NON-MOTORISED TRANSPORT

ERICA DRIVE, KUILS RIVER

Landscape background and approach

1. Planting
2. Water
3. Hard Landscaping
4. Maintenance
5. Environmental and stormwater

NMT Liesbeek Parkway
Photo by author

Background and approach

NMT

The City of Cape Town non-motorised transport projects prioritise pedestrian, cycle and other modes of transport. It is prudent to work with a long term strategic landscape plan in mind to ensure optimal outcomes.

HARD AND SOFT LANDSCAPING

The spatial design of these projects considers hard and soft landscaping elements in order to improve functionality, environmental quality and the aesthetic of the road reserve area.

After meeting with the City of Cape Town – Parks Department official and the Client, we are clear on the approach to be followed, which is encompassed in the approach outlined.

Planting

Planting

Erythrina caffra (Coast Coral tree) http://pza.sanbi.org/erythrina-caffra



Syzygium guineense http://pza.sanbi.org/syzygium-guineense



Planting

Vachellia karroo (Sweet thorn) http://pza.sanbi.org/vachellia-karroo

Trees

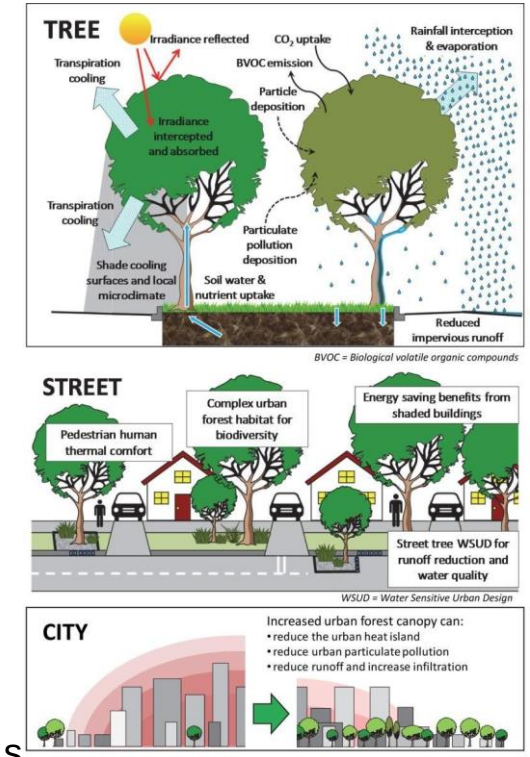
Trees are the most important element in this environment as resource for absorbing carbon dioxide and giving off oxygen for human life. They also provide shade for pedestrians, shelter from the elements and habitat for birds, insects and wildlife. Trees are the most substantial green vertical element in the landscape that mitigates “urban heat island effect” created by large paved surface areas and they soften an otherwise harsh or hard living environment. Trees also contribute to stormwater attenuation in the form of soil stabilization and absorption of water that seeps into the ground. Many trees have deep roots to stablise them and shallow roots to absorb food & water for growth. These roots hold the ground in tact on slopes and surfaces that require “soft stabilization”.

Shrubs

Shrub planting is often not a consideration on these projects, as these may become litter traps. Thorny shrubs may be considered for the purpose of visual and acoustic screening or a vertical impenetrable barrier to guide & direct pedestrians.

Groundcovers

Groundcover planting provides the benefit of soil stabilization and a horizontal plane green element with a similar function to trees. Shrubs may not currently be planted in the stormwater channel as this will impact on flows.



Plant selection

- Larger and fewer trees preferred. The larger the size of trees and plants at time of sourcing the better chance of survival. Larger trees and plants can withstand more stress than smaller specimens, making it more preferable to plan for the ultimate long-term layout and strategically phase-in the tree planting.
- Indigenous species are preferred over exotic species. They are more adapted to the local climatic conditions such as wind and sun exposure, soils and drought. The species diversity is enormous, making selection and availability easier, improving the quality of habitat and chance of survival. Indigenous succulent species require minimal water and are ideal in drought conditions.
- Replace dead trees and removed trees with trees of a similar biomass.
- Ensure that planting does not obstruct views.

Water

Water, or the current scarcity thereof in the Cape Town Metro, is the most important constraint when considering the way forward in terms of implementation. Without a secure, alternative water source, planting will not be possible.

Watering options:

1. Water using treated effluent water via filtered irrigation or water tanker.
2. Water with recycled / harvested water via irrigation or a water tanker.
3. Supplement such water with the use of water absorbent additives that release water slowly over time.

Boreholes and wells

Government regulation

National Government gazetted new guidelines for all borehole and wellpoint use, effective from 12 January 2018 Government Gazette No. 41381 (Vol. 631). Borehole/well point water use must be metered and all users are required to keep records and have these available for inspection. Permission from the national Department of Water and Sanitation to sell or buy borehole/well point water. Using this water needs to be used responsibly as over-extraction harms the environment. Refer to the Water By-law (2010) and Water Amendment By-law (2018)

Apply to sink a borehole or wellpoint and register your borehole or well point.

Well points draw groundwater that is close to the surface, from about 8 - 10 metres. Boreholes can be shallow at a depth of about 30 m, or deeper at 100 m or more, and cost more than well points.

Use of groundwater

Not all groundwater is ideal for watering plants or indoor use, as it might have too much salt or iron in it. During the drought, limited irrigation is allowed in order to preserve groundwater. It should only be used if it has received the appropriate treatment e.g. removing heavy metals. Groundwater (like all alternative water) may not generally be used for drinking, cooking or body washing according to the Water By-law (2010) and Water Amendment By-law (2018).

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ALTERNATIVE WATER INSTALLATION GUIDELINES & DROUGHT CRISIS UPDATE

TOGETHER WE CAN AVOID DAY ZERO

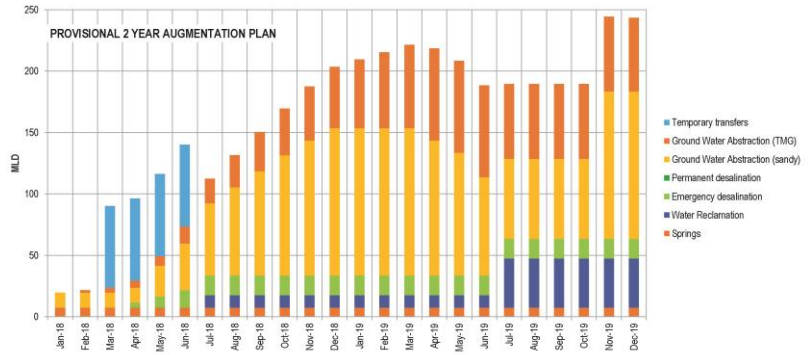
20 March 2018

Making progress possible. Together.

WHAT FORWARD LOOKING UTILTIIES ARE DOING

- Diversification of supply mix (water source portfolio)
  - Desalination – 25%
  - Water Reuse – 25 %
  - Groundwater Extraction – 25%
  - Surface/Dam Water – 25%
- Recharge of aquifers & reservoirs by reclaimed and desalinated water in wet years
- Maximise use of aquifers during dry years

SHORT TERM NEW WATER PROGRAMME - TBC

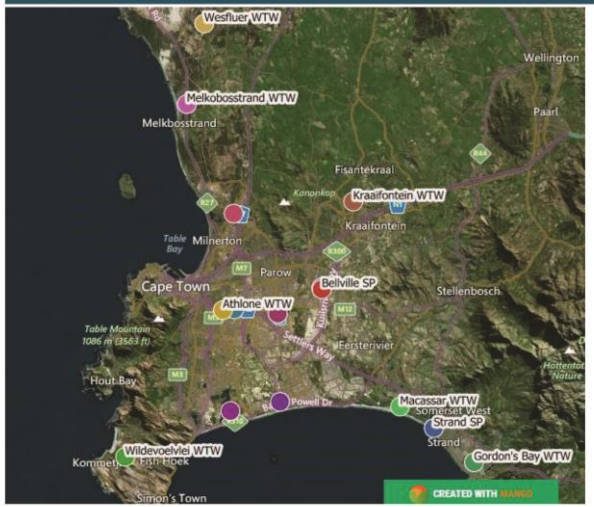


UNDER REVISION

TREATED EFFLUENT RE-USE FOR LARGE USERS

- Treated wastewater from treatment plants
- Cost is **R5.30/kl** compared to **R57/kl**.
- 75 million litres per day supplied through permanent pipeline connections
- 10 million litres from collection points
- Untreated for toilet flushing, irrigation, fire systems and other operational uses. Can be treated onsite to required quality.
- Email treated.effluent@capetown.gov.za
- So far mostly for
  - Industries & commercial operations
  - City Parks & Departments
  - Golf courses
  - School irrigation
  - Farmers

TREATED EFFLUENT RE-USE FOR LARGE USERS



Businesses can collect at designated collection points or can connect to existing treated effluent reticulation.

PARTNER RESOURCES

- GreenCape drought support service, website with useful case studies & resources. Contact Jane Reddick – jane@green-cape.co.za
- Green Building Council SA water & energy benchmarking tool for offices
- Supplier database for water saving & alternative water technologies and services on Western Cape Government's 110% Green webpage
- WWF's business campaign and Wednesday Water Files. www.wwf.org.za
- National Cleaner Production Centre for free industrial water efficiency audits Contact Andre Page - APage@csir.co.za http://ncpc.co.za

GreenCape

GREEN BUILDING COUNCIL SOUTH AFRICA

Western Cape Government 110% GREEN

WWF

NCPC NATIONAL CLEANER PRODUCTION CENTRE SOUTH AFRICA

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THINK WATER
THINK LESS THAN 87ℓ A DAY

City's position on installation of alternative water systems.

November 2017

Making progress possible. Together.

Alternative water for the 'new normal'

- **City promoting alternative water for operational uses** - but only if done responsibly to avoid health risks, contamination of drinking water supply a environmental damage.
  1. Rainwater
  2. Groundwater : boreholes, wellpoints and springs
  3. Greywater
  4. Treated effluent from City, and own treatment on site
  5. Surface water: rivers and streams on the property

  Stormwater will come in 'new build' guidelines, and ocean water not included yet

Installation guidelines

- **For installations of systems with plumbing**, not 'bucketing'
- **For homes & businesses**, but not for complex industrial systems
- Fairly **wide stakeholder inputs** so far.
- **Consistent with legislation and current Water Bylaw** which is to be updated soon. So position may be updated, but key principles will remain.

- **Full guideline document available soon.** Will cover:
  - Alternative water explanations and legislation overview
  - Appropriate uses, quality and treatment
  - Installation to prevent contamination – with illustrations
  - Application, registration and/or licensing requirements
  - Signage
  - What to look for in an installer
  - Checklists for pre-installation, installation & post-installation for each type

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KEY PRINCIPLES FOR ALTERNATIVE WATER

1. **Quality required for different uses** – as per 1996 national guidelines
2. **Imperative to prevent potentially dangerous alternative water from contaminating drinking water system** on the premises and for surrounding area. Reduced Pressure Zone (RPZ) valve back-flow preventers mandatory.
3. **Quality required for different uses** – as per 1996 national guidelines. See matrix.
4. **Discharge to correct place** – overflow to stormwater or to sewer if harmful chemicals or substances
5. **Colour code the pipes**
6. **'Do not drink' signage**

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SOURCES OF WATER:	RAINWATER	GROUND WATER	SURFACE WATER	GREYWATER	TREATED EFFLUENT
	TEST FIRST, AND TREAT ACCORDING TO USE				
USES OF WATER:					
Plant bed irrigation (subsurface)	4	4		4	
Fire fighting	3 (Categories 3 & 4)	3 (Categories 3 & 4)		3 (Categories 3 & 4)	
Vehicle cleaning	3	3		3	
Food garden (subsurface) & lawn irrigation	4	4		4	
Outdoor hard surface cleaning	3 (Category 4)	3 (Category 4)		3 (Category 4)	
Swimming pools*	SANS 241*	SANS 241*		SANS 241*	
HVAC	3 (All 4 categories)	3		3	
Toilet flushing**	**	**		**	
Fish ponds	1	1		1	
Indoor surface and kitchen cleaning	1	1		1	
Laundry washing	1	1		1	
Cooking & food preparation	1	1		1	
Body washing (ablution)	1	1		1	
Drinking	SANS 241	SANS 241		SANS 241	
Water features (no contact)	1	1		1	
Water features (e.g. splash parks)**	SANS 241	SANS 214		SANS 241	

KEY/ EXPLANATION

COLOUR CODE	RISK OF USE	WATER QUALITY REQUIRED FOR INTENDED USE	TESTING AND TREATMENT REQUIRED, FOR INTENDED PURPOSES
USE WITH DISCRETION	**Low, negligible risk** No direct human contact with water	Low	• No testing or treatment required. • Use with discretion.
TEST QUALITY AND TREAT FOR USE/S	**Moderate risk** Some human contact with water	Moderate	• Test water quality • Check results against national guidelines for intended use. Treat if required. • For this low risk category, treatment may be unlikely.
TEST QUALITY AND TREAT FOR USE/S	**Medium risk** Greater human contact	Medium	• Test water quality • Check results against national guidelines for intended use. Treat as required. • For this risk category, treatment is likely.
TEST QUALITY AND TREAT FOR USE/S	**Very high risk** High levels of contact and human ingestion	High	• Test water quality • Check results against national guidelines for intended use. Treat as required. • For this high risk category, high level of treatment is essential. • Regular quality testing necessary to determine ongoing water quality and suitability for use. Filtering and or treatment will be necessary.
	No alternative water sources permitted for these uses – as per City's Water Bylaw. Unless by contract as a Water Service Intermediary	N/A	N/A

Application, registration and licencing

ALTERNATIVE WATER TYPE	FROM NATIONAL DWS	FROM CITY OF CAPE TOWN
Rainwater	No licencing.	Approval for installation
Groundwater	Licencing – General Authorisation or Water Use Licence	Approval for drilling, and register the source, and get approval for installation
Surface water	Licencing – General Authorisation or Water Use Licence	Approval for installation
Greywater	No licencing.	Approval for installation
Treated effluent – own treatment	Licencing required.	Approval for installation
Treated effluent – from City	N/A for consumers buying from City	Approval for installation

RPZ valve back-flow preventer

- **Specifications & functionality outlined in SANS 1808-15.** If products approved according to this standard are not easily available locally, the City will also accept international standards for RPZs from organisations such as the German Institute of Standardization (Deutche Insitut vur Normung– DIN) or the American Water Works Association (AWWA). Locally available RPZ models include the products manufactured by ARI and Caleffi.
- **Local suppliers** so far:
  - Equilibrium Water, importing Caleffi range *(www.equilibrium-water.com)*
  - Ultra control valves *(www.ultravalves.co.za)*
  - Wholesale plumbing supply in Mphumalanga *(www.wholesaleplumbingsupply.co.za)*
- **City has approached these specialist retailers**: Plumblink, Incledon, CP&B, OnTap, Brights, Buco, Build It and Builders Warehouse.

NOTE: City of Cape Town does not endorse any particular product or service provider and cannot be held liable for any non-performance.

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Colour codes

- Greywater = lilac, Pantone 522 colour code
- Groundwater = dark green with two grey stripes
- Rainwater = no specific colour, but labelling recommended.
- Treated effluent = orange

- And with reference to SANS 10140-3: 2003, Edition 3 for identification colour

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CITY WEBSITE USEFUL LINKS	SHORT URL
Water By-law (2010)	http://cct.gov.za/xAjse
Alternative water sources for your organisation	http://cct.gov.za/INIBT
Apply to sink a borehole or wellpoint	http://cct.gov.za/99C1r
Register a borehole or wellpoint	http://cct.gov.za/juF60
Apply to install and use an alternative water system	http://cct.gov.za/99C1r
Apply for supply of treated effluent	http://cct.gov.za/iNPx2
Water saving toolkits- water saving posters, guides and materials to download	http://cct.gov.za/iwC7P

Signage for main thoroughfare and point of use

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Appropriate signage as per SANS 1186-1:2008

PLEASE DO USE – BUT RESPONSIBLY

Under current Water Bylaw & legislation:

- **Alternative water systems subject to City approval**, and groundwater and surface water subject to national Dept of Water & Sanitation licensing.
- **No alternative water for drinking, cooking and body washing** (ablution). Due to health risks and City's statutory responsibility for providing drinking quality water.
- **No full 'off-grid' for water for homes and smaller businesses.** Risks & monitoring/ enforcement costs too high to allow.
- **Some 'off-grid' for large consumers** such as large residential developments and businesses which contract with the City as Water Service Intermediary, and can show reliable treatment and monitoring system, and backflow-prevention.

Alternative water use entirely at risk of consumer, City not liable.

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City approval & inspection

- Current groundwater and treated effluent applications systems stay 'as is' for now. Apply to borehole.water@capetown.gov.za and treated.effluent@capetown.gov.za respectively.

- Greywater & rainwater applications: download 'Alternative Water System Application Form' from City's website, see http://cct.gov.za/bC2nV Email with attachments to water@capetown.gov.za

- Plumbing Certificate of Approval to be compulsory.

- City started engagement with plumbing industry associations IOPSA and PIRB, and they're pioneering training programmes now.

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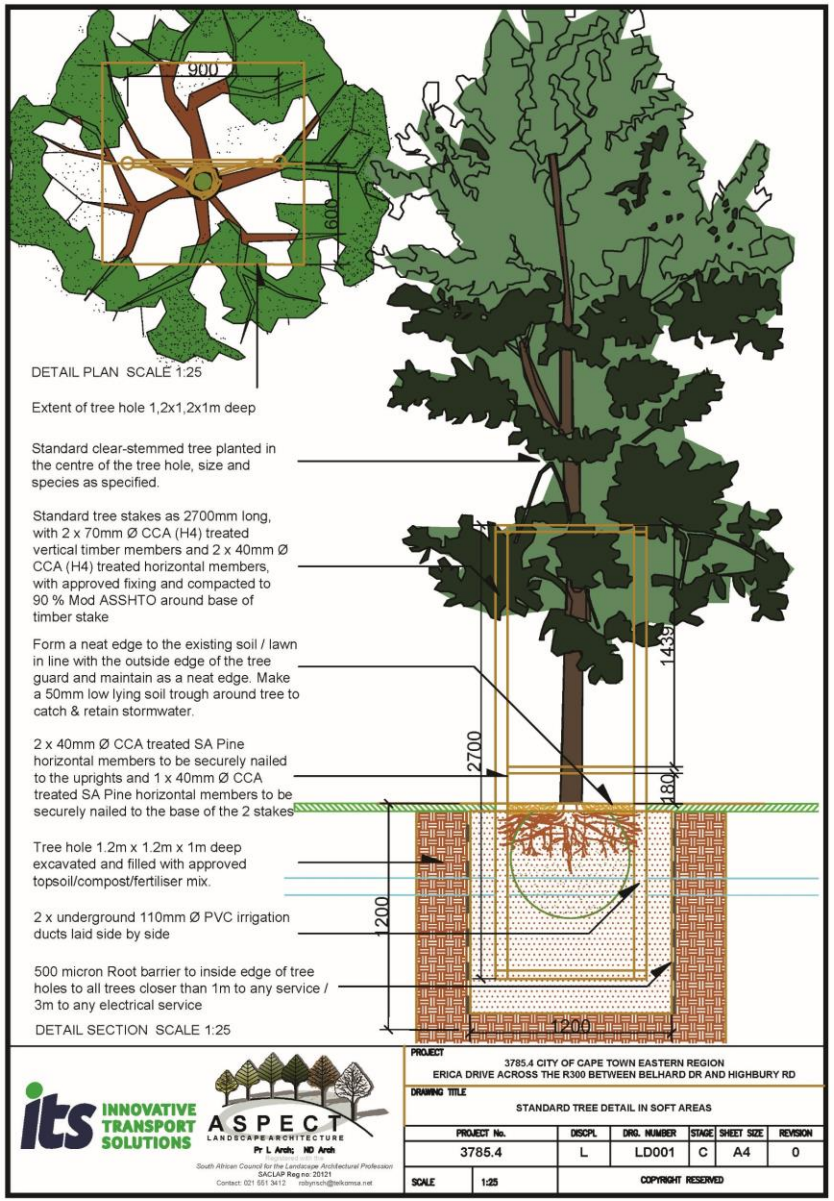
Hard landscaping

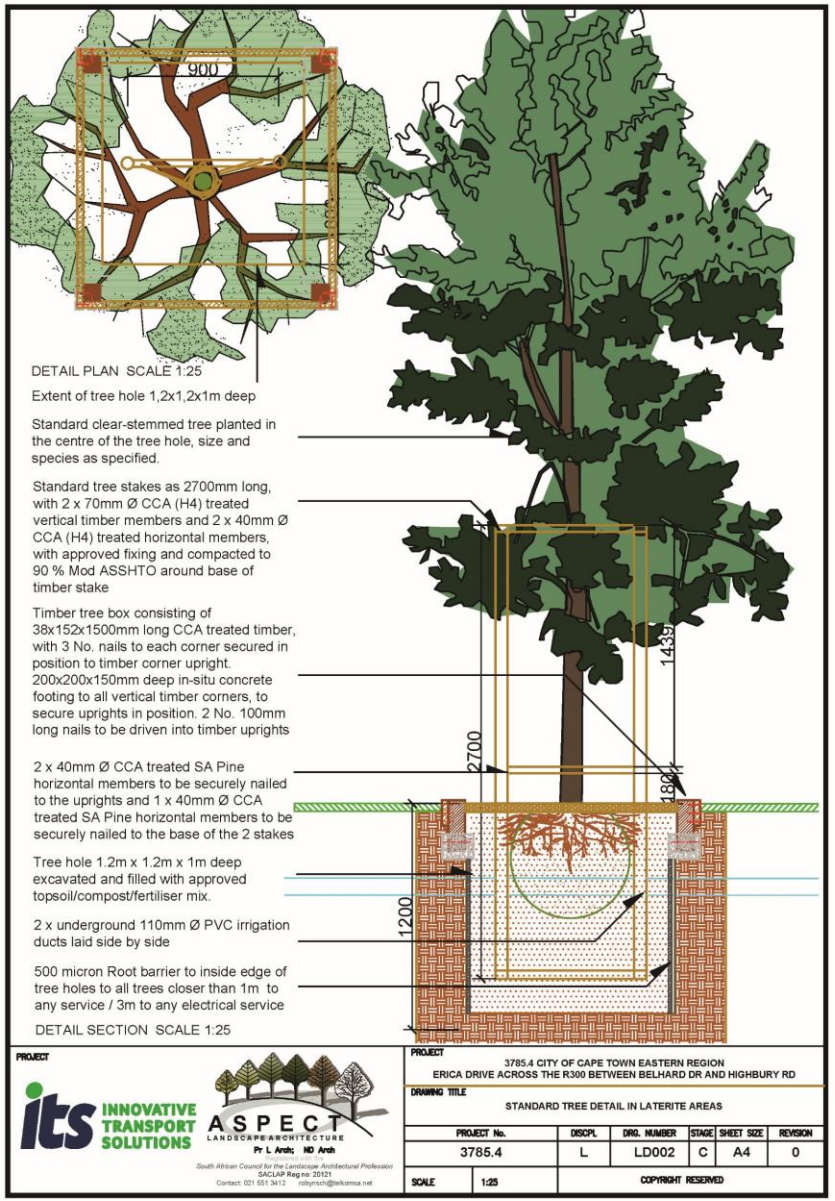
Hard landscaping

Surface materials

A compacted laterite surface will be used on centre medians.

Trees will have a tree box constructed with timber to ensure the space around them is clear of hard surfacing.





Maintenance

To achieve the vision of a safe NMT facility, the key is maintenance and the success of any landscape installation is governed by the quality of after-care and maintenance. This applies to both hard and soft landscaping, buildings, roads and any other piece of infrastructure. Trees and planting requires a minimum of 24 months horticultural maintenance to ensure optimal growth.

The challenge of vandalism and theft needs to be accounted for on all projects as a Provisional Sum

Environmental and Stormwater




Erica Drive – Bio-Retention Ponds – Refer to Environmental and Stormwater Specialist reports and specifications

Two Bio-Retention Ponds were proposed in the stormwater masterplan for Erica Drive. The purpose of these ponds is to attenuate stormwater and therefore reduce the size of the new pipe system. The ponds designed with litter traps and very specific vegetation has a cleaning purpose which means better quality of water discharged into Kuils River.

Wetlands to the west of the R300 within the road reserve have been identified. The construction of Erica Drive will result in a loss of some of the wetland habitat. The two new Bio-Retention Ponds and the construction / rehabilitation of the existing wetland between the R300 and the residential area immediately west of the R300 will contribute to the replacement of the existing wetlands to the satisfaction of relevant local and regional authorities.

Bio-Retention Pond with the future R300 interchange area

The pond has a capacity of 1400m³. The largest part of the catchment area on the western side of the R300 discharges towards this Pond through a pipe system. The pond will mostly be dry although allowance for permanent water has been made.

The Bio-Retention Pond consists of the following:

750Ø Inlet

Sediment Forebay / Litter Trap with a maintenance ramp

750Ø Outlet underneath the R300

5m wide Armorflex pond overflow structure

Appropriate obligate and facultative indigenous vegetation as per the Guidelines in The Sustainable Urban Drainage System

New Wetland area adjacent to Erica Drive west of the R300

With the new Erica Drive encroaching the wetland habitat 0,28 ha of wetland habitat is lost. The existing wetland will be rehabilitated with a new wetland footprint of approximately 0,58ha. The lowpoint kerb inlet (westbound carriageway) and the bridge approach (westbound carriageway) discharges towards the wetland through a pipe system.

The rehabilitated wetland consists of the following:

375Ø Inlet

Sediment Forebay / Litter Trap with a maintenance ramp

5m wide Armorflex pond overflow structure

Appropriate obligate and facultative indigenous vegetation as per the Guidelines in The Sustainable Urban Drainage System

Bio-Retention Pond north east of Erica Drive / Eland Street intersection

The pond has a capacity of 5000m³. The catchment area west of the R300 and a smaller catchment area between the R300 and Eland Street discharge towards this Pond through a pipe system. The pond will mostly be dry although allowance for permanent water has been made.

The Bio-Retention Pond consists of the following:

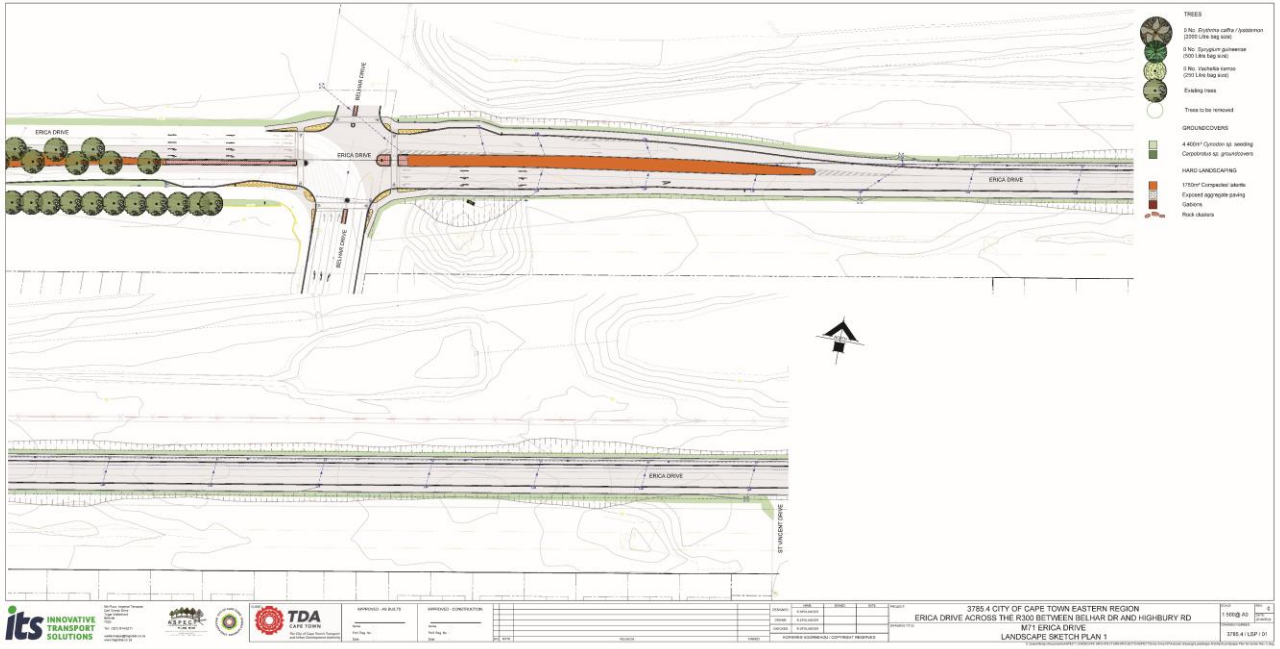
900Ø Inlet

Sediment Forebay / Litter Trap with a maintenance ramp

750Ø Outlet towards Kuils River

5m wide Armorflex pond overflow structure

Appropriate obligate and facultative indigenous vegetation as per the Guidelines in The Sustainable Urban Drainage System



TREES
0 No. Erythrina caffra / lysistemon (2000 Litre bag size)
0 No. Syzygium guineense (500 Litre bag size)
0 No. Vachellia karroo (250 Litre bag size)
Existing trees
Trees to be removed
GROUNDCOVERS
4 400m² Cynodon sp. seeding
Carpobrotus sp. groundcovers
HARD LANDSCAPING
1750m² Compacted laterite
Exposed aggregate paving
Gabions
Rock clusters
ERICA DRIVE
BELHAR DRIVE
ST VINCENT DRIVE
INNOVATIVE TRANSPORT SOLUTIONS
TDA CAPE TOWN
3785.4 CITY OF CAPE TOWN EASTERN REGION
ERICA DRIVE ACROSS THE R300 BETWEEN BELHAR DR AND HIGHBURY RD
M71 ERICA DRIVE
LANDSCAPE SKETCH PLAN 1
3785.4 / LSP / 01

TREES
1 No. Erythrina caffra / lysistemon (2000 Litre bag size)
19 No. Syzygium guineense (500 Litre bag size)
55 No. Vachellia karroo (500 Litre bag size)
Existing trees
Trees to be removed
GROUNDCOVERS
HARD LANDSCAPING
Exposed aggregate paving
Gabions
Rock clusters
BIO 3
ERICA DRIVE
INNOVATIVE TRANSPORT SOLUTIONS
TDA CAPE TOWN
3785.4 CITY OF CAPE TOWN EASTERN REGION
ERICA DRIVE ACROSS THE R300 BETWEEN BELHAR DR AND HIGHBURY RD
M71 ERICA DRIVE
LANDSCAPE SKETCH PLAN 3
3785.4 / LSP / 03

TREES
0 No. Erythrina caffra / lysistemon (2000 Litre bag size)
7 No. Syzygium guineense (250 Litre bag size)
15 No. Vachellia karroo (250 Litre bag size)
Existing trees
Trees to be removed
GROUNDCOVERS
2 000m² Cynodon sp. seeding
Carpobrotus sp. groundcovers
HARD LANDSCAPING
Exposed aggregate paving
Gabions
Rock clusters
BIO 1
BIO 2
FOOTPRINT OF EXISTING WETLAND (PRE-CONSTRUCTION)
ERICA DRIVE
INNOVATIVE TRANSPORT SOLUTIONS
TDA CAPE TOWN
3785.4 CITY OF CAPE TOWN EASTERN REGION
ERICA DRIVE ACROSS THE R300 BETWEEN BELHAR DR AND HIGHBURY RD
M71 ERICA DRIVE
LANDSCAPE SKETCH PLAN 2
3785.4 / LSP / 02

TREES
Erythrina caffra / lysistemon
11 No. Syzygium guineense (500 Litre bag size)
24 No. Vachellia karroo (500 Litre bag size)
Existing trees
Trees to be removed
GROUNDCOVERS
Carpobrotus sp. groundcovers
HARD LANDSCAPING
Exposed aggregate paving
Gabions
Rock clusters
ERICA DRIVE
HIGHBURY ROAD
INNOVATIVE TRANSPORT SOLUTIONS
TDA CAPE TOWN
3785.4 CITY OF CAPE TOWN EASTERN REGION
ERICA DRIVE ACROSS THE R300 BETWEEN BELHAR DR AND HIGHBURY RD
M71 ERICA DRIVE
LANDSCAPE SKETCH PLAN 4
3785.4 / LSP / 04