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06 site scale

Fig:62. Historic photograph of power plant taken in 1952.

7. Site Scale

7.1. Background

In 1891 the first power plant was establish in Schoeman Street however by 1919 the demand for electricity had grown so rapidly that the municipal council decided to relocate operations about 5km west. The original Pretoria West Power Station officially opened in December 1923 and occupied and enlarged a number of times up until 1949, when it was decided to build a new plant next to the existing one. The new plant was constructed in 1952, at a cost of £ 8,372,000 and remains in operation to this day.

The site is a landmark both because of its scale and because of its age and has always played an important role in providing the city with electricity and jobs. Its structures rise up to 80 meters above the ground and offer excellent views of the city, the towers are visible afar off and serve as a beacon in the west. The site offers a strong contrast between man and nature with strange industrial structures within the landscape and vegetation re-colonizing abandoned structures and surfaces as well as numerous topographical and hydrological features. This interaction lends a certain poetic magic to the site.

The Future of the power plant is uncertain as it is outdated, ineffective, expensive to maintain and not feasible to upgrade. Therefore the plant is set to be decommissioned within the next 10 years.

However demolishing the plant would be costly and many structures are older than 60 years and are now heritage protected. Therefore it is likely that the plant will be abandoned adding to the patchwork of contaminated sites that define and decay the west.

Fig:63. Historic aerial photograph of power plant taken in 1947 (Author Unknown)

7.2. Character of site

The various industrial and ecological processes working in on the site have over time shaped it into irregular landscape that it is today. These processes have also evolved over time rendering many structures and landforms obsolete therefore free to decay and be overgrown. This has imbued the site with a mysterious yet intriguing character illustrating a rather haphazard dialogue between man and nature. Numerous water bodies and industrial structures create picturesque scenes shielded from the surrounding urban environment by large trees and landforms.

Fig:64. Aerial photograph of power plant taken in 2008 (UP Geography Department)

Fig:66. Word depicting character of site (Author 2010)

Fig:67. Inside one of the cooling towers (Author 2010).


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Fig:68. View points (Author 2010).

Fig:69. East ward view of power plant complex (Author 2010).

Fig:70. View points (Author 2010).

Fig:71. Northern ash pond (Author 2010).

Fig:72. Western ash pond (Author 2010).

 Fig:73. Panorama looking south at the eastern ash pond with the power plant in the background (Author 2010)

7.3. On site process

The power plant generates electricity by burning coal. The coal heats up water and creates steam. This steam then turns the turbines that generate electricity. The steam is then released into the cooling towers where it cools off and is then allowed to run into the dam.

Coal contains heavy metals, through the process of burning these heavy metals are released either into the air or in the ash. The ash is transported from the burners to ash hoppers through a high pressure water system fed by the main dam. The course ash remains in the hoppers where it can be dumped directly into trucks whilst the finer fly ash is pumped to ash ponds where it is allowed to settle. The ash is then later removed though the use of a tendering process. The heavy metals in the ash are contained as long as the ash remains water-logged. When the ash ponds are drained the water is released into the Skinner Spruit.

These processes have contaminated the soil and the heavily disturbed soil has made way for various invasive and alien plant species.

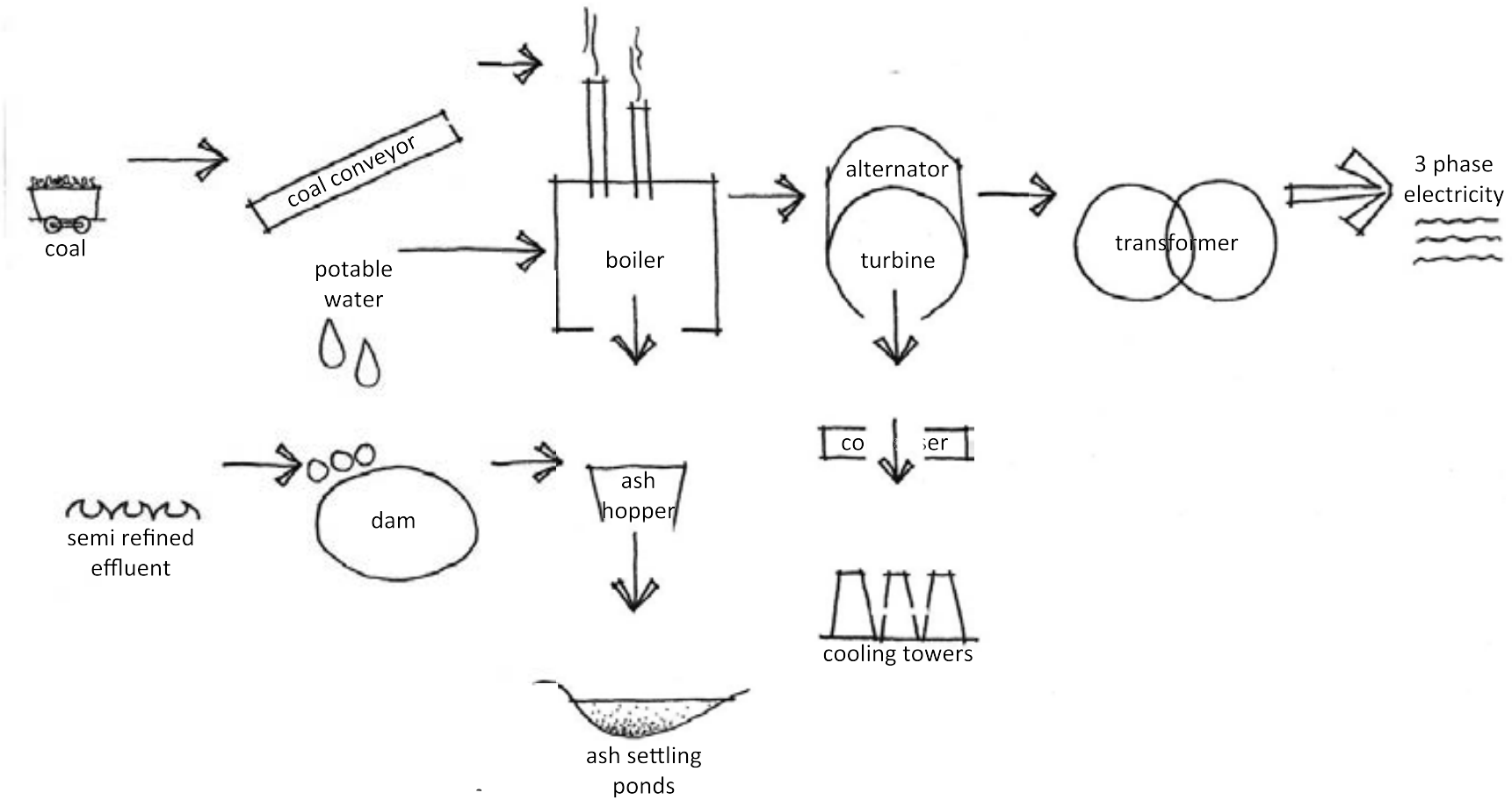


Fig:74. Diagram illustrating the on-site process of generating electricity (Group Framework 2010)

7.4. Project motivation

The decommissioning of the power plant poses a threat to Pretoria west as it will mean a loss of jobs as well. If the plant is left derelict it will further decay the surrounding urban fabric.

However it presents the city with a major opportunity as it is a large site, rich in both heritage and spatial character and close to the CBD. This iconic site offers major development opportunity in terms of both its natural features and landmark buildings. These features may lead to both job creation and urban regeneration.

7.5. Approach

Address the site in such a way as to heal site, address surrounding urban issues and maintain existing character.

The two main informants on this site is the process of healing the site and the other would be the physical and historical character of the site.

7.6. Precedents

There are many examples of post industrial sites that have been successfully converted into regional parks, museums and other public amenities. This has contributed to regeneration of the surrounding urban fabric. I have investigated several of these in order to develop an approach as to dealing with the power plant site.

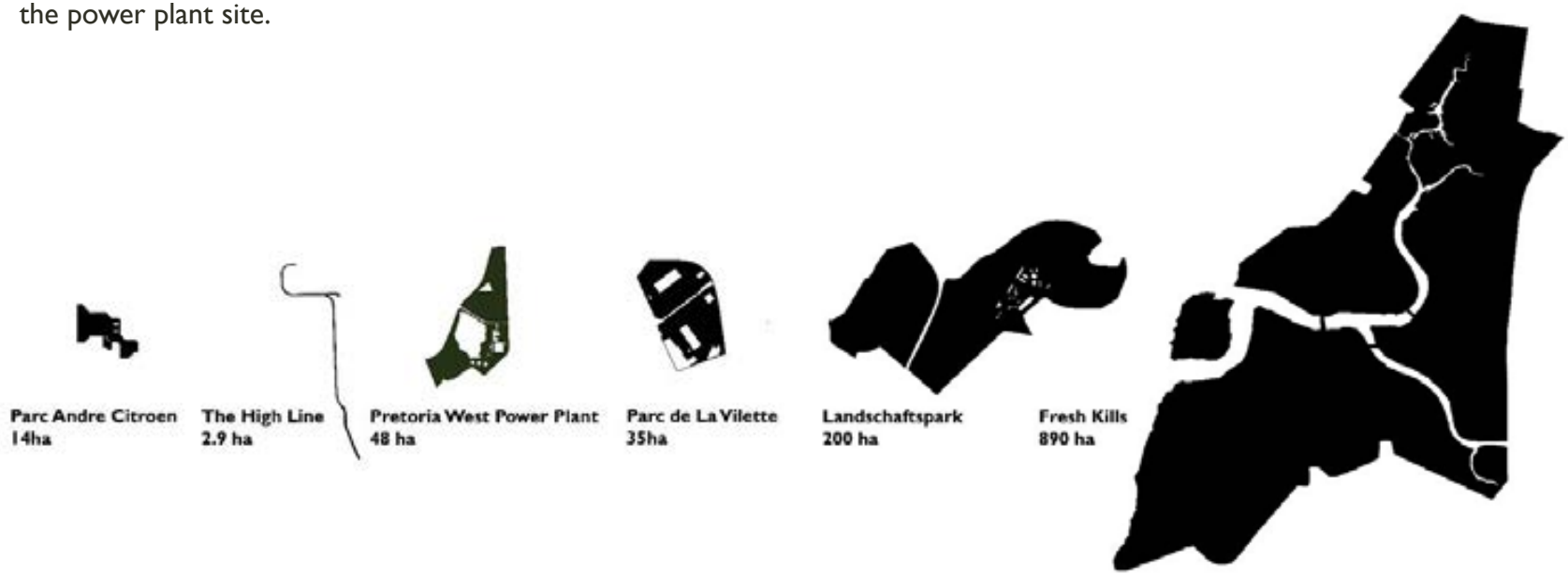


Fig:75. Diagram showing sizes of various post-industrial parks in relation to site (Author 2010)

7.6.1. Parc de La Villette

Background

Parc de la Villette is located in north-eastern Paris, France, on the site of a former abattoir and meat market operating from the late 1860s and closed in 1974.

The 35 hectares park was commissioned by President François Mitterand who issued an international design competition of which Bernard Tschumi was the finalist. The objective was to generate a new model for the urban park in the twenty-first century (Tate 2001: 56).

The park consists of a grid of 'points' (bright red metal follies); a series of 'lines' and 'surfaces'. Tschumi's aim was to try and prove that it was possible to construct a complex urban park without resorting to conventional rules of order, hierarchy and composition. The park has very little reference to its industrial past and does not take natural processes into consideration; however the park has a strong social layer to it. A series of smaller themed gardens such as the bamboo and sound gardens, provide more intimate spaces that do take natural process into consideration. These ironically were not designed by Tschumi (Tate 2001: 56).

The park has had a remarkable influence on the profession of landscape architecture and its theoretical underpinnings.

Fig:76. Philip Starck-designed seats in Parc de La Villette (Tate 2001: 61)

Remarks

The park operates at a regional scale, is similar in size to the power plant and was also constructed on a brownfields site. In the case of La Villette the site was almost completely stripped before the park was constructed and therefore reflects little of the existing character of the site.

The park is successful in the sense that it aided renewal in a post industrial area. It is dynamic because it is event driven. However, it was designed as an object and its fixed form does not address ecological processes nor does it allow for the park to evolve and adapt over time.

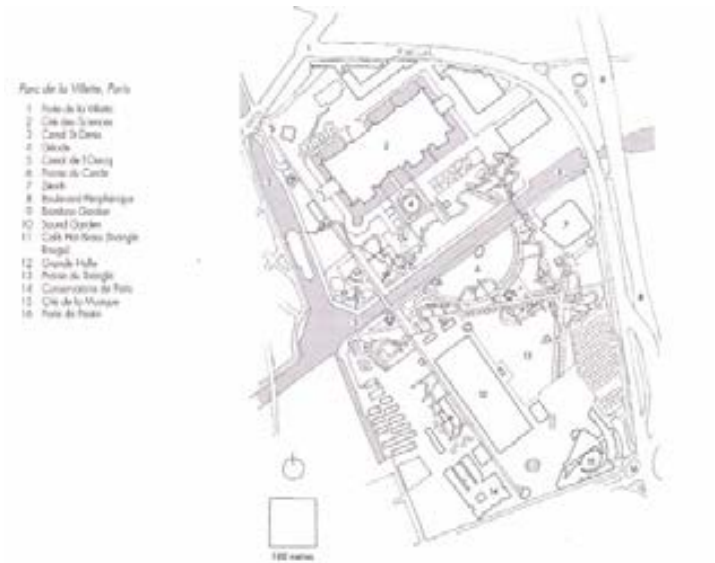


Fig:77. Plan of Parc de La Villette (Tate 2001: 57)

Fig:78. Bamboo and sound garden (Tate 2001: 65)

Fig:79. Landschaftspark Duisberg Nord (Reed 2006: 125)

7.6.2. Landschaftspark Duisberg Nord

Background

Landschaftspark consists of 200 hectares located in Duisburg North, Germany. Duisburg is the Emscher district in north-west Germany that was the largest industrial region in the world. The site included a coal mine and coking plant that ceased production in 1977, and a steelworks that closed in 1985 (Tate 2001: 115).

The site forms part of Emscher Park that opened in 1989 and constitutes a 70 km long green network covering an area of 800 km2, of which only 320 km2 was not built up. The park was designed by Latz + Partner and officially opened on 17 June 1994.

The brief required that the design adapt and reinterpret the industrial features and natural processes that already occur on site, as well as preserving remaining leftover landscape, rezoning and linking fragmented areas up with main parkland.

The park consists of massive storage bunkers, rail beds, blast furnaces and the main steel works building, that have all been retained as industrial heritage and adapted for public use. Numerous gathering spaces, bridges and walkways connect these various elements while the existing vegetation offers an evolving reflection of the history of the site. Indigenous vegetation has been encouraged and heavily contaminated soils have been removed and rehabilitated. An intricate lighting scheme designed by British light designer Jonathan Park, allows the site to be used at night.

The park is located on major cycling routes that form part of larger historic and cultural tourism routes. The park is well marketed and boasts a range of uses varying from extreme sports to venues for events that generate income for park maintenance.

"Conversion of derelict land into parks in the IBA Emscher often led to destruction of that mysterious atmosphere between decay and revitalization that had made the sites so attractive (Tate 2001: 119)."

Remarks

The steelworks were a barrier for development between two major districts in the city, but this post-industrial brownfield has now become a catalyst for future development and urban regeneration.

Before the steelworks, the natural topography was mostly flat. Industrial processes shaped its unusual landforms over time. Latz embraced the qualities and character of the site and his design is a reaction to its existing potential. The design allows the natural processes of decay and regeneration to take place and therefore the site will adapt and evolve over

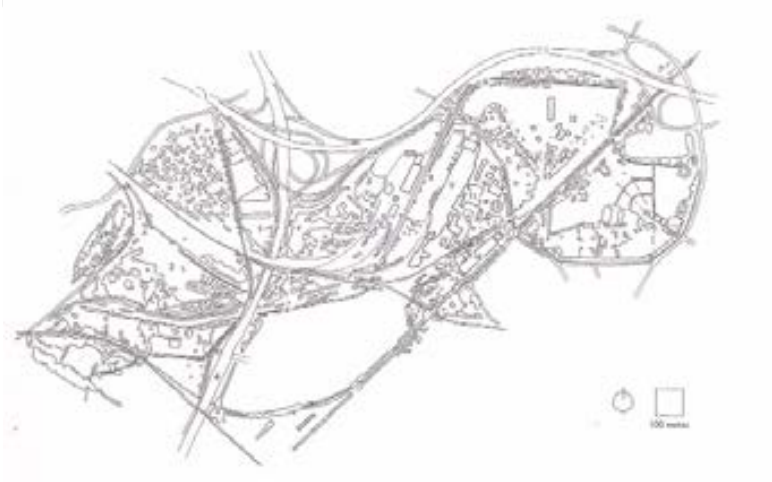


Fig:80. Landschaftspark master plan (Tate 2001: 115)

Fig:81. Ore bunker adapted for rock climbing (Reed 2006: 129)

Fig:82. Aerial view of ore bunkers (Reed 2006: 128)

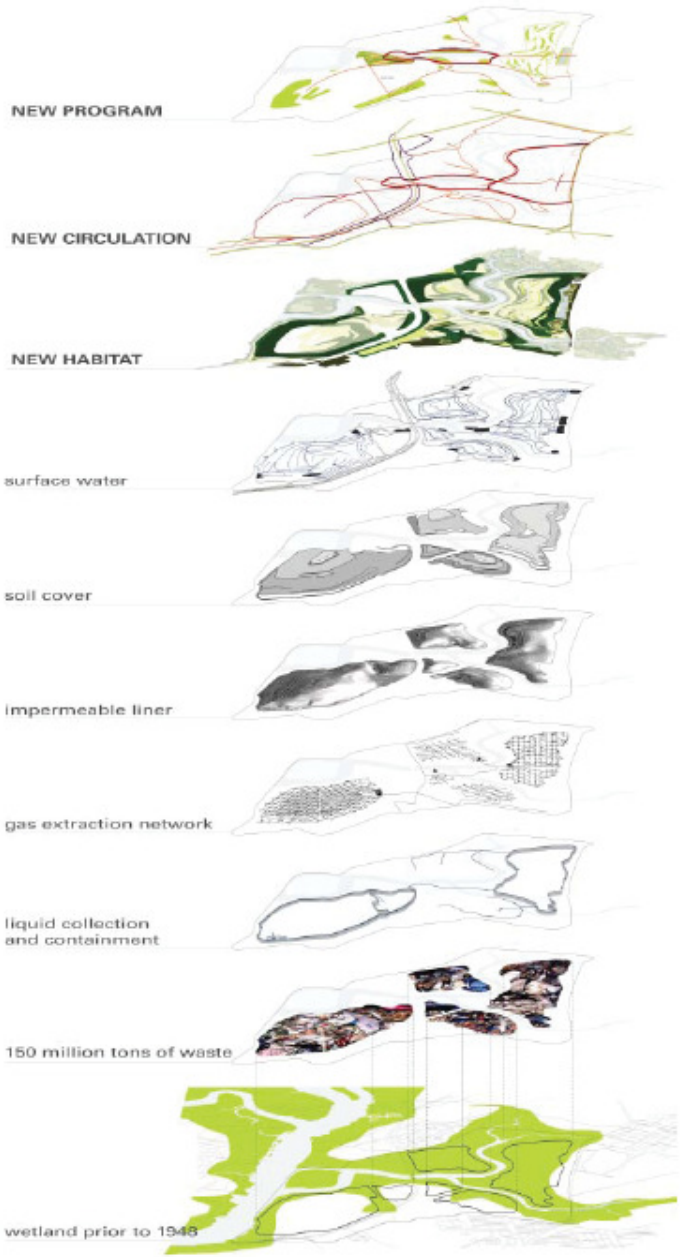


Fig:83. Layering of new processes onto existing (Field Operations 2006: 6)

7.6.3. Fresh kills

Background

In 2001 the City of New York conducted a two-stage International Design Competition to redevelop what was once the world's largest landfill, located on Staten Island.

A multi-disciplinary consultant team led by landscape architecture firm, Field Operations, was selected to produce the Draft Master Plan for Fresh Kills Park. Their proposal, lifescape, envisioned the park as a new form of public ecological landscape and a new paradigm for creativity and adaptive reuse. The scheme has informed public involvement and is shaped by time and process.

The park is currently being converted into 896 hectares of public parkland, featuring a beautiful expanse of tidal marshes and creeks and over 65 km of trails and pathways with significant recreational, cultural and educational amenities.

It will be a diverse reserve for wildlife and social life. The scheme is multi layered and the implementation of the project comprises three 10-year phases. Ecological succession is instigated by introducing pioneer species that will in time develop into full-blown eco-systems. The phases also include a series of movement systems, pathways and trails, neighbourhood parks, public art installations, sports, recreational and other amenities

(Field Operations 2006: 6).

Remarks

Fresh Kills is a park designed within the LU idiom. It is a contaminated site within an ecologically sensitive area.The departure point is to first contain and heal the damaged and disturbed landscape and then programme it with various socio-cultural and recreational activities.

The park will evolve as processes take fruition, unlocking new potential over time.The framework or masterplan designed by Field Operations acts as a formwork in which these processes take place; in time new opportunities will arise for more specific design interventions on a small scale. Even though the scheme is process based it respects the character of the site evolving out of its existing potential, such as the various wetlands and large mounds caused by years of dumping.

Fig:84. Fresh Kills master plan (Field Operations 2006: 33)

Fig:85. Rehabilitation of Dump site (Field Operations 2006: 32)

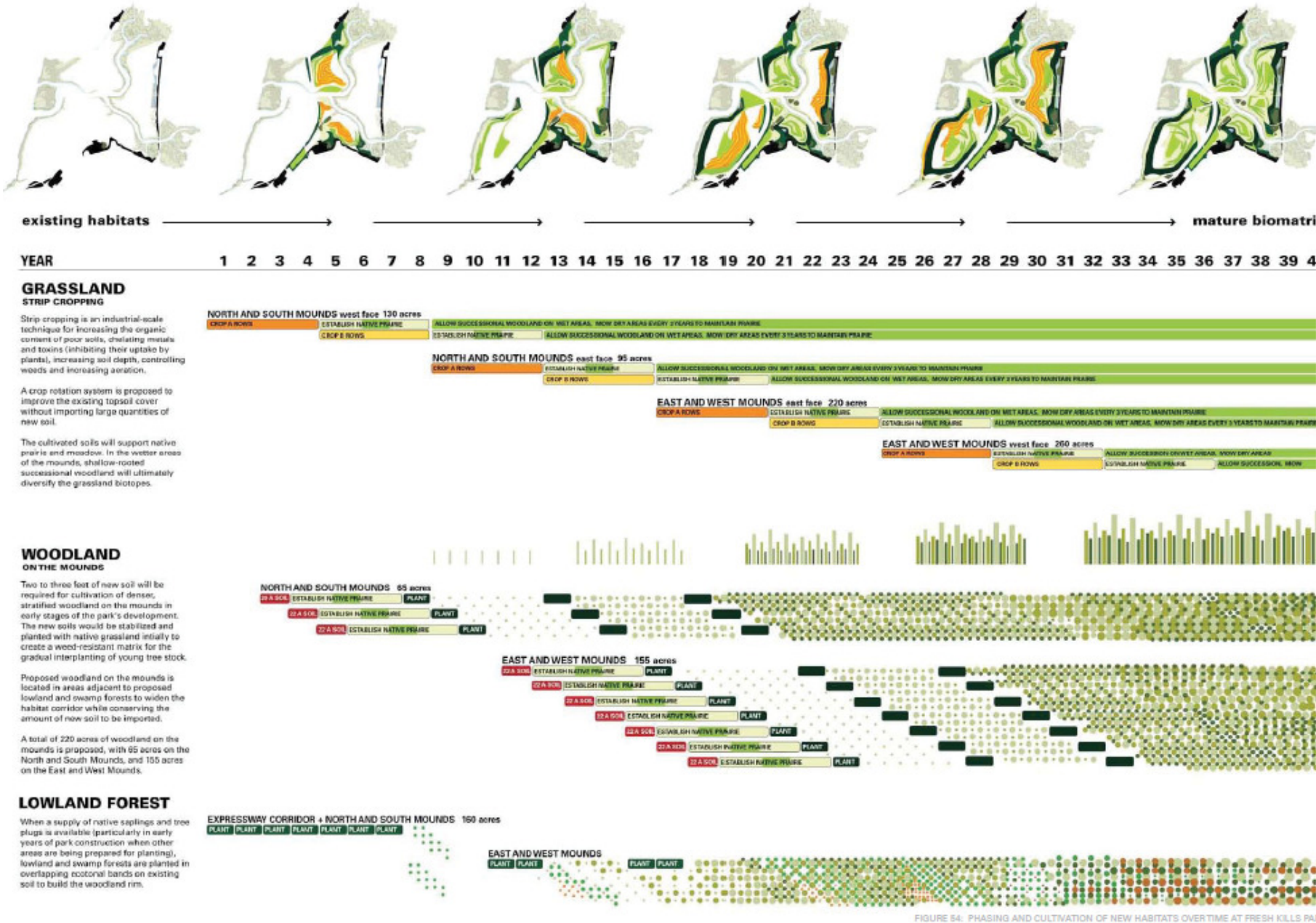


FIGURE 54: PHASING AND CULTIVATION OF NEW HABITATS OVER TIME AT FRESH KILLS PA

116 Fig:86. Phasing and cultivation of new habitats over time (Field Operations 2006: 33)

Fig:87. Aerial view of Fresh Kills Park (Field Operations 2006: 7)

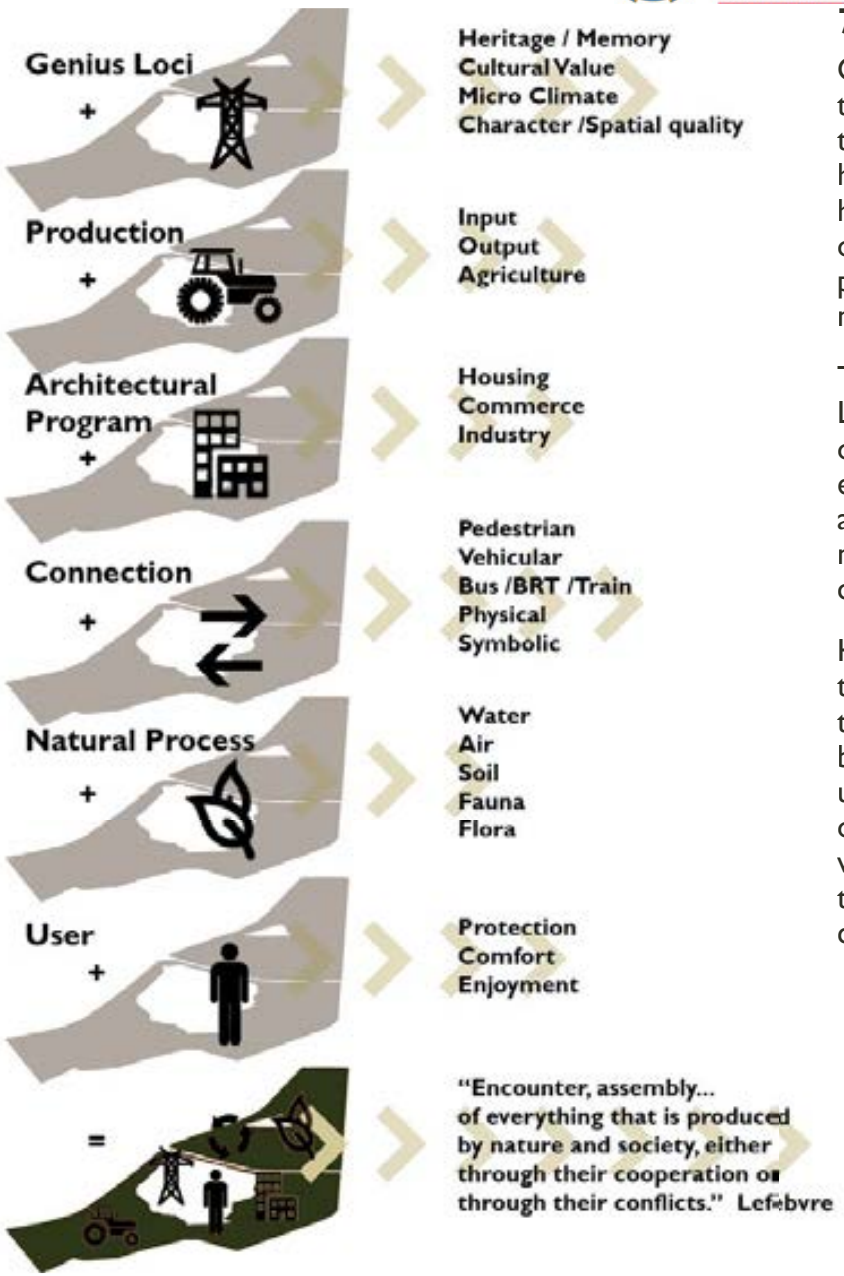


Fig:88. Diagram showing layers (Author 2010)

7.7. Approach

Of these three precedents investigated, Parc de la Villette is the least process driven and least reacted to the qualities of the existing site. Landschaftspark on the other hand displays how landscapes can respect and interact with the structural heritage of the site while engaging the inherent potential of the existing site. Fresh Kills illustrates how different processes can be layered or coded onto a site to create new potential over time.

The approach in this thesis will be a combination of Landschaftspark and Fresh Kills; focussed on the one hand on the existing potential and on the other the unlocking of eventual new potential. The existing potential or qualities of a site will be termed the qualitative aspects. The processes needed to heal the site and stage development - the quantitative aspects.

How does my approach for the masterplan relate back to landscape urbanism theory? The departure point for this scheme is healing the landscape of this post-industrial brownfield site in order to regenerate the surrounding urban fabric. It is based on Corners' principles of "Processes over time" and "staging the surface" (See 2.2.1 and 2.2.2) where the site is formed over time by the various processes that work on it and intervention is done in a way that will create opportunity for future development.

7.8. Concept

The concept is to change the power station site into a regional park, one that will cater not only for the open space needs of immediate neighbourhoods but also offer regional economic, recreational and tourist attraction that will create investment opportunity in the area.

The master plan will take into account both qualitative and quantitative aspects in order to create a place that emerges from the existing potentials of site and creates new potentials through process.

The concept diagram shows the site and its existing potential (qualitative) and the network of processes (quantitative) that affect it. It is where these two ideas intersect that new design possibilities will arise.

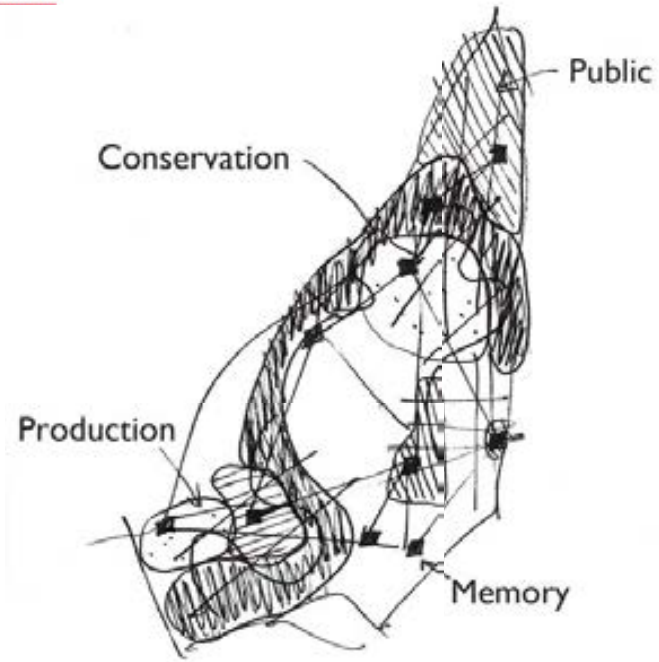


Fig:90. Conceptual diagram (Author 2010)

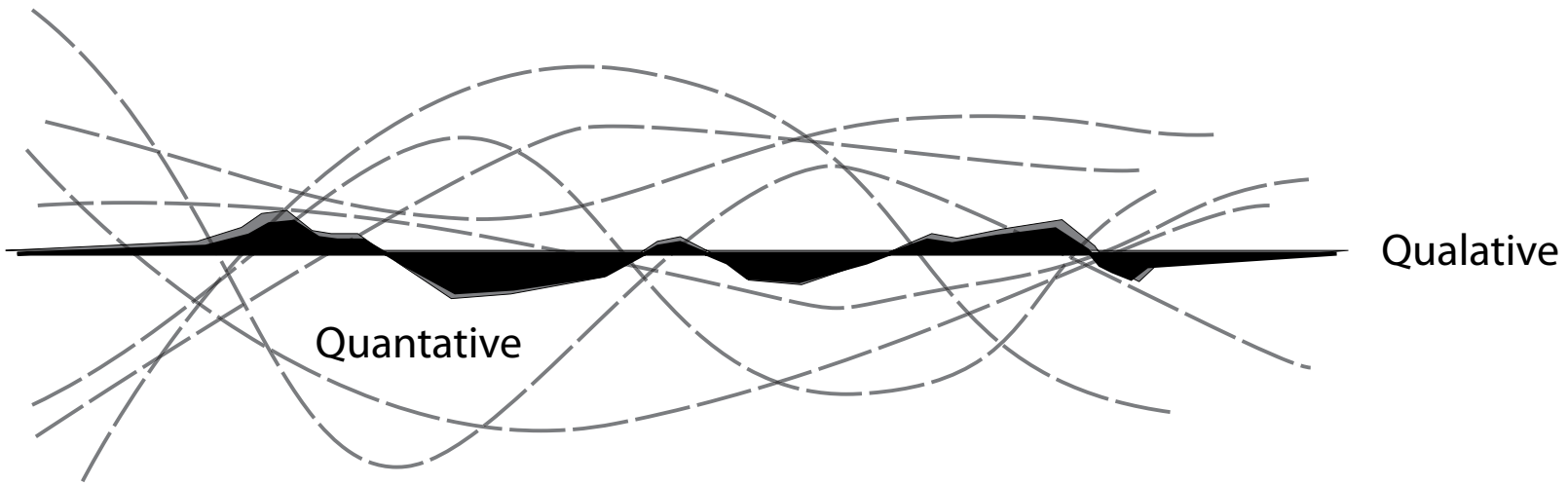
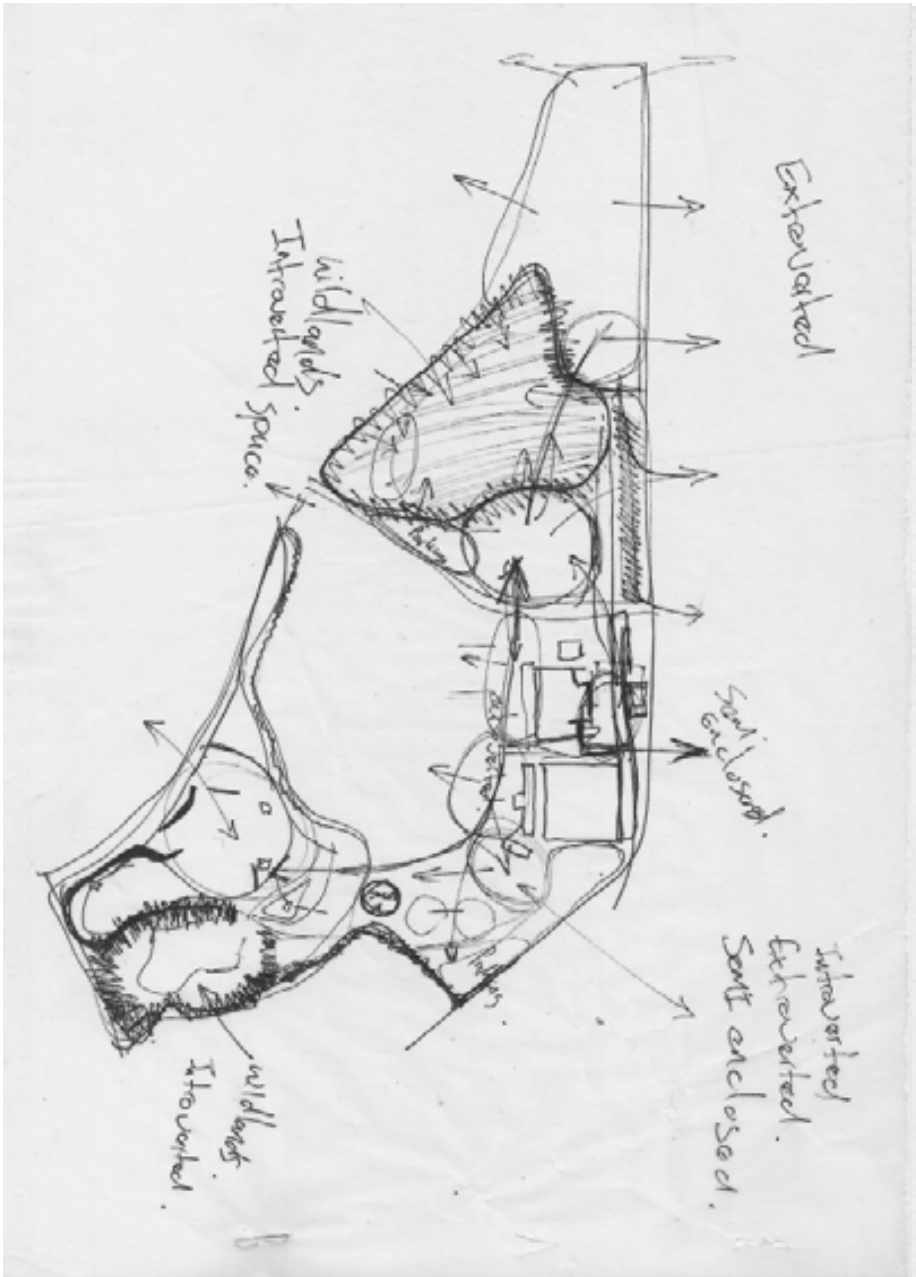


Fig:89. Conceptual diagram showing interaction between the qualitative and quantitative aspects of site (Author 2010)

7.9. Concept development



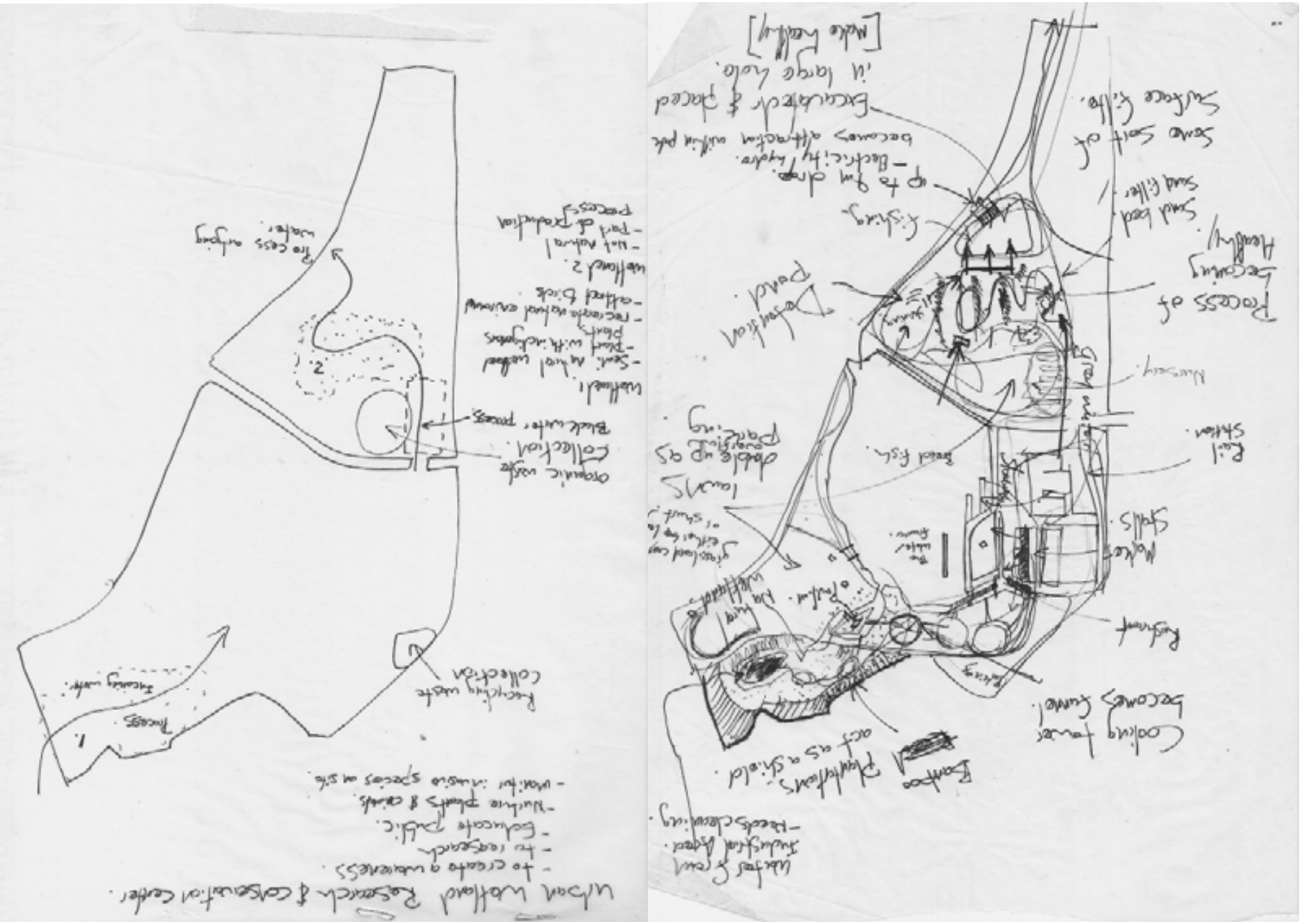


Fig:91. Conceptual development diagrams (Author 2010)

Fig:92. Cooling towers (Author 2010)

7.9.1. Qualitative aspects

What are the qualities or features of the existing site that can be engage with or need protecting?

- Existing topographical features
- Existing water bodies and vegetation
- Existing structures
- Existing spatial character

7.9.2. Quantitative aspects

What are the processes and layers that need to be considered in order to regenerate and then reprogram the site?

- Hydrology
- Ecological succession
- Removal of invasive species
- Bio-remediation of ash ponds
- Access and movement
- Urban densification
- Activities

Features that characterise site

1. Electric pylon
2. Wetland
3. Bridges
4. Cooling towers
5. Pump house
6. Concrete canals and sluice
7. Oil tanks
8. Conveyor belt
9. Ash hoppers
10. 1933 coal bunker
11. 1945 coal bunker
12. Railway tracts
13. Water level meter
14. New coal bunker
15. Steel structure
16. Stone sluice
17. Tree lined ash pond
18. Energy dissipater
19. Steel pier
20. Large ash pond

Fig:93. Diagram showing qualitative aspects of site (Author 2010)

Fig:94. Cooling towers (Author 2010)

Fig:95. Cooling towers (Author 2010)

Fig:96. Ash hoppers (Author 2010)

Fig:97. Pump house (Author 2010)

Fig:98. Water level meter (Author 2010)

Fig:99. Canals and sluices (Author 2010)

Fig:100. Electric pylons (Author 2010)

Fig:101. Under cooling tower (Author)

7.10. Zones

I have divided the site into four zones according to the character and qualities of site.

Zone A

This area is not currently part of the power plant operations and is open to the public and contains some recreational infrastructure, such as lawns, a soccer field and clubhouse.

Zone B

This area is the most secluded due to its irregular topography and large trees. It is the most disturbed or toxic area in the landscape because it includes the ash ponds.

Zone C

This is the main power plant complex containing most of the structures on site. It is the most built up of all the zones.

Zone D

This is the most seemingly natural area on site, containing large open fields and wetland areas.

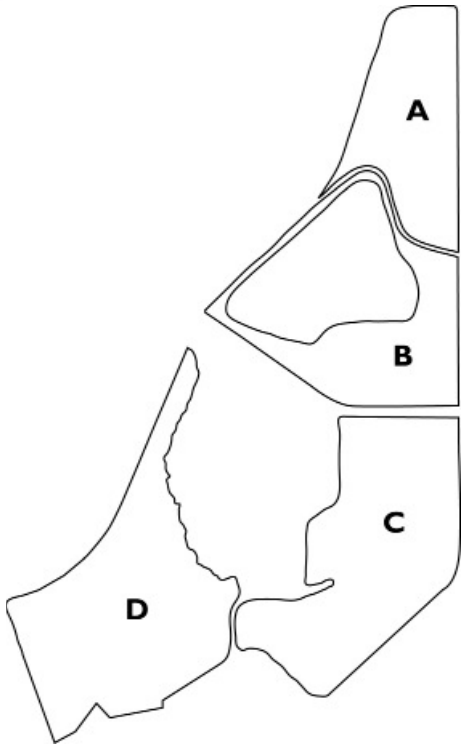


Fig:102. Diagram showing different zones (Author 2010)

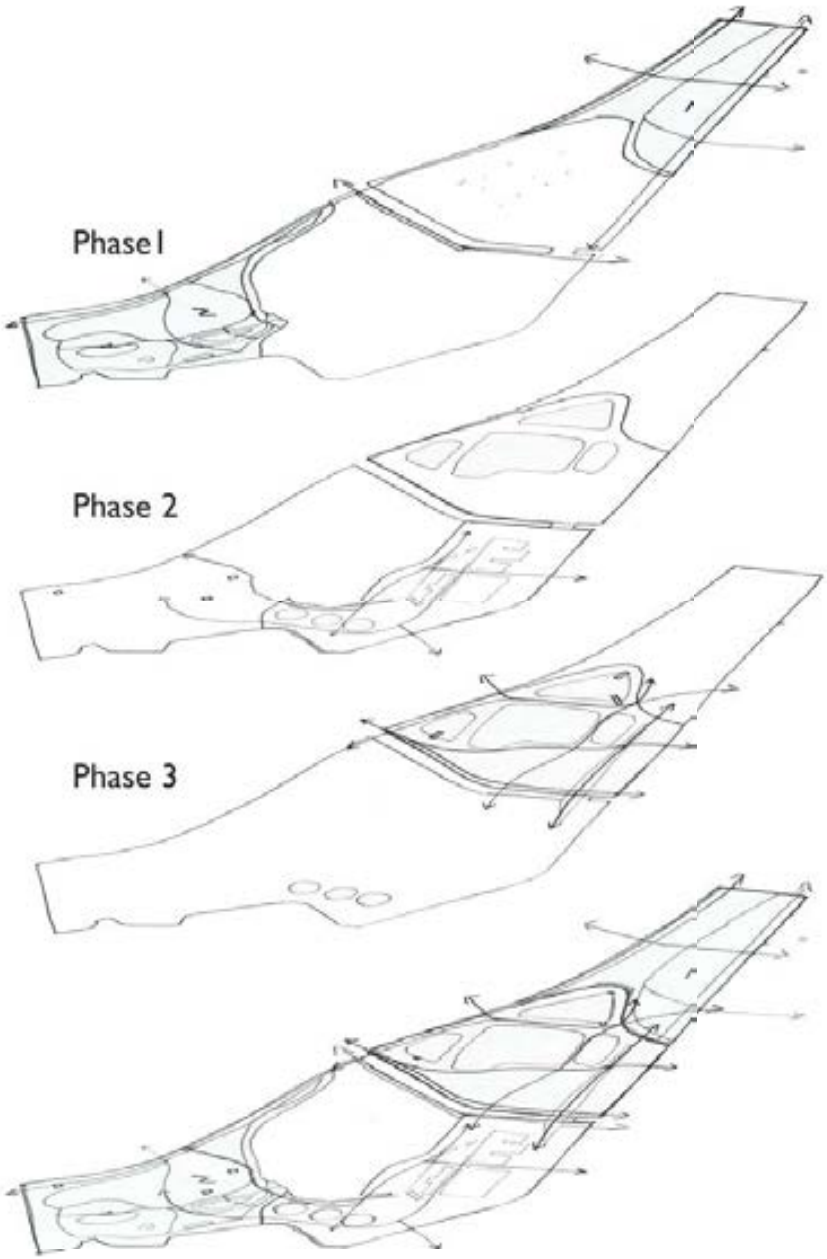


Fig:103. Phasing diagram for site (Author 2010)

7.11. Phasing program

The power plant will only be decommissioned in the next 10 years. Due to the fact that some of these processes will take a number of years to take effect, a phasing programme has been included.

7.11.1.Phase 1

Site

Open and develop Zone A and D to public and connect with jogging and cycling trail. Create a series of internal pathways and trails. Connect with context. Develop the dam edge facing Mitchell street.

Zone A

Develop Zone A into a large formalized neighbourhood park with playgrounds and sports fields and large lawns.

Create links across site including pedestrian bridges across canal to stitch together the residential districts on both sides.

Create anchor point for street connecting to station and Pilditch.

ZONE B

Set up plant nursery to salvage existing vegetation where possible and to grow plants for the rest of the site so that by phase 3 large plants are available.

Zone B and Zone C

Power plant still in operation and requires these zones to function and remains inaccessible to public.

Start removing invasive species and replace with indigenous

species.

Hydro-seed to start process of natural succession. Use ash to manufacture construction materials such as bricks. Use timber from invasive trees that were removed.

Zone D

Restore Zone D into a natural area that can be used for large gatherings, events and socials. Remove invasive species and replace with indigenous. Develop wetland.

7.11.2. Phase 2

Site

Power plant is decommissioned, leaving zone B and C obsolete.

Zone B

Remains closed to public. Plant nursery still in operation. Ash ponds are no longer functional may contain heavy metals, therefore need bio-remediation. A combination of excavation, capping and extraction.

Large ash pond turned into wetland processing grey water from power plant complex while extracting heavy metals from ground. Ongoing removal and replacement of invasive vegetation.

Zone C

Zone c is now opened to the public. Existing structures given new commercial, production and event programmes . Redevelopment of water front. Connect Zone C and D with Pathways. Station opened on Buitenkant street.

Zone D

Pylons no longer in use and are converted into a series of lookout towers.

7.11.3.Phase 3

Site

Phase 3 is an ongoing evolution and appropriation of site. Basic parameters have been set to guide the development of site, while not being too prescriptive.

Network of cycling and walking trails now completed.

Zone B

Through ongoing remediation processes, this section will become safe for pedestrians and can now be opened to public.

A movement network that connects the neighbourhoods together as well as stitching together Zone A and C.

The site will retain its wild overgrown character, industrial structures re-appropriated through programming.

Nursery is now opened to public for both commercial and educational purposes and no longer only propagates plants for the site.

Zone C

Cooling towers are developed into extreme sport facilities, viewing platforms and installations. Rooftops developed into gardens and outdoor venues.

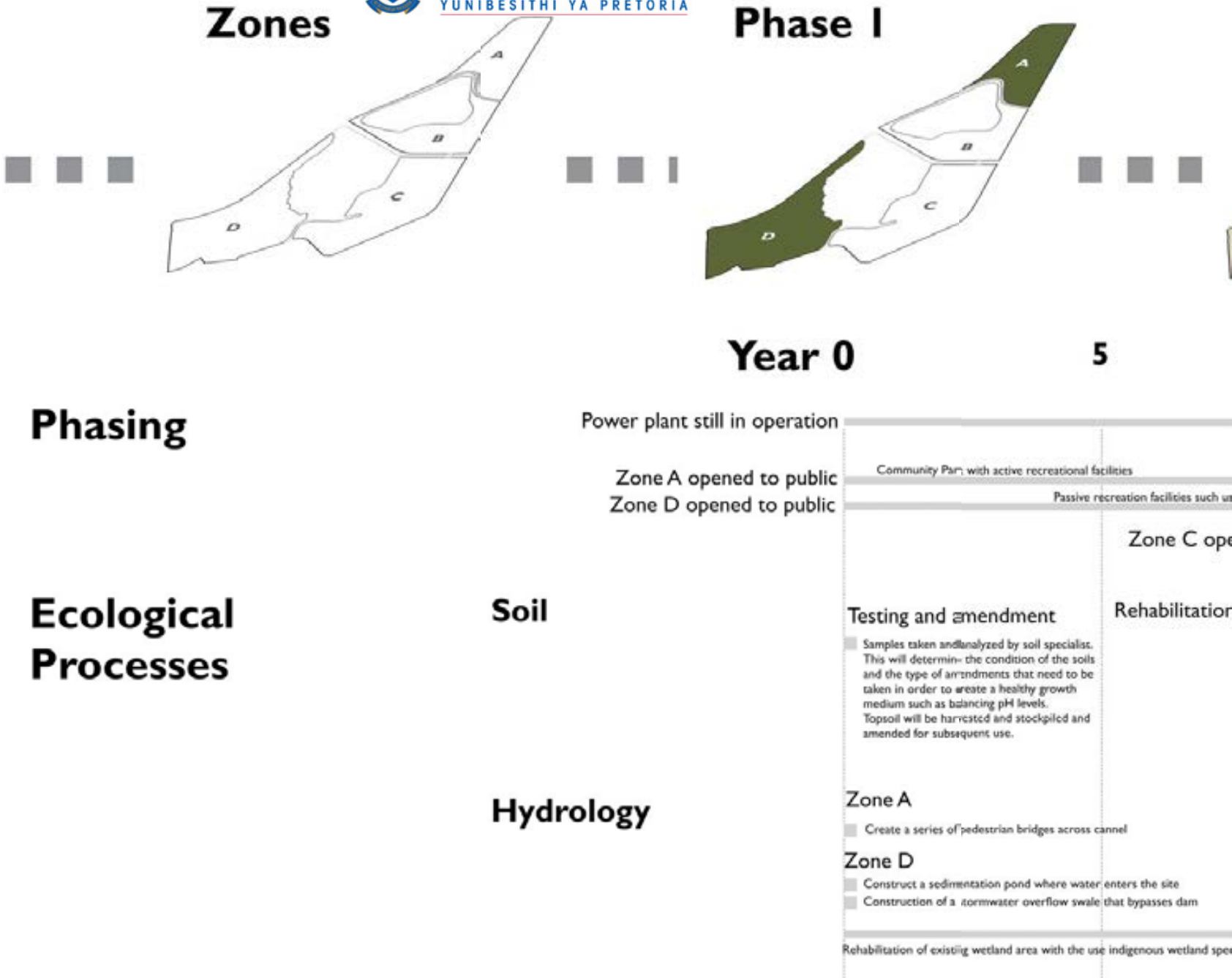
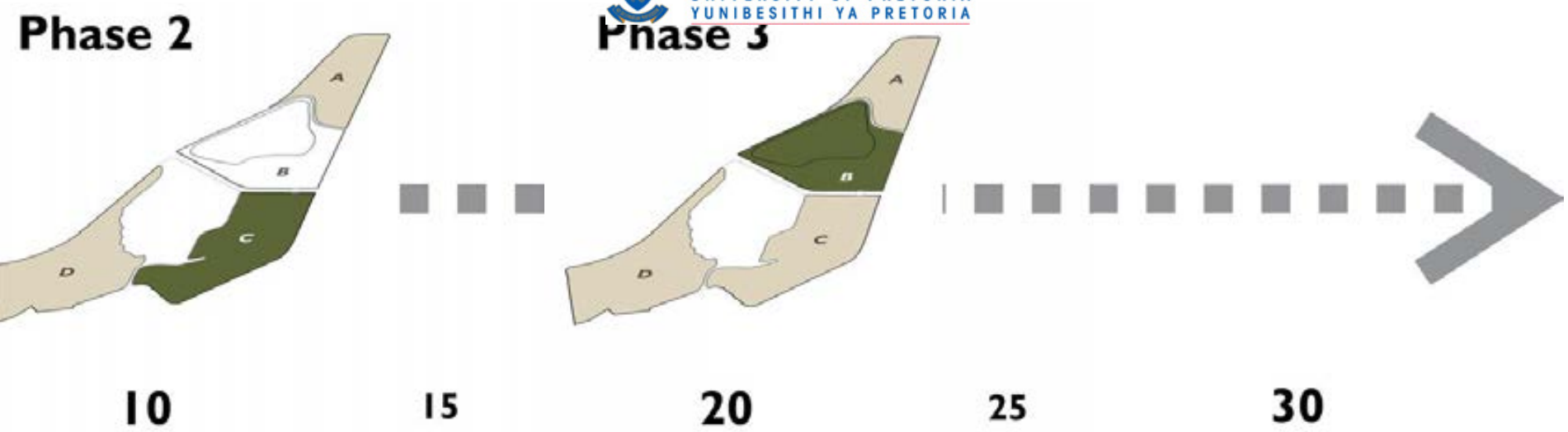


 Fig:104. Matrix of remediation processes (Author 2010)



10 15 20 25 30

nature walks and bird hides, braai facilities and large open fields for events

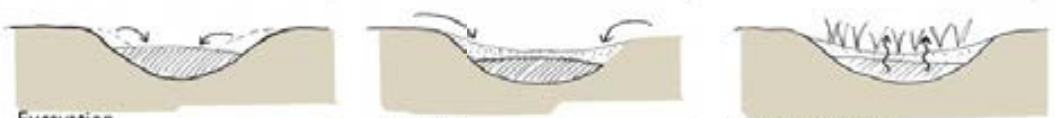
ened to public

Commercial and residential cluster offering various tourist, retail, work and transport opportunities, active and passive recreation as well as various venues for events

Zone B opened to public

Natural area including on site nursery, water treatment wetlands and walking and bicycle trails

of Ashponds



Excavation
Contaminated soil from smaller ash ponds are transferred to the largest pond

Capping
Contaminated soil is then capped with a layer of topsoil to temporarily contain it.

Phytoremediation
The bunker is then planted with various wetland species and then becomes a grey water treatment facility that will over time extract contaminants from the soil

Zone B

Construct a series of subsurface and surface wetlands that will treat and polish grey water effluent from the power plant complex before releasing it into Skinner Spruit

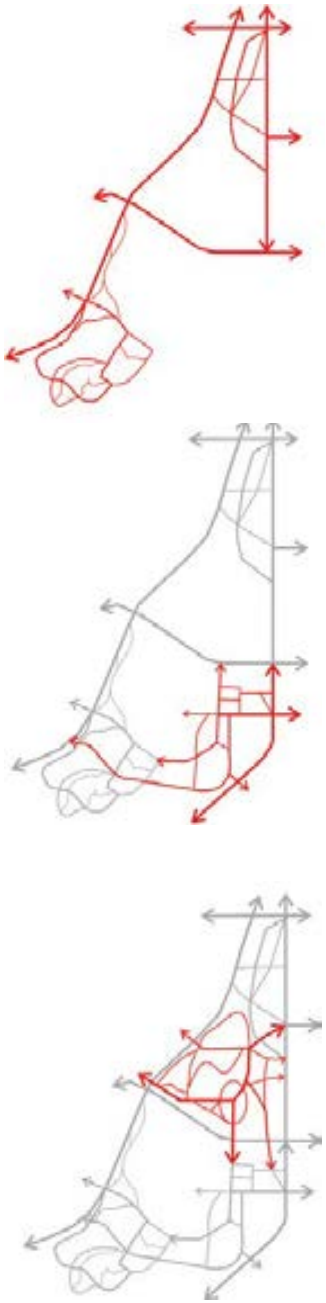
Zone C

Capture stormwater from roof surfaces

Create various on-site detention facilities that will allow for subsequent slow release

Introduce permeable surfaces to allow for infiltration

ies and the re introduction of and small animals



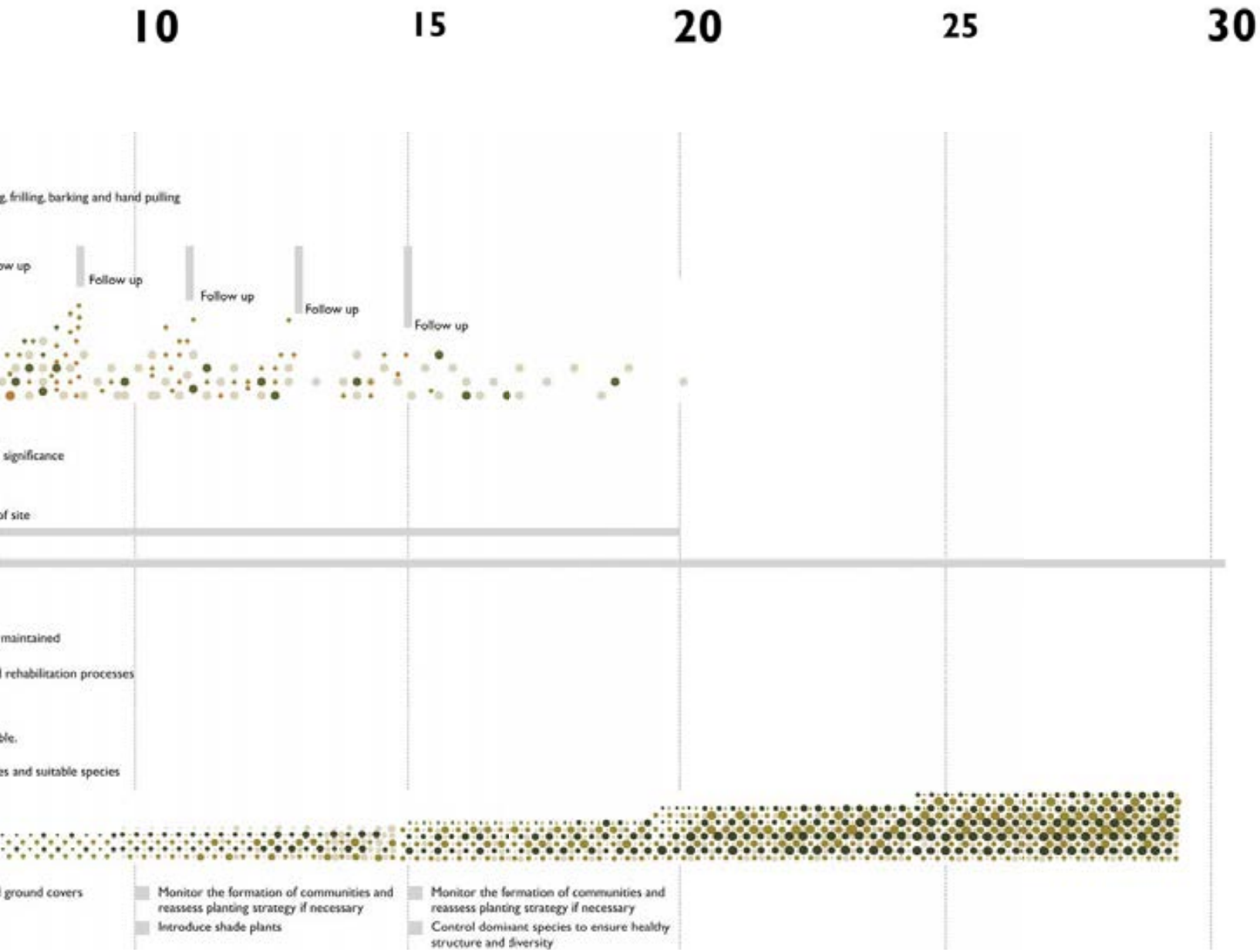
Year 0 5

Removal of invasive species

Secondary ecological succession

Fig:105. Movement diagrams (Author 2010)

Fig:106. Matrix of remediation processes (Author 2010)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ble.
es and suitable species
l ground covers
Monitor the formation of communities and reassess planting strategy if necessary
Introduce shade plants
Monitor the formation of communities and reassess planting strategy if necessary
Control dominant species to ensure healthy structure and diversity

Fig:107. Digital collage illustrating the vision for zone D (Author 2010)

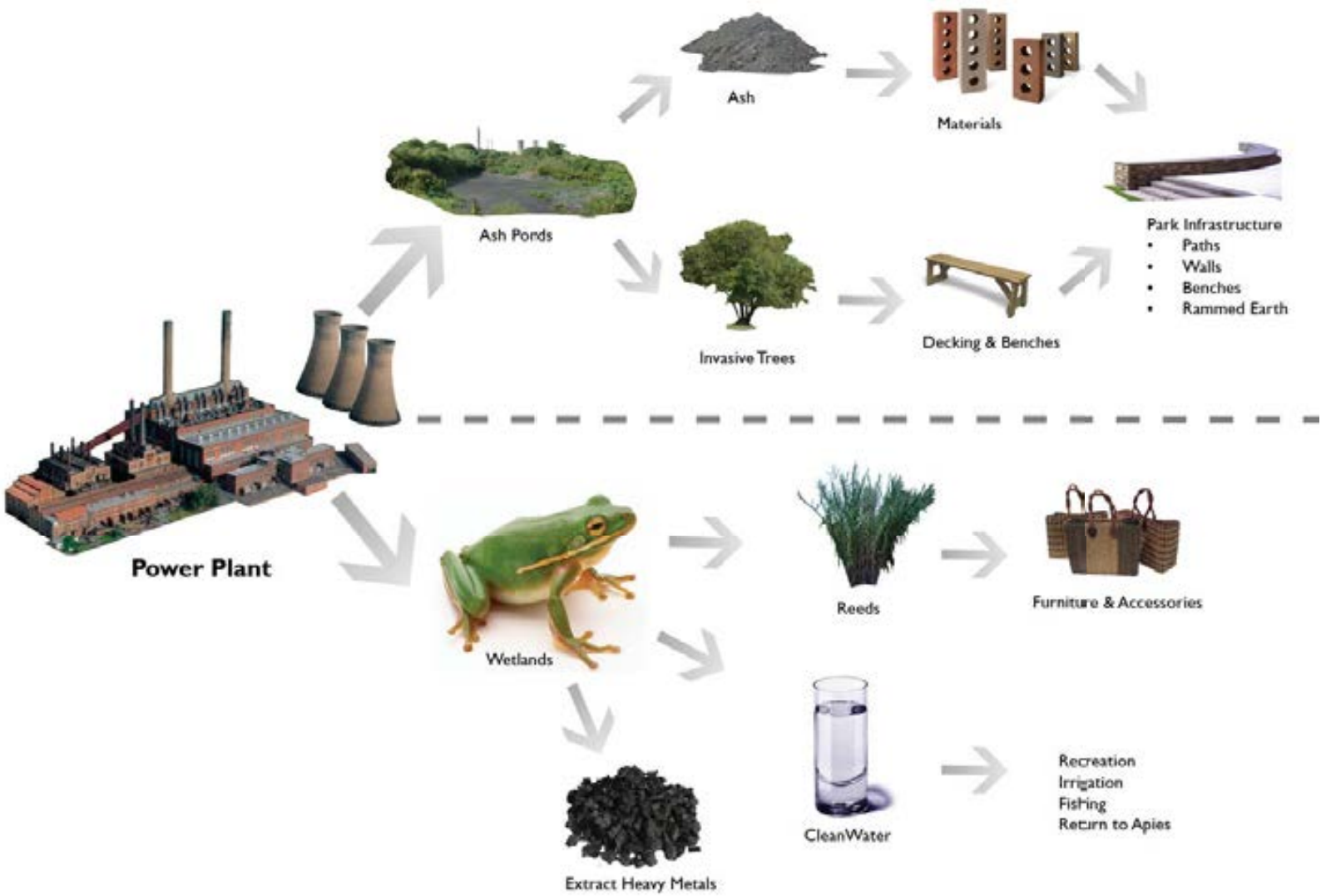

Fig:108. Diagram showing the conversion of an ash pond into a wetland and the site benefits thereof (Author 2010)

7.12. Design development

Fig:109. Diagram showing the design development (Author 2010)

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