

## Technological development

Building on the points argued throughout essays one and two, the project's approach to technical design and development is to protect the existing heritage layers, but not allow them to exist as sole focal elements and only attractions on the site. Second, to represent and express the forgotten and lost historic narratives and marginalised or misrepresented groups that once played a role on the site. And lastly, the stance is taken that a heritage site such as the Union Buildings that has been used all these years as a public park but is not ideally adapted to it, should be designed as a public park to allow these heritage spaces to also be robust and functional and not only passive spaces of commemoration.

As such, the technical investigation is focussed around the topics of inclusive design, designed spatial experience, and site water and ecology:

Representation and access:

- The first investigation focuses on the lack of inclusivity of the site and how the site can be re-imagined and designed to include people of all backgrounds and physical abilities and allow them to experience and enjoy the site and its attributes.
- The second investigation focuses on the lack of inclusive representation and how the forgotten and lost narratives discussed in essays one and two (concentration camp, kraal, and women's protests) can be expressed on the site. The investigation entails experimenting with materiality and planting design to manipulate the phenomenological representation and atmosphere or experience of these spaces.
- The last investigation focuses on a more sustainable water system design and improved ecological qualities of the newly designed site.

Both the first and second technical investigations react to the second research question posed in essay one:

2. How can a landscape intervention be applied as a medium for heritage transformation to act as an all-inclusive park that reflects the broader society and democratic spirit of South Africa?

The inclusivity of the site as mentioned in the question is thus addressed both in terms of accessibility and heritage representation in the design.

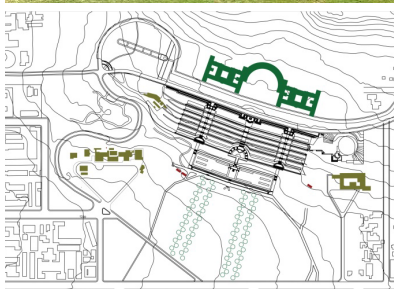
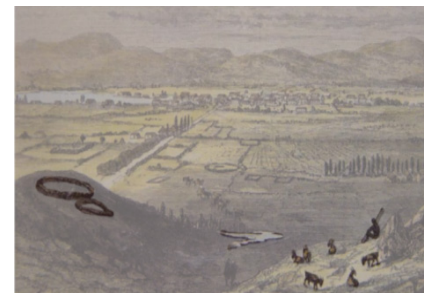


Figure 208-211. Technical issues defined (Varies)

Figure 212. Kraal on Meinjieskop (Crane 1877)

Figure 213. Concentration camp (Alberton Record 2016)

Figure 214. 1956 women's march (Mail & Guardian 2016)

## Investigation one: Inclusive design

The unique quality and character of every heritage site, specific to a culture, an event, or a place can to some seem exclusive and can lead to its heritage value in a contemporary society to be doubted or contested. However, even though it might be exclusive in its representation a heritage site should not in my opinion deliberately exclude history, people, and events that played a role in the shaping of that place, and neither should it be exclusive in terms of its accessibility to any person that wishes to visit the site.

The Union Buildings, as such a heritage site, is inherently patronizing, selectively representative, and exclusively accessible, furthermore, despite the fact that the management of the site claims to have attempted a more water-wise planting palette, the site makes little attempt to be more sustainable and ecologically friendly with its water use and monotonous plant beds.

As a designed landscape on the slope of a ridge with a 100 m elevation climb from its lowest point of the site to the ridge of the hill, and with 459 steps on the garden terraces alone, the site is inherently and patronizingly inaccessible to anyone who is not at full-body strength and capability. The intervention thus aims at creating an inclusive design in the form of a series of ramps and landings (to the specifications of SANS10400) that will allow these former marginalised and excluded groups to access and enjoy the site and more specifically the historical terraced gardens

The following table shows that the designed ramps and handrails meet SANS10400 requirements in terms of inclusive design (Author 2021).

SANS10400 requirements	Union Buildings inclusive design
Ramps must not have a gradient steeper than 1:12 as measured along the ramp's center line.	The ramp gradient proposed at the Union Buildings is 1:15
Ramps must be at least 1100mm wide and have a clear trafficable surface.	All ramps are 1500mm wide
Ramps must have a surface in accordance with SANS10400 regulations	
Ramps must have a landing at the top and bottom of each ramp at least as wide as the ramp and with a minimum length of 1200mm.	Each landing has a minimum width of 1500mm and length of 2000mm
At the maximum gradient of 1:12: a ramp must have a landing at every vertical rise of 500mm and every 6m length of ramp.	The gradient proposed is 1:15
At the gradient of 1:15: a ramp must have a landing at every vertical rise of 665mm and every 10m length of ramp.	These standards are used to create a module that is repeated in the ramp design
Ramps must have a handrail on both sides of the ramp	These standards are met
At a vertical rise of more than 600mm the ramp should be staggered	The ramps are staggered to prevent a single line of long ramps in one direction and monotonous experience for the user
All circular handrails must have a diameter between 35 and 50mm wide	The diameter proposed is 45mm
The height of the handrail should be consistently throughout the length of the ramp be between 900mm and 1000mm from the surface of the ramp	The height of the handrail is consistently 950mm high
The handrails shall extend 300mm beyond the top and bottom of the ramp onto the landings	These requirements are met
These extensions act as tactile aid for persons with visual impairments	The extensions will act as tactile aids among other proposed details

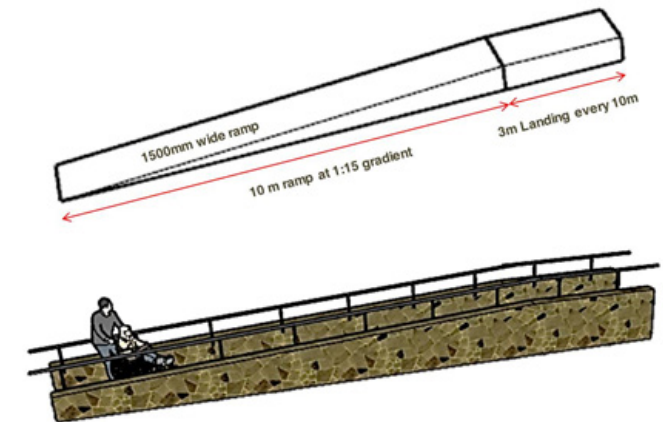


Figure 215-217. Inclusive design  
(Author 2021)

Terrace number / name	Terrace height	1:15 ramp length	Ramps every 10m 1,5m wide	Total length	Ramps every 10m 3m wide	Total length	1:20 ramp length	Ramps every 15m 3m wide	Total length
1 – Terrace to UB	6,274 m	94,11	9 (13m)	107,11	9 (27m)	121,11	125,48	8 – 27m	152,48
2 – Delvillewood memorial - wall	4,24m	63,6	6 (9m)	72,6	6 (18m)	81,6	84,8	5 – 15m	99,8
3- Small terrace 1	1,352	20,28	2 (3m)	23,28	2 (6m)	26,28	30,44	1 - 3m	33,44
4- Small terrace 2	1,522	22,83	2 – 3m	25,83	2 – 6m	28,83	30,44	1 - 3m	33,44
5- Small terrace 3	1,182	17,73	1 - 1,5m	19,23	1 - 3m	20,73	23,64	1 – 3m	26,64
6- Small terrace 4	1,182	17,73	1 – 1,5m	19,23	1 – 3m	20,73	23,64	1 – 3m	26,64
7- Small terrace 5	1,711	25,665	2 – 3m	28,665	2 – 6m	31,665	34,22	2 – 6m	40,22
8- Small terrace 6	1,711	25,665	2 – 3m	28,665	2 – 6m	31,665	34,22	2 – 6m	40,22
9- Large terrace to NM statue	3,96m	59,4	5 – 7,5m	66,9	5 – 15m	74,4	79,2	5 – 15m	94,2
10- Large terrace to War memorial	3,92	58,8	5 – 7,5m	66,3	5 – 15m	73,8	78,4	5 – 15m	93,4
11- Medium terrace	2,56	38,4	3 – 4,5m	42,9	3 – 9m	47,4	51,2	3 – 9m	60,2
12- Small terrace 8	0,85	12,75	1 – 1,5m	14,25	1 – 3m	15,75	17	1 – 3m	20

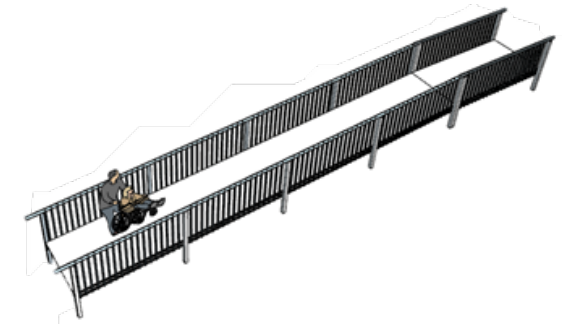
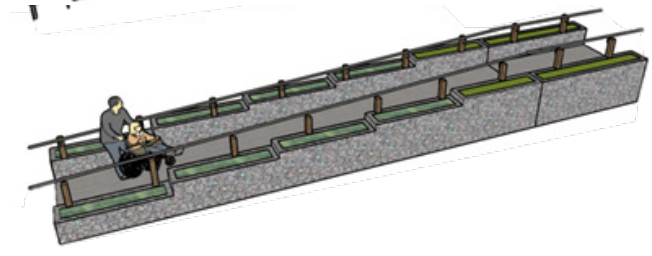
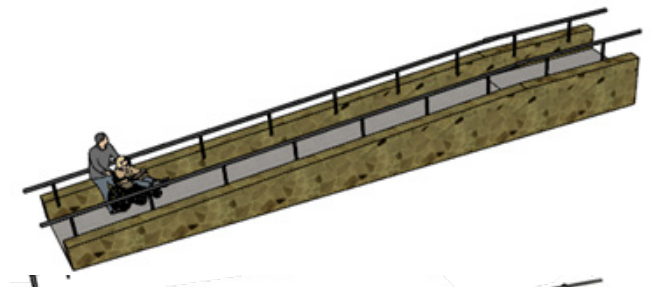


Figure 218-222. Inclusive design ramp calculations and design (Author 2021)

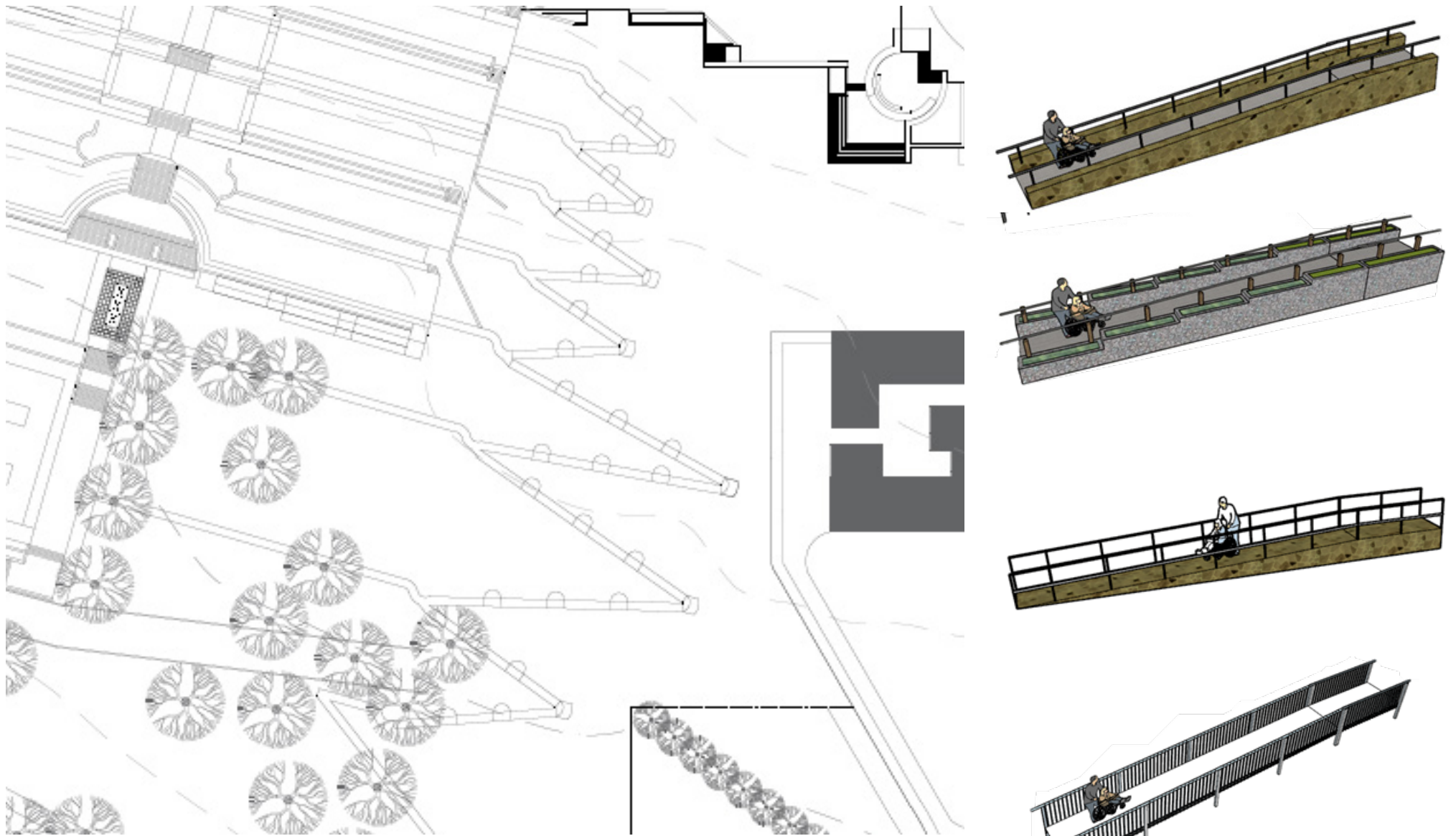


Figure 223-227. Inclusive design ramp placement and materiality  
(Author 2021)



One ramp, however, is proposed to be built on the eighth terrace against one of the heritage terrace walls. This proposed ramp is in an area where the wall has been badly ruined and lack of maintenance has led to further decay, it is also on the Easternmost edge of the terrace wall where it will be able to integrate with the new proposed ramp system. The direct access between two of the terraces will provide a unique experience similar to what an able-bodied person would experience using the heritage stairs on the terraces.

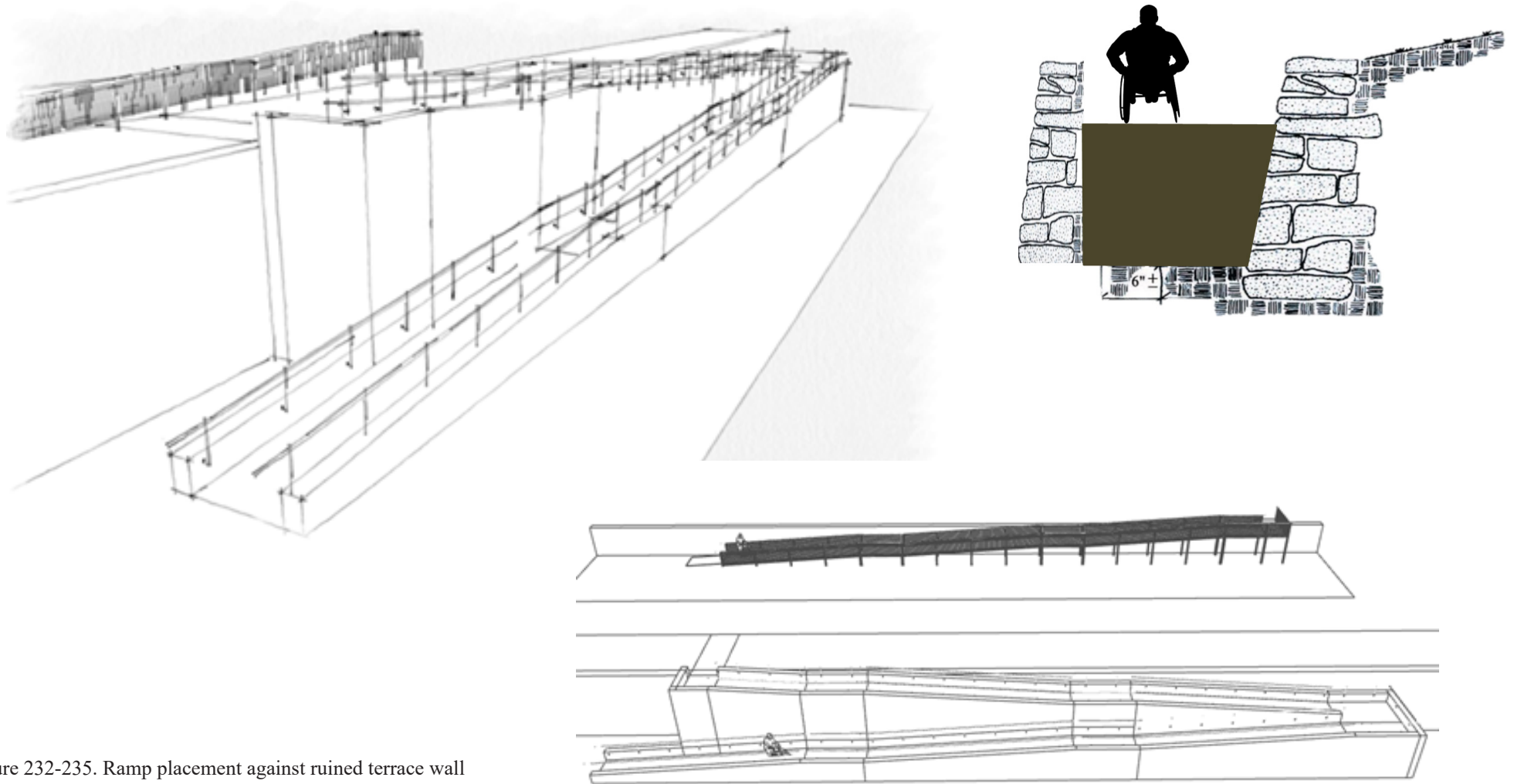


Figure 232-235. Ramp placement against ruined terrace wall  
 (Author 2021)

## Model explorations of terrace wall ramp

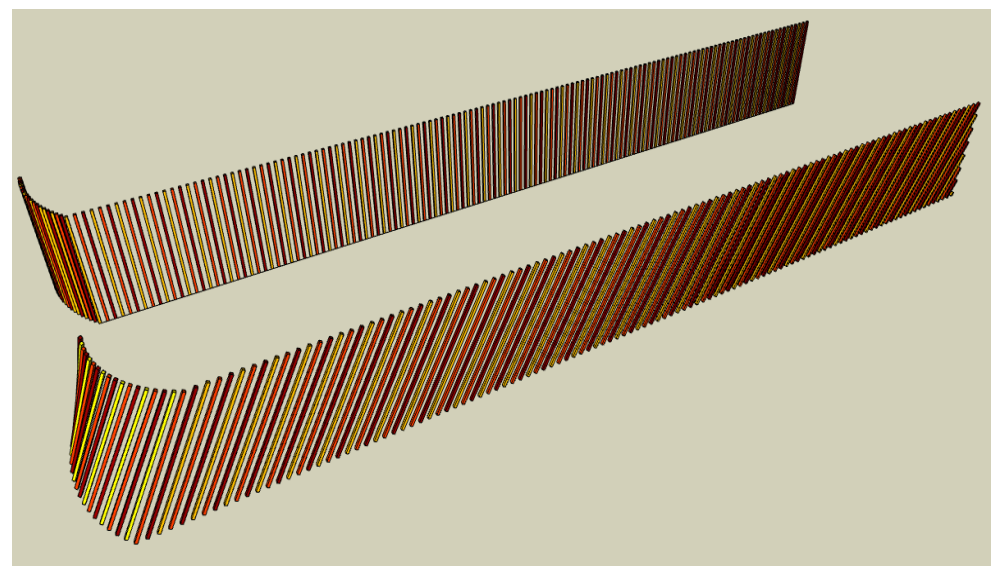
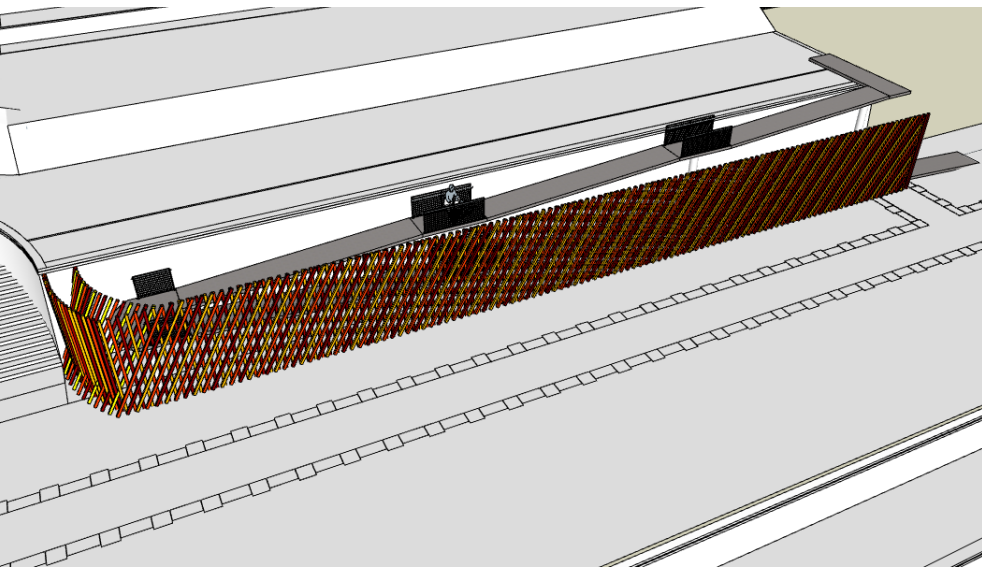
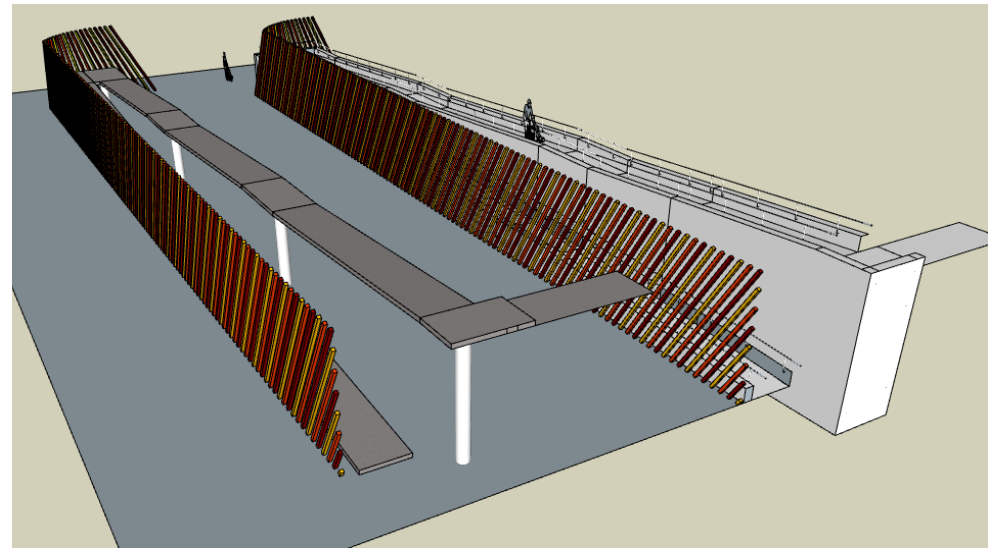
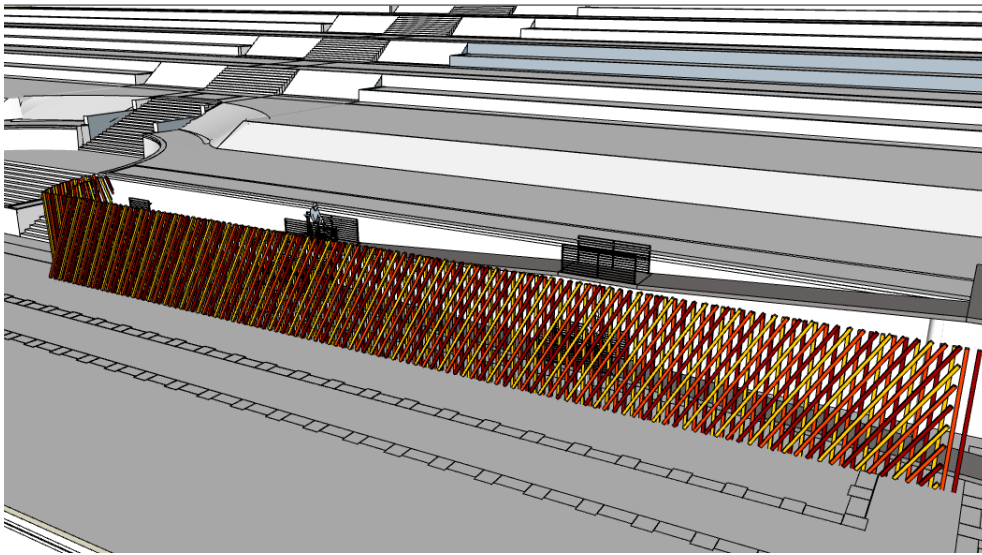
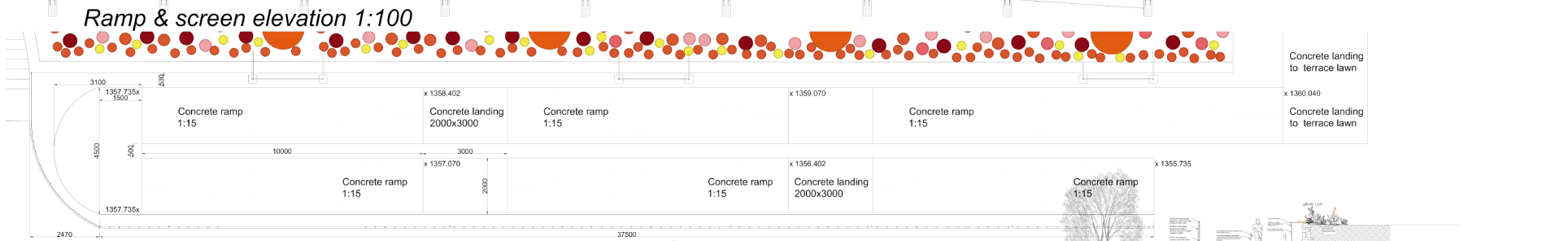
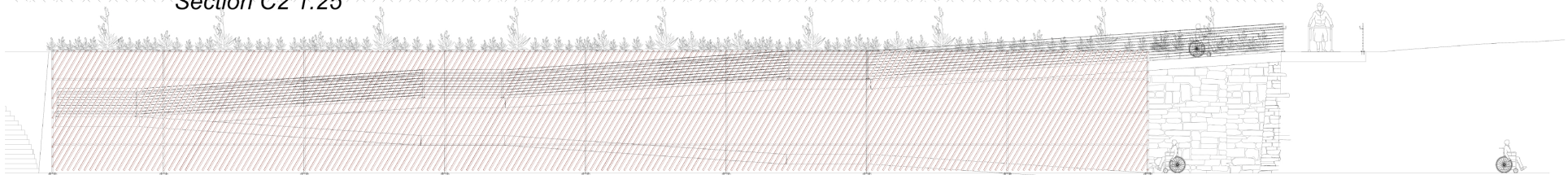
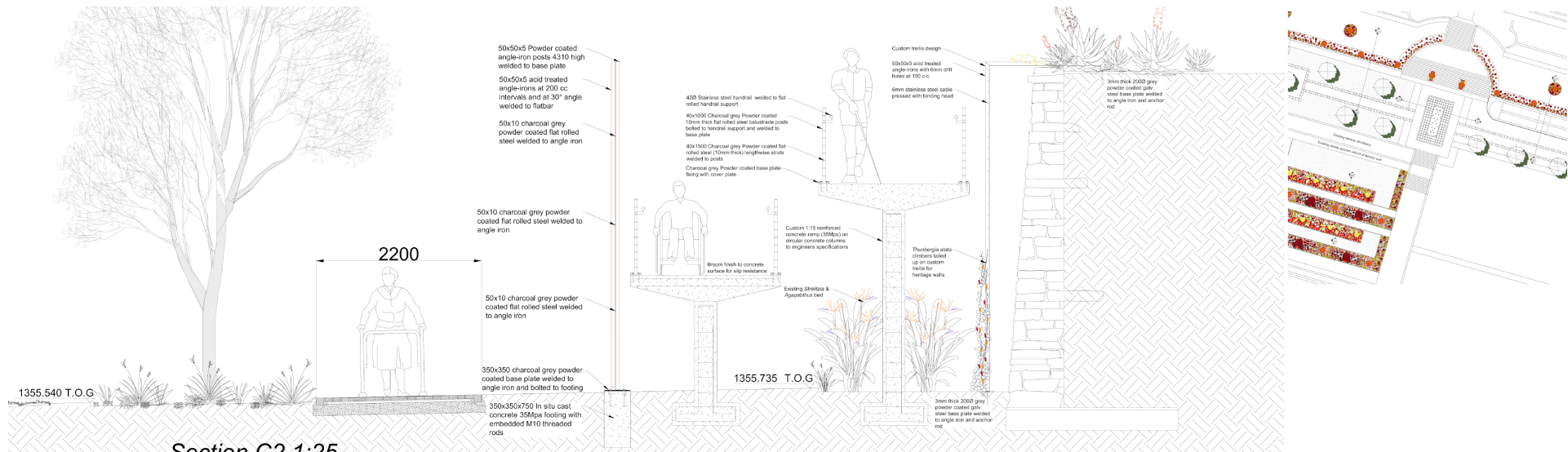


Figure 236-239. Ramp model explorations(Author 2021)



Ramp plan 1:00

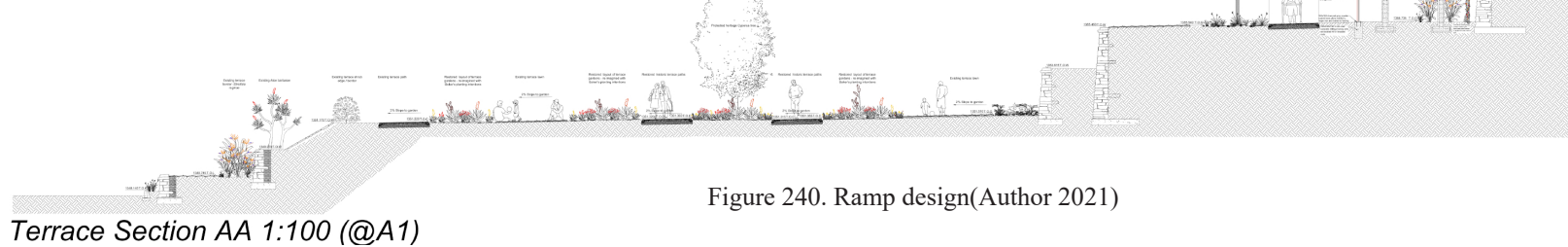


Figure 240. Ramp design(Author 2021)





## Phenomenology

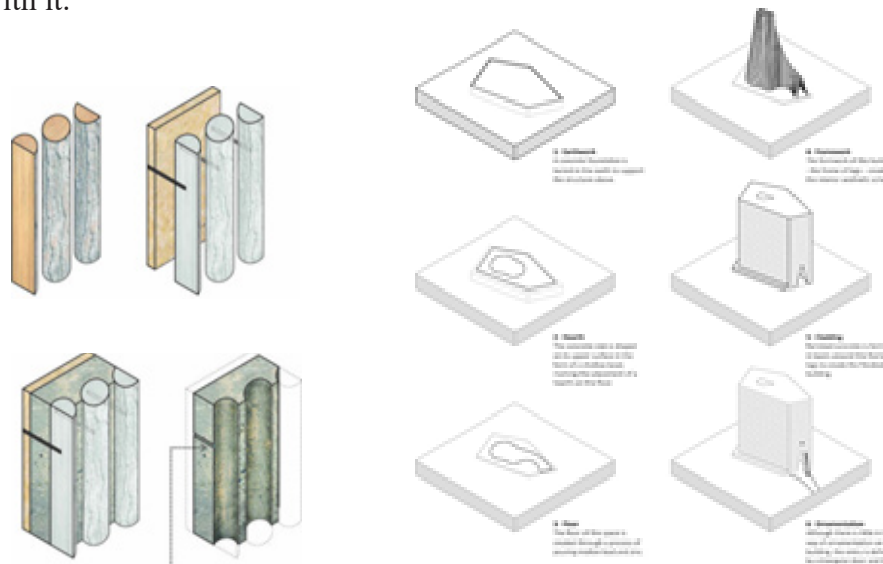
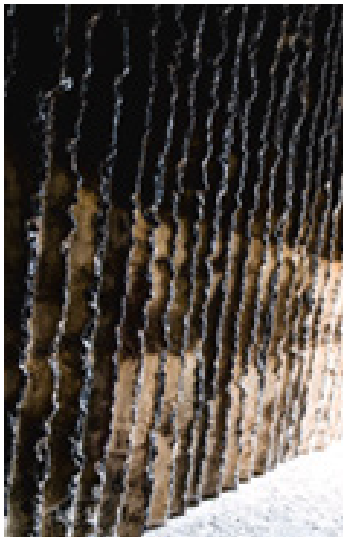
How can an appropriate memorial space be designed to articulate the loss of concentration camps – The scorched earth policy was chosen as inspiration for the atmosphere and materiality of the designed space, to represent the destruction, loss and death of the concentration camps and Anglo-Boer War. Since fire also plays an important role in highveld ecology with the regular occurrence of veld fires, fire and a charred landscape also became an important informant for the planting where fire can be used and represented in the design.

The technical experiment entailed investigating the possible aesthetic effect fire can have on construction materials where fire becomes more permanent in the colour and texture of the surface materiality.

The Bruder Klaus Field Chapel (2007) of the well-known phenomenologist, Peter Zumthor was studied and informed the material investigation for the project.

Concrete was chosen, where the formwork is burnt after the concrete has been set, which alters the texture and colour of the finished product, making the after-effects of fire permanent in the landscape. This material will be used to build walls, seating walls and floor surfaces. and charred timber poles

The concentration camp memorial route sits as a permanent reminder of the loss within the natural landscape on the hill, in contrast with it.



**Concentration camp remembrance  
(Collage by Author 2021)**

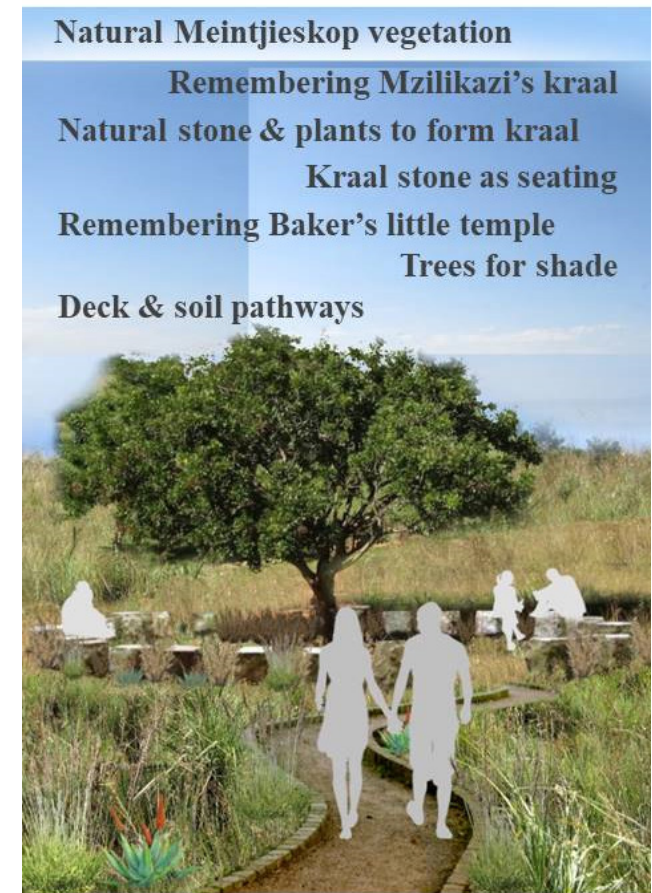
Concentration camp remembrance collage by Author 2021  
Figure 242. Bruder Klaus field chappel (Archdaily 2016)  
Figure 243. Bruder Klaus field chappel (CJS Research & teaching anthology n.d.)  
Figure 244. Bruder Klaus field chappel (Moodydesigns 2019)

How can an appropriate passive gatherings space be designed to articulate the lost kraal narrative – Stone, natural environment, seating place, viewpoints, informal pathways  
Research into materiality & planting of kraal typologies and the natural vegetation of the area.

Neither the concentration camp nor kraal can be placed in their exact historic position on the site, and their narratives are similar where the original Mzilikazi kraal was built as part of a military kraal associated with war and the concentration camp was part of the Anglo-Boer war. Since the programming of these contemporary spaces is similar in the form of passive gathering space on the hill that allows for elevated views over the city, the two spaces are arranged as a series of places along one trail on the koppie. Location, form and materials are chosen as indirect representation and for spatial experience and atmosphere of these narratives rather than a direct duplication of these historic places and their location.

To represent the theme of the natural occurrence of veld fires in the grassland and bushveld of South Africa burned concrete is used as material. To represent the theme of stone kraals, plants are chosen that naturally grow on rocky outcrops as well as for their fire resistance and plants that according to academic documents were planted around kraals.

The designed spaces manifest as a viewing platform on the hill, taking the shape of a platform on the slope acting as a kraal on the hill. The outer face of the walls that surround this space, will be the first view a visitor would see of the space from the Union Buildings and nature walk.



**Kraal re-imagined as final destination  
on koppie (Collage by Author 2021)**

Figure 245. Kraal remembrance collage (Author 2021)

## Investigation two - material (fire and concrete)

The investigation was based on the precedent of Peter Zumthor's Bruder Klaus Field Chappel where the chapel was constructed by burning combustible material used as part of the formwork.

Method: The investigation was done by building six pine timbre boxes of 400x400 mm large after which concrete was cast into these boxes at 50 mm thick and six different types of combustible materials were placed onto these surfaces and partially embedded into the wet concrete. The combustible materials were: Eucalyptus tree lathes, pine cones, bamboo lathes, bark chips, SA pine timber planks, and grass. After a week of curing the concrete, the outer formwork boxes were removed and the combustible material was set on fire. The materials were allowed to burn away to create both unique textural and pigmentation alterations to each of the blocks. Two days after burning the combustible materials away the blocks were sprayed off with a light spray using a hose, removing the ash from the blocks it washed away the light grey colour off the blocks and highlighted the black soot colour that stained the concrete, the spray also removed all loose debris that filled the crevices formed by the fire and allowed the full textural changes to appear.



Timbre formwork –  
400 x 400 blocks



Combustible material – wood  
lathes



Combustible material – bark  
chips



Combustible material – Cut grass



Combustible material – planks



Combustible material – reed lathes

Figure 246. Fire experiments - combustible materials and formwork (Author 2021)



Figure 247. Fire experiments - Curing and burning



Figure 248. Fire experiments - After curing fires

Conclusions: Although some of the materials such as the timber planks, bamboo, and wood lathes could simply be removed instead of burning it away, the fire creates the added advantage of coloured concrete and the fire allows finer textural details to be formed on the concrete where the removal of the formwork will chip it off.



Figure 249. After cooling, wash and cleaning  
(Author 2021)

With the smaller and more complex shapes of combustible material such as the grasses, pine cones, and bark chips, trying to remove them by hand-made the concrete break and crumble away instead of allowing the fire to burn the complex patterns and shapes into the concrete.



Figure 250. Fire experiments - post wash colour and textures  
(Author 2021)





Figure 251. Fire experiments - Final colour and texture  
(Author 2021)

# Kraal memorial place Palette - fire

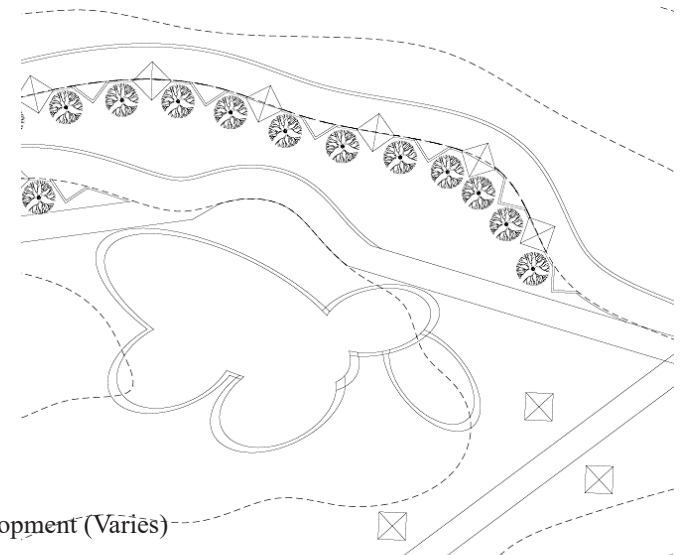
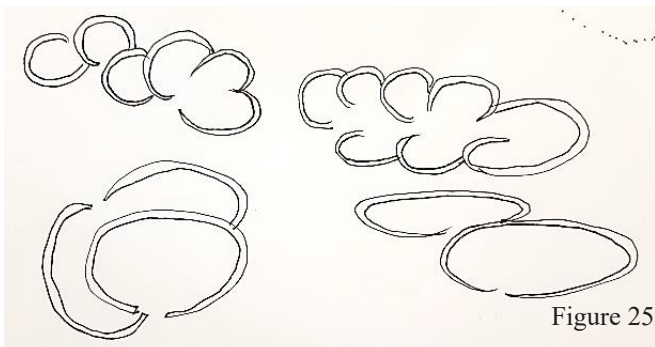
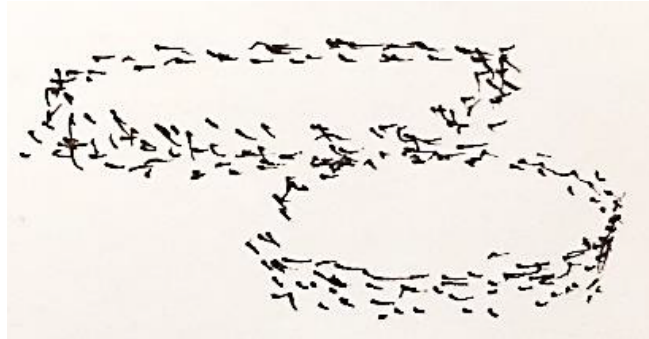
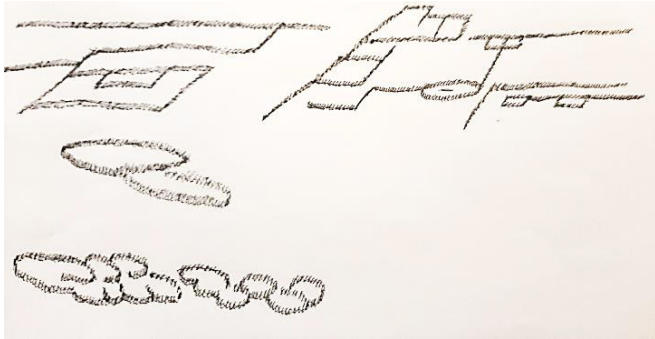
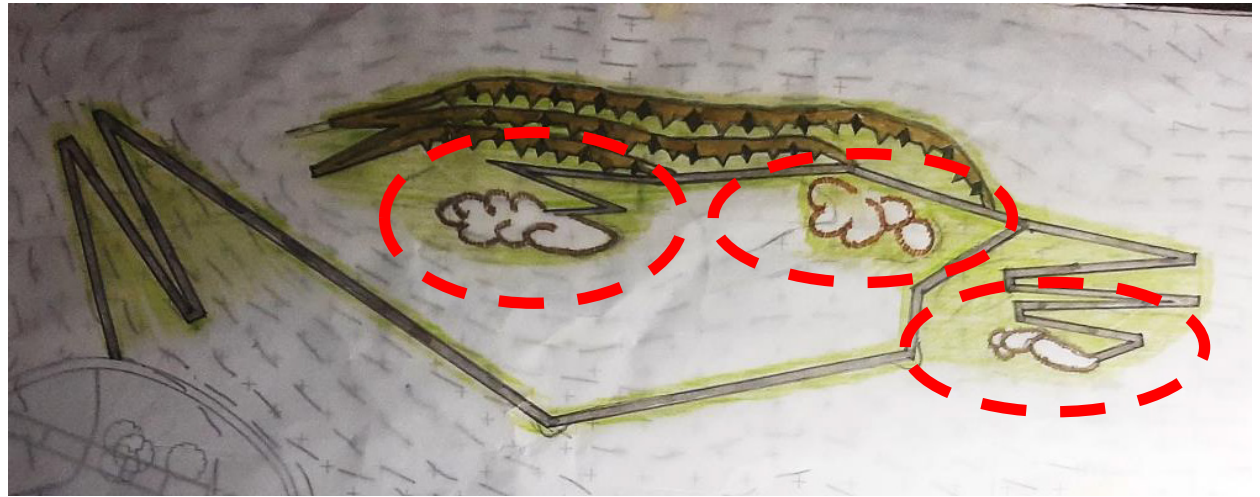


Figure 252-257. Kraal memorial space design inspiration and design development (Varies)

## Section through Kraal and Concentration camp memorial areas

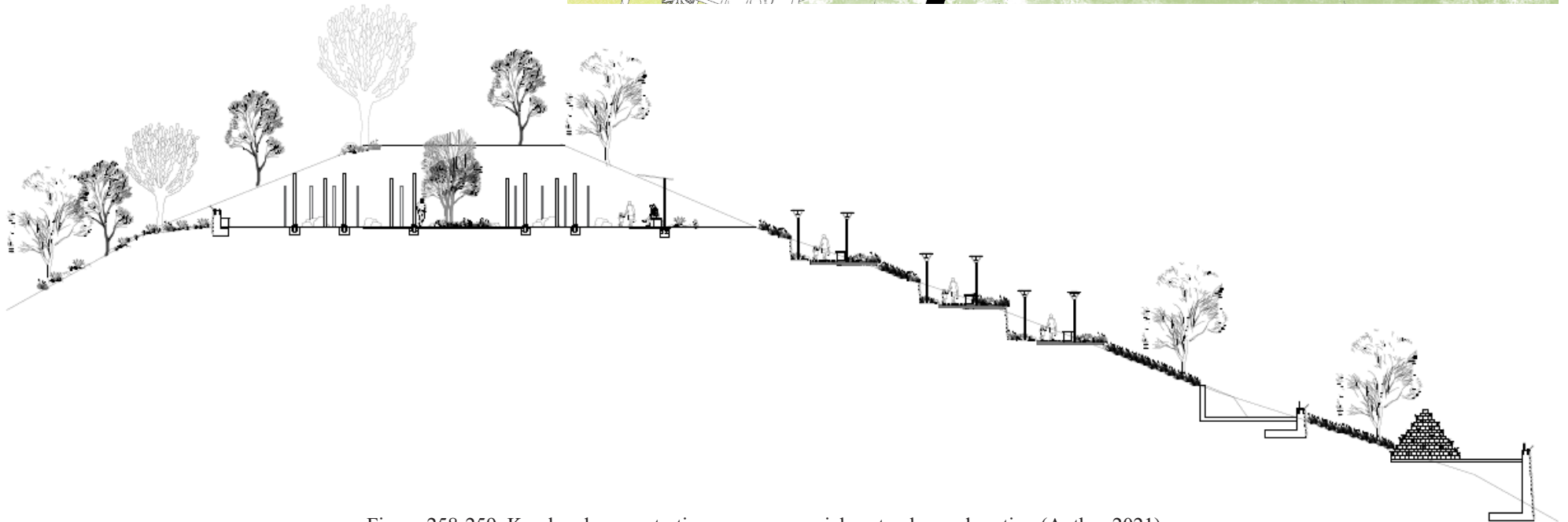
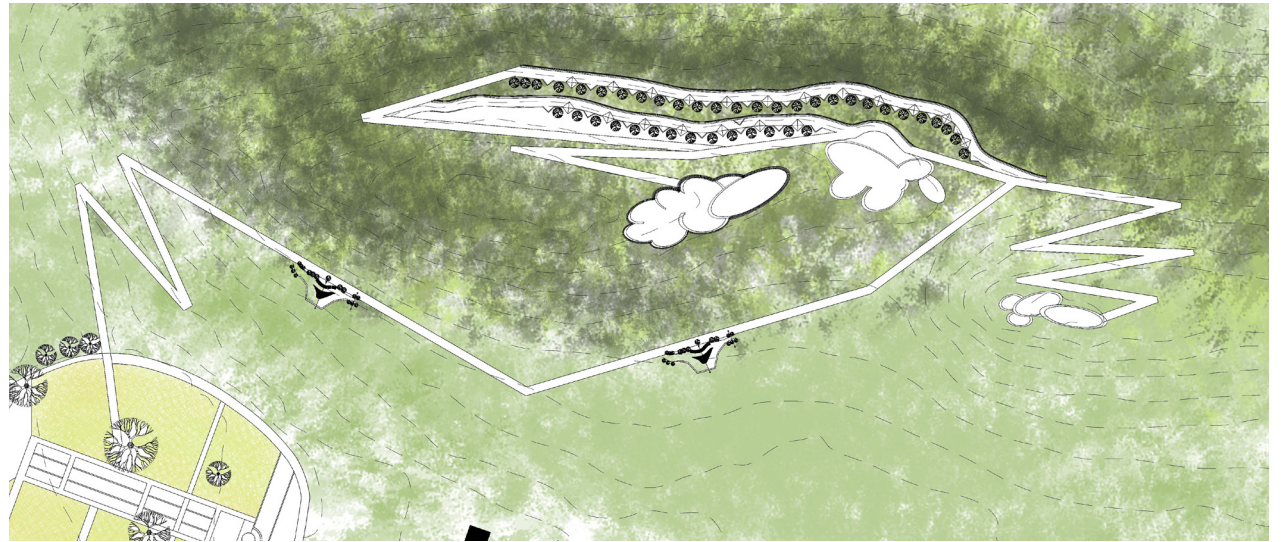


Figure 258-259. Kraal and concentration camp memorial route plan and section (Author 2021)

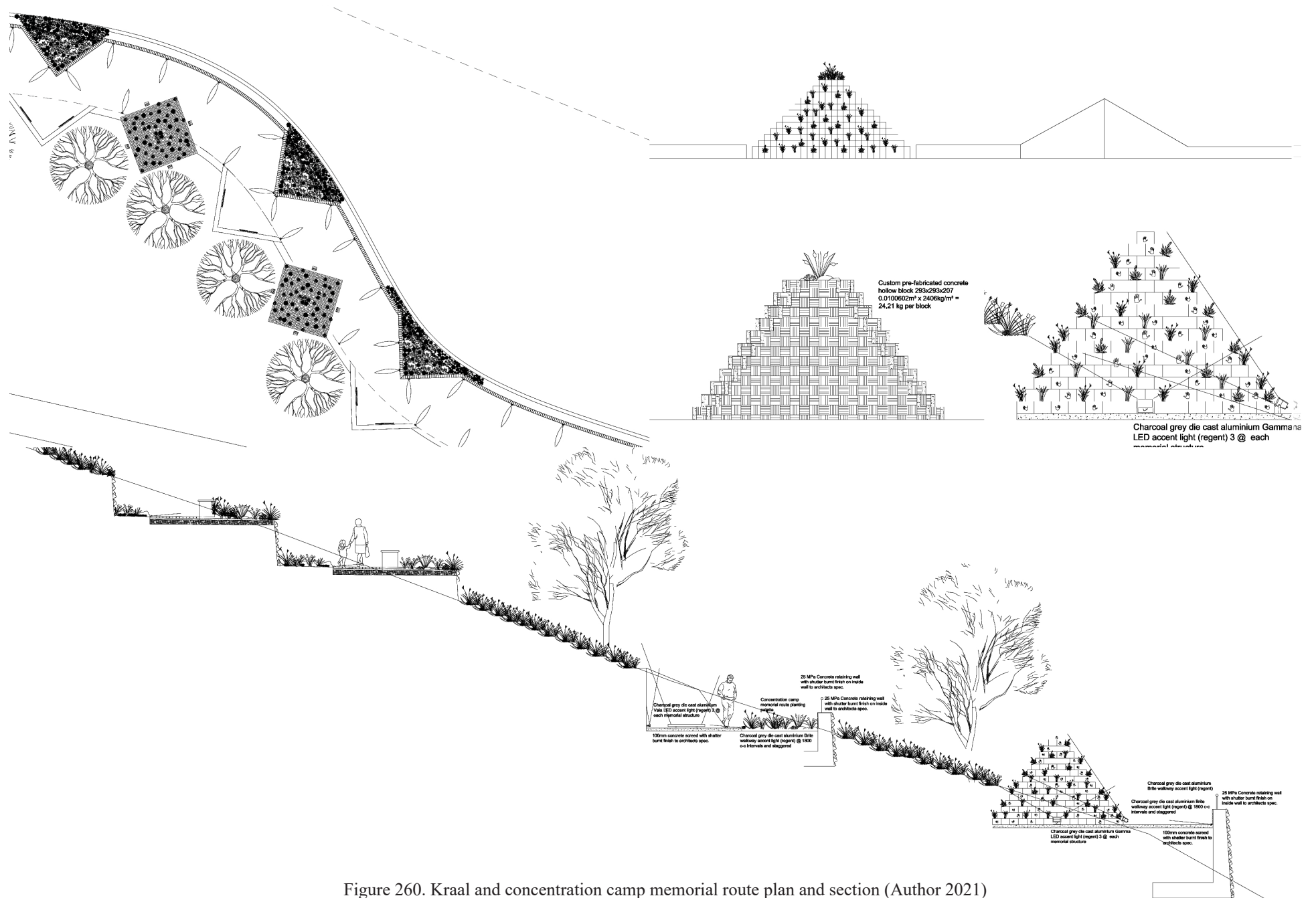


Figure 260. Kraal and concentration camp memorial route plan and section (Author 2021)

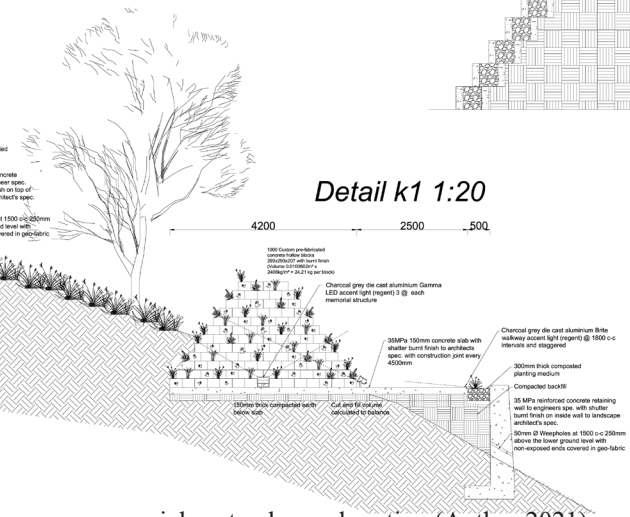
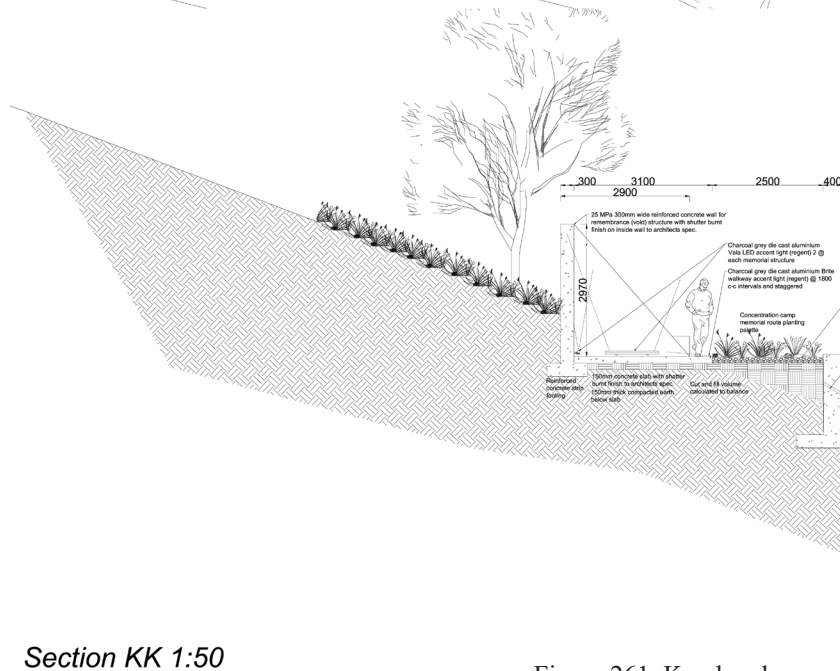
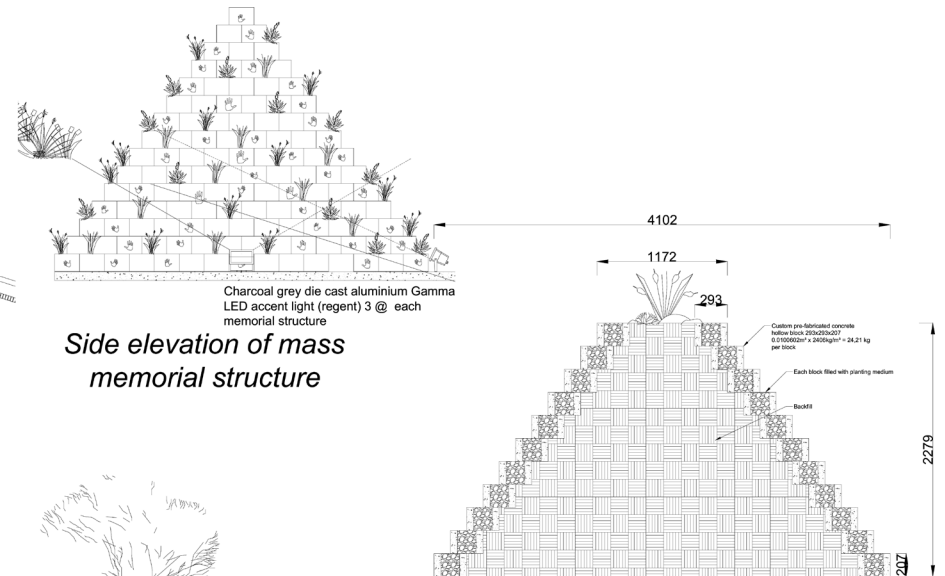
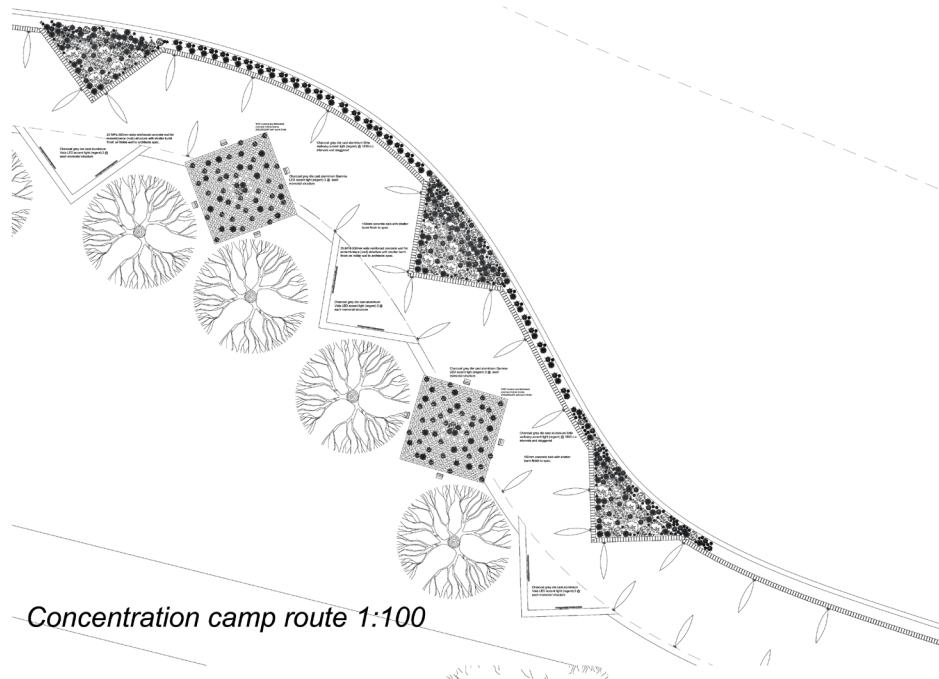
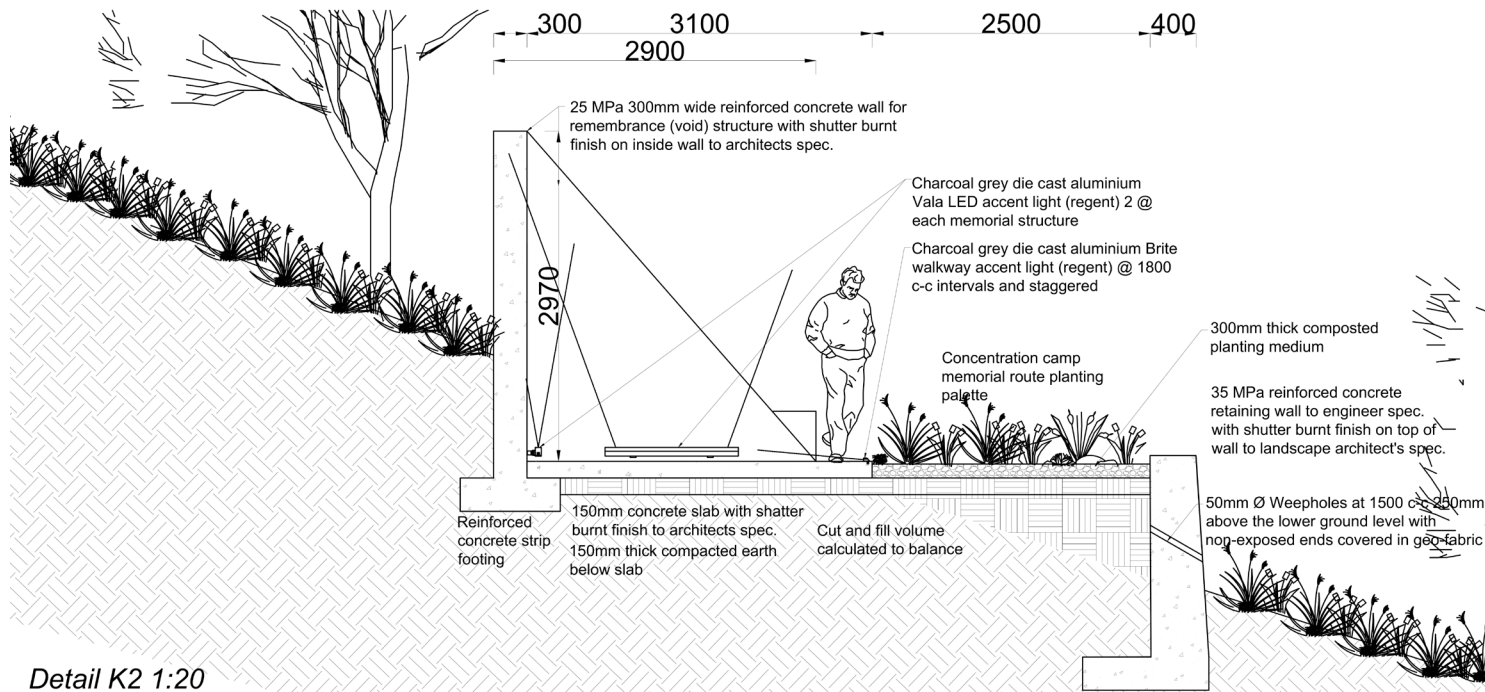
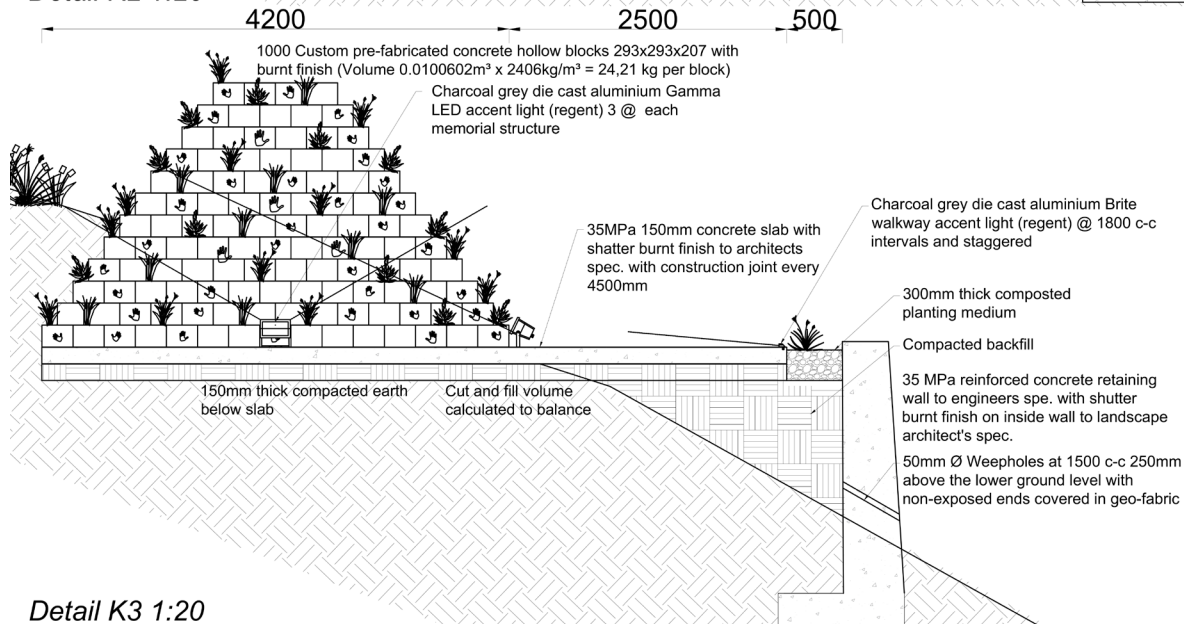


Figure 261. Kraal and concentration camp memorial route plan and section (Author 2021)



Detail K2 1:20



Detail K3 1:20

Figure 262. Kraal and concentration camp memorial route details (Author 2021)

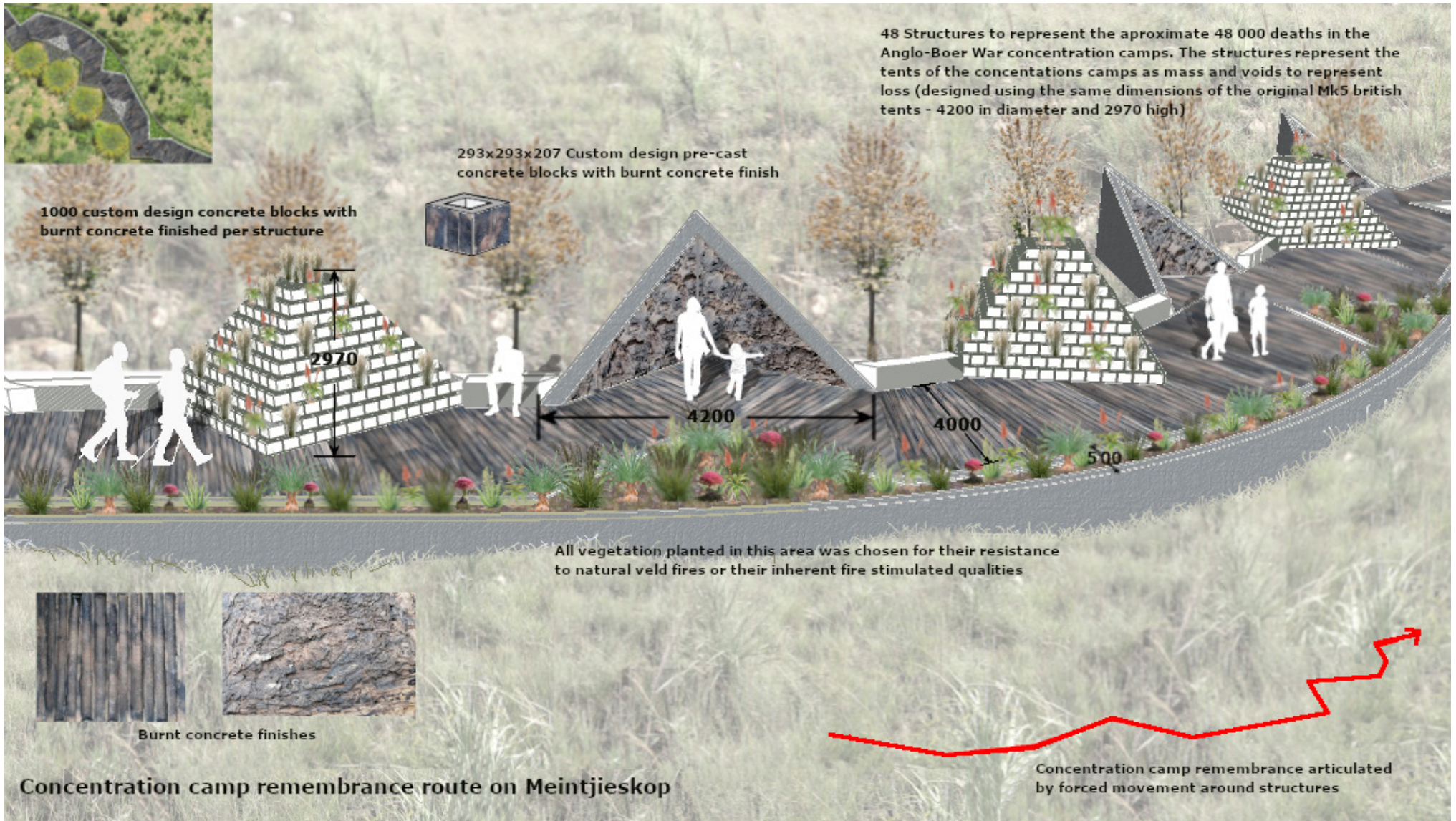


Figure 263. Kraal and concentration camp memorial route Axonometric (Author 2021)

## Investigation three: water systems & ecology (planting design)

Water systems: The goal of the water system design is to articulate the lost & forgotten narratives of the site as well as to recharge the groundwater used to sustain the site.

The Union Buildings site is located on the southern slope of Meintjieskop in Pretoria. The site's water is pumped from two boreholes on the site to the Meintjieskop reservoir which lies to the northeast just above the Union Buildings on the ridge from where water is used in the Union Buildings, on the site, and in the neighbourhood. A pre-construction photograph of Meintjieskop in the book, *Pretoria: a photo journey* by Friedel Hansen 2016, shows water that accumulated at the foot of Meintjieskop. This accumulation of water during the rainy season in summer months in Pretoria, before the construction of the Union Buildings, is also shown in a painting done by S. Crane in 1877, the pond and water acted as recreational space where locals of Pretoria could go for a swim, it was known as Meintjies' swimming pool (Meintjies-se-swembad) or Meintjies' hole (Meintjes-se-gat). (Crane 1877, Hansen 2016, Swanepoel 2006).

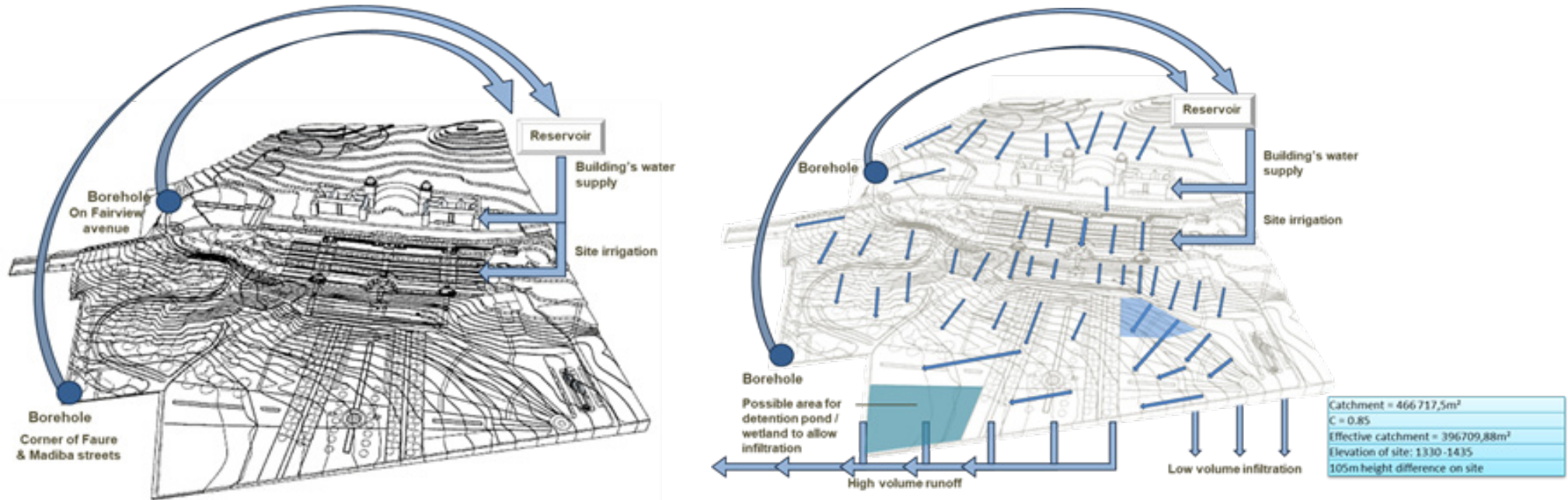


Figure 264-265. Early Water system strategies (Author 2021)



As a more sustainable approach to the site’s water system, the primary aim is to use sustainable principles of green infrastructure (such as bio-swales and seasonal wetlands) to convey and capture run-off and partially recharge some of the site’s groundwater. The narrative of water as recreation on-site has been lost and forgotten and currently due to blocked stormwater drains & low infiltration, water builds up and sits on the terraces for extended periods of time. The secondary aim is to articulate the lost narrative of water as recreation on-site by creating create social spaces on the site around the bio-swales and seasonal wetland but also to create recreational water features where water currently sits on site.

The water system entails the capture, conveyance, detention, and filtration of stormwater runoff on-site which will be recharged into the water table along with excess irrigation that builds up on site. A small volume of the water will be stored and re-used for some irrigation purposes and in water features to create social spaces and recreation around these water features.

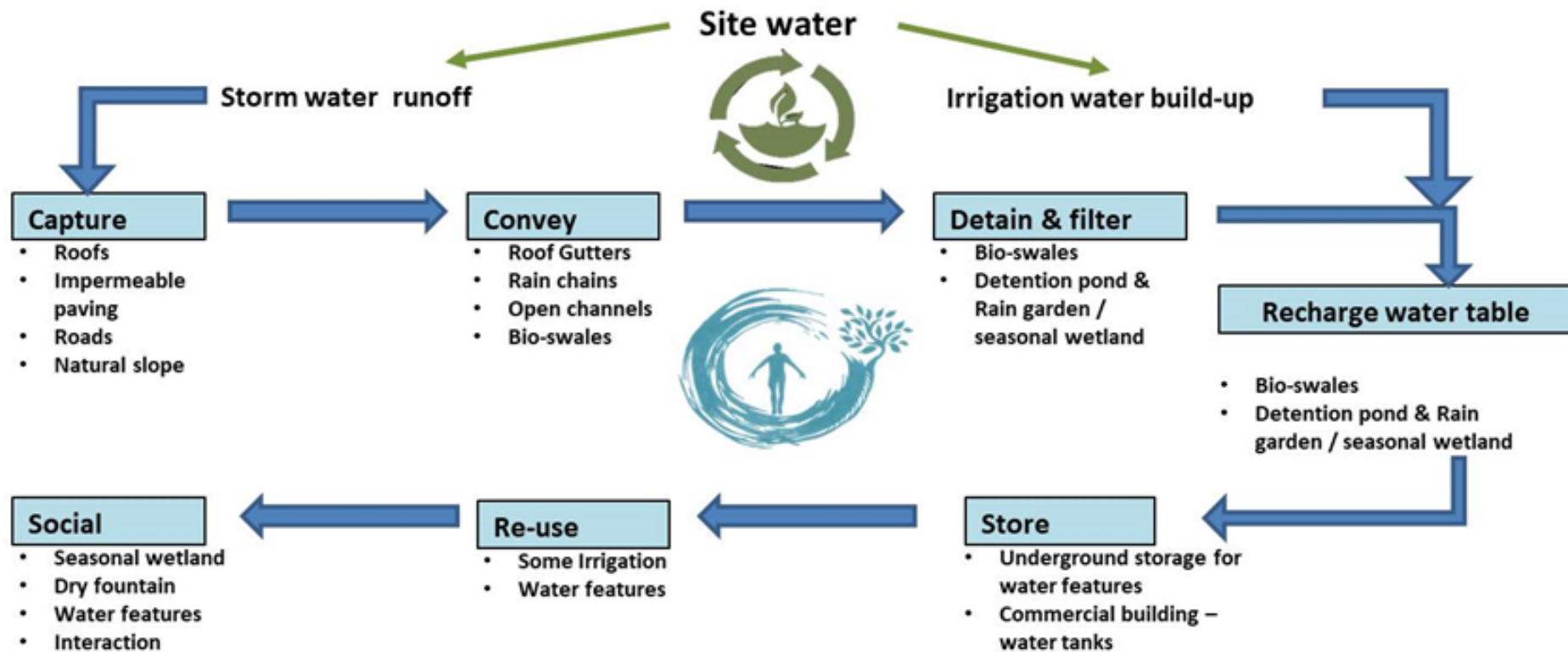


Figure 266. Water systems explained (Author 2021)

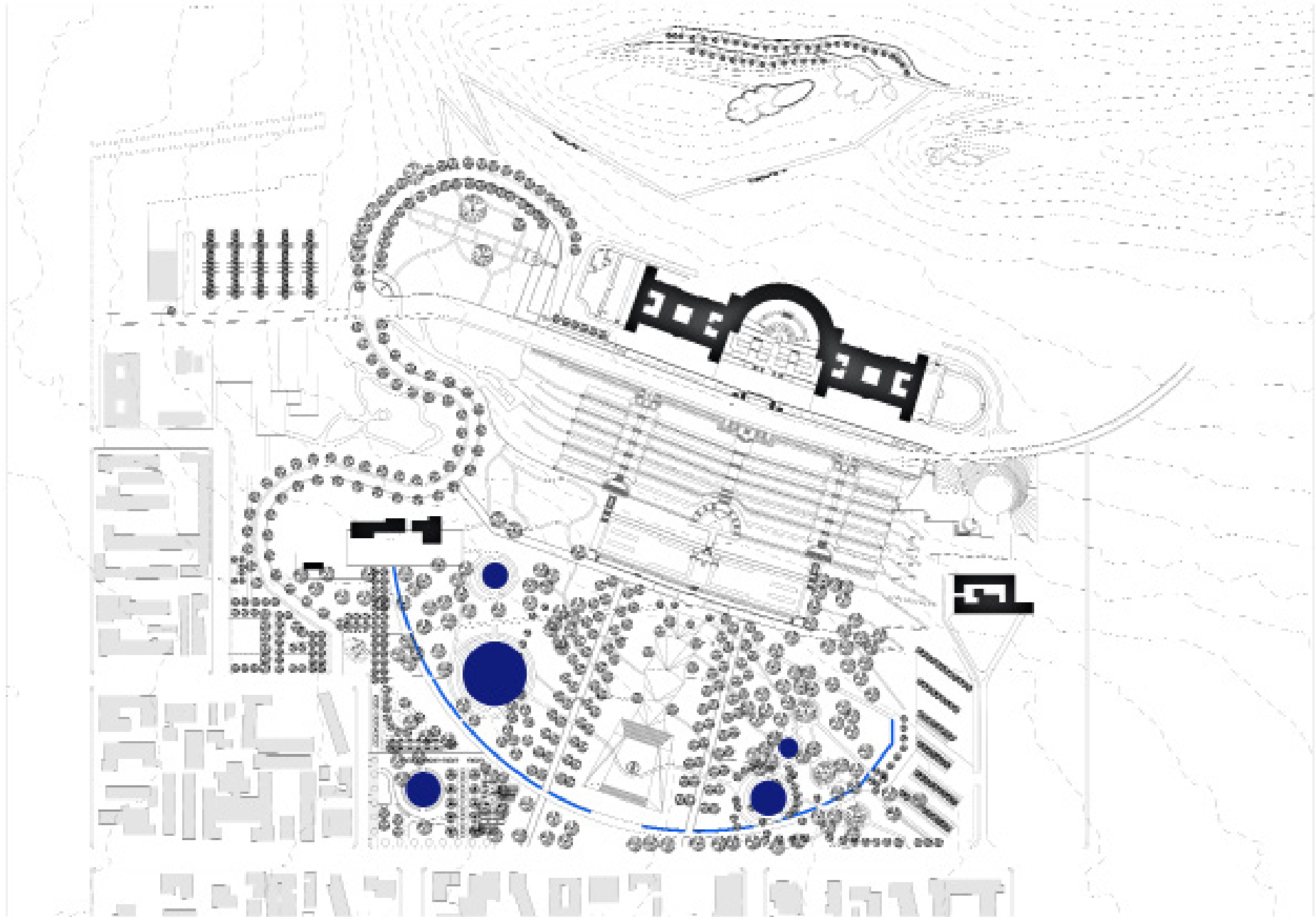


Figure 267. Masterplan Water systems (Author 2021)

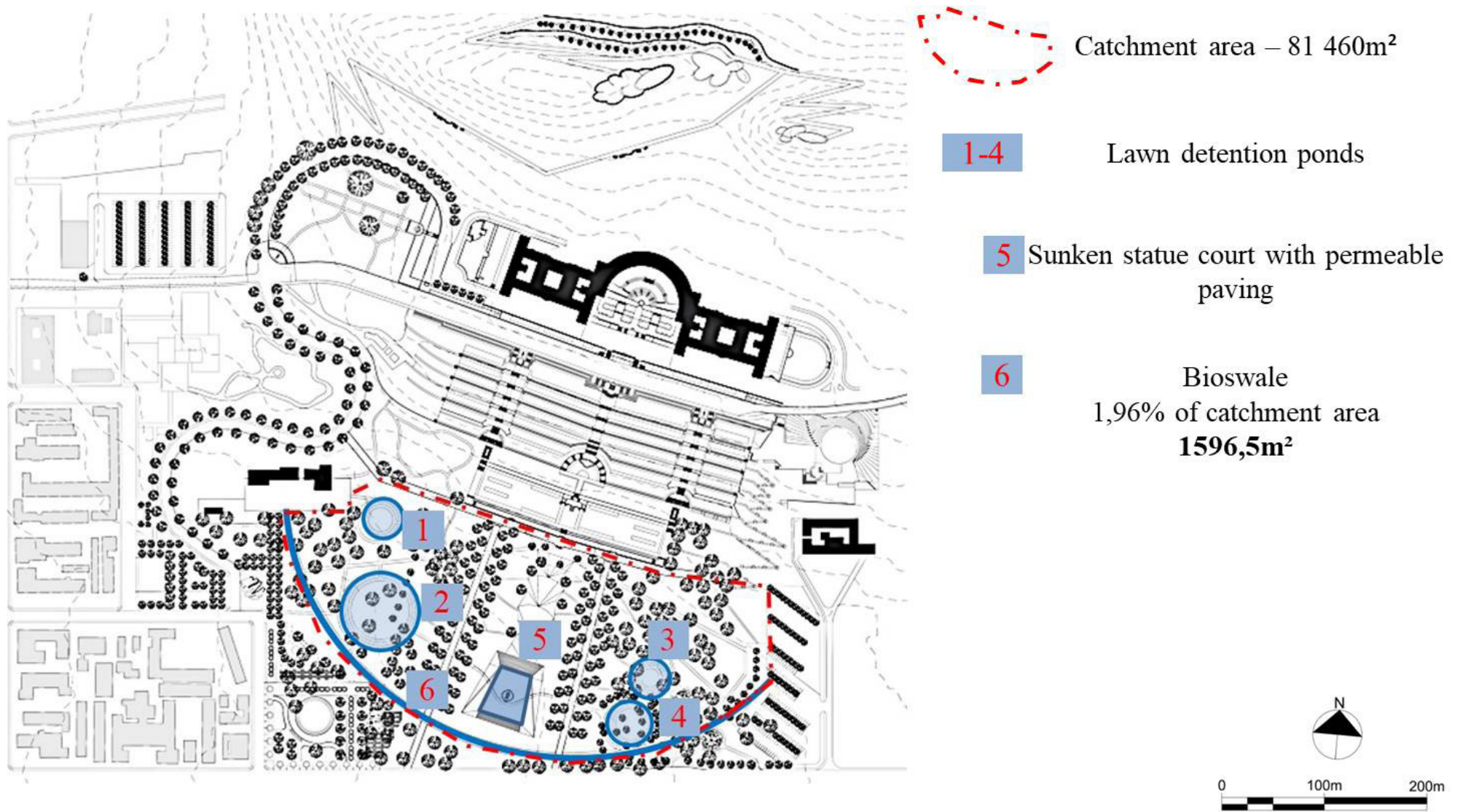


Figure 268. Masterplan Water systems (Author 2021)

2. Yield			
(Where P=precipitation (m), A=area (m <sup>2</sup> ), and C=run-off coefficient )			
Yield (m <sup>3</sup> ) = P x A x C	Area	Run-off Coefficient	
Area of Catchment: Per surface (Per surface)	Area (m <sup>2</sup> )	Run-off Coefficient	
Roofing	0,00 m <sup>2</sup>	0,9	
Paving	14 036,75 m <sup>2</sup>	0,8	
Veldgrass	40 095,78 m <sup>2</sup>	0,4	
Lawn	23 924,06 m <sup>2</sup>	0,4	
Planting	2 564,03 m <sup>2</sup>	0,3	
Gravel	839,02 m <sup>2</sup>	0,7	
TOTAL:	81 459,63 m <sup>2</sup>	0,47	

Mayford website 25mm/week

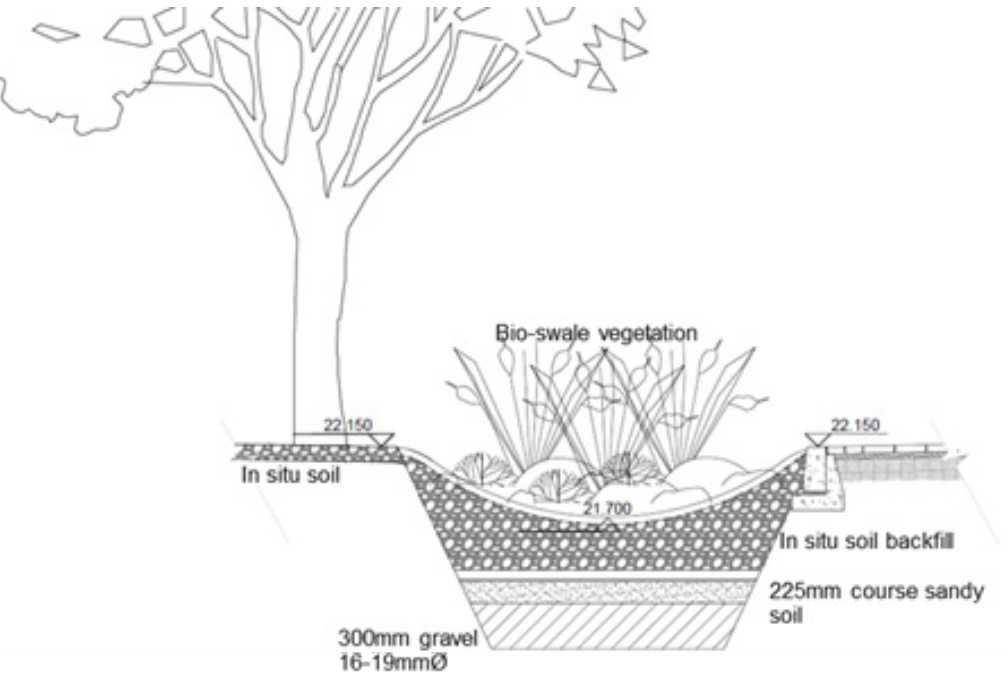
IRRIGATION DEMAND for proposed planting (to be sustained with rain after 2 years of establishment)				
	Planting Area (m <sup>2</sup> )	Irrigation Depth per week (m)	Irrigation Depth per month (m)	IRRIGATION DEMAND (m <sup>3</sup> )
January	2 564 m <sup>2</sup>	0,040 m	0,177 m	454 m <sup>3</sup>
February	2 564 m <sup>2</sup>	0,040 m	0,160 m	410 m <sup>3</sup>
March	2 564 m <sup>2</sup>	0,040 m	0,177 m	454 m <sup>3</sup>
April	2 564 m <sup>2</sup>	0,030 m	0,129 m	330 m <sup>3</sup>
May	2 564 m <sup>2</sup>	0,020 m	0,089 m	227 m <sup>3</sup>
June	2 564 m <sup>2</sup>	0,020 m	0,086 m	220 m <sup>3</sup>
July	2 564 m <sup>2</sup>	0,020 m	0,086 m	220 m <sup>3</sup>
August	2 564 m <sup>2</sup>	0,020 m	0,089 m	227 m <sup>3</sup>
September	2 564 m <sup>2</sup>	0,030 m	0,129 m	330 m <sup>3</sup>
October	2 564 m <sup>2</sup>	0,040 m	0,177 m	454 m <sup>3</sup>
November	2 564 m <sup>2</sup>	0,040 m	0,171 m	440 m <sup>3</sup>
December	2 564 m <sup>2</sup>	0,040 m	0,177 m	454 m <sup>3</sup>
YEAR	2 564 m <sup>2</sup>	0,032 m	1,646 m	4 220 m <sup>3</sup>
	(Average)	(Average)	(Total)	(Total)

IRRIGATION DEMAND FOR EXISTING LAWN				
	Planting Area (m <sup>2</sup> )	Irrigation Depth per week (m)	Irrigation Depth per month (m)	IRRIGATION DEMAND (m <sup>3</sup> )
January	128 659 m <sup>2</sup>	0,025 m	0,111 m	14 244 m <sup>3</sup>

Figure 269. Water calculations  
(Author 2021)

The first phase of capture, convey, detain and filter will primarily take place using bio-swales. The bioswale depths and widths are designed using the Mannings equation and designed masonry steps are used at regular intervals to slow the water within the bio-swales to ensure infiltration. The bioswale runs along an arched pathway across the southern lawn to capture stormwater runoff and allow for recharge.



**Bioswale Species palette**

- Andropogon eucomis
- Crinum bulbispermum
- Crinum macowanii
- Hesperantha coccinea
- Juncus kraussii
- Kniphofia praecox
- Kniphofia ensifolia
- Stiburus alopecuroides

Figure 270-271. Water system bioswale (Author 2021)

For the second phase consisting of water table recharge, is a planted detention pond in the form of the proposed, large manicured lawn circles will be used as short period detention to allow for recharge. Water is also captured in areas where water accumulates on site, silt traps are used to capture any silt that is still in the water that enters the storage tanks from surface run-off. Only a small volume of water is captured of the total run-off and stored for the use of the two new water features on the terraces where water normally accumulates in the rainy season. Besides the lawn circles being used for recreation and sport, they will be used to detain and recharge ground water during the rainy season. With the help of a stormwater engineer, the circles will be designed to detain stormwater for between 24 and 72 hours to allow for recharge.



Figure 271. Water accumulation on site (Author 2021)  
Figure 272. Dam on site before 1910 (Hansen 2016)

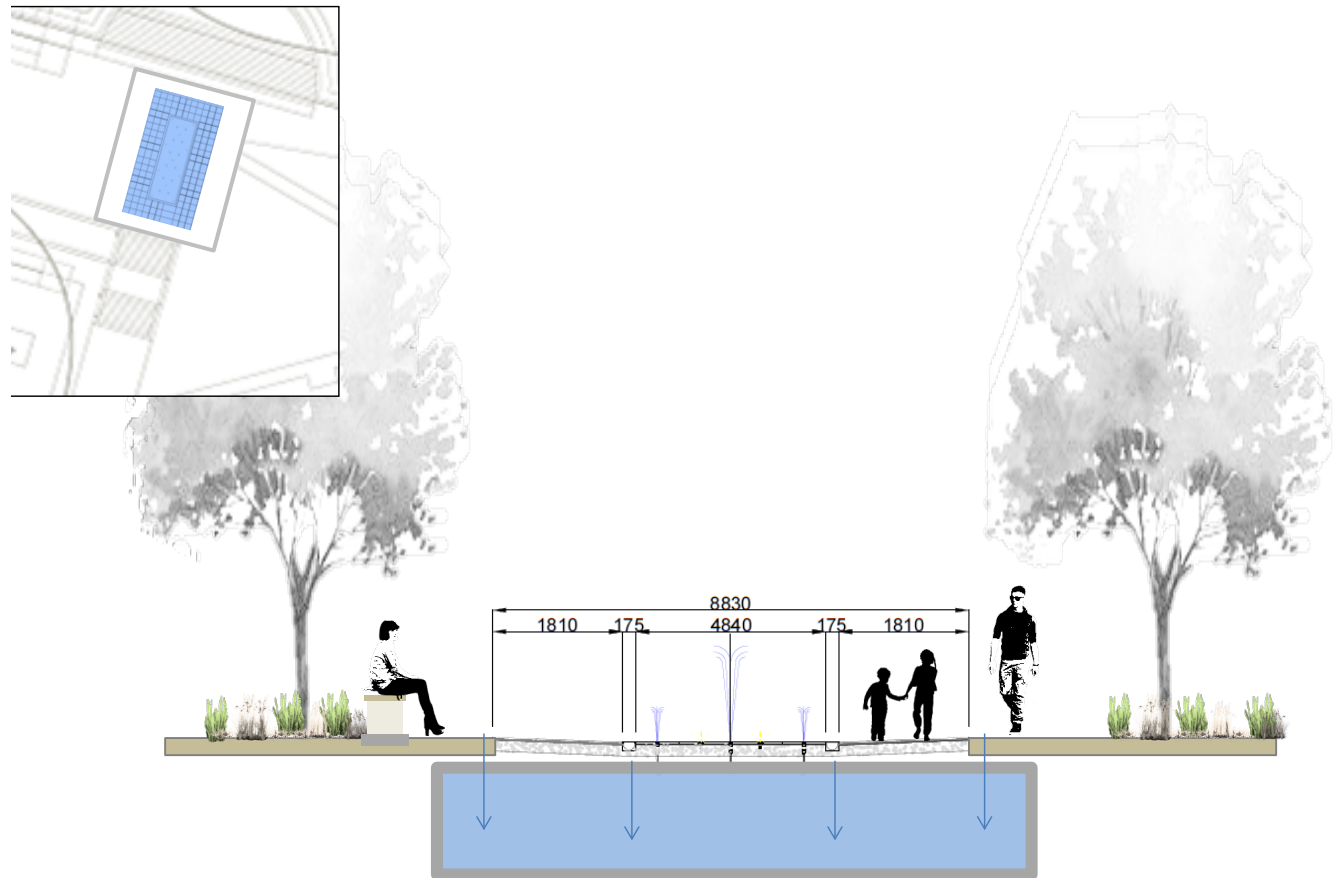


Figure 273. Water systems - water feature storage  
(Author 2021)



**Detention pond - lawn circles 5000,7m<sup>2</sup>**  
Mayford Princess *Cynodon dactylon*

Figure 274-275. Water systems - Ground water recharge / detention ponds (Author 2021)

## Ecology / Planting design:

The primary goal of the planting design is to articulate the lost narrative of indigenous planting on the hill, secondly to create a multi-sensory experience around the inclusive design interventions, and thirdly to renew the planting of the terraces by taking inspiration from early references to some of Baker's intentions with the plants, as well as paintings of the site by Pierneef 1939, K.A. Lausdell 1919 from the Memoirs of the First Botanical survey of South Africa (See fig. 20 & 208) and a similar painting done by Goosen in 1944 and N. Coetzee n.d. (See fig. 209 & 211).

For the terrace study, an attempt was made to identify the plants in these artworks and to compare them with current images of the site and existing planting palettes as identified on-site visits.

In the first known artwork drawn by K.A. Lausdell as a frontispiece for a botanical survey of South African plants and specifically those planted at the Union Buildings. This drawing clearly depicts the original gardens of the Union Buildings with Herbert Baker's original intent to create bright coloured gardens with scarlet, orange, and yellow flowers of sun-loving African plants, later described as *Aloes*, *Mesembrantheums* and *Cotyledons* that was planned to contrast against the stone terrace walls.

On the image, a number of different *Aloe*, *Cotyledon*, and *Euphorbia* species can be identified. If these species are re-introduced onto the site, they would fall within the current water-wise approach to planting, implemented by the Department of Public Works and it will create more permanent landscaping in the form of perennials rather than their current approach of using annuals and seedlings.



Figure 276. Union Buildings gardens from the Polica Memorial Photo by Elzbieta Sekowska n.d.(Online Adobe stock)

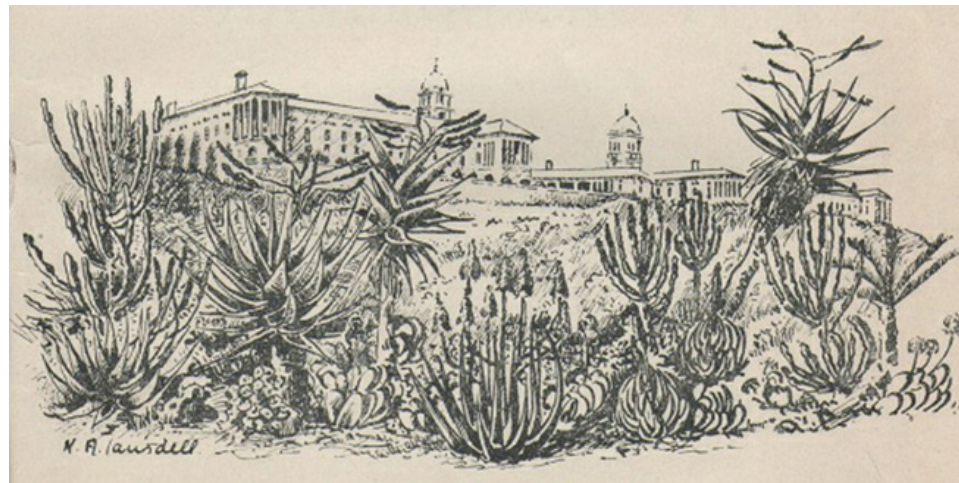


Figure 277. Remembering the original (Union Buildings drawing by K.A. Lausdell 1919)



Figure 278. Union Buildings gardens Photo by Lisa S. Engelbrecht n.d.(Online Adobe stock)

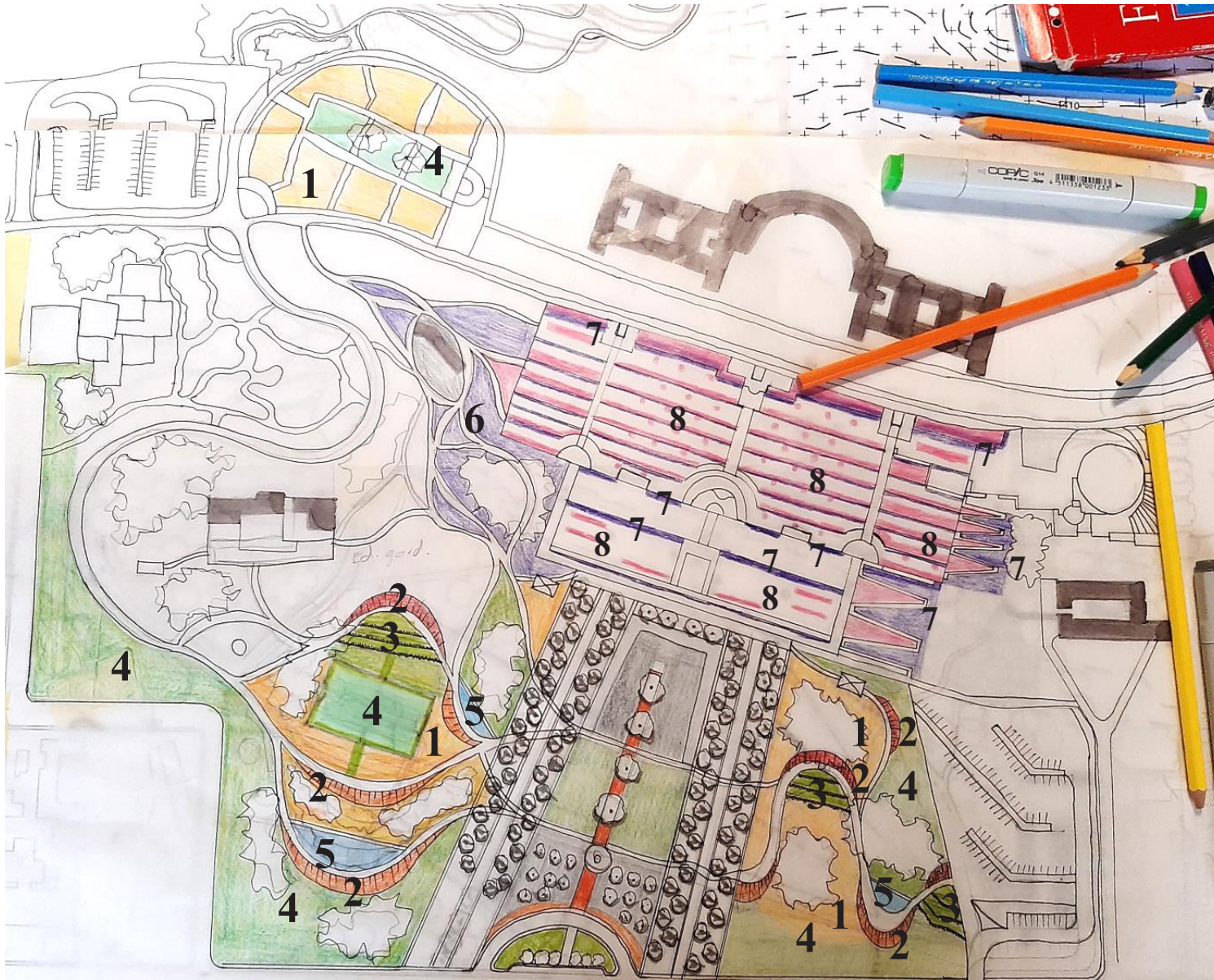


The second and third images show similar paintings done by N. Coetzee for which the date is unknown and also by Goosen in 1944.

Since the plants seem similar in these artworks it can be assumed that Coetzee's painting was done more or less in the same period as Goosen's. The gardens show the classical approach to formal gardening in the form of topiaries and the use of *Cyperus* trees. Although these topiaries and these specific cyperus trees are no longer in this area on-site, similar topiaries and *Cyperus* trees can still be found on the terraces. What is interesting about these paintings is the depiction of clumps of grass species and what seems to be the indigenous *Dombeya* tree flowering with its beautiful small white flowers. The clumps of grasses with large white tufts appear to be the category 1 Invasive Alien species, pampas grass (*Cortaderia jubata* or *Cortaderia selloana*) which is native to South America. As can be seen, the last image depicts this area in the gardens as it looked like on the 25th of August 2021 which shows that the once beautiful gardens are now mostly lawn, *Dietes grandiflora*, *Tulbachia violacea*, *Violas*, *Irises*, and a *Rhus lancea* tree.

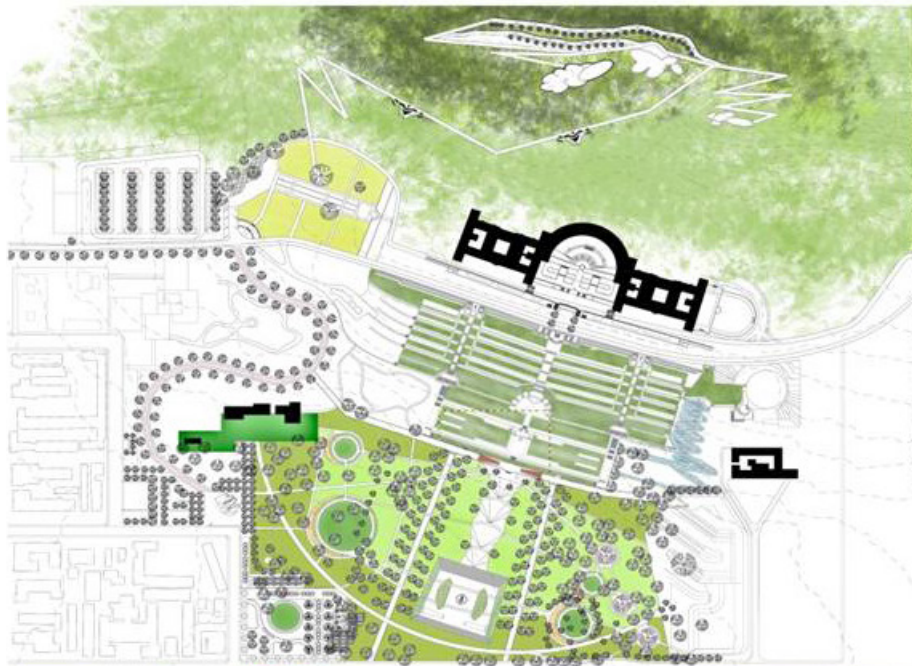


Figure 279-281. Planting over time (varies)



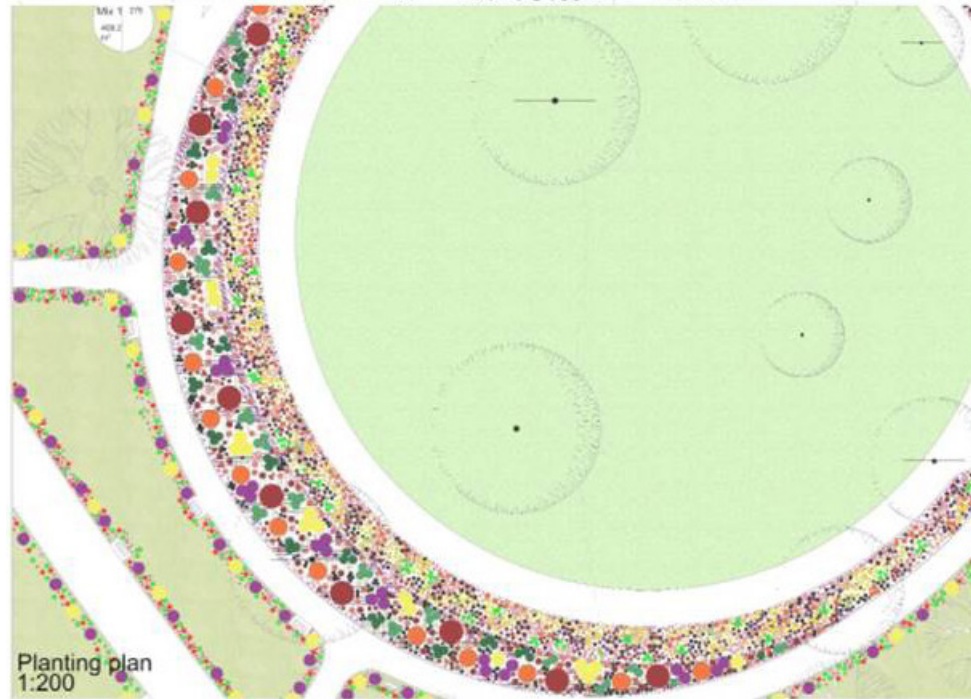
- 1 - Grassland habitat
- 2 - Rocky outcrop habitat - berms (northern slope and southern slope)
- 3 - Stepped lawn embankments
- 4 - Maricured lawn
- 5 - Detention pond
- 6 - Shade planting
- 7 - Shade terraces
- 8 - Sun terraces

Figure 282. Early plant zoning (Author 2021)



**Grassland palette -  
Planted along edges of paths**

- Helichrysum* spp.
- Chlorophytum saundersiae* *Scabiosa incisa*
- Themeda triandra*
- Cenchrus ciliaris*
- Aerva leucura*
- Panicum maximum*
- Eragrostis curvula* & *racemosa*
- Melinis repens*
- Kylinga alba*
- Sporobolus stapfianus*
- Loudetia simplex*
- Aristida junceiformis*
- Aloe cooperi*
- Aloe greatheadii*
- Barleria pretoriensis*
- Eucomis autumnalis*
- Gladiolus dalenii*
- Freesia grandiflora*
- Bulbine abyssinica*
- Delosperma*
- Portulacaria afra*
- Monocymbium ceresiforme*
- Erythrina humeana*
- Dianthus*
- Crossandra greenstockii*



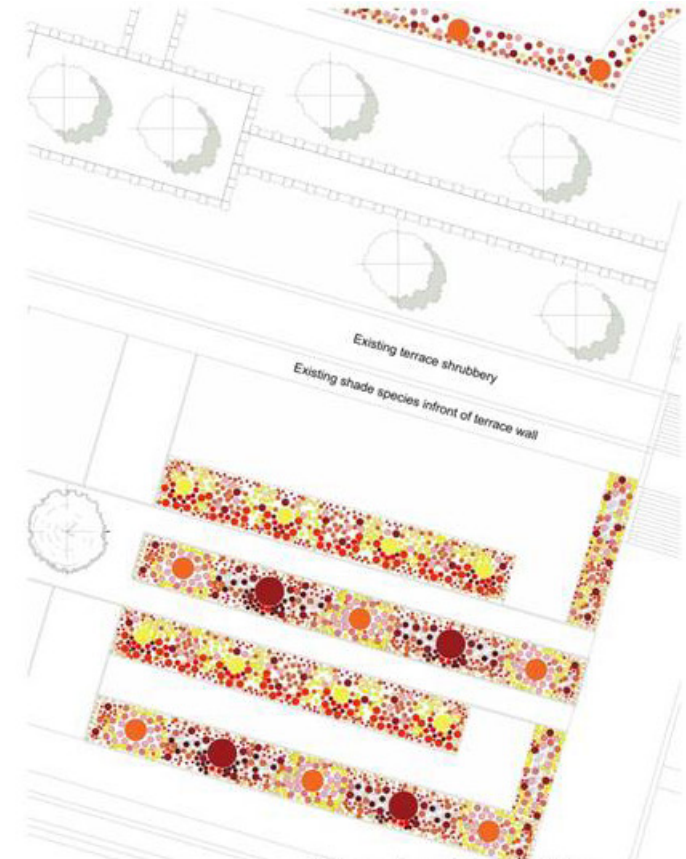
**Active lawn circle**

*Cynodon dactylon* "princess"

**Rocky outcrop palette -  
Planted on berm around circle**

- Aloe cooperi*
- Aloe greatheadii*
- Aloe pretoriensis*
- Aloe verecunda*
- Aloe transvaalensis*
- Aristida junceiformis*
- Boophone disticha*
- Bulbine abyssinica*
- Cotyledon orbiculata*
- Crassula alba*
- Crassula multicaeva*
- Crossandra greenstockii*
- Dianthus moienis*
- Eucomis autumnalis*
- Falkia repens*
- Felicia filifolia*
- Felicia mucicata* \*
- Gazania krebiana* \*
- Gerbera jamesonii*
- Huemia transvalensis*
- Hypoxis hemerocallidea*
- Hypoxis interjecta*
- Hypoestis forskoali*
- Ipomoea crassipes*
- Kalanchoe sexangularis*
- Kalanchoe thyrsiflora*
- Kylinga alba*
- Melinis nervigulumis*
- Melinis repens*
- Portulacaria afra*
- Scadocus puniceus*
- Senecio barbetonicus*
- Sporobolus stapfianus*
- Stapelia gigantea*
- Themeda triandra* "ice"
- Tulbachia violacea*
- Tulbachia violacea* "ashanti"

Planting plan  
1:200



**Warm coloured - South African,  
sun-lovers planted on terrace 7 & 8**

- Aloe arborescens* - Krantz aloe (Red)
- Aloe arborescens* yellow - Yellow Krantz aloe
- Aloe cooperi* - Grassland aloe (Red)
- Aloe greatheadii* - Spotted aloe (Red) [winter]
- Aloe marlothii* - mountain aloe (orange)
- Aloe pretoriensis* - Pretoria aloe (Orange / red)
- Aloe transvaalensis* (Aloe zebrina) - Zebra leaf aloe (Orange / Red) [summer]
- Aloe verecunda* - Grass aloe (Orange / red)
- Bulbine abyssinica* - Bushy bulbine (Yellow)
- Cotyledon orbiculata*
- Crossandra greenstockii* - Bushveld crossandra (Orange)
- Crassula capitella* "campfire" - Red flames (red)
- Erythrina humeana* - Dwarf coral (Red)
- Freesia grandiflora* - Forrester freesia (Red)
- Gazania krebsiana* - terracotta gazania (yellow & orange)
- Kalanchoe sexangularis* - Bushveld kalanchoe - (Red)
- Kleinia fulgens* - coral senecio (red)
- Melinis repens* - Natal red top (Red)
- Melinis nervigulumis* - bristle-leaved red-top grass (red)
- Stapelia leendertziae* - bell stapelia (Deep red)
- Themeda triandra* - Red grass (Red)
- Triumfetta sonderii* (red seed balls)

Figure 283. Planting areas (Author 2021)

## Existing Species colour calender:

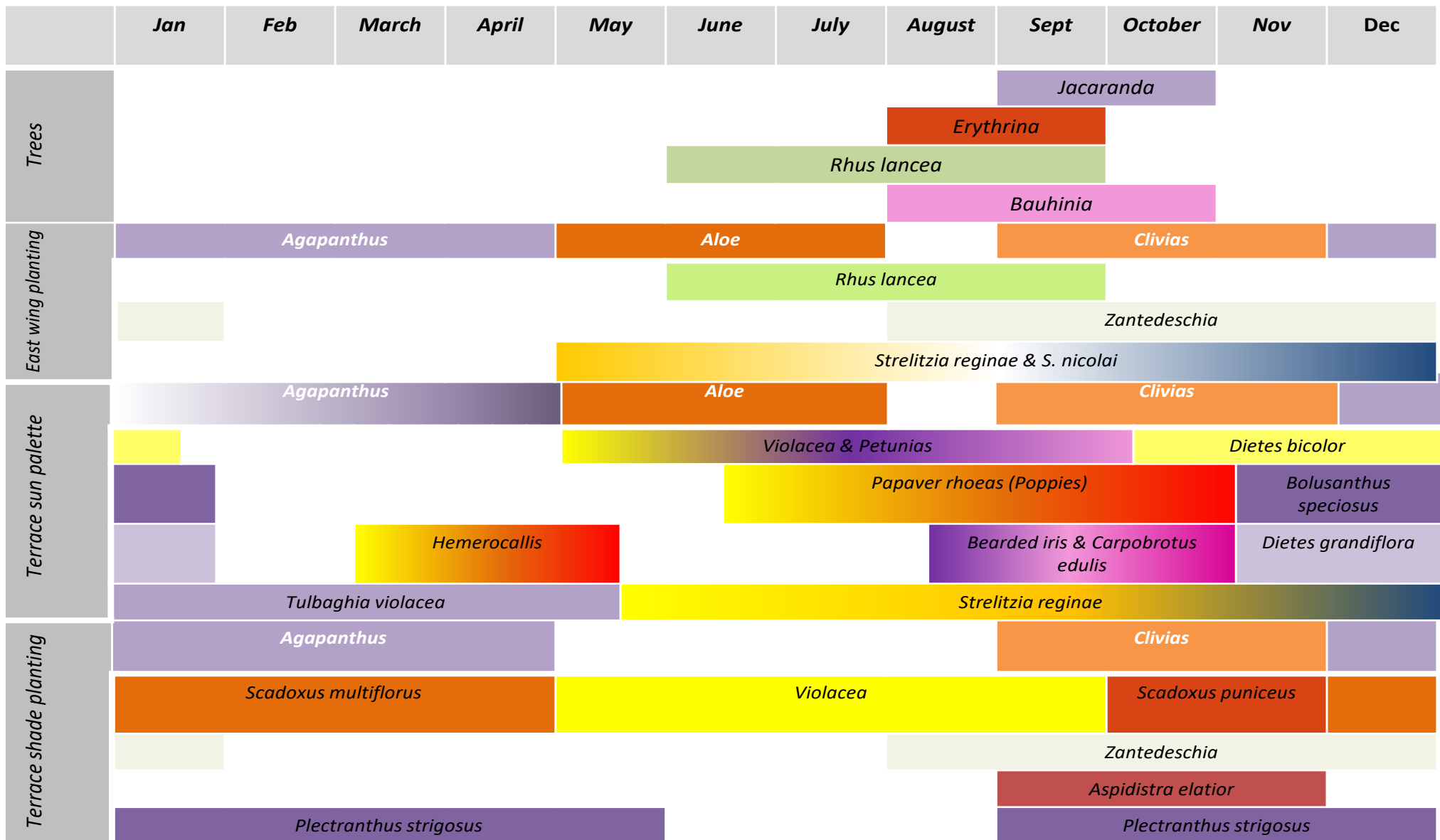


Figure 284. Existing species colour calender (Author 2021)

## Existing specie palette (East wing palette)

### East wing

*Agapanthus* sp.

*Strelitzia nicolai*

*Monstera deliciosa*

*Zantedeschia aethiopica*

Broodboom -  
*Encephelartos* sp.

*Strelitzia reginae*

*Aloe arborescens*

*Searsia lancea*



Figure 285. Identifying existing species on site. (Author 2021)

## Existing specie palette (Terrace sun palettes)

### Sunny Terrace palette

Poppies (*Papaver nudicaule*)

Day lilies –  
*Hemerocallis* sp.

*Viola tricolor*

*Petunia* sp.

*Strelitzia reginae*

*Dietes bi-color*

*Agapanthus praecox*

*Aloe arborescens*

*Strelitzia reginae*

*Iris germanica*

*Bolusanthus speciosus*

*Tulbaghia violacea*

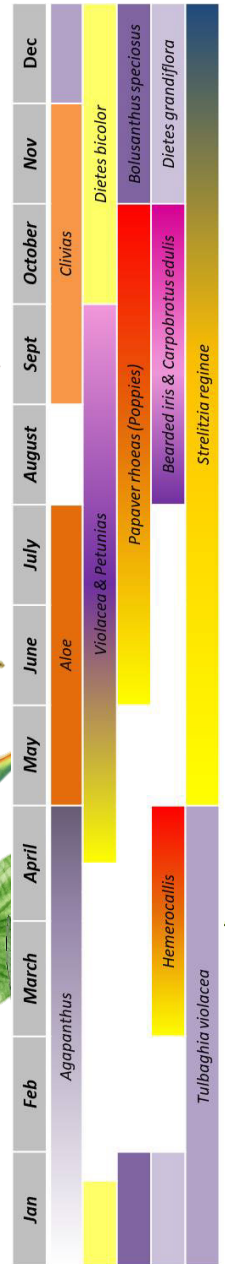


Figure 286. Identifying existing species on site. (Author 2021)

# Existing specie palette (Shade & tree palettes)

## Tree palette

- Berg karee – *Searsia lyptodicta*
- Bauhinia variegata*
- Podocarpus henkelii*
- Pinus roxburghii*
- Coral tree - *Erythrina lysistemon*
- Searsia lancea*
- Jacaranda mimisifolia*
- Celtis africana*



## Shady Terrace palette

- Zantedeschia aethiopica*
- Pansies (*Viola tricolor*)
- Agapanthus sp.*



## Shade wings palette

- Ivy – *Hedera helix*
- Cast iron plant – *Aspidistra elatior*
- Mondo grass – *Ophiopogon japonica*
- Clivia sp.*

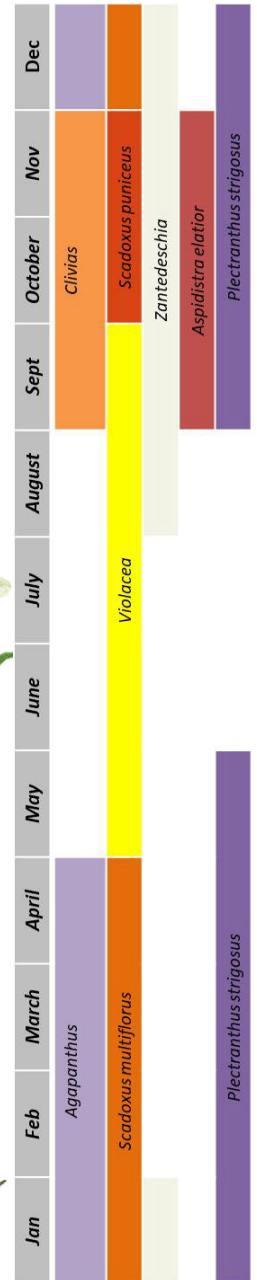


Figure 287. Identifying existing species on site. (Author 2021)

## Masterplan - proposed planting plan

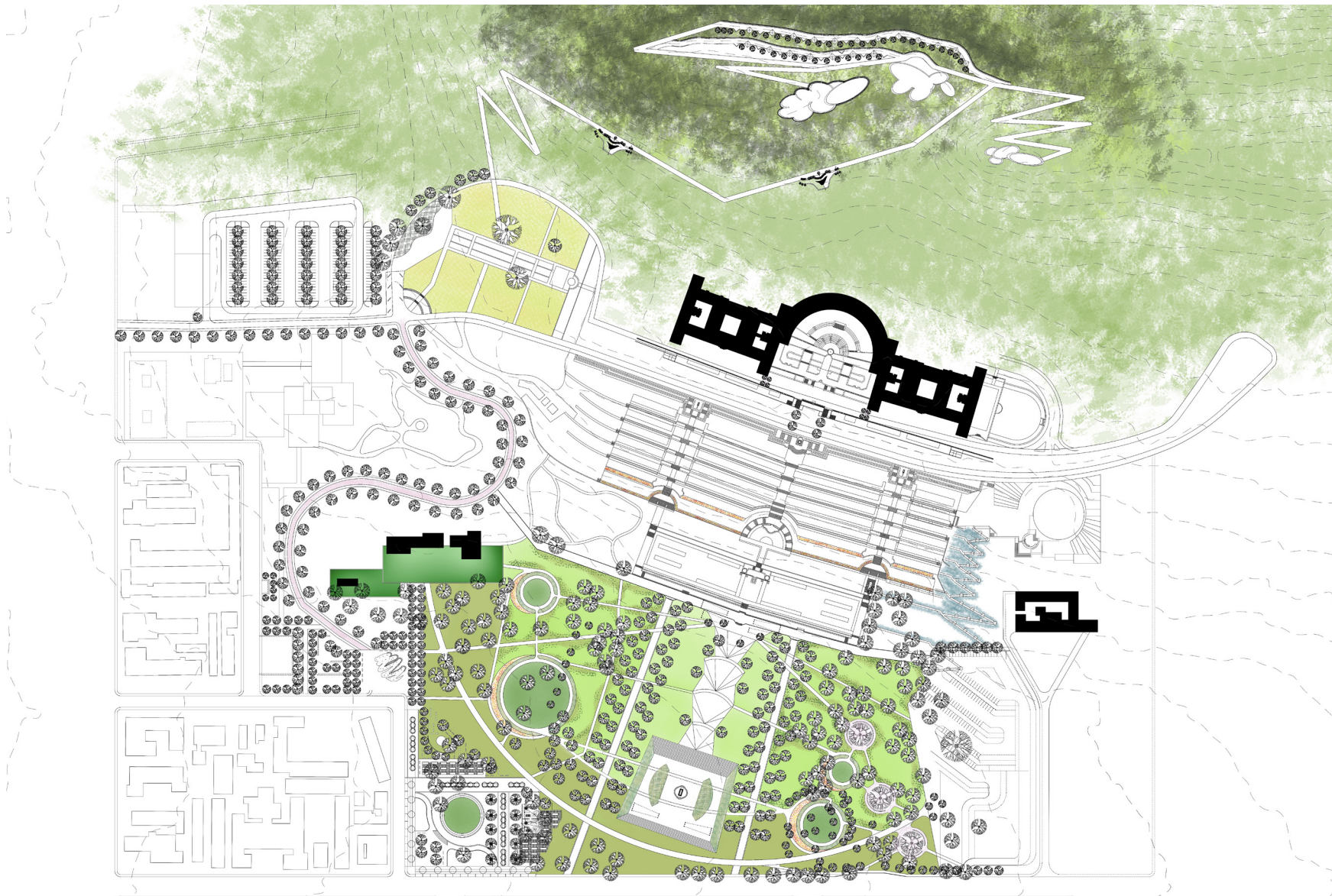


Figure 288. Planting on Masterplan. (Author 2021)



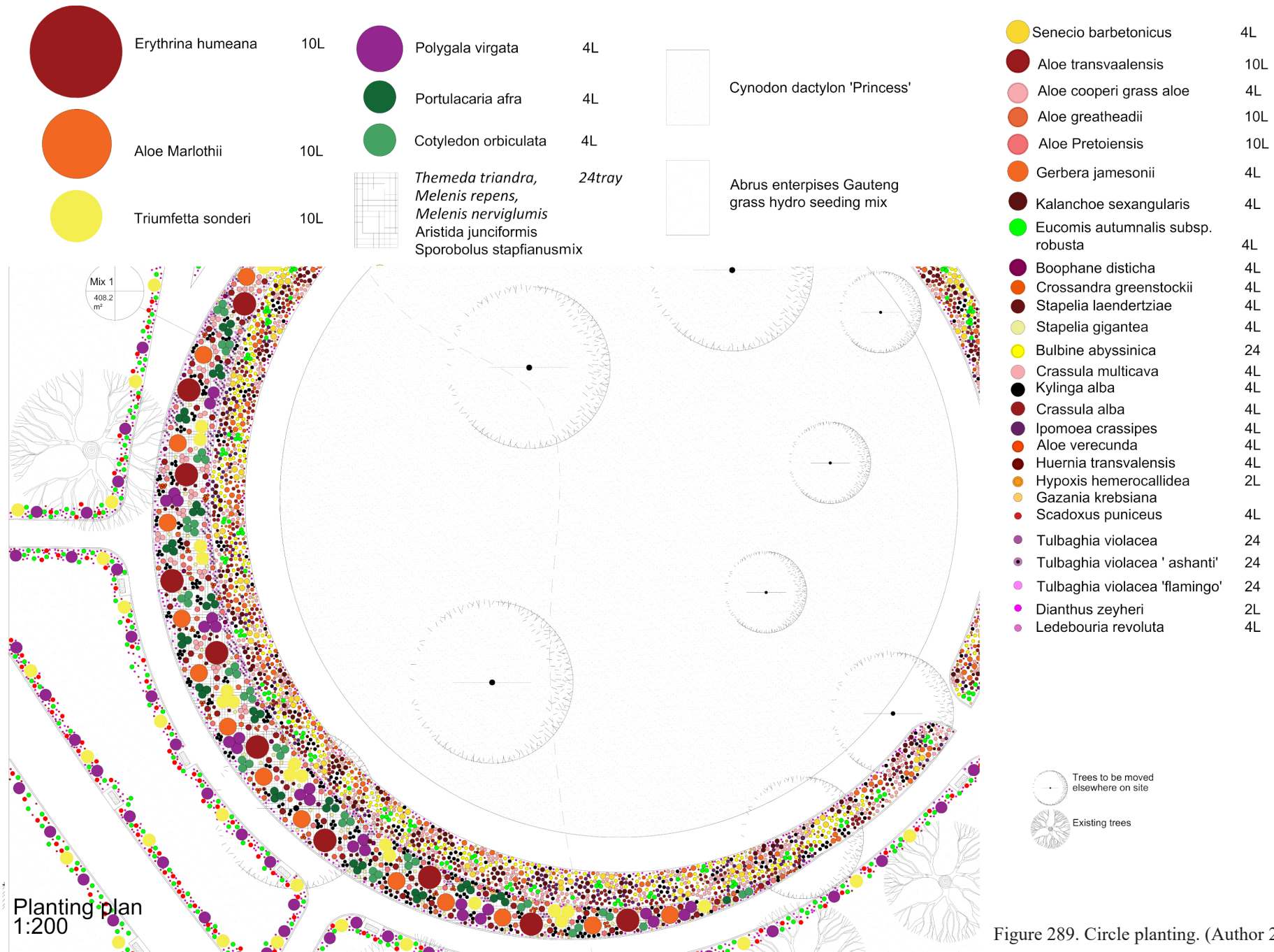
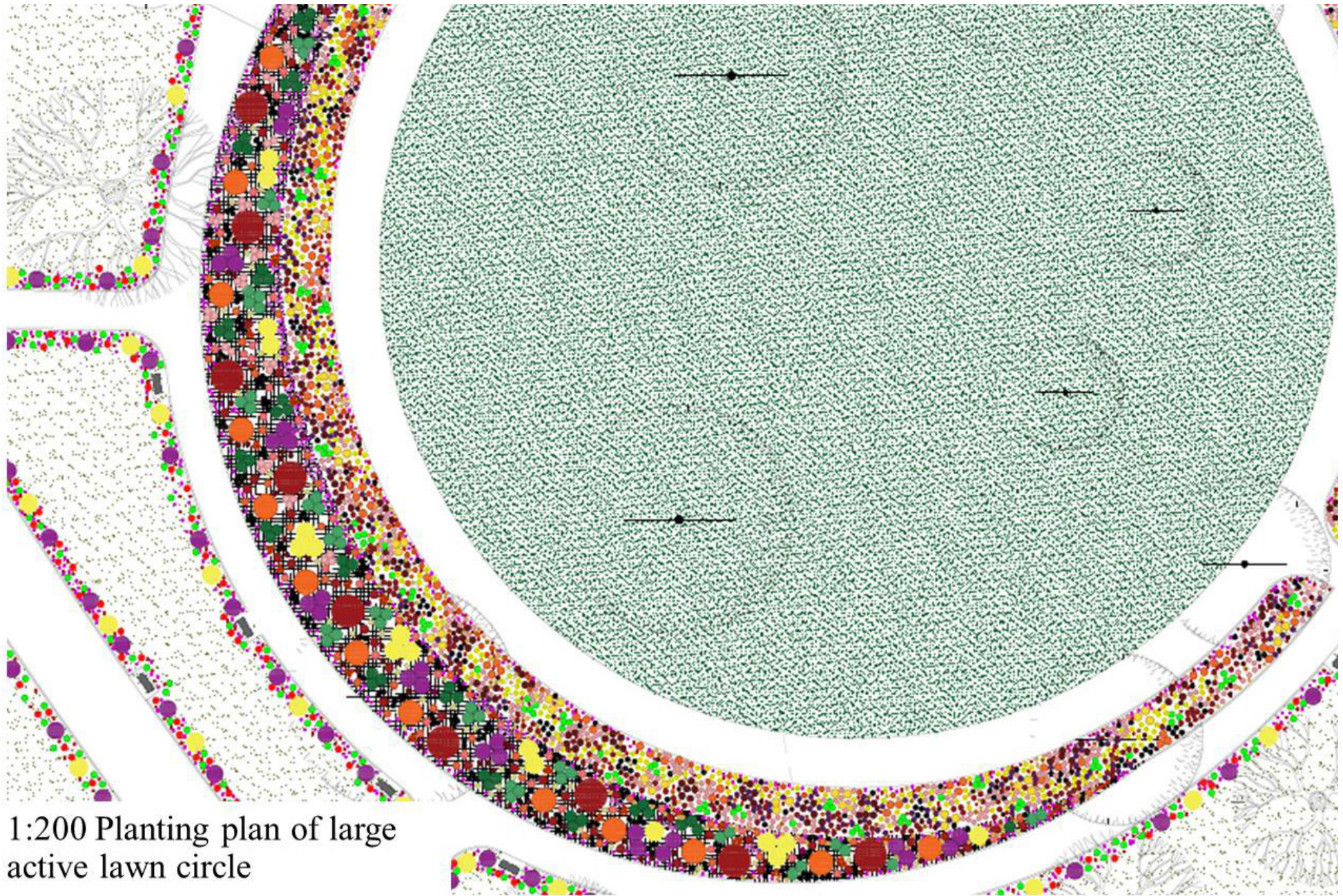


Figure 289. Circle planting. (Author 2021)



1:200 Planting plan of large active lawn circle

Figure 290. Circle planting. (Author 2021)



Figure 291. Circle planting perspective. (Author 2021)





Figure 293. Main paths planting perspective. (Author 2021)

# Sensory garden Palette (ramps) – Touch, smell, taste, sound

Sensory garden palette																							
Plant name		Plant type	Size	Seasons												Attracts			Plasticity				
Common name	Botanical name			J	F	M	A	M	J	J	A	S	O	N	D	Insects	Fauna & Birds	Humans	Light	Moisture	Soil type	Hardiness	
Lemon verbena	<i>Aloysia citrodora</i>	Deciduous Perennial herb	Up to 3m tall						Dormant period				White to lilac tiny flowers						Smell and taste	Full sun		Well drained soil	
Lemon grass	<i>Cymbopogon citratus</i>	Grass	90cm to 2m tall, 1,2m wide						Dormant in cold areas										Smell and taste	Full sun to semi-shade	Moderate	Well drained Loamy soil	Frost sensitive
Stork's bill, star burst pelargonium, wildemalva	<i>Pelargonium luridum</i>	Deciduous Perennial herb	1m tall	Cream to pink flowers		Elliptical Seeds				Dormant period								Grazing	Smell	Full sun	Moderate	Well drained. Sandy, loam	
Starry wild jasmine	<i>Jasminum multipartitum</i>	Evergreen climber or shrub	Up to 1,5-3m		Green to bluish-black berries							40mm diameter perfumed white flowers				Butterflies and moths	Insects attract insectivorous birds, Game grazing	Smell	Prefers partial shade	Low to moderate	Well drained soil with organic material, sandy loam	Relatively hardy, sensitive to frost	
Wild mint	<i>Mentha longifolia</i>	Perennial herb	0,5-1m Up to 1,5m tall	White to mauve flowers													Bees and butterflies	Smell	Full sun to semi shade	Moderate to high	Sandy loam		
Rose-scented geranium	<i>Pelargonium graveolens</i>	Shrub	1,3m tall, 1m wide									White to pinkish flowers				Butterflies, bees		Smell	Semi-shade	Moist	Sandy loam		
Golden sage	<i>Salvia aurea (africana-lutea)</i>	Shrub	Up to 2m	Brown flowers from spring sometimes year round														Smell and touch	Full sun	Low	Well-drained, sandy loam	Hardy	
Wild garlic	<i>Tulbaghia violacea (Tulbaghia pearl, oshanti and flamingo)</i>	Bulbous plant	0,5m	Pinkish mauve flowers garlicky scented													Moths, bees and butterflies	Smell	Sunny to semi-shade		Most soils, prefers well-drained composted	Drought resistant	
Lamb's ear	<i>Stachys byzantina</i>	Groundcover																Touch	Full sun	Low to moderate	Well drained sandy loam	Drought tolerant	
Natal red top	<i>Melinis repens</i>	Grass	Up to 1,5m	White pinkish small scented flowers														Birds	Touch	Full sun		Sandy loam	
Cat's tail	<i>Asparagus densiflorus 'Meyersii'</i>	Perennial	30-60cm tall by 400-700 wide	White pinkish small scented flowers														Birds	Touch	Full sun, semi-shade	Moderate	Sandy loam	Drought tolerant
Yellow everlasting	<i>Helichrysum setosum</i>	Perennial	Up to 40cm	Yellow flowers														Touch and smell	Full sun		Sandy loam, well drained	Hardy	
Wild pear	<i>Dombeya rotundifolia</i>	Tree	3-6m Up to 10m tall							White to cream flower clusters							Bees and butterflies	Touch	Full sun	Moderate	Loam, sand	Fire resistant trunk	
Raasblaar blaar	<i>Combretum zeyheri</i>	Tree	10-15m	Green flowers													Butterflies and moths	Horn bill bird	Sound	Full sun semi-shade	Moderate	Sandy Well drained	

Figure 294. Proposed sensory garden species (Author 2021)

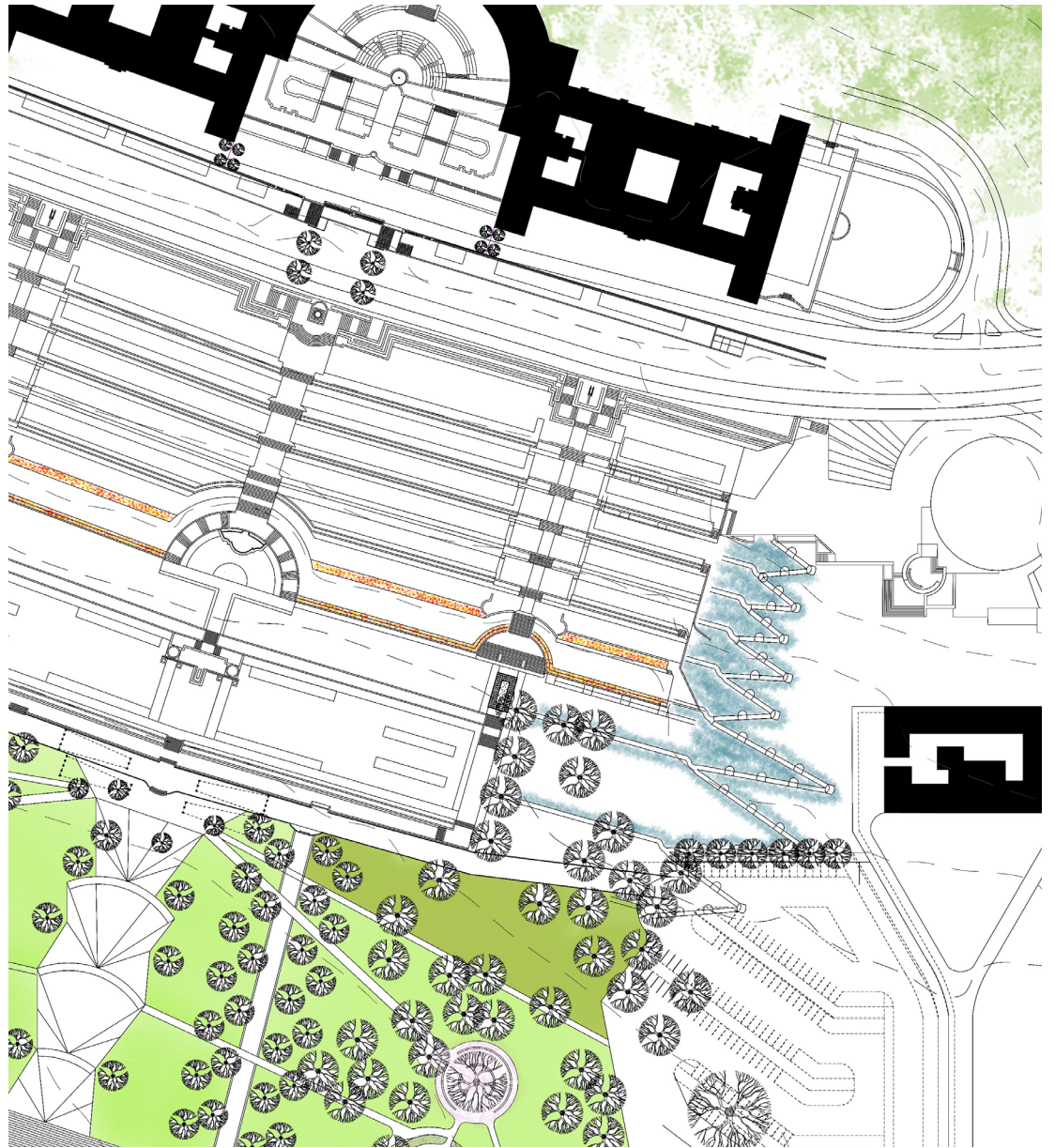
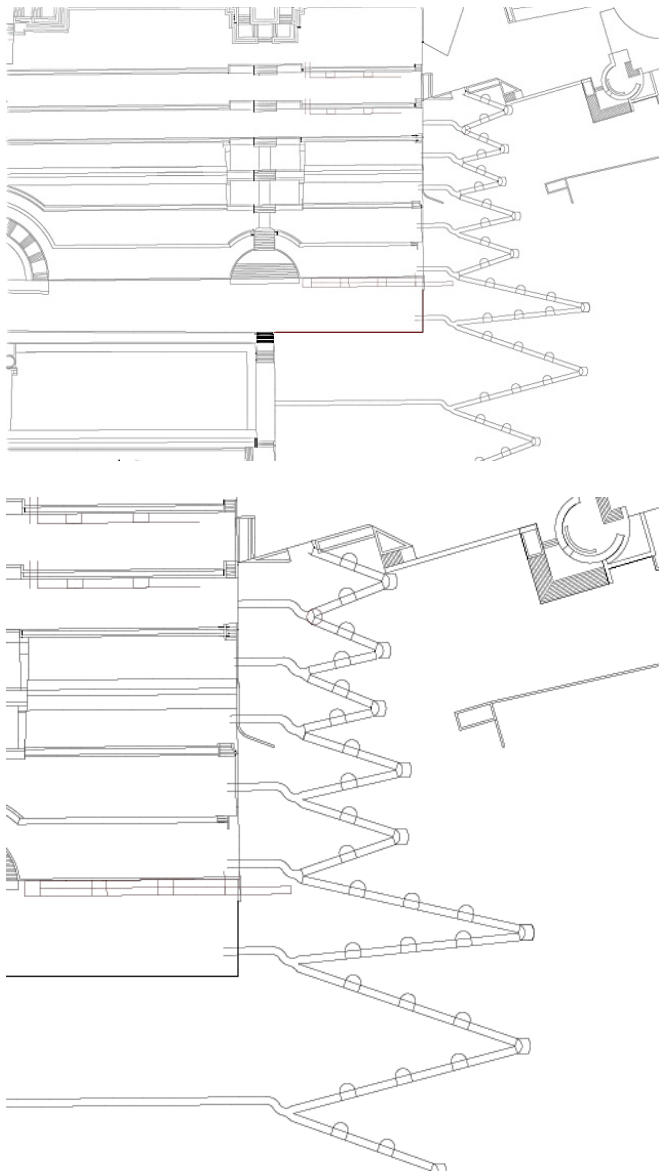


Figure 295-296. Proposed sensory on plan (Author 2021)

# Terrace planting design - based on Baker's planting intentions

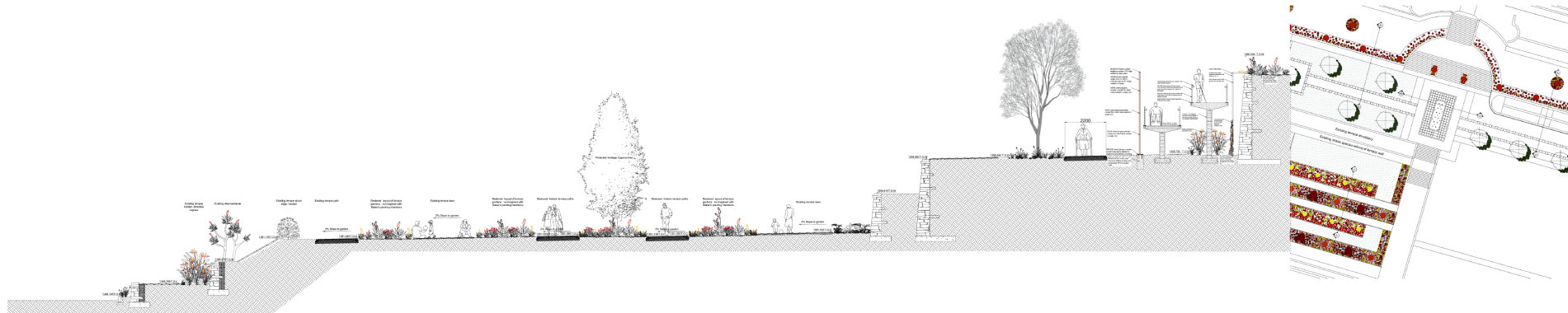


Terrace planting plan 1:100 (@A1)

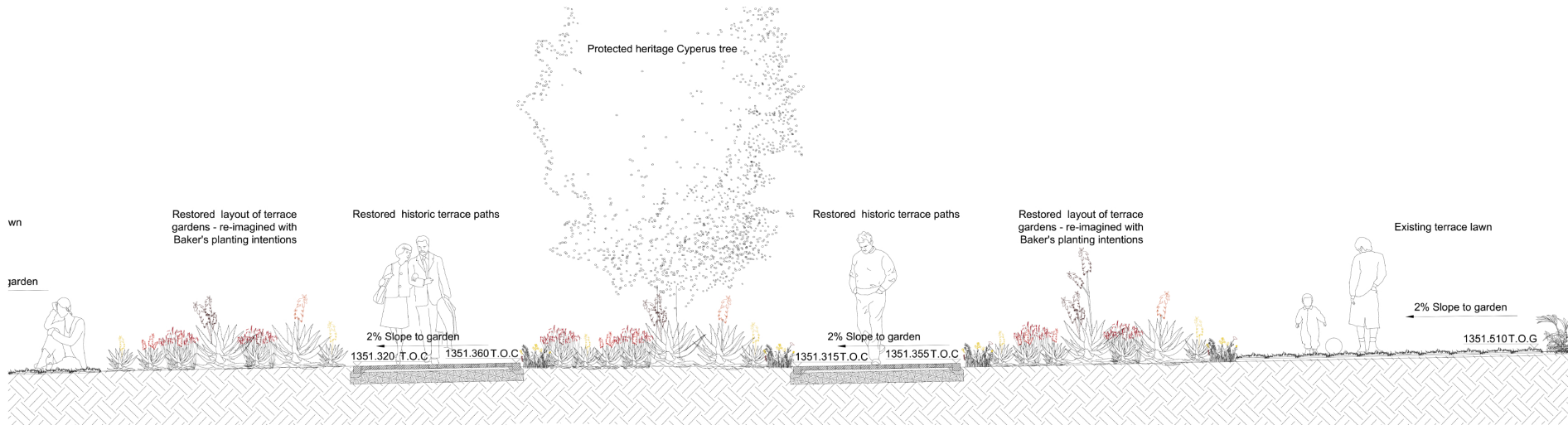
Figure 297. Terrace planting design (Author 2021)



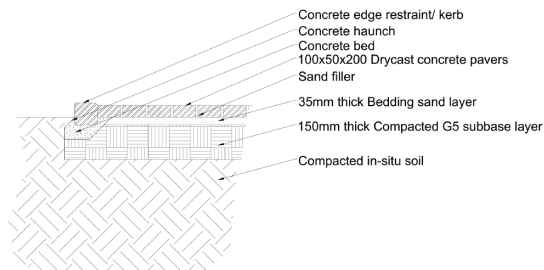




Terrace Section AA 1:100 (@A1)

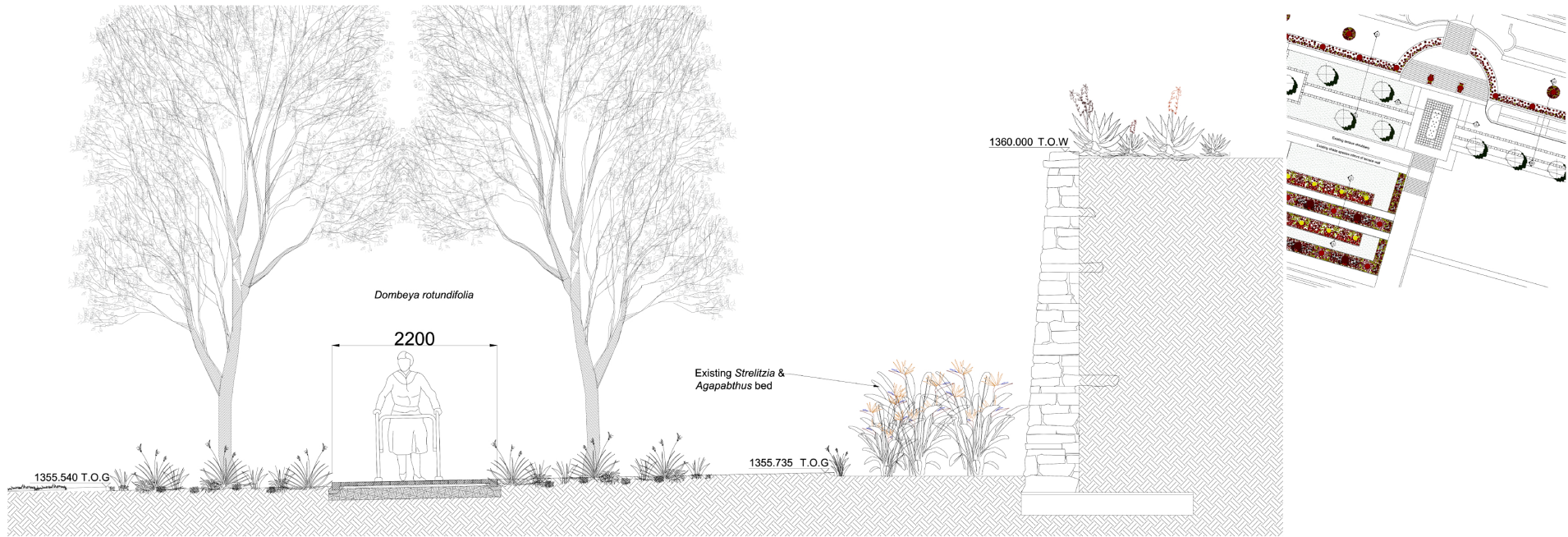


Section AA 1:25

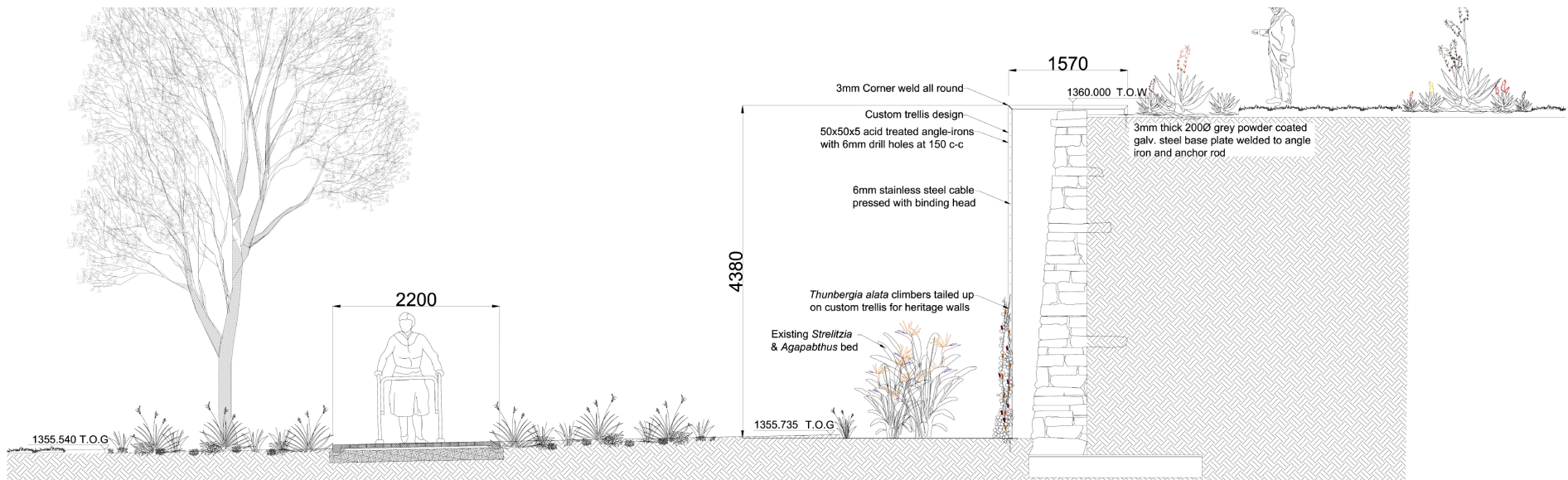


Paving edge detail  
1:10

Figure 299. Terrace planting design sections (Author 2021)



Section C2 1:25



Section C3 1:25

Figure 300. Terrace planting design sections (Author 2021)

# Women's protest routes Palette – Mostly white blooms

Plant name		Plant type	Size	Seasons												Attracts			Plasticity			
Common name	Botanical name			J	F	M	A	M	J	J	A	S	O	N	D	Insects	Fauna & Birds	Humans	Light	Moisture	Soil type	Hardiness
Wild pear	<i>Dombeya rotundifolia</i>	Tree	3-6m Up to 10m tall										White to cream flower clusters			Bees and butterflies		Touch	Full sun	Moderate	Loam, sand	
White sedge	<i>Kylinga alba</i>	Sedge	30cm	Year round White balls (flowers)															Full sun	Moderate	Loamy	Very hardy
Wilde-tabak	<i>Silene undulata</i>	Perennial herb	Up to 1,2m	White to pale pink scented flowers												Bees and butterflies					Loam	
White paint brush	<i>Haemanthus albiflos</i>	Bulb	25cm																Shade			
Snowflake grass	<i>Andropogon eucomis</i>	Grass	50cm	Glistening white seeds													Birds		Full sun	Moderate	Loamy	Hardy
Silver andropogon	<i>Andropogon huilensis</i>	Grass	1m									Silvery white feathery inflorescences				Birds		Full sun	Moderate to high	Sandy loam	Hardy	
	<i>Themeda triandra 'ice'</i>	Grass	20-80cm									Silvery white inflorescence						Full sun or semi-shade		Loam	Fire resistance	
Candelabrum lily	<i>Albuca nelsonii</i>	Bulb	1m										White striped green flowers						Semi-shade or sun		Loam	
African lily	<i>Agapanthus 'white ice' &amp; 'white giant'</i>	Bulb	40cm – 1,5m																Full sun semi-shade	Low to moderate	Any well composted soil	



Figure 300-302. Proposed women's memorial route species and section (Author 2021)

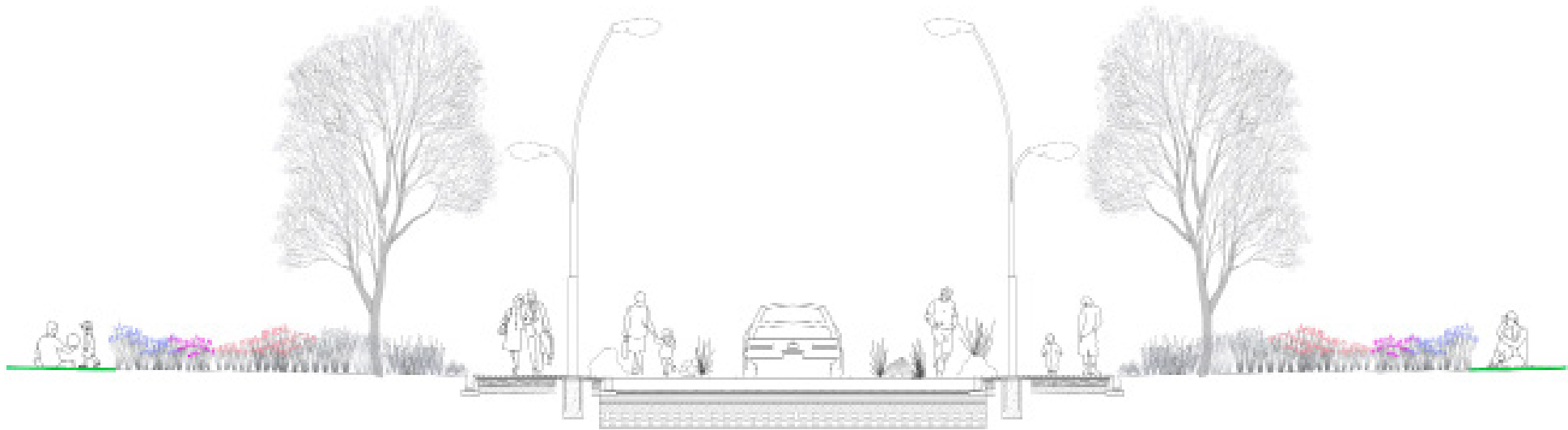


Figure 303-304. Proposed women's memorial route sections (Author 2021)

# Concentration camp memorial route

## Palette - fire

Plant name		Plant type	Size	Seasons												Attracts			Plasticity							
Common name	Botanical name			J	F	M	A	M	J	J	A	S	O	N	D	Insects	Fauna & Birds	Humans	Light	Moisture	Soil type	Hardiness				
Naboom	<i>Euphorbia ingens</i>	Succulent Tree	Up to 12m													Butterflies and bees	Birds nesting		Full sun	Low	Sandy					
Century plant	<i>Boophone disticha</i>	Bulb														Pink to red sweetly scented flowers			Full sun		Sandy well drained	Fire resistance				
Wild pear	<i>Dombeya rotundifolia</i>	Tree	3-6m Up to 10m tall													Bees and butterflies		Touch	Full sun	Mode rate	Loam , sand	Fire resistant trunk				
Red grass	<i>Themeda triandra 'ice'</i>	Grass	20-80cm																Full sun or semi-shade		Loam	Fire resistance				
Star flower	<i>Hypoxis hemerocallidea</i>	Tuberous perennial	40cm													Dormant in fire season				Bees	Grazing		Full sun	Low to mode rate	Well drained sandy loam	Fire tolerant
Chocolate bells	<i>Trichodesma physaloides</i>	Perrenial herb, shrub	0,5m													Pink brownish flowers			Full sun		Sandy loam	Fire resistance and fire stimulated				

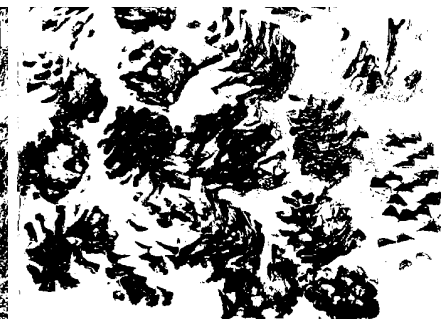
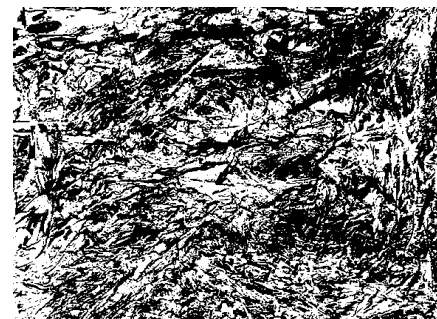
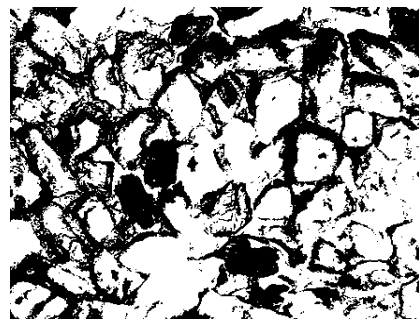
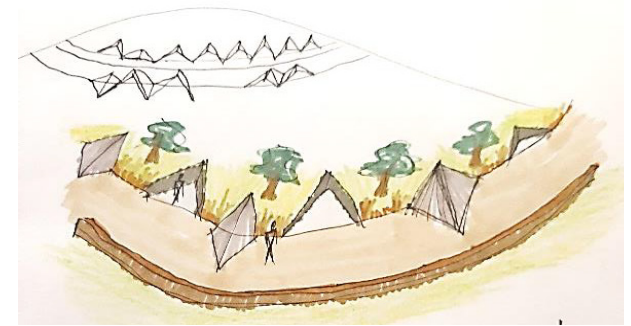
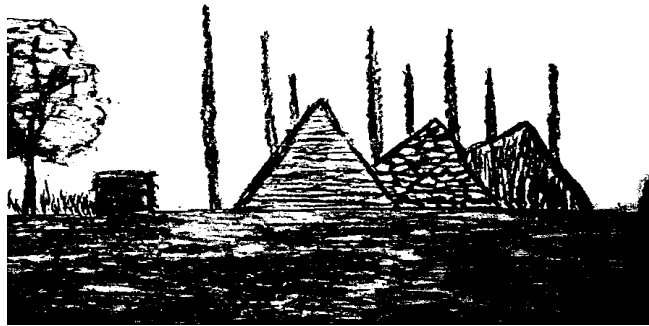


Figure 305-309. Proposed concentration camp plant species, design informant and design form and materiality development (Varies)

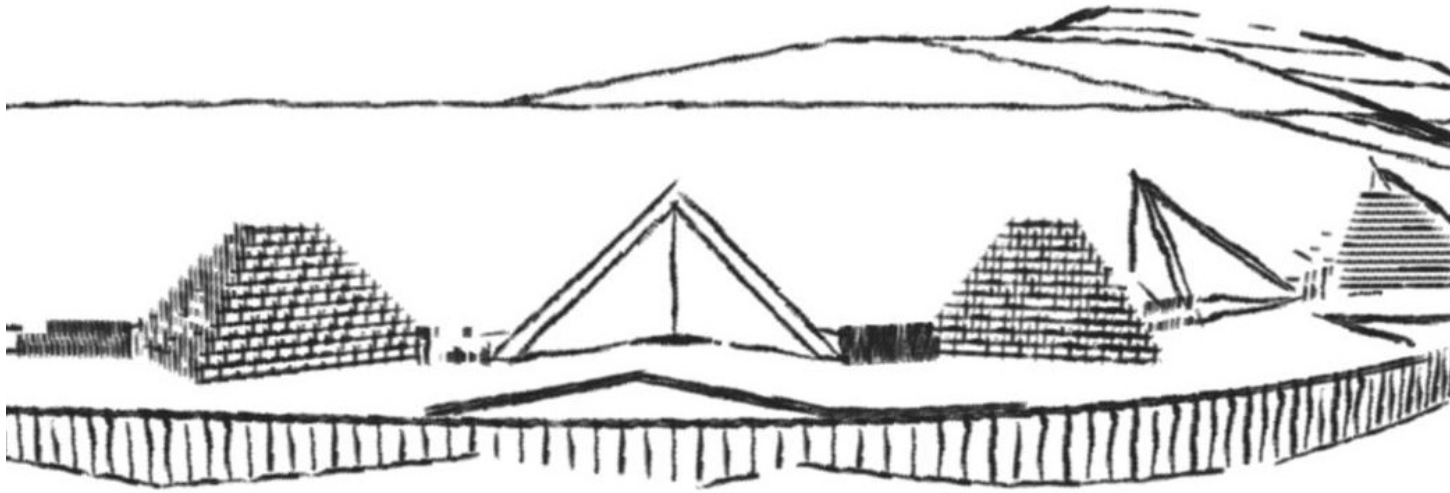


Figure 306-307. Proposed concentration camp remembrance route model(Author 2021)

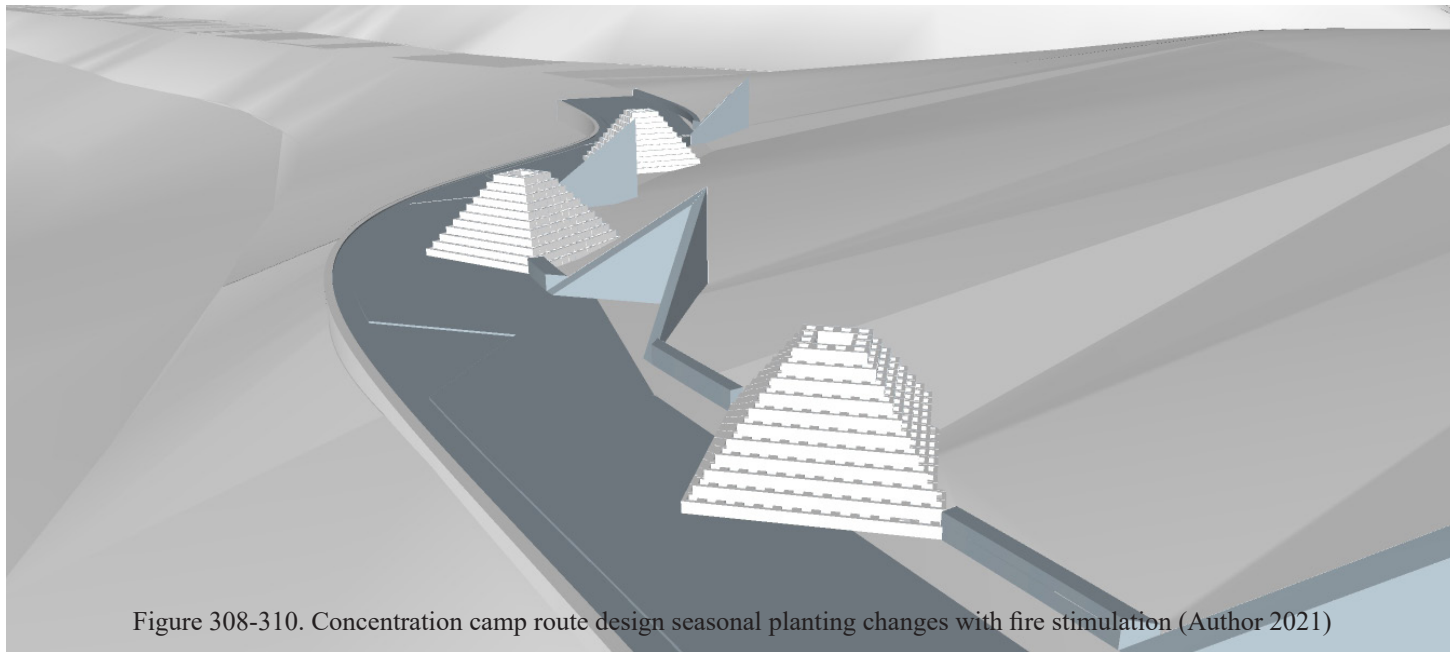


Figure 308-310. Concentration camp route design seasonal planting changes with fire stimulation (Author 2021)

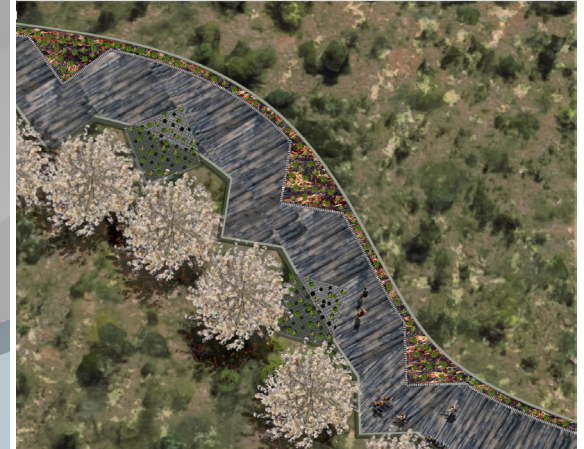




Figure 311. Proposed concentration camp route perspective (Author 2021)



# Concentration camp memorial route

Inspired by the scorched earth policy implemented during the Anglo-Boer War

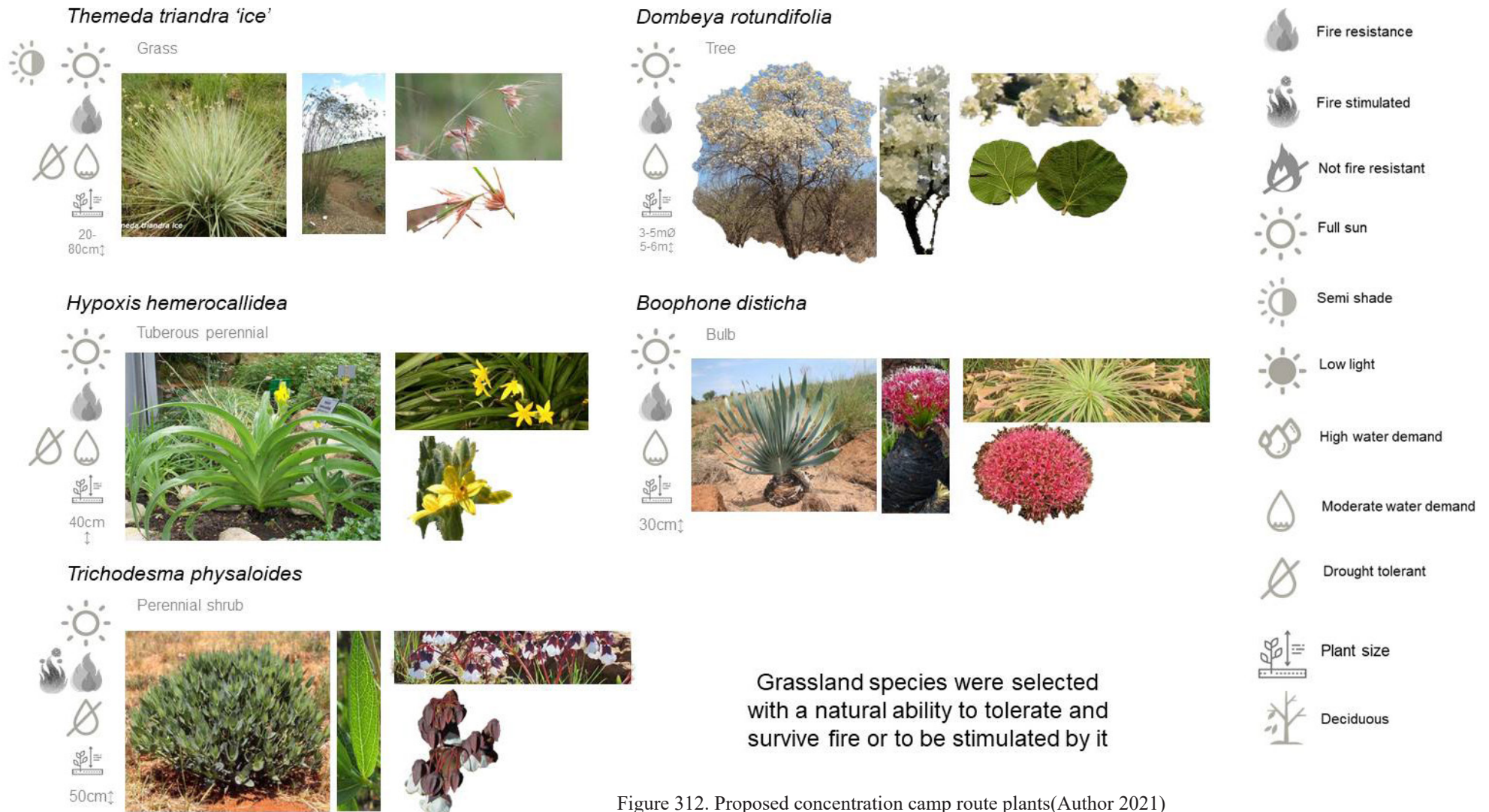


Figure 312. Proposed concentration camp route plants(Author 2021)

## Material and furniture approach



A palimpsest heritage approach is taken towards the design which implies a process of layering of physical change and meaning over time. It includes that new layers can be either **uncovered or added** to the **existing, highlighting historical importance and cultural relevance**.

One key principle of the **Burra Charter**, was applied where **new insertions and interventions**, (besides restoration or reconstruction) should **not replicate the heritage fabric** but be **distinct and clearly identifiable**.

In terms of **materiality and language** this stance is taken to find an **alternative to the existing stone work** that would **complement it, but be clearly identifiable** as new and imitation should be avoided (Article 20 and 22 of the Burra charter).

One material was identified on the site that is recurrently used in newer areas and distinct from the original masonry and stone work, it is concrete pavers. So as **complimentary stone alternative, concrete was chosen as coherent language throughout the design** rather than completely alternative materials such as metal or timber. Repetition with variation is key, as **concrete will be repeatedly used in the different areas**, but with variation in colour and texture to compliment the specific use and atmosphere of that area.

The New work will respect the significance of the place through consideration of the placement, form, bulk, scale, character material and colour and texture.

- **The design approach I took for the design is that of contrast.**
- Through contrast, change and difference it is patently evident as the addition or extension is set against that which exists.

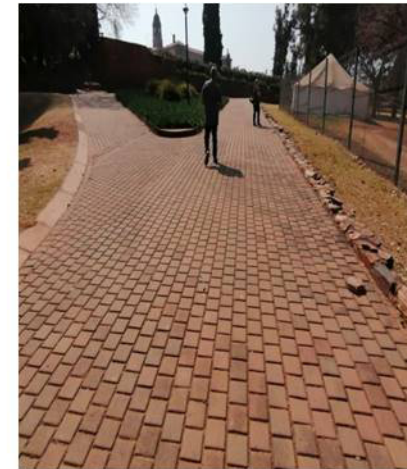


Figure 313-318. Existing site material photographs (Author 2021)

**Heritage principles applied**

**Insertions and interventions**, (besides restoration or reconstruction) should **not replicate the heritage fabric** but be **distinct and clearly identifiable** (Burra charter 20&22)

Adaptation should involve minimal change to significant fabric, achieved only after considering alternatives (Burra charter 21,1)

Changes which reduce cultural significance should be reversible, and be reversed when circumstances permit (Burra charter 15.2)

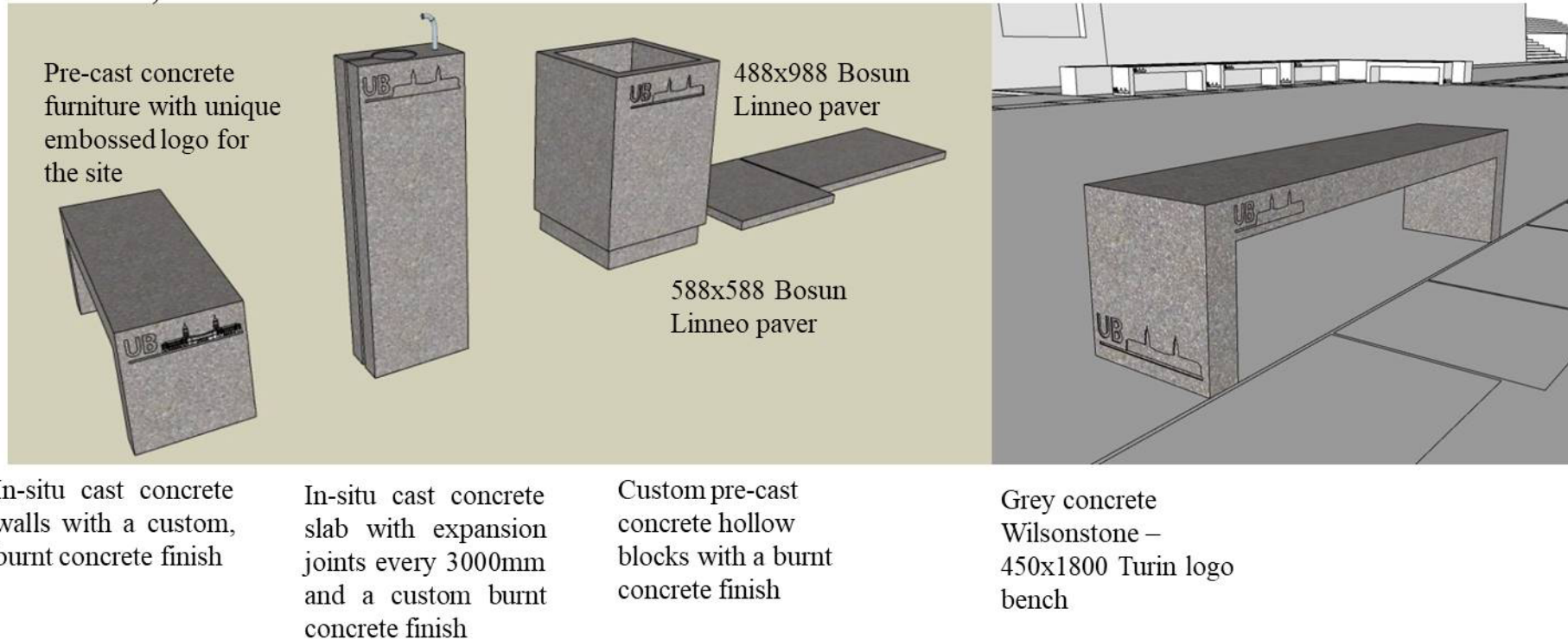


Figure 319. Furniture design (Author 2021)

**Conclusion:**

In conclusion, I believe that the careful consideration and design of accessibility and materiality, and planting has allowed the gardens of the Union Buildings to become a truly transformed landscape and a wholly inclusive garden for all visitors with an enhanced sensory experience throughout the site. The careful experimentation with planting and materiality has allowed the envisioned lost narrative spaces to come to life and no longer only to act as forgotten tales of the site in historical texts and lastly by reconsidering maintenance issues and nuisances on-site, the new functional elements that were once believed to have been pure maintenance issues have also become social and recreational aspects.

