

Multi-purpose stormwater infrastructure in Cape Town

Water and Sanitation Directorate Bulk Services Department, CSRM Branch

Andrew McDonald 3 November 2023

Presentation Outline

- 1. Cape Town's stormwater system
- 2. GIP and LUW
- 3. Good examples
- 4. Opportunities
- 5. Planning and management considerations



Cape Town's stormwater system

A complex network of interconnected built infrastructure and natural systems:

2000km of rivers and streams
480km of canal and channel
Over 850 ponds – wet and dry
Thousands of wetlands and vleis





Green Infrastructure Programme (GIP)





GIP includes both 'green and blue' elements.

GI Definition:

Natural and engineered ecological systems that integrate with the built environment to provide the **widest range of ecological**, **community and infrastructural services**.

GIP Purpose:

The protection and enhancement of existing natural assets and the promotion and creation of new GI assets, in order to **underpin the sustainability** of Cape Town, enhance the city's living environment and improve its resilience to the effects of climate change.

What is the water pollutant assimilation/purification ability of this space
What is the importance of this space overlaying a recognized aquifer
What is this space's contribution to infiltration
What is this space's contribution to flood control assistance/protection
Does this space provide local, regional or bulk water supply
What is this space's contribution to coastal infrastructure protection
What is the extent of indigenous vegetation in this space (quantity)
What is the presence of threatened indigenous vegetation in this space (quality)
What is the importance of this space for species of conservation concern or large fauna
What is the importance of this space for faunal breeding, roosting, nursery or den sites
What is the importance of this space for ecological connectivity
How important is this space as a buffer to conservation or protected areas
How important is this space for allowing/supporting coastal processes
What is the social, economic and/or cultural function of the trees in this space
What is the importance of this space for spiritual or cultural rituals and/or activities
What is the importance of this space for general public recreation
How significant is the cultural or heritage value of this space
What is the importance of this space for environmental education and/or research
How significant is this space for tourism
How significant is the view shed/vista from this space
What is the aesthetic appeal or sense of place/identity of this space



What is the importance of this space for extracting natural resources for subsistence What is the importance of this space for agriculture / producing food Connects communities, and used and enjoyed by communities

> Has a functioning ecology

Provides a range of ecosystem, economic and social benefits

Makes space for water

Has acceptable water quality

Connects to the water table and floodplains

Liveable Urban Waterway Programme (LUW)

LUW Purpose:

A programme that will systematically, proactively and collaboratively rehabilitate city waterways using water sensitive design, nature-based solutions, catchment interventions and green infrastructure.

Pond at Edith Stephens Nature Reserve

Initially a flood alleviation pond that is now integrated into the nature reserve, providing water quality improvement, important habitat for the WLT and birds, and a pleasant space to sit and relax.





Silvermine wetlands

A flood scheme that set a range of objectives that extended beyond just flood alleviation.

Mutli-functional stormwater infrastructure with the many cobenefits still with us today – recreational, ecological, cooling, education, biodiversity, water quality improvement and flood alleviation.





Pond by the Paddocks Shopping Centre

A wet pond with lovely landscaping and paths, providing for multiple functions, including some polishing of urban drainage prior to discharging into Table Bay Nature Reserve and the Diep River Estuary.





Beautified canal edges

Very local and small scale interventions to make canals multi functional, in this case a pathway and gardens to entice people to the water edge and promote a sense of pride in the neighbourhood.





Milky Way pond – Joe Slovo Park

This pond is one of a few open spaces in the informal areas of Joe Slovo Park, with potential to be multi-functional stormwater infrastructure:

- 1. Water quality improvement
- 2. Flood alleviation
- 3. Landscaping and habitat improvement
- 4. Recreation and amenity for the local community





Design features proposed:

- 1. Modifications to layout and geometry to create a micro pool, forebay and rip rap check dams.
- 2. Control weir invert raised to allow an additional volume.
- 3. Vegetation, trees and landscaping, including along roads.
- 4. Sections of permeable fencing.
- 5. Repair of existing play equipment, installation of synthetic lawn and rubber surfaces.

Note – early stage concept designs may not reflect what is eventually implemented.



Canal and wetlands at Roscommon Rd

Opportunities to connect the canal back to the wetlands and create a multi-functional, community GI asset that can provide various benefits.

This space is being investigated through the LUW programme with support from the C40 CFF.





Note – early stage concept designs may not reflect what is eventually implemented.

Sheffield Rd ponds – Philippi Opportunity Area

Ponds D5, P7 and P20 along Sheffield Road have been identified in the masterplan as having huge potential.

- 1. Stormwater functioning, including water quality improvement.
- 2. Social and economic activity such as recreation/sporting functions, informal trading.
- 3. Greening, landscaping, trees.
- 4. Paths and walkways.
- 5. Safety improvements.
- 6. Community-driven management model.



Sand/Langevlei Canal

LUW project to repurpose the space into multi functional GI.

- 1. Remove the canals and where possible naturalise the channel - infiltration
- 2. Top wetland/pond with a forebay to hold and treat the water
- 3. Bottom wetland as a biodiversity wetland with a polishing function
- 4. Pathways, signage and landscaping



Planning and management considerations

The demand for space for housing and the challenge of encroachment.



January 2020

January 2022

January 2023



Planning and management considerations

Water quality is a major risk to the safe use of stormwater systems for any purpose, particular recreation.





Planning and management considerations

- The GIP has developed a very useful dataset to inform decisions and planning.
- Stormwater infrastructure generally and ponds specifically present an opportunity to be multi-functional GI assets.
- Context is important and each space needs to be evaluated on its own merits.
- When planning for upgrades or new stormwater infrastructure one must consider what opportunities present themselves.
- Maximise co-benefits, do what is right not what is easy.
- **Multi-disciplinary and transversal input** is needed both to inform integrated space planning, as well as long term management and maintenance.
- New ways of **managing and maintaining the spaces** will be required, ones that extend beyond traditional departmental silos.
- Community buy in and support is critical long term sustainability of the spaces,
- Multi-functionality needs to be included in relation to development applications and urban design and stormwater policies.



THANK YOU | DANKIE | ENKOSI

Contact information: Andrew.McDonald@capetown.gov.za