SECTION C-C

DETAIL 4: STEP DETAIL WITH CONCRETE PAVERS
INTERPLANTED WITH GROUNDCOVERS   1:10
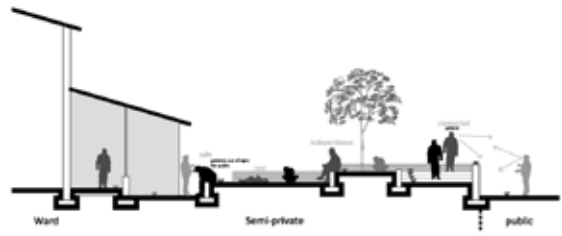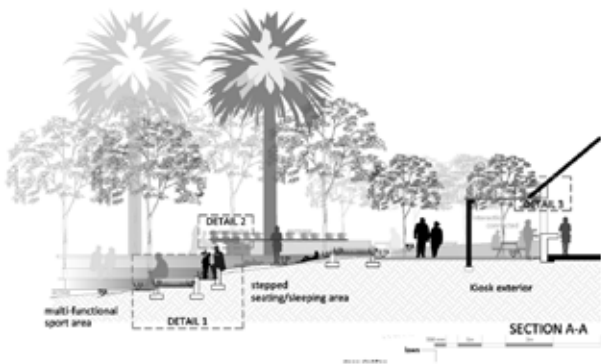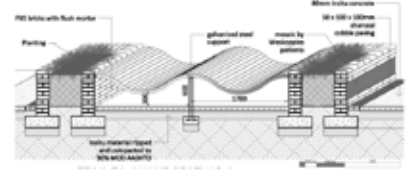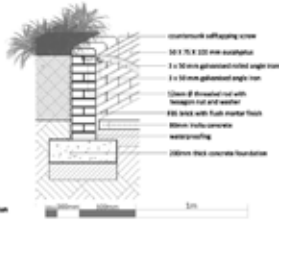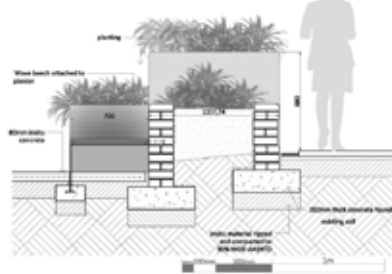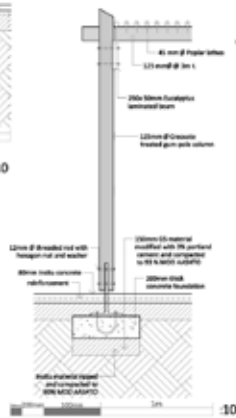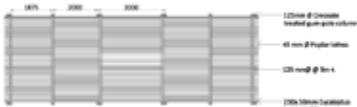
SECTION A-A

multi-functional
sport area

stepped
seating/sleeping area

Kiosk exterior

DETAIL 1

DETAIL 2

DETAIL 3

SECTION B-B   1:50

Ward   Semi-private   public
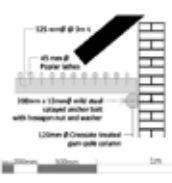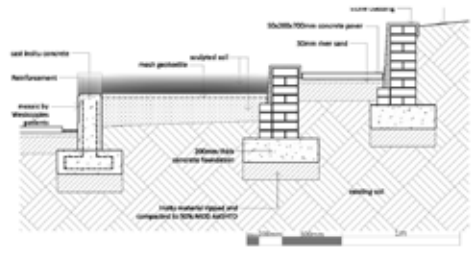
9.1. MATERIALS

Materials was selected to complement and enhance existing materials, respecting the heritage of Weskoppies. The ability of the material to stimulate the senses was also considered when materials were selected. Flowers have the ability to lift the spirit and therefore the selected vegetation mostly consists out of flowering plants. Mosaic work done by Weskoppies patients on planters and retaining walls encourage community participation and give the people at Weskoppies a sense of ownership and pride.

LEGEND:

SOFT LANDSCAPING (refer to 9.1)

Tree species:
(refer to the codes for tree species in 9.1.1).

Flowering shrubs: refer to the shrubs palet as illistrated in (9.1.2)

Fragrant groundcovers planted between pavers to release fragrance when crushed (refer to 9.1.3. for species)

Climbing plants at pergolas (refer to 9.1.4 for species).

Herbs and vegetables as selected by patients in horticultural therapy program (refer to 9.1.5).

Red cut flowers (refer to 9.1.6 for species)

Purple/ blue cut flowers (refer to 9.1.6 for species)

Yellow cut flowers (refer to 9.1.6 for species)

Mixed colours cut flowers (refer to 9.1.6. for species)

Cynodon dactylon

PAVING MATERIALS

In situ concrete: a comfortable surface for wheelchair users

Gravel: provides texture, sound and a permeable surface for infiltration

Concrete pavers interplanted with fragrant groundcovers: releases fragrance when leaves are crushed.

Semi-glazed ceramic tile inserts: bright colours that lead the pedestrian to colour pockets.

N

10m   25m

9.1.1. TREES

Indigenous trees were selected based on their colours and their ability to change with the season. This creates a sense of anticipation and makes patients more aware of the time and seasons while the colours contribute to creating a uplifting, positive outdoor environment. The proposed trees also fit in with the existing trees at Weskoppies as well as the existing natural bushveld.

Fig. 9.3: Bolusanthus speciosus (BS)
(Venter, 1998)

Fig. 9.4: Pterocarpus rotundifolius (PR)
(Venter, 1998)

Fig. 9.5: Erythrina lysistemon (EL)
(Venter, 1998)

Bolusanthus speciosus (Tree witseria): The tree witseria was selected based on its purple flower display during spring that attracts insects. It has a non-agressive root system ,grows quickly and can survive with little water. (VENTER. 1998:242)

Pterocarpus rotundifolius (Round-leaved kiaat): Selected for its yellow flower display in spring, creating a cheerful environment and attracting insects. It has a is non-aggressive root system and grows quickly. (VENTER. 1998:58)

Erythrina lysistemon (Common coral tree): Selected for its vibrant red flower display in spring attracting insects. Its root system is aggressive and it should not be planted close to paving. It grows fast. (VENTER. 1998:78)

Combretum erythrophyllum (River bushwillow): The root system is non aggressive and the foliage provides autumn colours. It is a fast grower and can survive with little water. (VENTER. 1998:240)

Celtis africana (White stinkwood): Selected because it is reflective of the seasons which is important in the context of Weskoppies. The tree also provides dense shade during the summer and sun during the winter when it loses all its leaves. It grows extremely fast. (VENTER. 1998:278)

Acacia xantophloea (Fever tree): Selected for its contrasting green trunk and foliage and fast growing nature

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Fig. 9.6: Combretum erythrophyllum (CE) (Venter, 1998)

Fig. 9.7: Celtis africana   (CA) (Venter, 1998)

Fig 9.8: Acacia xantophloea   (AX) (Venter, 1998)

9.1.2. SHRUBS

Indigenous shrubs was also selected to give a vibrant, uplifting colour display with flowers that accentuates the seasons. These shrubs doesn't require a lot of maintenance and fit in with the natural bushveld vegetation at Weskoppies. The flowers also attracts insects and birds.

Fig. 9.9: Barleria obtusa (Joffe, 2003)

Fig. 9.10: Hypoestes aristata (Joffe, 2003)

Fig. 9.11: Plectranthus fruticosus (Joffe, 2003)

Fig. 9.12: Plectranthus neochilus (Joffe, 2003)

Fig. 9.13: Plumbago auriculata (Joffe, 2003)

Fig. 9.14: Dietes grandiflora (Joffe, 2003)

Fig. 9.15: Euryops pectinatus (Joffe, 2003)

Fig. 9.16: Tecomaria capensis (Joffe, 2003)

Fig. 9.17: Strelizia reginae (Joffe, 2003)

Fig. 9.18: Bauhinia galpinii (Joffe, 2003)

Barleria obtusa (BO): This bushy shrub is ideal for reflecting the natural bushveld architecture at Weskoppies. The shrub was also selected for its masses of blue mauve, pink or white flowers in autumn. (Joffe, 2003:37)

Hypoestes aristata (HA): The Ribbon bush was selected for its mauve and pink flower display just before winter. It can be planted as a ground cover in the shady positions around the buildings. (Joffe, 2003:49)

Plectranthus fruticosus(PF): The Pink Fly Bush was selected for its pink or bluish mauve flower display in summer. It is ideal for a ground cover at shady positions underneath trees and close to buildings (Joffe, 2003:60).

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Plectranthus neochilus (PN): This is a good low growing ground cover plant with deep blue and purple flowers in autum and a strong garlic smell. (Joffe, 2003:61)

Plumbago auriculata (PA): This fast growing, drought resistant shrub will be planted in sunny areas where it will give a powder-blue flower display throughout summer. (Joffe, 2003:87)

Dietes grandiflora (DG): The white-orange-and-mauve flowers could be mass planted under trees and other partial shade areas. (Joffe, 2003:43)

Euryops pectinatus (EP): This shrub was selected because it is covered with bright yellow flowers from June to October. It will be planted in sunny positions. (Joffe, 2003:46)

Tecomaria capensis (TC): The cape honeysuckle is fast growing and drought resistant, it forms an informal hedge. It produces yellow flowers in Spring and summer. (Joffe, 2003:92)

Strelizia reginae (SR): This striking perennial is unique to the South African context. It produces flowers from March until October. (Joffe, 2003:66)

Bauhinia galpinii: This higher growing shrub was selected because it fits in well with the bushveld context and produces red flowers in summer. (Joffe, 2003:71)

9.1.3. FRAGRANT GROUNDCOVERS
The fragrant ground covers will be planted between precast concrete pavers. When crushed the leaves will release a fragrance and stimulate the sense of smell. The author proposes the following species:

Full sun
Thymus praecox (thyme)
Achillea tomentosa (Wooly yarrow)

Sun to partial shade
Mentha polegium (pennyroyal)
Mentha requienii (Corsican mint)
Laurentia flavuliatilis (Blue star creeper)

Shade
Galium odoratum (Sweet woodruff)

Fig. 9.19. Thyme

Fig. 9.20. Wooly yarrow

Fig. 9.21. Pennyroyal

Fig. 9.22. Corsican mint

Fig. 9.23. Blue star creeper

Fig. 9.24. Sweet woodruff

9.1.4. CLIMBING PLANTS
The following climbing plants can be used at the pergolas :

Jasminum multiparttitum (Starry wild jasmine)
Thunderbergia alata (Black-eyed susan)
Pyrostegia venusta (Golden shower)
Wisteria sinensis

Fig. 9.25. Jasmine

Fig. 9.26. Black-eyed susan

Fig. 9.27. Golden shower

Fig. 9.28. Wisteria

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9.1.5. HERBS & VEGETABLES (HORTICULTURAL THERAPY)

The herbs and vegetable species will not be specified by the author. The selection of plant species will be part of the horticultural therapy program. Patients will decide what they want to plant in this area based on what they have learned.

9.1.6. CUT FLOWERS

The cut flower species is categorized in four different groups based on their colour. These include a yellow, red/orange, purple/blue and mixed colours.

Yellow cut flowers

Fig. 9.29. Graspedia globosa

Fig. 9.30. Helianthus annuus

Fig. 9.31.Bupleurum grifithii

Blue & purple cut flowers

Fig. 9.32. Euryops pectinatus

Fig. 9.33. Delphinium belladonna

Fig. 9.34. Cynoglossum amabile

Red/ orange cut flowers

Fig. 9.35. Calendula officinalis

Fig. 9.36. Crocosmia paniculata

Fig. 9.37. Watsonia

Fig. 9.38. Sparaxis elegans

Mixed cut flowers

Fig. 9.39. Antrirrminum majeus

Fig. 9.40. Lathyrus odorata

Fig. 9.41. Freesia

Fig. 9.42. Gypsophila elegans

9.2. TECHNICAL DETAILS

Section A-A and B-B cuts through the most prominent landscape structures as proposed in the sketch plan. The numbered details will be explained on a bigger scale in 9.3.1 to 9.3.7. and includes; the sculpted sleeping and seating terraces, retaining walls, various planters, step details, pergola details and the waved seating benches. These details will show dimensions, material use, subsoil layers and fastening methods.

Fig. 9.43 (opposite page): Section A-A includes the multifunctional sport area with the stepped sleeping and seating area, primary walkway and kiosk exterior (Author, 2009).

Fig. 9.44 (below): Section C-C includes the multifunctional sport area, steps, primary walkway horticultural therapy garden and flower fields with colour pockets (Author, 2009).

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DETAIL 2

purpose

DETAIL 3

interaction connected

NGL

2.26

2.63 2.73

2.74 2.73

2.67

active

NGL

1.23 1.33 1.46

stepped
seating/sleeping area

Kiosk exterior

multi-functional
sport area

DETAIL 1

SECTION A-A

500 mm   1m   2m

responsibility

ownership

purpose

reflection

rest

connected
concious

variety of
experiences

DETAIL 6

Flower field

Colour pocket
DETAIL 7

ltural therapy garden

SECTION C-C

500 mm   1m   2m

131

9.2.1. DETAIL 1: SCULPTED SLEEPING AND SEATING AREA

The Sculpted lawn is a comfortable sleeping area for patients that needs rest during the day. Seating walls and terraced lawns are also accommodated in this area. It is situated around the multifunctional sport area to allow people to observe sport activities.

A reinforced waved cast in situ retaining wall with mosaic work by Weskoppies patients retains the waved lawn area, while flat terraced lawn areas will be retained with stone cladded retaining walls. A 50 x 299 x 700 concrete paver inter planted with fragrant ground covers will provide a walkway between terraces .

Fig. 9.45 (below): Detail 1- stepped seating and sleeping area (Author, 2009).

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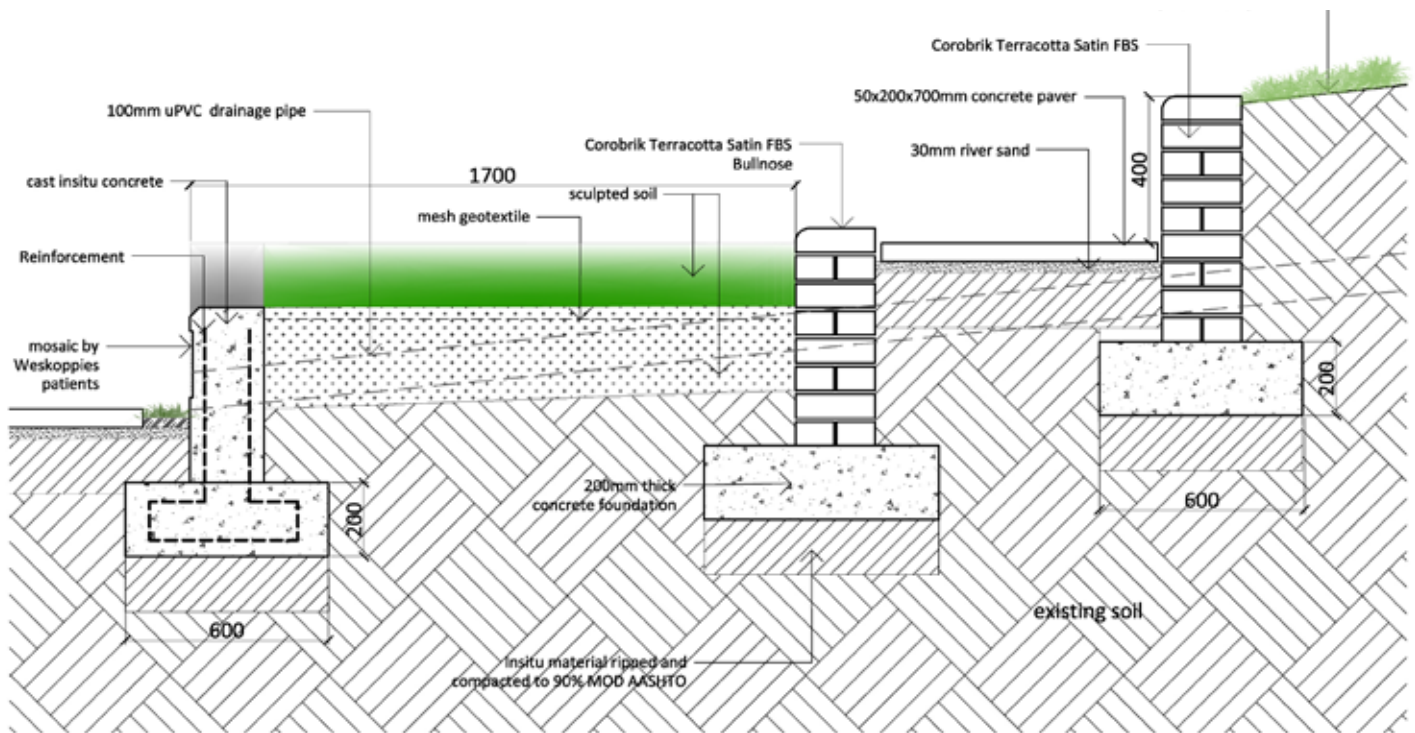
9.2.2. DETAIL 2: PLANTER WITH POT OPENINGS

Detail 2 shows a 700mm high horticultural planter with a 700mm wide pre-cast concrete slab attached to the inner edge. The concrete slabs have pre-cast holes in them to function as pot holders. As part of the horticultural therapy program patients will start out with small manageable size pot plants which they can place in these holes. The height of the concrete slabs makes it possible for wheelchair users to put their legs underneath the slab while working with the plants.

The planters are built with FBS bricks with a flush mortar finish. At certain places as indicated on the detail, mosaic work by Weskoppies patients will be accommodated. The detail also indicate the concrete pavers, inter planted with fragrant ground covers.

Fig. 9.46 (below): Horticultural planter with pre-cast concrete slab with holes for pots (Author, 2009).

This planter in conjunction with the planter described in detail 6 encloses the horticultural therapy garden.

9.2.3. DETAIL 3: PERGOLA FIXED TO WALL

A pergola fixed to the existing kiosk structure is proposed for shading at the area where people can buy food from the outside. Fragrant climbing plants like Jasminum multiparttitum will cover the pergola to stimulate sense of smell and provide denser shade.
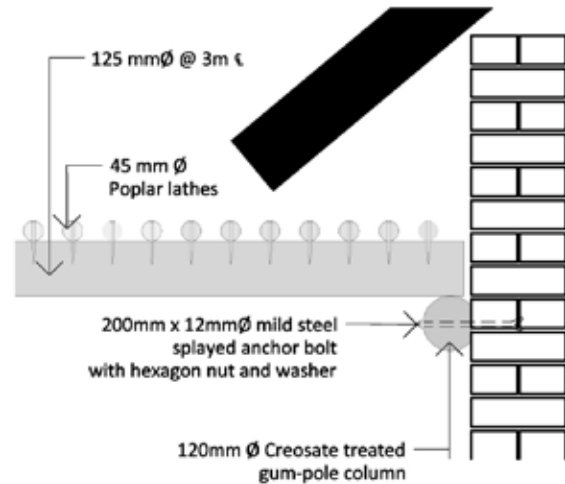
9.2.4. DETAIL 4: STEP AND INTER PLANTED CONCRETE PAVING DETAIL

The steps at the stepped seating and sleeping area will be cast insitu with a brushed and washed finish.

A walkway will be accommodated to allow movement between terraces. This walkway will consist out of 50 x 200 x 700mm concrete pavers inter planted with fragrant ground covers in 100mm openings.

Fig. 9.48 : Detail 4- Step and inter planted concrete paving detail (Author, 2009).

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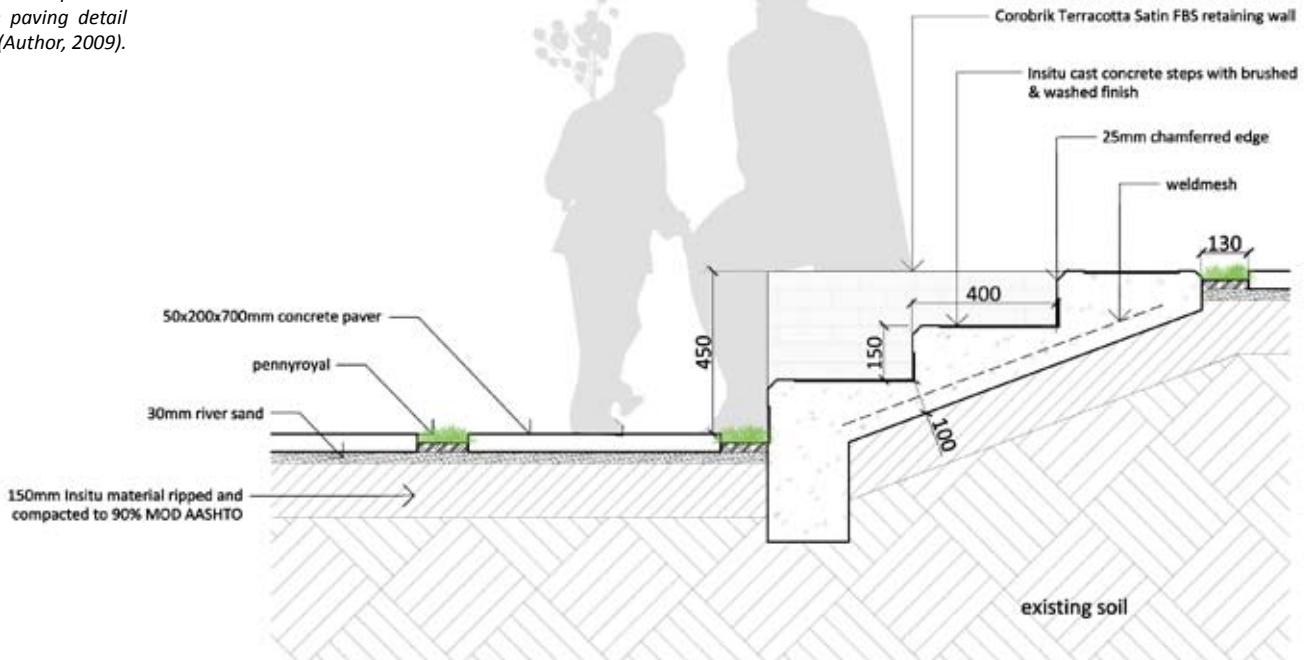
9.2.5. DETAIL 5 A & B: PERGOLA DETAILS

The pergola, situated central to the horticultural therapy garden will provide shading for the working tables. Fragrant climbing plants will cover the pergola stimulating the sense of smell while softening the structure and providing denser shading.

Materials used for the pergola includes; 125mm diameter creosote treated gum pole column, 250 x 50mm Eucalyptus laminated beams, and 45mm diameter poplar lathes

45 mm Ø Poplar lathes

125 mmØ @ 3m ℄

250x 50mm Eucalyptus laminated beam

125mm Ø Creosote treated gum-pole column

1875   2000   3000

125mm Ø Creosote treated gum-pole column

45 mm Ø Poplar lathes

125 mmØ @ 3m ℄

250x 50mm Eucalyptus laminated beam
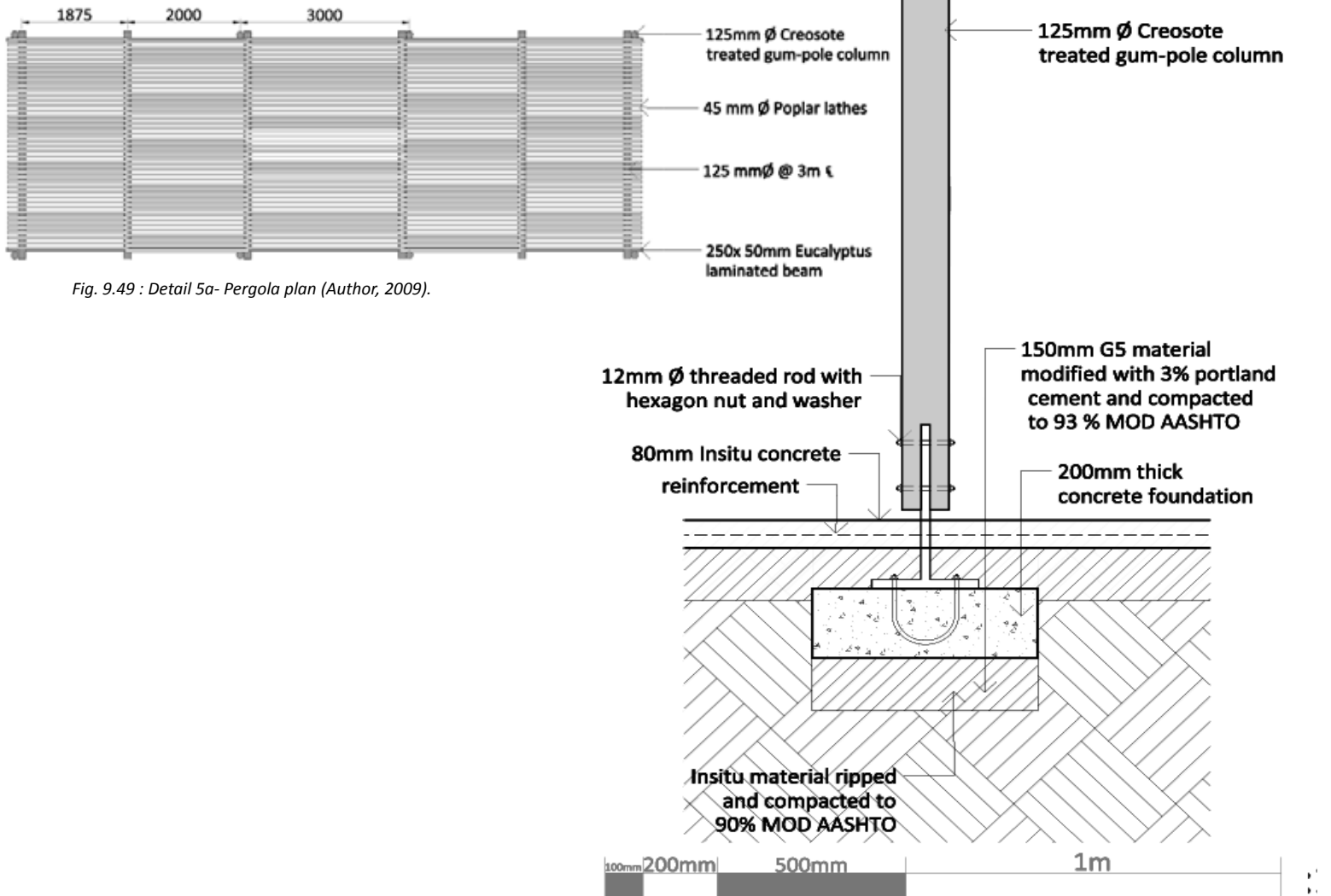
Fig. 9.49 : Detail 5a- Pergola plan (Author, 2009).

12mm Ø threaded rod with hexagon nut and washer

80mm Insitu concrete reinforcement

150mm G5 material modified with 3% portland cement and compacted to 93 % MOD AASHTO

200mm thick concrete foundation

Insitu material ripped and compacted to 90% MOD AASHTO

100mm 200mm | 500mm | 1m

Fig. 9.50 : Detail 5b- Section trough pergola column (Author, 2009).

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9.2.6. DETAIL 6: HORTICULTURAL THERAPY PLANTER WITH WAVE BENCH

The same waved sleeping benches as described in detail 7A & B will be attached to some of the face brick horticultural planters at the horticultural therapy garden. This allows patients to sit sleep or rest in a familiar environment between fragrant vegetables and herbs planted by themselves (refer to detail 7 A & B).

This planter in conjunction with the planter described in detail 2 encloses the horticultural therapy garden.

Fig. 9.51 : Detail 6-
Horticultural therapy
planter with wooden
waved sleeping bench
(Author, 2009).

planting

Wave bench attached to planter

80mm insitu concrete

700

1157,74

880

200mm thick concrete foundation

existing soil

Insitu material ripped and compacted to 90% MOD AASHTO

100mm 200mm   500mm   1m

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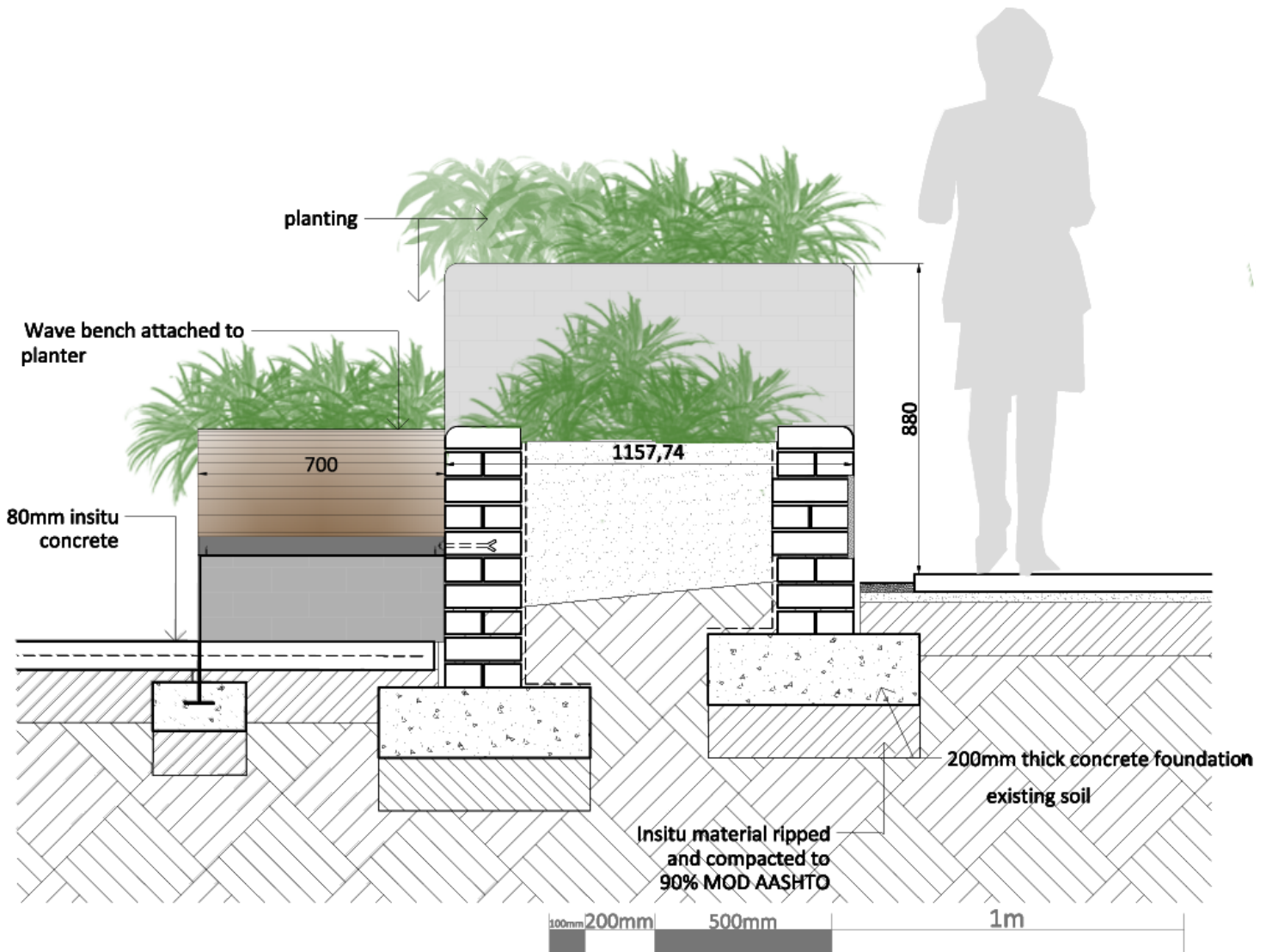
9.2.7. DETAIL 7 A & B: WAVED BENCH
ATTACHED TO PLANTER

Wavy wooden benches between square face brick planters becomes a comfortable outdoor sleeping area for patients that need rest during the day.

Fig. 9.52 (right): Detail 7A- The fastening of the waved sleeping bench to planter the planter(Author, 2009).
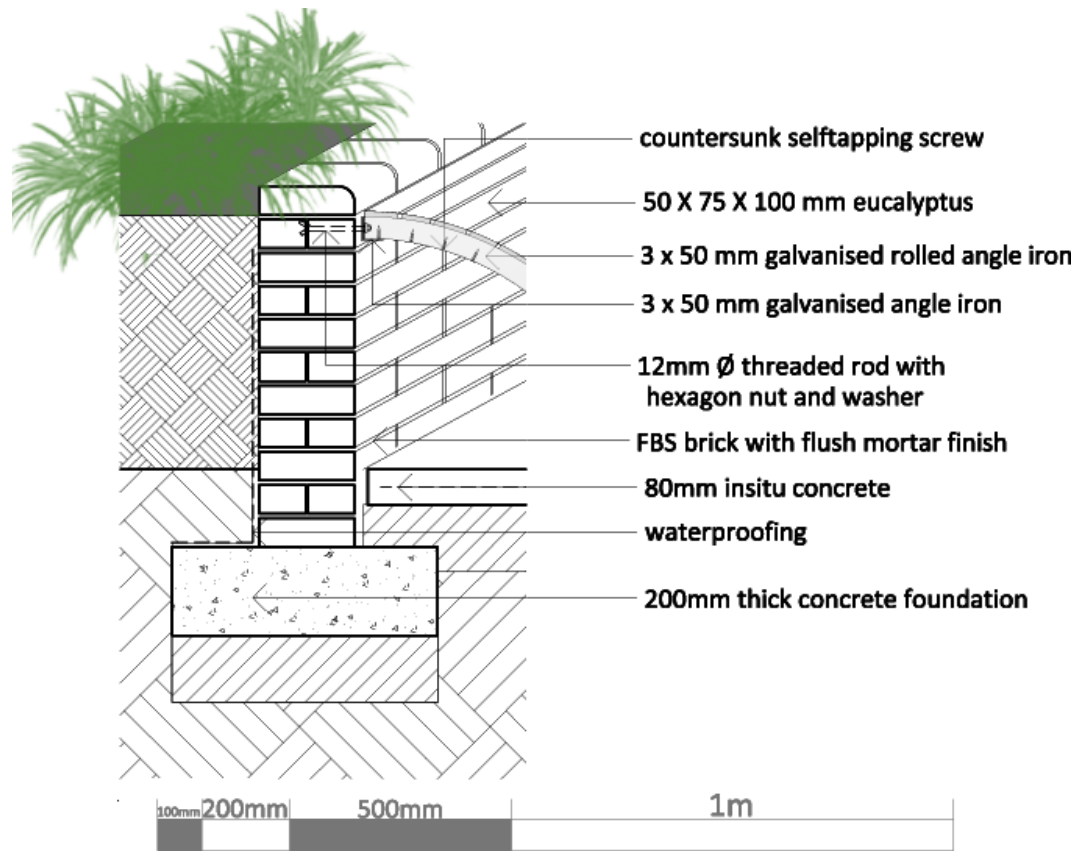
Fig. 9.53 (below): Detail 7B- Detail of a wooden sleeping bench attached to a facebrick planter (Author, 2009).

- countersunk selftapping screw
- 50 X 75 X 100 mm eucalyptus
- 3 x 50 mm galvanised rolled angle iron
- 3 x 50 mm galvanised angle iron
- 12mm Ø threaded rod with hexagon nut and washer
- FBS brick with flush mortar finish
- 80mm insitu concrete
- waterproofing
- 200mm thick concrete foundation

100mm 200mm   500mm   1m

- 80mm insitu concrete
- FBS bricks with flush mortar
- Planting
- galvanised steel support
- mosaic by Weskoppies patients
- 50 x 100 x 100mm charcoal cobble paving
- 300
- 600
- 1700
- Insitu material ripped and compacted to 90% MOD AASHTO

200mm 500mm   1m

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9.3. STORM WATER MANAGEMENT

Storm water will be captured in three retention dams and used for irrigating the landscape and flower fields. As part of the catalytic sketch plan only 2 Ha of land will be developed as flower fields initially. Retention dam 1 will be used for irrigating the first 2 Ha of flower fields. The rational method was used for determining peak flow and the catchment area and longest channel is indicated on figure 9.55.,

Fig. 9.54: Storm water management plan with catchment area and retention dams (Author, 2009).

Fig. 9.55 (opposite page): Table illustrating the rational method of determining peak flow and determining the capacity of Retention dam 1 (Author, 2009).

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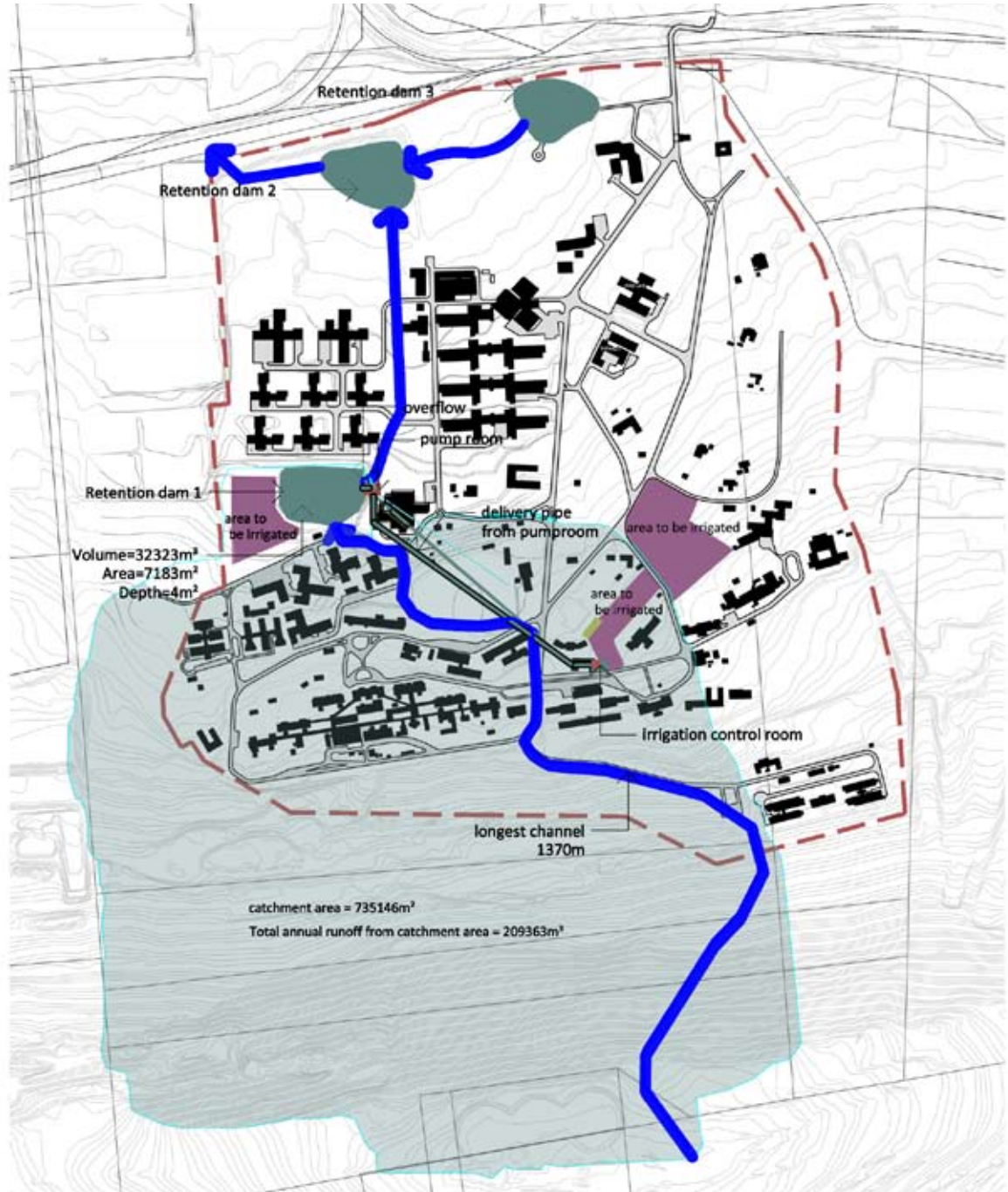
The Rational method to determine peak discharge

$$Q = C.I_t.A$$

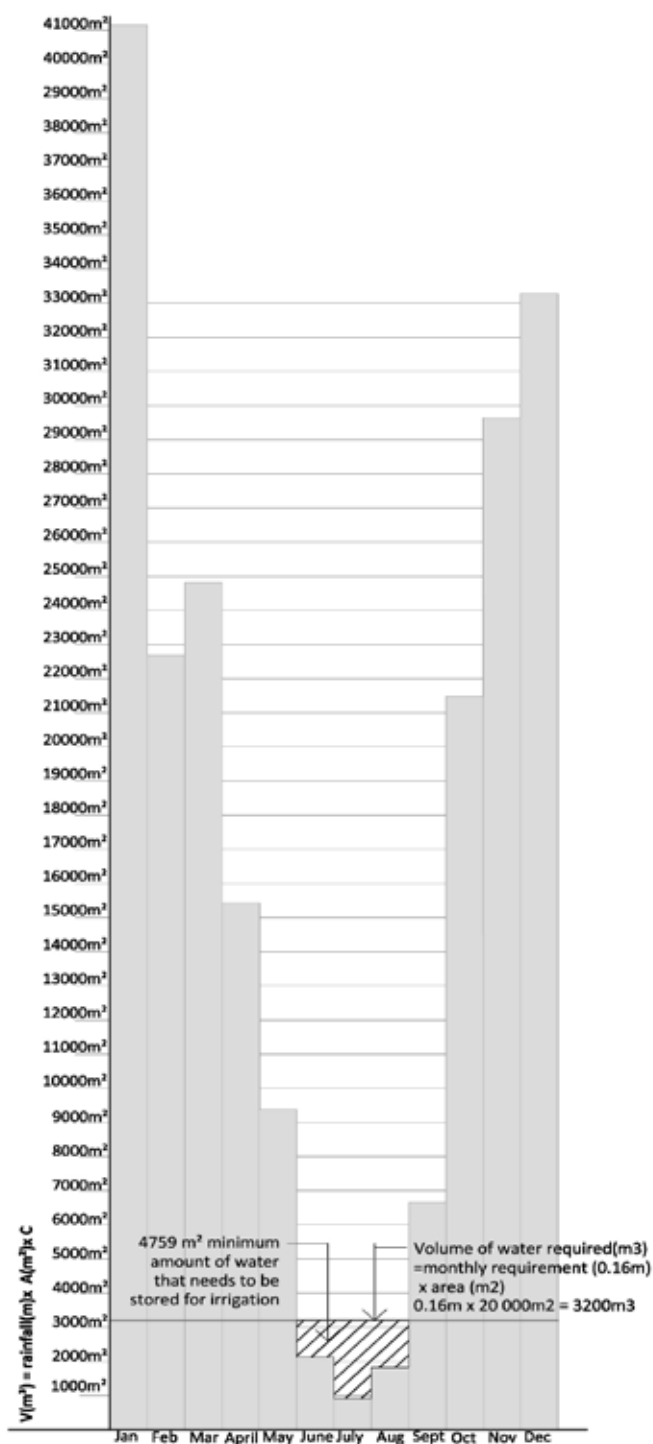|	
Catchment area (m²)	735146
Length of the longest channel (m)	1370
Elevation difference (m)	154
Time of concentration (hours) *from table*	0.175
Time of concentration (seconds) **Tc**	630
Rainfall region	summer
Average annual rainfall for pretoria(mm)	673
Area to be irrigated (m²)	20000
Irrigation needed for cut flowers (m)	0.16

	Rainfall intensity m/sec (I) I=Depth of precipitation/Tc	Depth of precipitation(m) *from table*
2 year	4.7619E-06	0.003
5 year	3.1746E-05	0.02
10 year	3.80952E-05	0.024
20 year	4.44444E-05	0.028
50 year	5.55556E-05	0.035
100 year	6.34921E-05	0.04

Runoff coefficient (C)

	Area m	% of total	Coefficient (C)	% x Coefficient
Grassland (steep)	510324	0.694180476	0.45	0.312381214
Lawn	131494	0.178867871	0.08	0.01430943
Cultivated land	20000	0.02720548	0.5	0.01360274
streets and pavements tennis netball	30366	0.041306081	0.8	0.033044865
Roofs	30065	0.040896638	0.9	0.036806974
lawn sport fields	12897	0.017543454	0.08	0.001403476
Total				0.411548699

	Peak discharge Q=C.A.I (m³/sec)
2jaar	1.440706571
5jaar	9.604710476
10jaar	11.52565257
20jaar	13.44659467
50jaar	16.80824333
100jaar	19.20942095

Budget for retention dam (refer to graph)

Month	Monthly rainfall (m)	In V(m³) = rainfall(m)x A(m²)x C	Out *Flowers need 0.16m/month* V(m³)=0.16(m)xA irrigated(m²)	Total
January	0.136	41146.57968	3200	37946.57968
February	0.075	22691.1285	3200	19491.1285
March	0.082	24808.96716	3200	21608.96716
April	0.051	15429.96738	3200	12229.96738
May	0.031	9378.99978	3200	6178.99978
June	0.007	2117.83866	3200	-1082.16134
July	0.003	907.64514	3200	-2292.35486
August	0.006	1815.29028	3200	-1384.70972
September	0.022	6656.06436	3200	3456.06436
October	0.071	21480.93498	3200	18280.93498
November	0.098	29649.74124	3200	26449.74124
December	0.11	33280.3218	3200	30080.3218
Total		209363.479	38400	

Minimum amount to be stored for irrigation (m²) from graph	4759
Total runoff from site	209363.479
Depth of proposed retention dam (m)	4.5
Area of proposed dam(m²)	7183
Volume of water in proposed dam (m³)	32323.5

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Graph indicating the volume of runoff per month
from the catchment area and the required volume
of water needed for irrigation

The graph shows that far more water will be captured from the catchment area than needed for irrigation purposes. The dam will therefore be designed to accomodate more water than needed for irrigation purposes and will be full throughout the year, adding aesthetic value.

Water will be estracted from the retention dam to the pump room (Fig. 9.59) where it will be filtered and pumped to the irrigation control room (Fig. 9.58) closer to the flower fields.

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Palisade fence hidden in ha ha where possible

swale takes water to retention dam 2

100mm perforated pipe to manage water level

extraction pipe takes water to pump room

delivery pipe takes water from pump room to irrigation control room

pump room (refer to pump room detail)

Bird hide

timber ramp

concrete weir

walkway

Gabion wall

1336
1337
1338
1339
1340
1341
1342
1339

Fig. 9.57: Retention dam 1 plan (Author, 2009).

Fig. 9.58 (below left): Irrigation control room plan (Author, 2009).

Fig. 9.59 (below right): Section through pump room (Author, 2009).

outlet pipes

Solanoid valves

controller with time control

pressure vessel

delivery pipe from pump room

cable to activate pump

electrical box

opening for ventilation

delivery pipe to irrigation control room

sand filter

centrifugal pump

non-return valve

pipe from retention dam

electrical motor

delivery pipe to irrigation control room
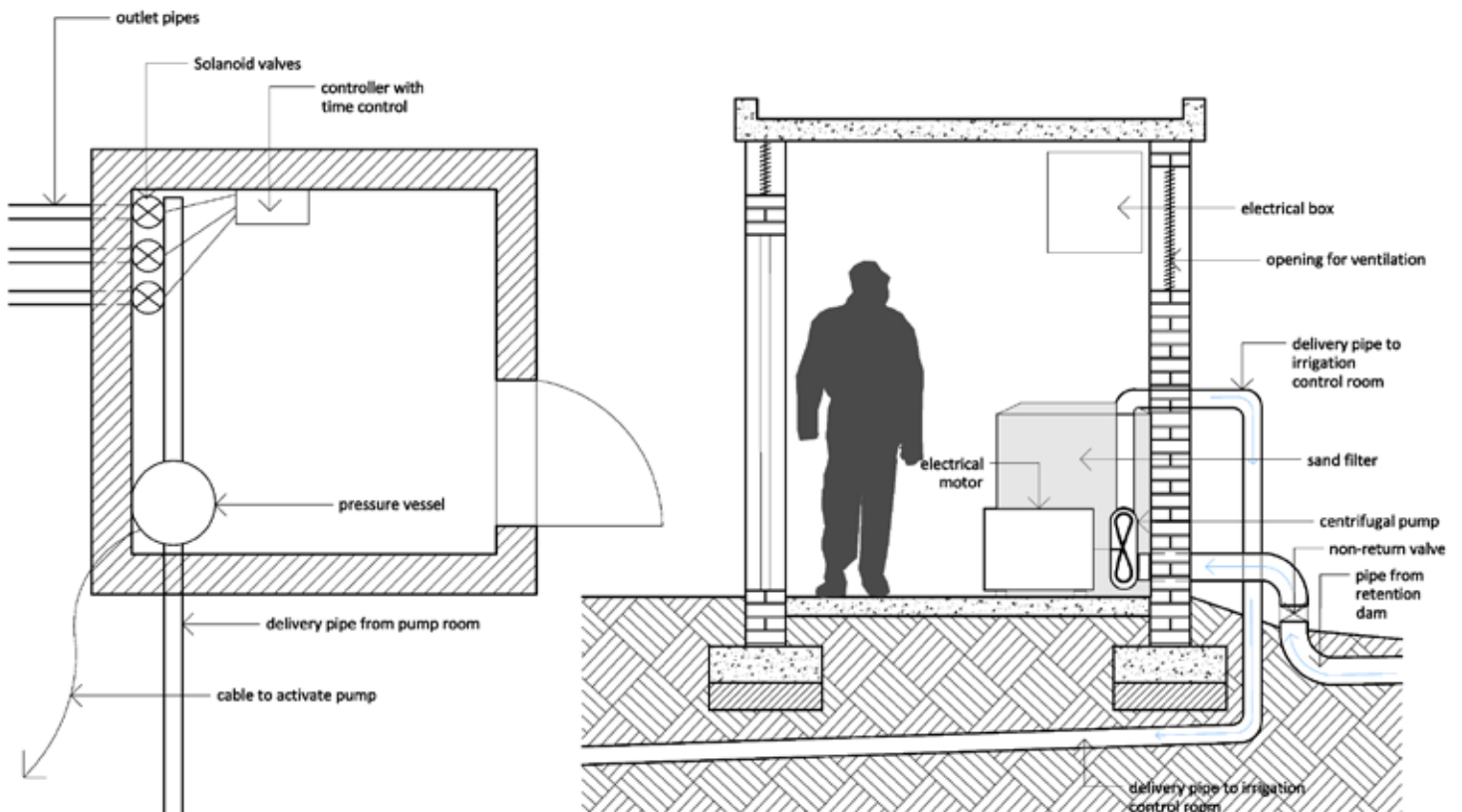
Fig. 9.60: Retention dam outlets and retaining wall (Author, 2009).

150mm uPVC pipe extracts water from retention dam to pump room (refer to pump room detail)

retaining wall from 2000 x 1000 x 1000mm gabions filled with rock from site

geotextile

overflow level for flooding

100mm uPVC perforated pipe to manage water level: discharged water is channeled to storm water system and released to rivers

geotextile

Bentonite for waterproofing

High water level 1440.65

Low water level 1438.85

2000 x 1000 x 230mm renomattress

75mm soil from site

NGL

2000 x 1000 X 230mm reno mattress

200mm Bentonite layer wrapped in geotextile

Bird hide in background

water plants

coping

High water level 1440.65

NGL

concrete weir

enviromat nailed to concrete weir

concrete footing

existing soil

Insitu material ripped and compacted to 90% MOD AASHTO

SECTION E-E 1:50 retention dam outlets at retaining wall

seating bench

unobstructed view to retention dam

palisade fencing in ha ha

walkway

Cynodon dactylon on Bio Jute soil saver

fill

High water level 1440.65

Low water level 1438.85

Bentonite for waterproofing

retaining wall from 2000 x 1000 x 1000mm gabions filled with rock from site

2000 x 1000 x 230mm renomattress

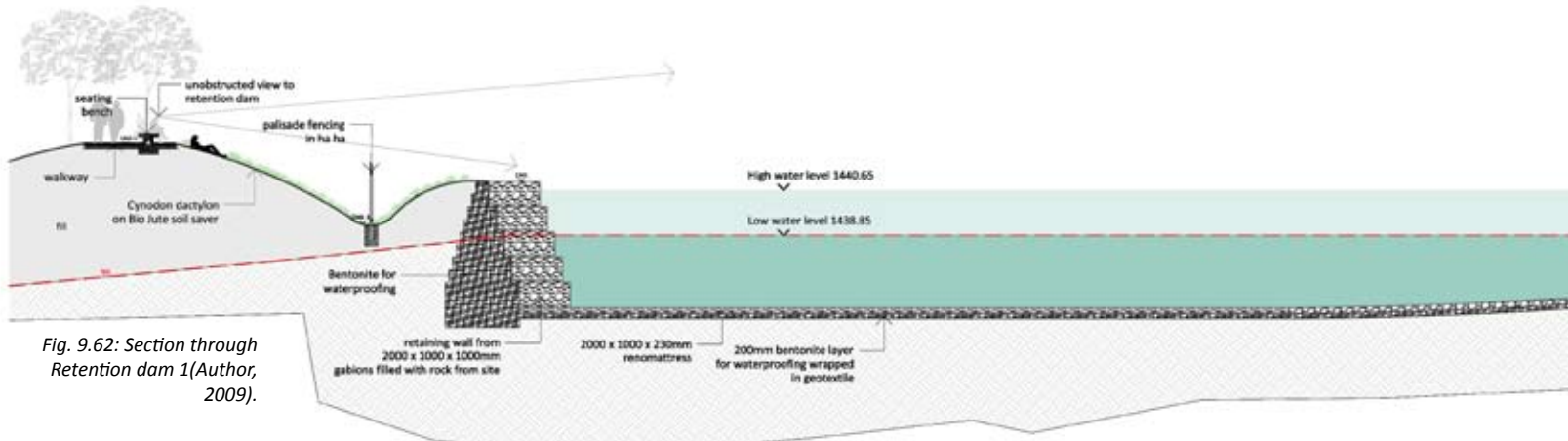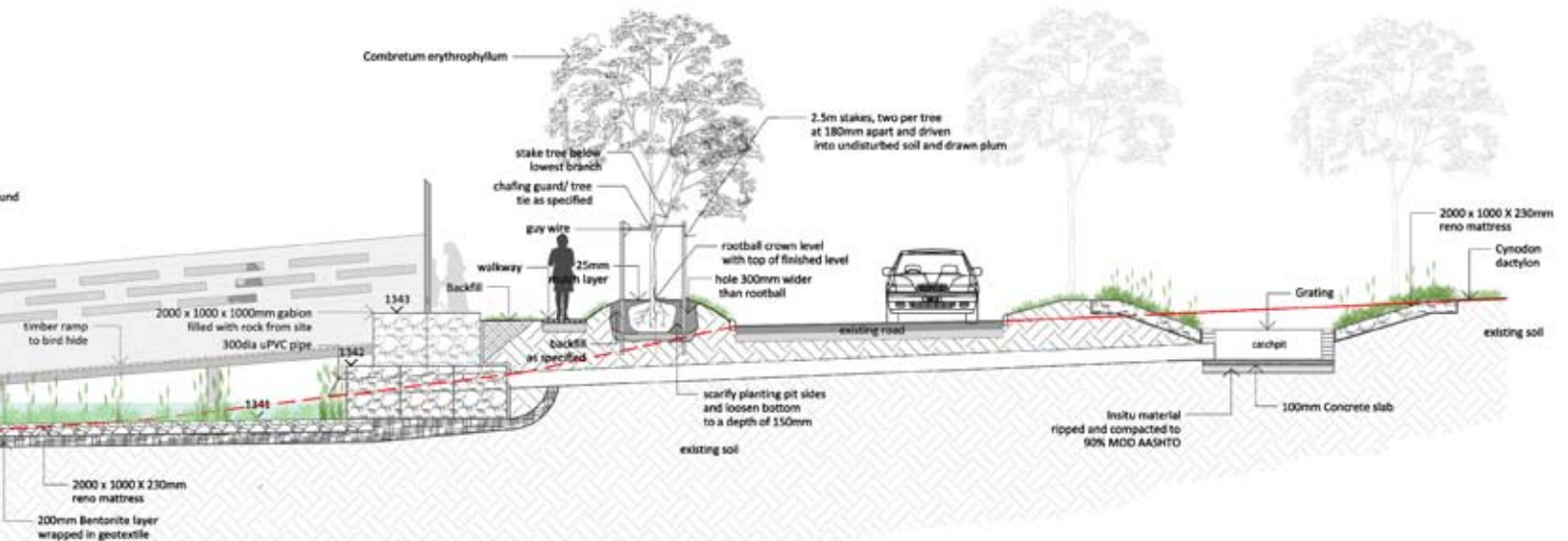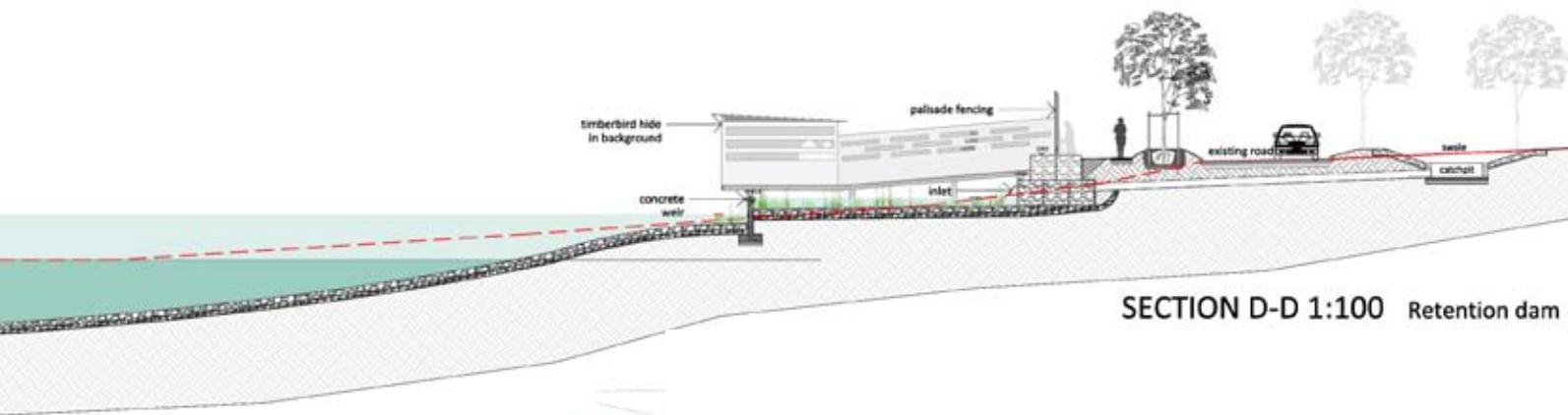200mm bentonite layer for waterproofing wrapped in geotextile

Fig. 9.62: Section through Retention dam 1(Author, 2009).

Fig. 9.61: Retention dam inlet with bird hide in background (Author, 2009).

SECTION D-Da 1:50 retention dam inlet with bird hide

SECTION D-D 1:100   Retention dam

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