconnected movement where humans are seen as a part of the natural world, and therefore human needs and ecological needs are one and the same. Using the Deep ecological platform (Naess & Sessions 1985) as the foundational theory, various ideas can be added to it. Sustainability is not a singular approach but rather a network or system of approaches (Fig. 41).

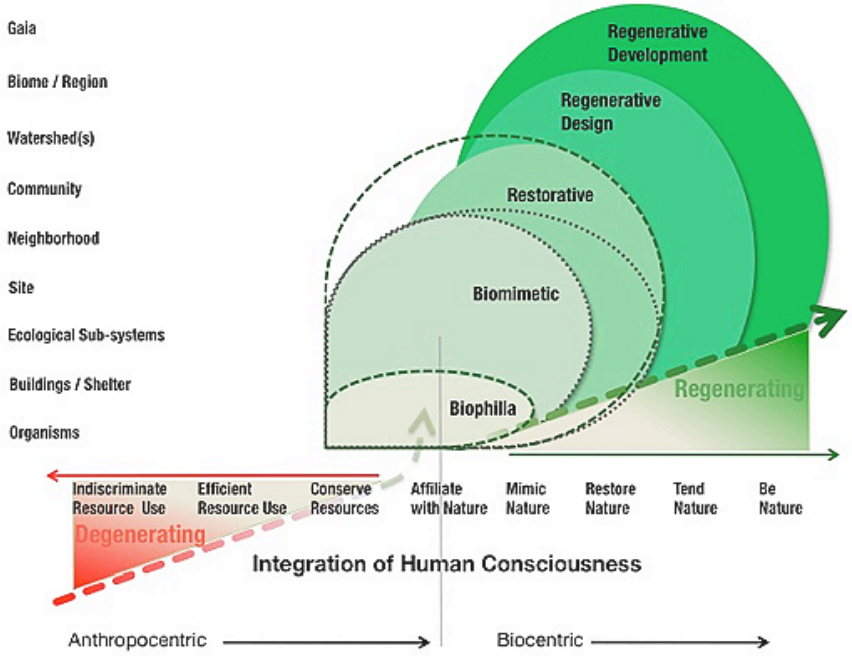


Figure.41: DE-GENERATIVE TO REGENERATIVE (Mang & Reed 2012).

Various strategies surrounding ecological sustainability were developed in the late 1990s, ordered around various theoretical and scientific ideas surrounding ideas of ecology (Mang & Reed 2012).

These differ in general scope but are all planned to have a net-positive impact. Moving away from a degenerative approach to a regenerative approach by integrating and adapting human consciousness or paradigm.

2.7 REGENERATIVE SUSTAINABILITY

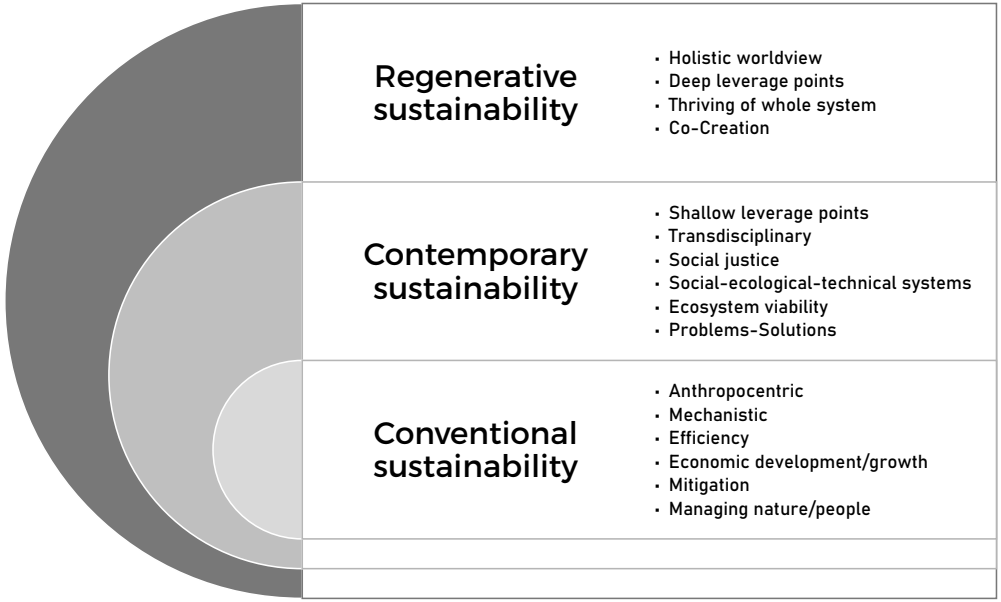
Regenerative sustainability is the new wave in the larger movement of sustainability. It represents a large shift in wordview an much like Deep Ecology sees humans and the rest of life as a holistic system (Gibbons 2020).

This movement is a radical change from our current thinking and would require major transformation for it to truly be effective but it is a goal to work towards.

The nature of these changes include to transcend our current approaches of contemporary

sustainability (Fig. 42), which focuses on symptoms of problems rather than the roots of unsuitability, or a "shallow leverage" (du Plessis 2012).

Regenerative sustainability adopts a holistic worldview which gives humans the ability to integrate and transform our current paradigm (Gibbons 2020). By causing changes within our current paradigm it leads to transformation within the deepest leverage point of systems (Meadows 1999) and this change is ultimately necessary for sustainability (Hes & Du Plessis 2014).



2.8 THE BIOPHILIA HYPOTHESIS

The Biophilia Hypothesis assert that human happiness and a fulfilling existence is inherently dependant on our relationship with the natural world, it further argues that the natural world is as essential to mankind's history as our social behaviour is in a term Edward O. Wilson termed; biophilia (1993). Stephen Kellert developed the term The Biophilia hypothesis with Wilson, which states that; during the development of our species, we have adapted to use the natural world to aid us in evolution. This created a need for us to be closely connected with the natural world and other living things (Kellert 2005). Wilson (1993) further elaborates that our brains developed before cities existed and therefore this connection is still relevant to humans.

"As such, social scientists should be concerned about what will happen to the human psyche when such a deep defining part of human evolutionary experience is diminished or erased" - (Gullone 2000:293)

This approach is appropriate because it provides an informant that is interconnected with the way humans have evolved within the natural world.

Figure.42: REGENERATIVE SUSTAINABILITY ADAPTED FROM (Gibbons 2020) BY AUTHOR 2021

Furthermore, It states why the reconnection between the inside and the outside of human life (and space) is of paramount importance to our mental and physical well-being (Hes & Du Plessis 2014:46).

This becomes an effective departure point that can be utilised and use as an approach to reconnect humans with nature. This approach proposes more than only placing natural elements within spaces designed for people but also includes not as obvious ways of exposure to these elements, such as dappled shade from structure (Hes & Du Plessis 2014:47).

In Designing for Hope, Dominique Hes & Chrisna Du Plessis (2014) unpack Kellert's work of Biophilic design and its six dimensions:

1. Environmental features.
2. Natural shapes and forms.
3. Natural patterns and processes.
4. Light and space.
5. Place-based relationships.
6. Evolved human nature relationship.

These six dimensions give insight into how different aspects of the Biophilia hypothesis can be used to inform design.

2.9 MAKE NATURE VISIBLE

Adding to these biophilic aspects, in Ecological design by Sim van der Ryn and Stuart Cohan (2007) the authors propose various principles that informs ecological design processes. One of which is by making nature visible, which is directly linked to the concepts of Biophillia.

Van der Ryn (2007). argues that we live within a de-natured world and that we have fallen into the trap of dumb design (van Der Ryn 2007). Everyday systems such as; how we receive our water, food, electricity, climate and how plants grow are hidden away in our buildings. Not allowing us to see the extent of our impact through these systems and/or learn anything from them (van der Ryn 2007). He goes on to say that it is no surprise that our buildings are teaching us only disconnect.

"De-natured environments ignore our need and our potential for learning. Making natural cycles and processes visible brings the designed environment back to life. Effective design helps inaform us of our place within nature." - (Van Der Ryn 2007:185)

Therefore, it becomes important to keep humans connected with the natural world and its cycles on a diurnal basis. This connection can be approached through the introduction of

biodiversity within a development and further, exposing these natural systems to the human occupants of such a development. By exposing natural systems to humans on a daily basis, people can reconnect with a broad range of life and natural cycles (Van der Ryn & Cowan 2007).

There should be a change to how we approach our buildings in regards to the exposure of systems. Buildings have the opportunity to be able to inform people of everyday cycles they live in (van Der Ryn 2007:187). Through allowing for natural systems within buildings, like: sunlight, natural ventilation, vegetation growth and storm water that is fed into artificial wetlands instead of storm water drains one can create an environment within a human system that exposes these systems to the public.

2.10 CONCEPTUAL APPROACH

Following on the work from the ecological paradigm, the discussed theory (the theory to still be discussed) and the normative position, a conceptual approach was developed with these as informants.

The conceptual approach calls for the symbiosis of the natural world and human beings and the co-evolution of this relationship, cementing it as part of who we are as humans. Finally, to expose this relationship between humans and the natural world through the development of an interface. A convergence area where a human system and a ecological system co-exist.

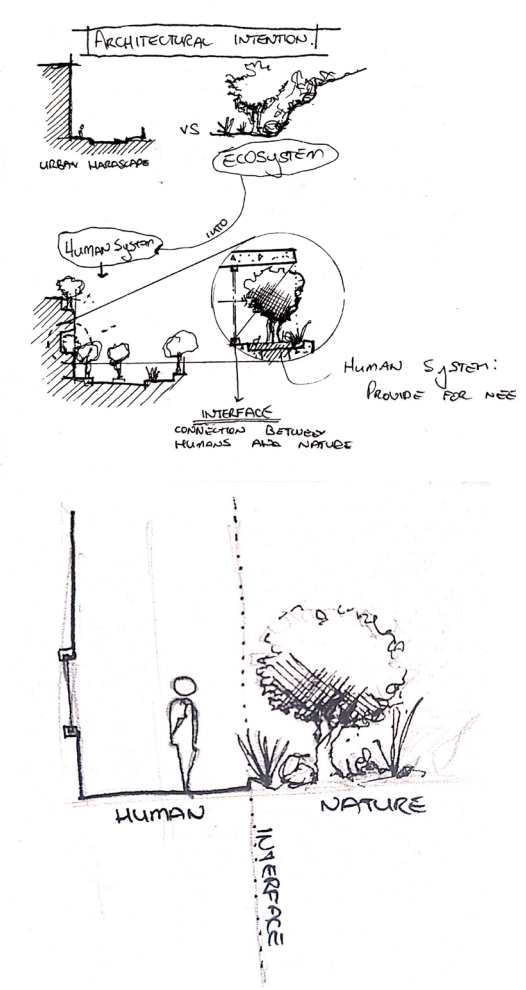


Figure.43: CONCEPTUAL APPROACH (AUTHOR 2021)

2.11 LARGER SITE APPROACH - ISLAND BIOGEOGRAPHY

Island Biogeography states that the various habitats found in urban areas should not be seen as separated entities but rather as connected, (Davis & Glick 1978). Seeing these areas as islands of green space within a larger contrasting matrix of the urban hard-scape (roads, houses, shopping malls, parks, etc). Planning for such spaces to be interconnected makes them more resilient and robust to change and further allows for more diversity in them (Handel 2017:1).

"Considering our urban habitats as islands in a sea of constructed problems may focus the protocols of urban work in a different way, from restoration work repairing or enlarging most rural habitat preserves." -(Handel 2017:2).

The development of the larger framework proposes to connect the Rietvlei Nature reserve with the Garstkloof site, Moreletaspruit and even as far as even Wolwespruit and other neighbouring open green space (Fig. 44) to create condition where all these spaces benefit.

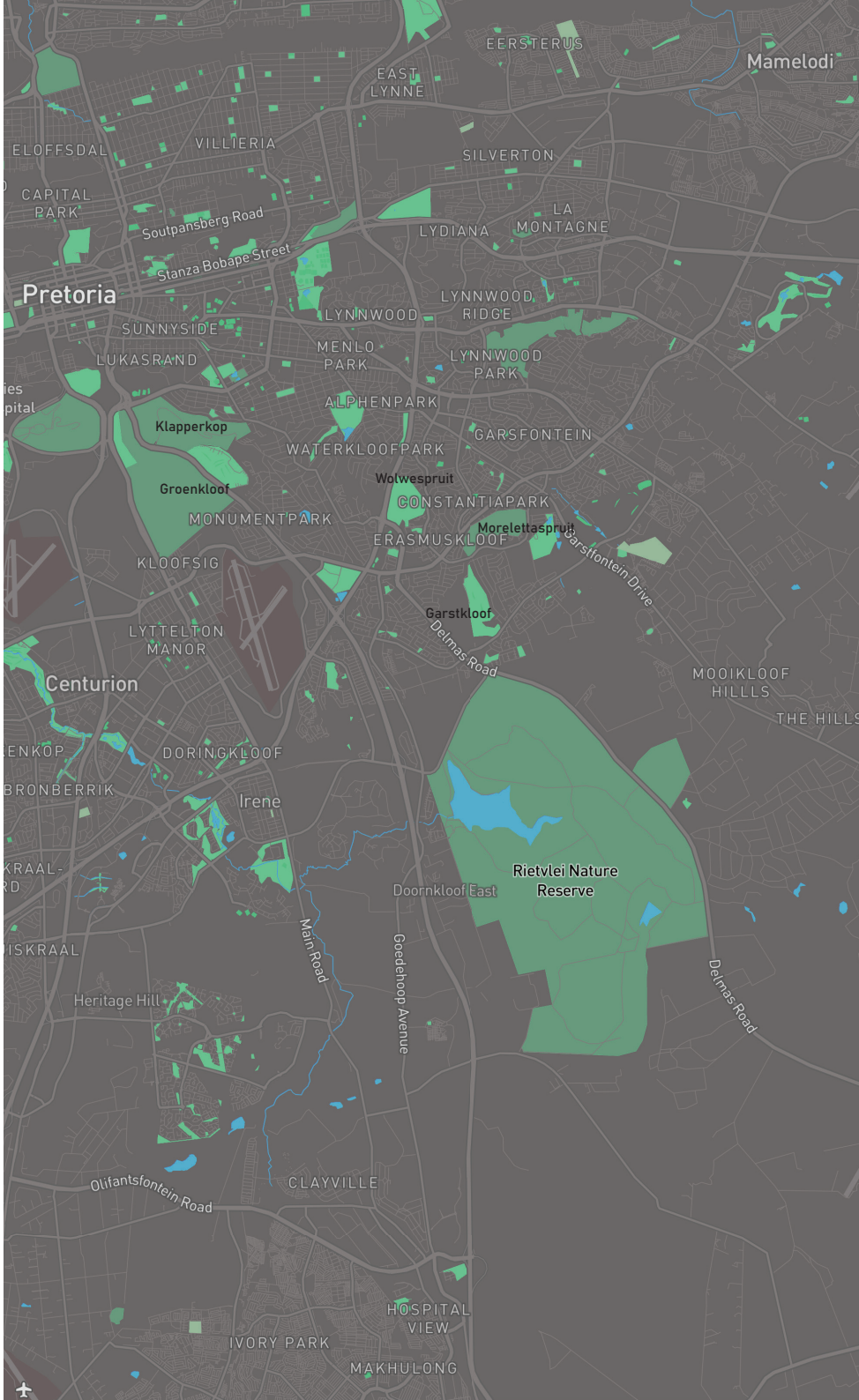


Figure.44: ISLAND BIOGEOGRAPHY PRETORIA EDITED FROM MAPBOX BY AUTHOR 2021

2.12 MASTERPLAN

The masterplan development calls for extension of the ideas surrounding island biogeography, and calls for the regeneration and improvement of the larger Garstkloof site to sustain a better ecosystem. This requires the further rehabilitation of the Garstkloof Landfill and the removal of boundaries separating it from the Garstkloof Nature area, to allow for the free movement of species between these spaces.

In doing so this will improve the adaptive capacity (Angelerand & Allen 2016) of the system and create a more diverse "island" of biodiversity. This in turn makes it more resilient and robust to change (Curtin & Parker 2014).

The De Villa Bois structure will be adapted and adjusted to allow for the use by humans and non-humans. This area will be where the largest concentration of human function that will exist on the larger Garstkloof site. The project focus falls on this area.

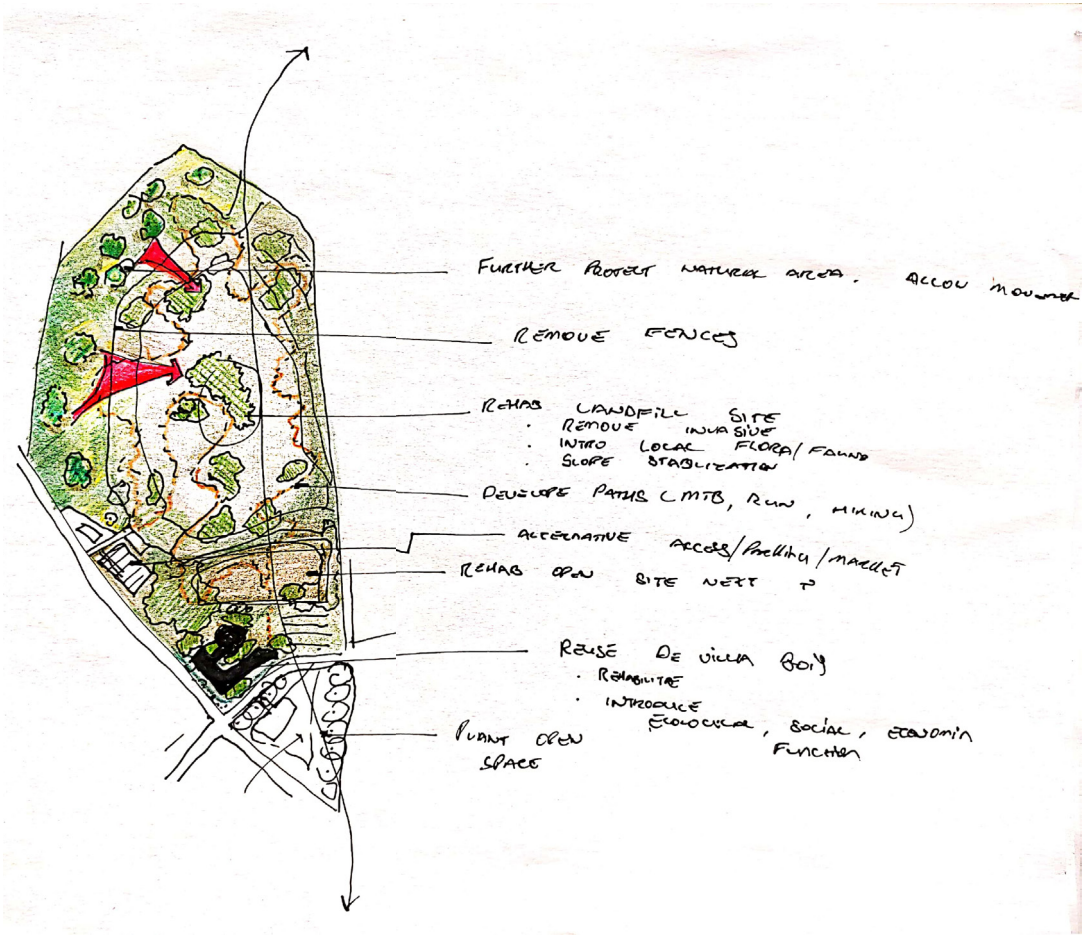


Figure.45: MASTERPLAN (AUTHOR 2021)

2.13 SITE APPROACH

Taking into account the theoretical backing, it is important to then understand the context surrounding the structure: a neglected, abandoned building, unused and left to decay. This provides an opportunity to reuse this building (Fig 46), providing space and function for both human and non-human needs, again implementing the introduction of ecological, social and economic functions. The function of the structure will then allow for this reuse whilst providing a space for a cultural and civic precinct through the rest of the structure, as a result of the larger site analysis conducted.

This programme will then include an activity facilitator for the reuse of the landfill, a main circulation route that becomes the transitions between nodes, a transport interchange, a theatre and art gallery and finally a data centre that will be housed in the western corner of the site. The data centre will not be a typical centre for masses of electronic equipment but rather a space of knowledge and data transfer through various media. The programme of this structure will attempt to incorporate the ecological principles set out by the dissertation theory of deep ecology, the normative position of the nested approach,

The Biophilia hypothesis (Wilson 1993, Kellert 2005) and exposing natural systems as explained by Sym van der Ryn and Stuart Cowan (2010). This calls for the introduction of ecological function through the De villa Bois structure.

The data centre will be unpacked in the next chapter, The programmatic intentions for the site is to become an interface for the connection between man and nature.

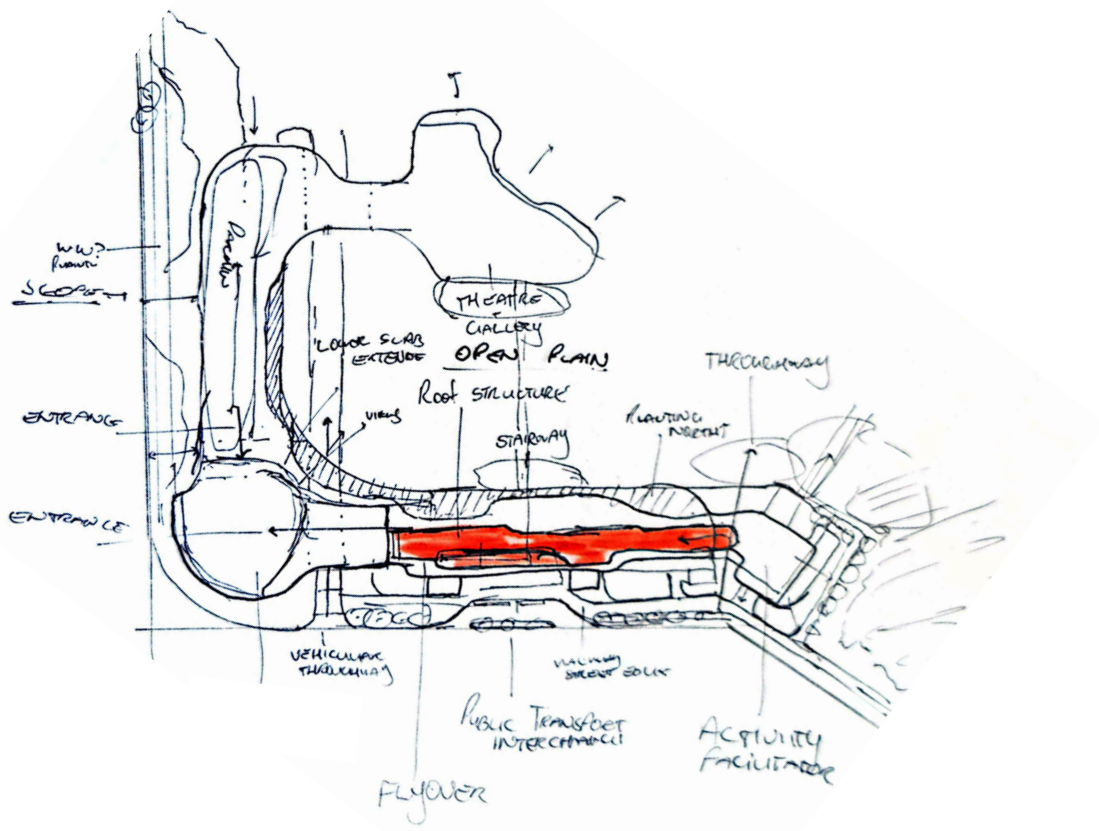


Figure.46: SITE APPROACH (AUTHOR 2021)

2.14 DECONSTRUCTION

For the introduction and rehabilitation of the Garstkloof area, a substantial decrease in size is proposed for the De Villla Bois structure to allow for the implementation of an ecological system within the building footprint. This will also affect the reputation of the structure in making it less imposing and taking away from its original form by creating something new in its place.

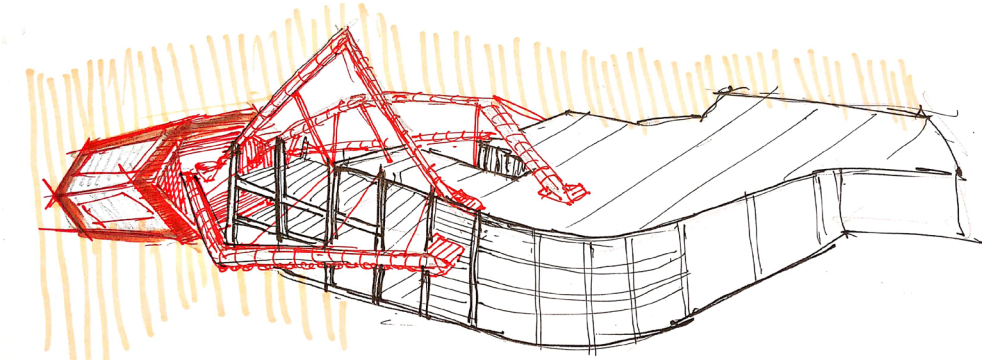


Figure.47:
DECONSTRUCTION
CONCEPT (AUTHOR 2021)

The decrease in size of the structure will be done by systematically removing considerable amounts of materials in the process or deconstruction (partial deconstruction).

Deconstruction is a well-defined field of engineering leaning on construction management, structural design, construction and industrial ecology (Thomsen, Schultmann & Kohler 2011). The first phase of deconstruction is the careful planning and extremely controlled deconstruction process producing various materials. The second phase is the repeated reused of de-constructed materials and components in other (or the same) building , at the highest level, to avoid "down cycling" and moving material to landfill (Thomsen, Schultmann & Kohler 2011).

This process is more sustainable and environmentally friendly (Rios, Chong & Grau 2015) than preparing the building for demolition (Thomsen, Schultmann & Kohler 2011). Retrofitting the entire structure is also detrimental in the long term as such a large building is not required and a waste of space, that will furthermore, have substantial upkeep costs.

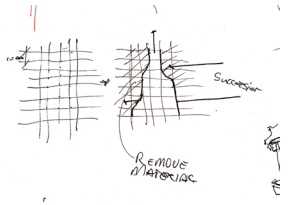


Figure.48: DECONSTRUCTION
PLANNING (AUTHOR 2021)

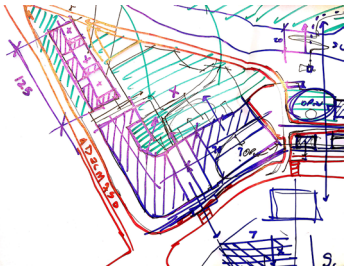


Figure.49: DECONSTRUCTION

"Initially the end of the life cycle was mainly seen as a waste (landfill) and maybe a recycling (down-cycling) problem. But 'waste' is increasingly considered as another form of resource. The 'cradle-to-cradle' perspective means the end of the life cycle is just the beginning of a new life cycle." - (Thomsen, Schultmann & Kohler 2011:328)

The most abundant material from the De Villa Bois structure is: concrete from the existing superstructure. Concrete can be reused within the "new" structure in various ways either within the new development as recycled concrete

aggregate or sold to other construction sites as building rubble in a system of resource sharing. The concrete aggregate can be used to create a plethora of items: kerbs, street furniture, pavers, walls, sculptures, planters, channels, etc.

The deconstruction approach (Fig. 50,51) leaned on keeping elements on the street edge at the corner of Delmas and De Ville Bois Mareuil somewhat intact. Material would be removed (Fig. 53) from the central areas of the structure and from upper floors. This will create large open space to the interior of the development, that can be rehabilitated and made suitable for ecological conditions

It is possible to create high quality concrete that can be used as structural element (Fig. 53) using high quality recycled concrete aggregate (Kearsley & Mostert 2011).

All measures must be taken to ensure that none of the material be taken to landfill, to avoid what occurred on the neighbouring landfill site.

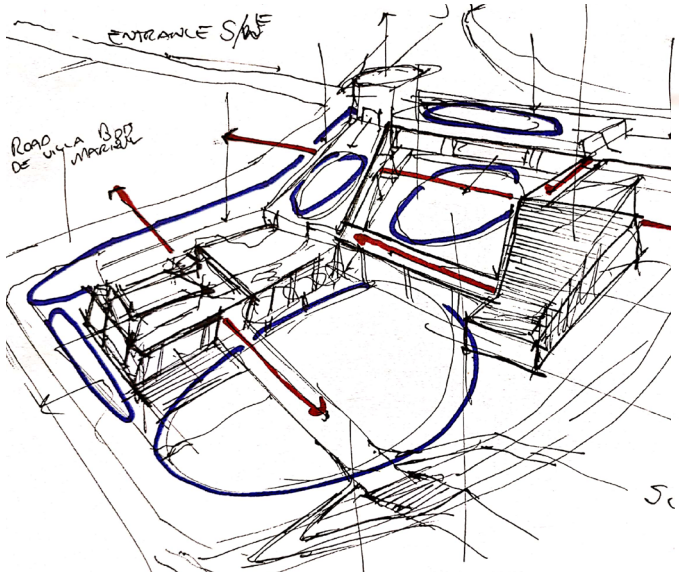


Figure.50: DECONSTRUCTION CONCEPTUAL APPROACH (AUTHOR 2021

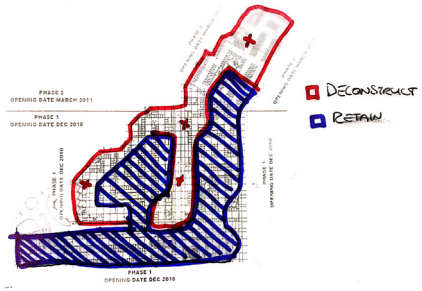


Figure.51: DECONSTRUCTION VS REMAIN (AUTHOR 2021)B

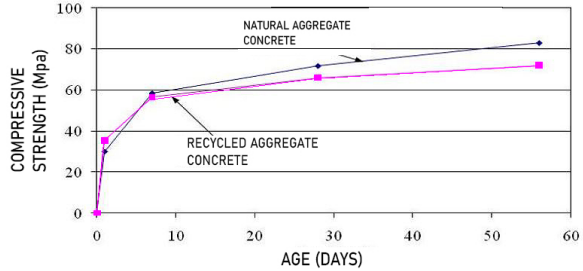


Figure.52: RECYCLED CONCRETE AGGREGATE VS NATURAL AGGREGATE EDITED FROM (Kearsley & Mostert 2011)

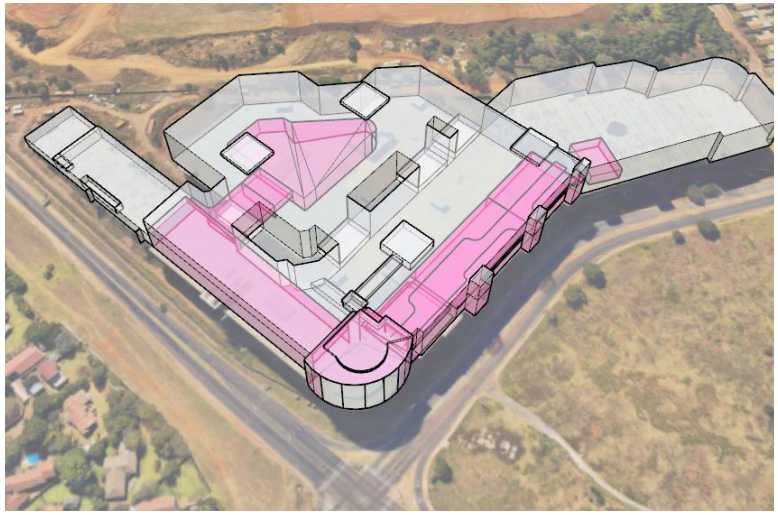


Figure.53:REMAINING VS DE-CONSTRUCTED (AUTHOR 2021)

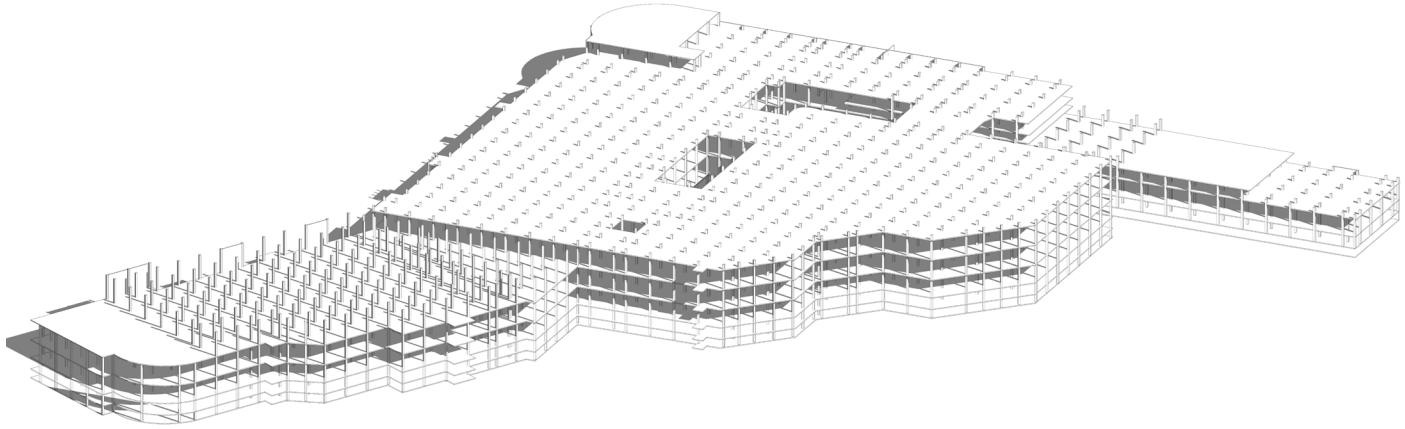


Figure.54: NORTHEN FACADE PRE-DECONSTRUCTION (AUTHOR 2021)

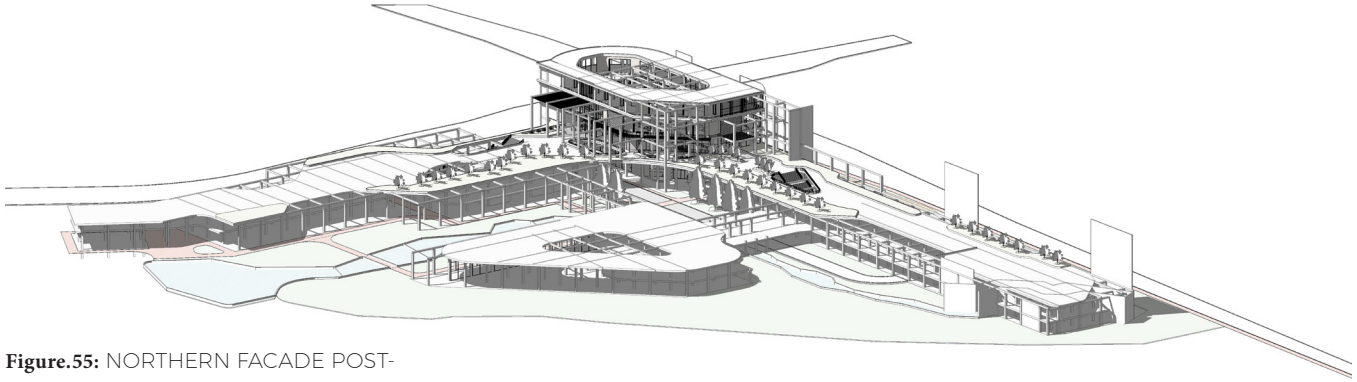


Figure.55: NORTHERN FACADE POST-DECONSTRUCTION (AUTHOR 2021)

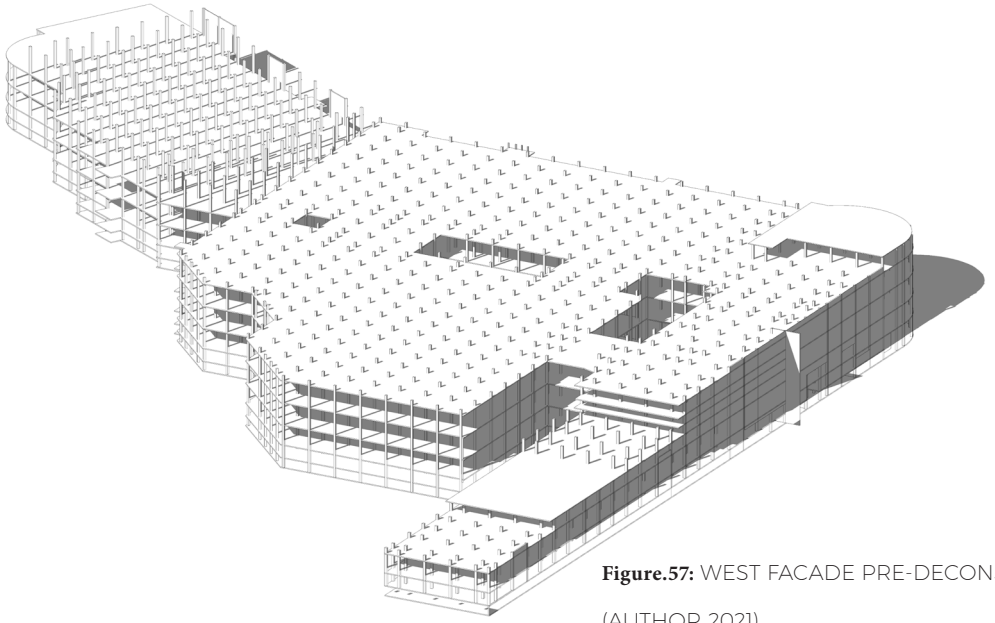


Figure.57: WEST FACADE PRE-DECONSTRUCTION (AUTHOR 2021)

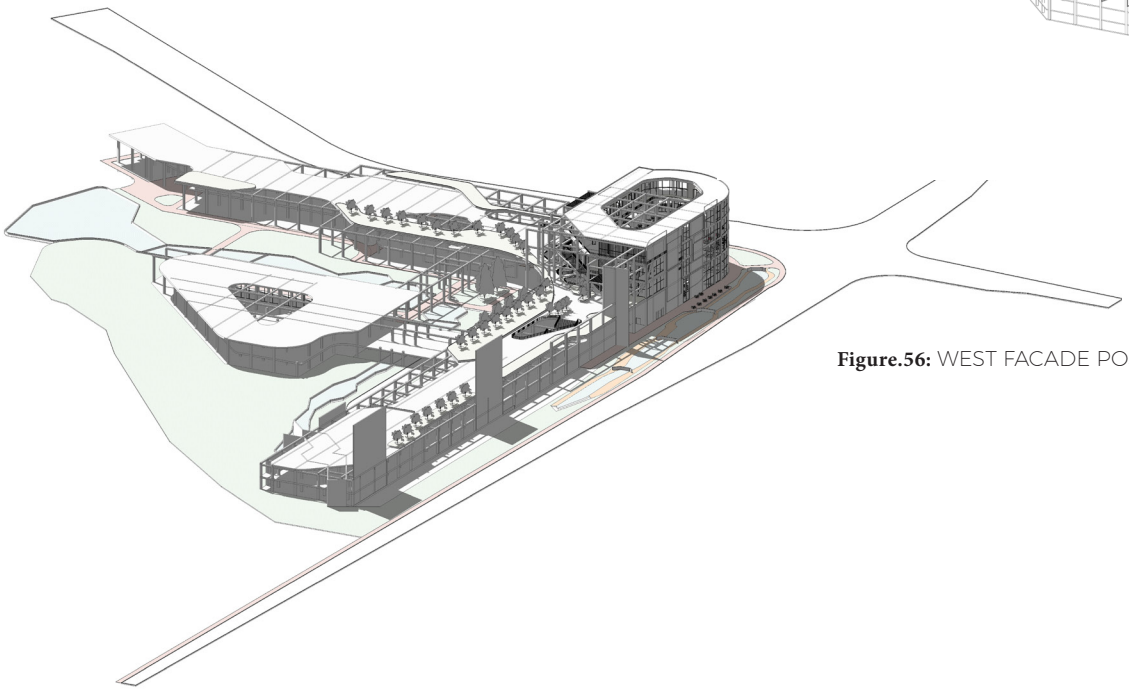


Figure.56: WEST FACADE POST DECONSTRUCTION (AUTHOR 2021)

2. 15 PRECEDENTS

SEATTLE CENTRAL LIBRARY- OMA/LMN

Location: Seattle, Washington, USA

Opened 2004

Functional precedent

The Seattle central library designed by Rem Koolhaas and Joshua Prince-Ramus is the flagship of the Seattle Public Library System. The design for the library was a move away from designing a library for only the book. Rather an approach was taken to design a space for all types of media and information. Every space of the building was curated and tailored to the specific needs of that specific space. Sections of themes within the library was not limited to specific floors but rather allowed to be more organic as it moves through the building.

This informed the design by not constricting functions to strict floor but rather allowing the programmes to move organically through the building

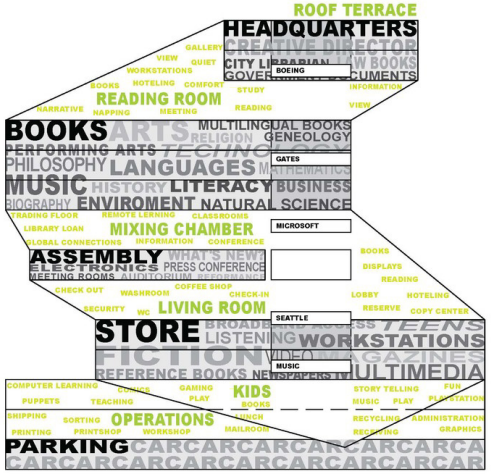


Figure.58: SEATTLE CENTRAL LIBRARY ORGANISATION (OMA/LMN 2004)

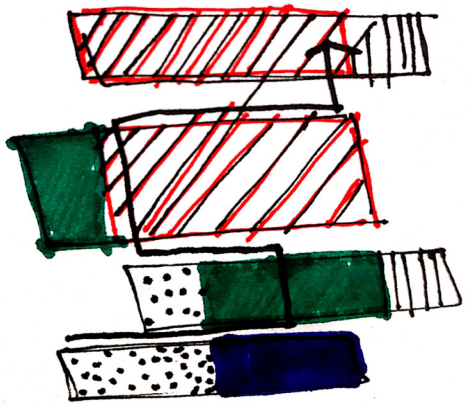


Figure.59: FLUID ORGANISATION (AUTHOR 2021)

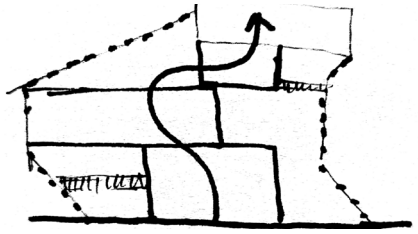


Figure.60: MOVEMENT THROUGH STRUCTURE (AUTHOR 2021)

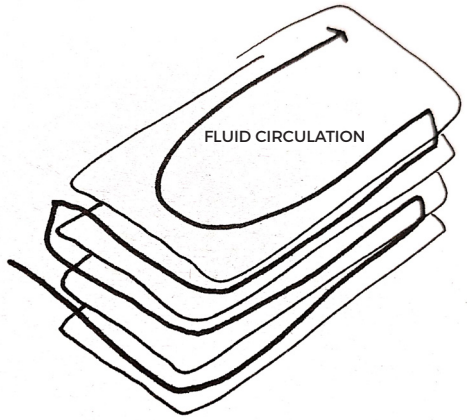


Figure.61: FLOORS NOT LIMITING MOVEMENT (AUTHOR 2021)

ZEITZ MOCCA – HEATHERWICK STUDIOS

Location: Cape Town, South Africa

Opened 2017

Construction precedent

The Zeits Mocca is a museum containing contemporary art from Africa. It is constructed in what was Cape Town's grain silos and at a time the tallest building in South Africa. The silos were decommissioned and the structure was left neglected. The architects had the challenge of working with the enormous silos that the building was constructed with.

The strategy and method they used to "cut" the concrete silos became important (Refer to fig 2). How spaces were then created through the deconstruction is why this precedent is of relevance to the dissertation.

Figure.62: ZEITZ MOCCA ATRIUM (HEATHERWICK STUDIOS 2018)

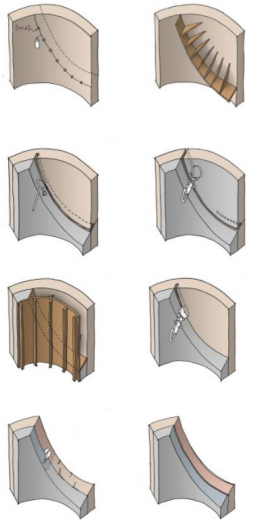


Figure.63: PROCESS OF CONCRETE "CUT" (HEATHERWICK STUDIOS 2018)

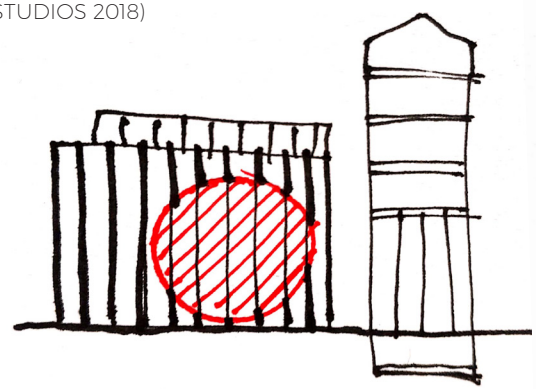


Figure.64: ZEITZ MOCCA CAVITY (AUTHOR 2021)

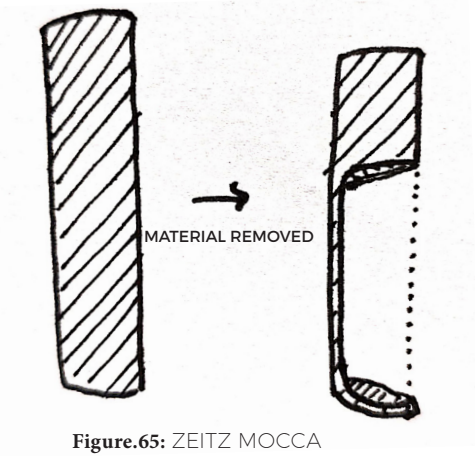


Figure.65: ZEITZ MOCCA COLUMN CUT (AUTHOR 2021)

HIGHLINE – FIELD OPERATIONS

Location: Manhattan, New York, USA

2009

Functional precedent

The Highline is a 2km long "strolling garden in the sky". It is constructed on an old rail structure that has been abandoned and left to decay. With the structure being reclaimed, ecology was introduced into an extremely compact urban area, this caused social and economic function to improve in the areas that the Highline passed.

Various strategies were used in the reuse of the structure, creating different spaces cityscape.

This precedent is of relevance for the design of the "flyover" space or the main circulation route between nodes. Specifically how a very linear element can be approached to be interesting and exciting throughout.

Figure.66: HIGHLINE ELEVATED PLATFORM (FIELD OPERATIONS 2009)

Figure.67: HIGHLINE SPACES (FIELD OPERATION 2009)

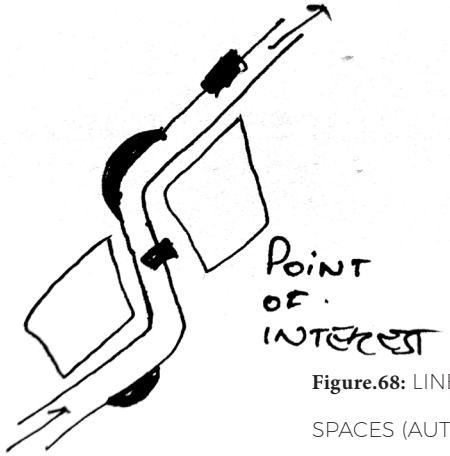


Figure.68: LINEAR ORGANISATION OF SPACES (AUTHOR 2021)

FUTURE AFRICA EARTHWORLD ARCH

Location: Pretoria, South Africa

Opened 2019

Ecological inclusion

The Future Africa precinct is a good example of how ecological systems, together with the use of net zero material can be implemented into design and development.

The artificial wetland/waterbody increases biodiversity whilst improving the micro-climate for the space.

Figure.69: FUTURE AFRICA DEVELOPMENT (EARTHWORLD ARCHITECTS 2019)

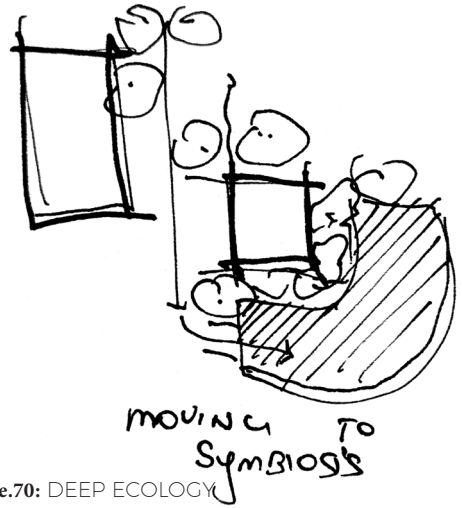


Figure.70: DEEP ECOLOGY(

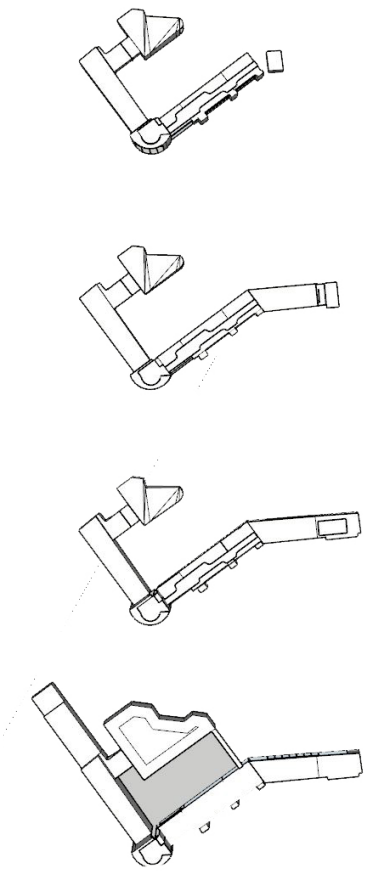


Figure.71: ITERATIONS OF DECREASING SCALE (AUTHOR 2021)

2.16 DESIGN PROCESS & EXPLORATION

The design development was a result of the site analysis conducted and development of the larger site approach of island biogeography that connects the Rietvlei Nature reserve with the Garstkloof Landfill, Moreletaspruit and beyond.

With this idea De Villa Bois was identified as the convergence point of this natural system and a human system. The strategy then progressed to how the structure can be deconstructed and allow for the introduction of an ecological system into the site. The iterations (Fig. 71) that follow show how the original structures scale and size is decreased by stripping away material. This indicates the systematic deconstruction for the project. The decrease of the size and the scale of the original De Villa Bois structure, that will change the entire genius loci of the site.

This process was informed by the identification of nodes where programme would be introduced within the disassembled structure.

A few nodes of activity are introduced being: Urban agriculture/rehabilitation on the extreme eastern boundary, Activity Facilitator on the eastern edge, Data centre on the Western corner, Taxi stop between the Data centre and activity facilitator, Theatre/gallery on the Northern edge, and Cube agricultural facility on the North Western Edge between nodes movement or circulation paths are introduced, with the main route called the Flyover. With the structures size, distance between nodes of activity was substantial, planning was made to decrease the distance but it remains vast.

The development of the structure is ordered in a linear organisation (Ching 2015) (Fig. 72), linking the end nodes (Data Centre and the activity facilitator, art/theatre gallery and cube agriculture) via the flyover which becomes the main circulation route throughout the development. Further, offsetting the taxi stop from the main circulation route and allowing access onto the flyover.

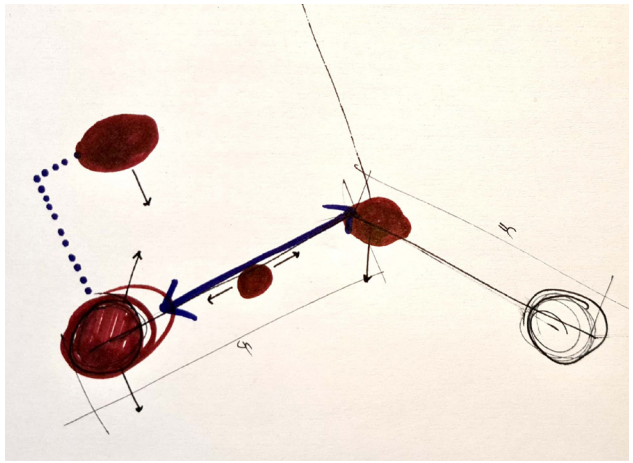


Figure.72: LINEAR ORGANISATION (AUTHOR 2021)

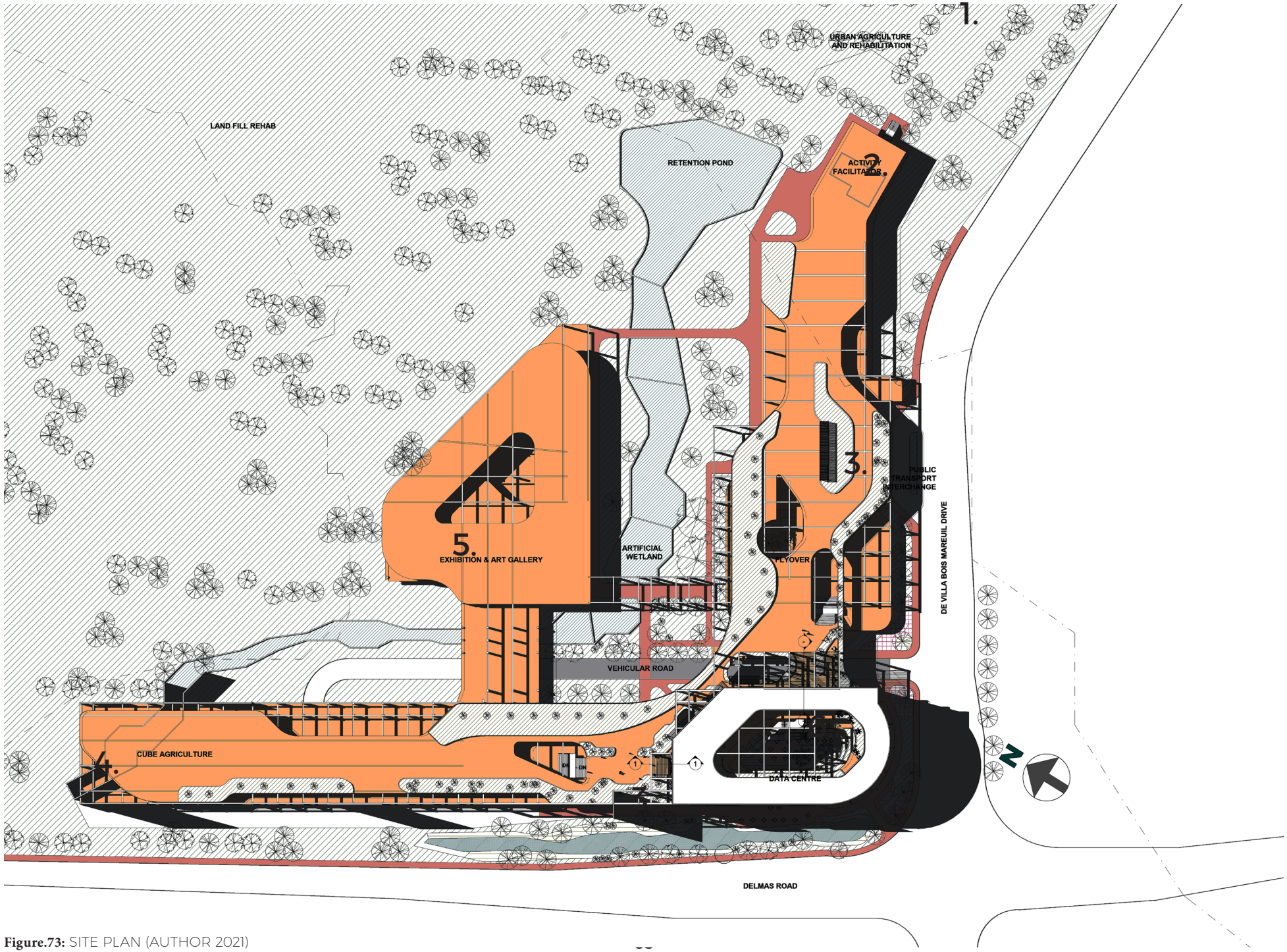


Figure.73: SITE PLAN (AUTHOR 2021)

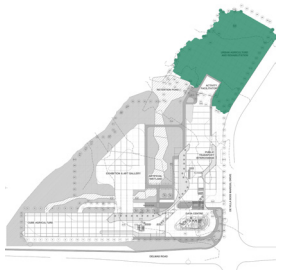


Figure.74: REHABILITATION/ AGRICULTURE (AUTHOR 2021)

The nodes (Fig. 73):

1. Urban Agriculture/Rehabilitation – The area to the extreme west of the site will be rehabilitated with indigenous trees, some that bear edible fruit. This will create a large area of local flora within the area and verging on the street edge, open to the public. Masses of trees in this area creates a habitat buffer between the landfill site and the street that can sustain multiple habitats and protects the vulnerable edge of this "island" (Lövei, Magura, Tóthmérész and Ködöböcz 2006)

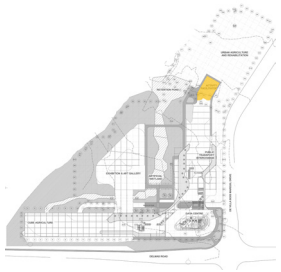


Figure.75: ACTIVITY FACILITATOR (AUTHOR 2021)

2. Activity facilitator – The function of this structure will enable the sustainable reuse of the rehabilitated landfill site. In other word this structure will be the point at which humans will "enter" into the landfill for reuse through various activities (Hiking, biking, running, birding, etc.). Introduction of an ecological system into this area will require the rehabilitation of the disassembled structure (as in all other areas of the larger structure) and further, the creation of habitats.

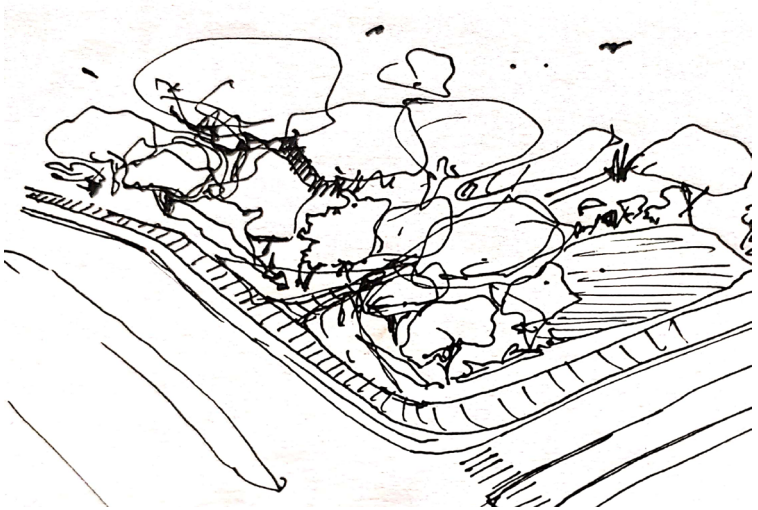


Figure.76: REHABILITATION/AGRICULTURE CONCEPT (AUTHOR 2021)

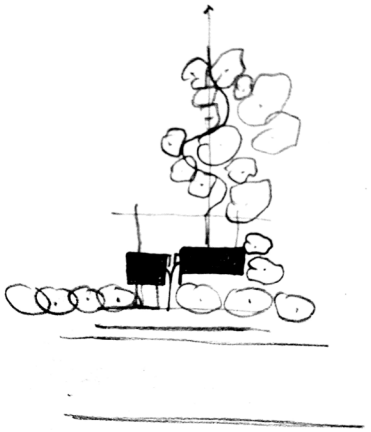


Figure.77: ACTIVITY FACILITATOR PLANNING (AUTHOR 2021)

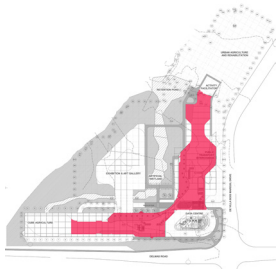


Figure.78: FLYOVER (AUTHOR 2021)

3. Flyover – The function of this structure will be the main circulation between nodes. The walkway on the flyover will allow for movement and waiting or contemplative spaces, activity areas, all with views to the rehabilitated landfill and the rest of the De Villa Bois development. The spaces was informed by how the Highline by Field Operations functions.

This area will be populated with various plant species in planted areas on the slab. Species for this area will need to be selected carefully, with non-aggresive root systems and able to grow in limited soil. Finally, this structure will pass over the taxi stop/public transport node with allowance for a stair onto the flyover and flow into the Data centre structure.

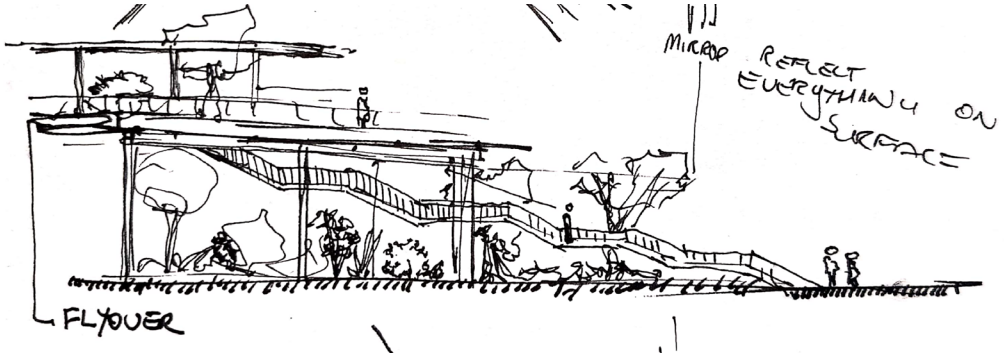


Figure.79: FLYOVER CONCEPT (AUTHOR 2021)

4.Cube Agriculture – CubeAgri farms are indoor urban farms that produce food at a rapid pace (within 6 days in some cases).

The inclusion of this programme indicates that neglected and abandoned building can be used for varying purposes and be productive in some capacity. This system provides the plant with the suitable growing conditions for the entire year within a controlled environment. Its automated growing system uses 95% less water (that will partly be harvested from the site) and no pesticide or herbicides.

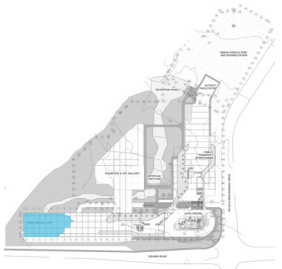


Figure.80: CUBE AGRICULTURE (AUTHOR 2021)

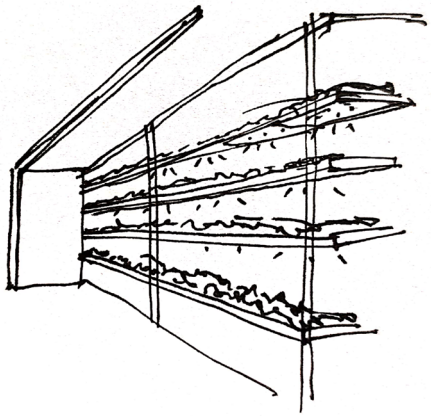


Figure.81: CUBE AGRICULTURE GROWING AREAS (AUTHOR 2021)

Figure.82: ART/THEATRE GALLERY (AUTHOR 2021)

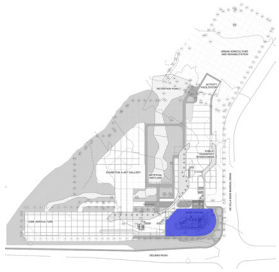


Figure.83: DATA CENTRE (AUTHOR 2021)

5. Art/Theatre Gallery – This space will be a multifunctional open space, providing room for various exhibition, showings or recreational activity. This will add to the cultural value of the site and provide this area of Pretoria with cultural stimulus.

6. Data Centre – The data centre will become the main point of focus for this dissertation and the area that will be designed in full. This area becomes the main visual connection of the site and most traffic will travel past it on Delmas road. Deep ecological principles (Naess & Sessions 1985) will be implemented here (and throughout the development).

It functions in following the example of the Seattle Central Library that incorporate various types of media in the structure, with an organic means of organising section/themes of information throughout the structure. This part of the De Villa Bois structure will remain at its original size.

The approach requires the building to be split open to allow for circulation and visual connection between floors, natural light, to allow for the introduction of ecology into the Data centre, making nature visible.

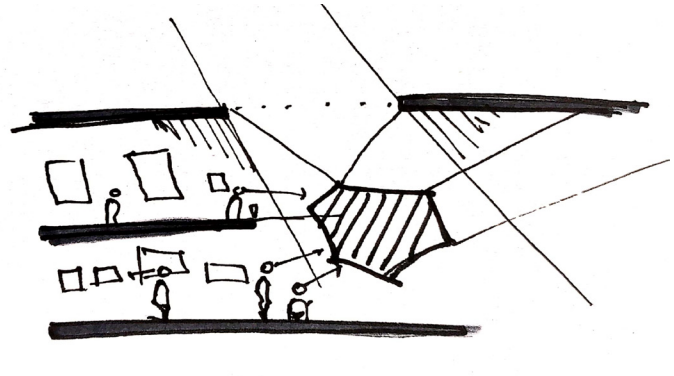


Figure.84: ART/THEATRE GALLERY CONCEPT (AUTHOR 2021)

The Data centre will partly spill out onto the flyover in two directions, this will also be town entrances that allows access into the structure, The other entrances will be on ground level, either on the street edge or spilling out onto the larger central area.

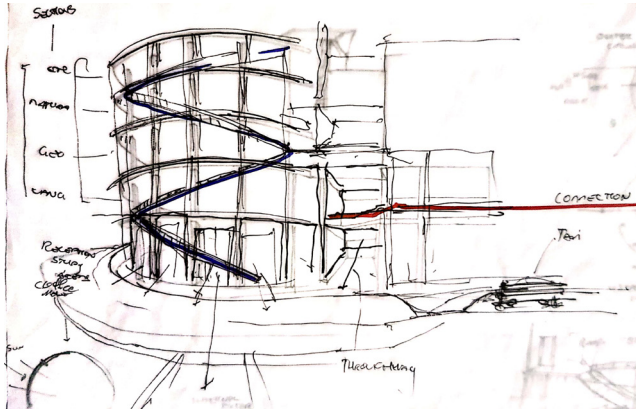


Figure.85: DATA CENTRE PLANNING (AUTHOR 2021)

2. 17 CONCLUSION

In conclusion, the problems our species face are clear. With our cities not supporting ecological functions and our very environment causing detachment from the natural world, change is required.

With a change in mindset and worldview a reconnect can be proposed. One where the natural world and human life is redesigned to co-exist and flourish, benefiting both . The theory discussed gives an indication on how this change in mindset and a reconnect can be approached and implemented in our current society and the built environment.

The foundational theory the project is informed by is Deep Ecology, other associated theoretical ideas are added to it and adjusted for the varying scales of the site. Island Biogeography will be employed for the larger site approach, with large scale rehabilitation of the landfill site and the De Villa bois site, which will be partially de-constructed.

The creation of habitat through the (re) introduction of fauna and flora, throughout the site, will inform upon the Biophilia hypothesis and exposing natural systems to occupants. In this way an area of convergence and interface is created, where a human system and an ecosystem live in symbiosis, which finally causes a reconnection.

The next chapter will take the project from an abstraction of theories and informants, to a functioning structure and system.

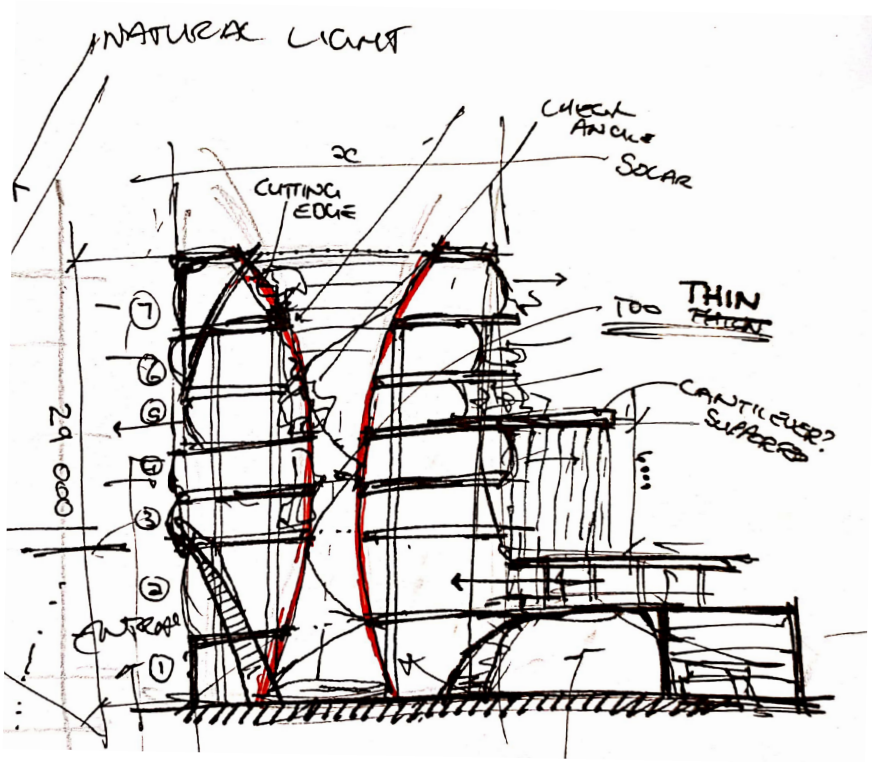


FIGURE.86:DATA CENTRE CONCEPTUAL SECTION (AUTHOR 2021)