

ENVIRONMENTAL MANAGEMENT CHALLENGES OF UNDERGROUND BULK WATER SERVITUDES IN AN INCREASINGLY URBANISING ENVIRONMENT.



The implications of the urban edge .

Gail Andrews and Leslie Hoy

Rand Water

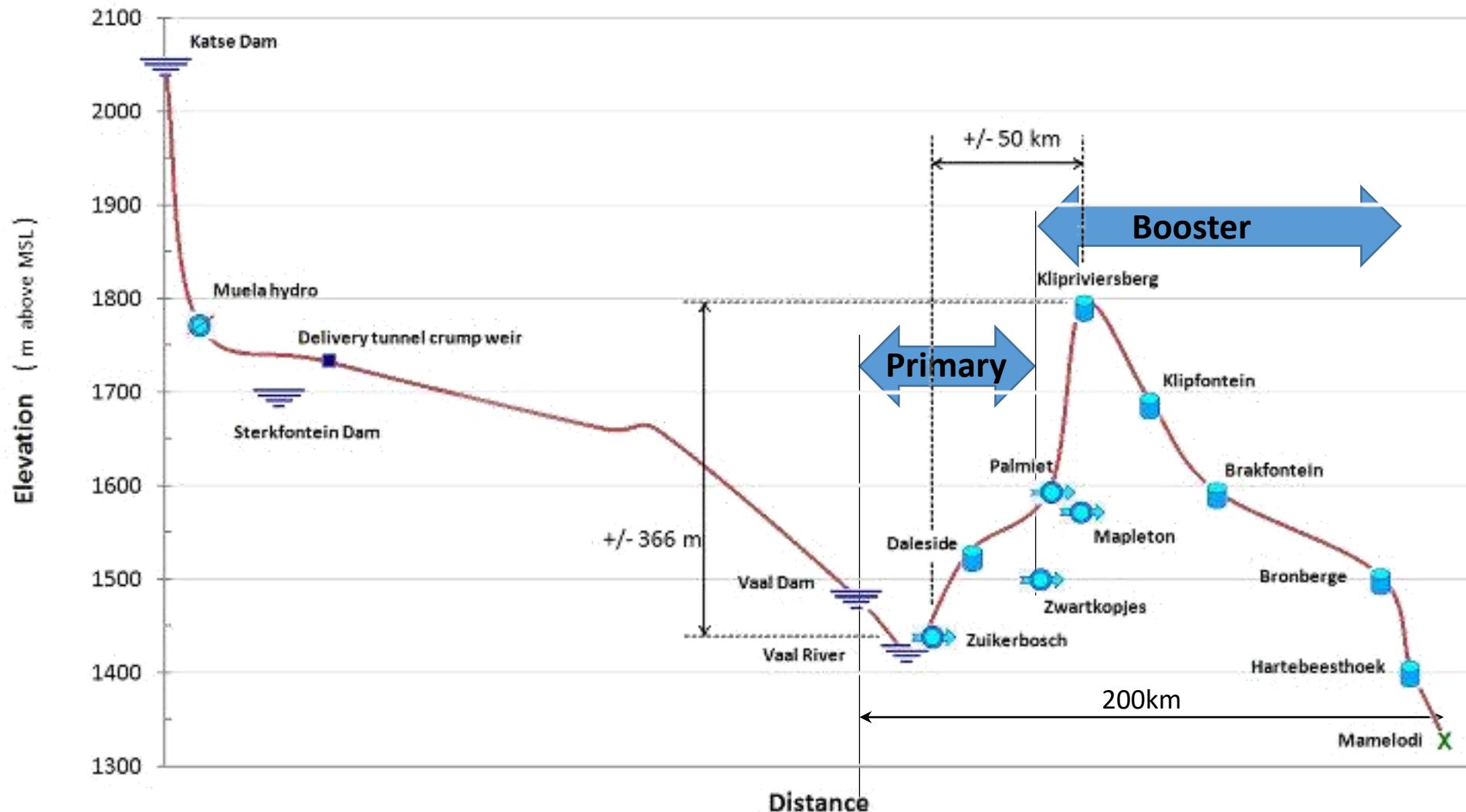
Tel(011) 682 0911

gandrews@randwater.co.za

Globally and locally the world is faced with an increased demand for the provision of services

- Government-owned para-statal entity
- Purifies & transports potable water (mainly) to municipalities
- Income (potable) is derived from rate-payers
- No funding from National Treasury
- Some Augmentation Capex is funded by borrowing
- All Renewal Capex is self funded

Supply topography (Palmiet)



Sources of Water

Lesotho Highlands



Vaal Dam



Lesotho Highlands Scheme augments
Vaal River System (about half of our
water is LH Water)

Raw water from Vaal Dam purified and
pumped to foothills of Witwatersrand
ridge

Purification





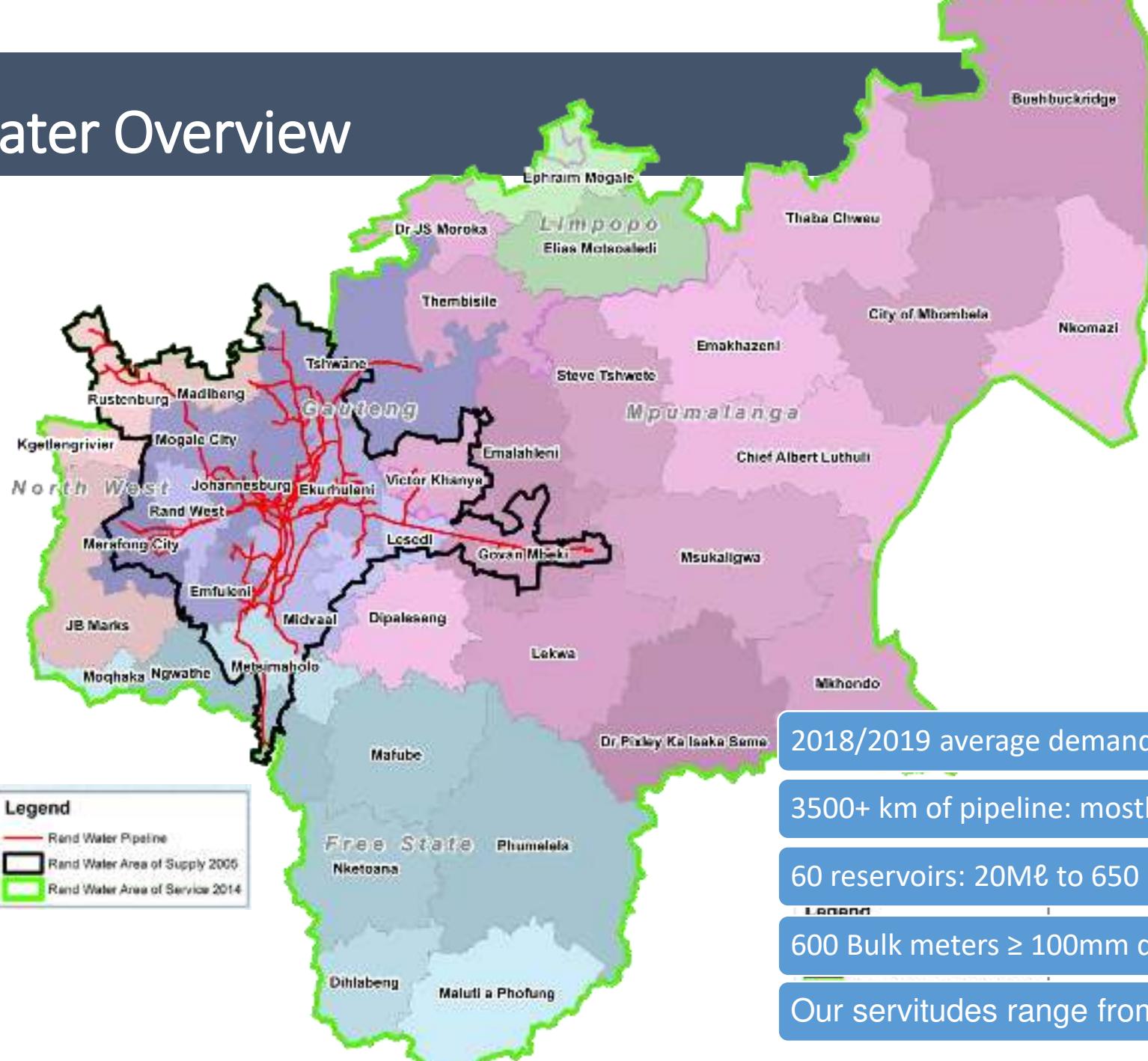
RAND WATER

**Rand Water is a public utility
now wholly owned by
government**

**Rand Water has been existence
for 110 yrs**



Rand Water Overview



2018/2019 average demand: ~4300 Mℓ/d

3500+ km of pipeline: mostly > 600 mm

60 reservoirs: 20Mℓ to 650 Mℓ

600 Bulk meters \geq 100mm dia.

Our servitudes range from 3m to 42m in width

Activities in our R.o.W/Servitude for Operation

Negotiate space
for new pipeline/
Authorisations

Install and
rehabilitate the site

Monitor integrity of the
environment . Fix soil
erosion

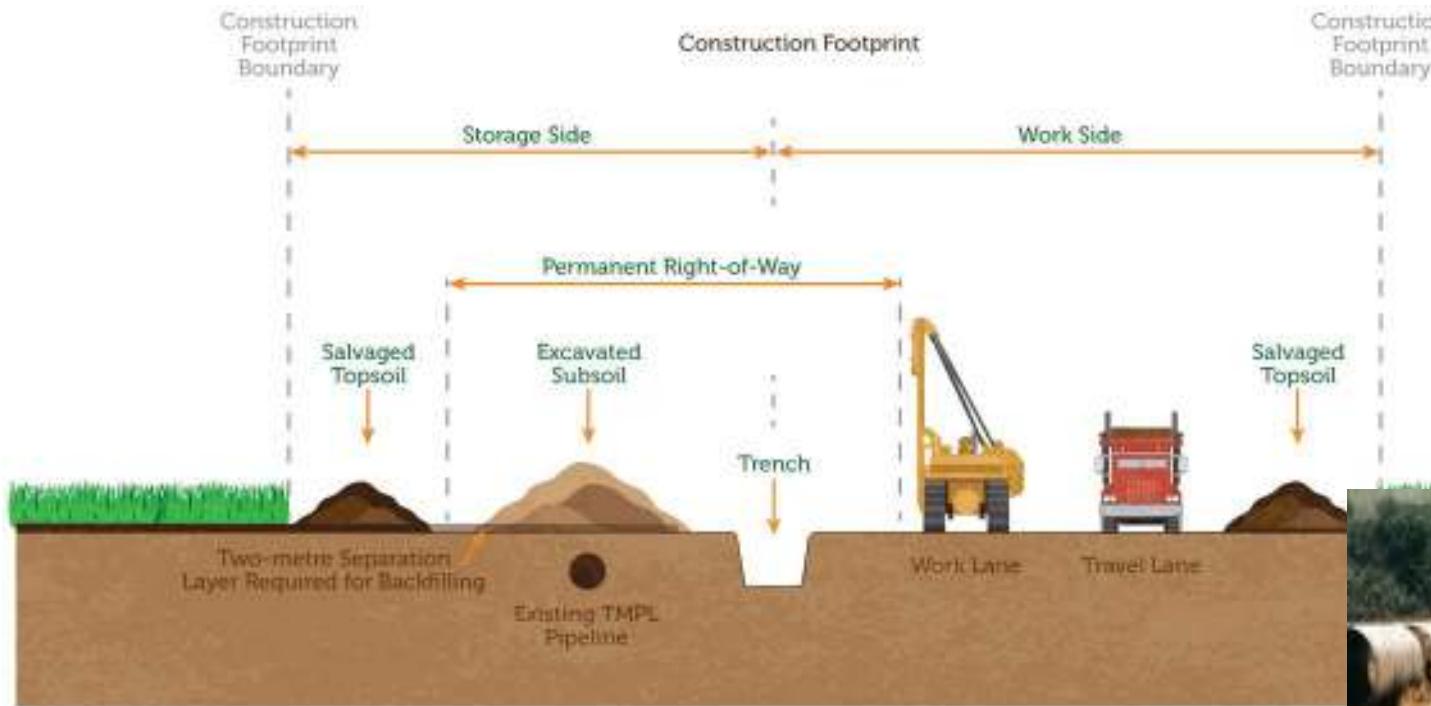


Environmental Management Challenges of Underground Bulk Water Servitudes In An Increasingly Urbanising Environment.

- Increased urbanisation
- Space limitations
- Maintain servitudes
- Access
- IAP's – Socio/political/ economic agenda
- Corrosion from stray current
- Erosion threatening pipe integrity
- **Very sensitive fauna and flora**
- Vandalism
- Servitude rights (inconsistent)
- Cost of maintenance
- Expropriation
- Encroachment



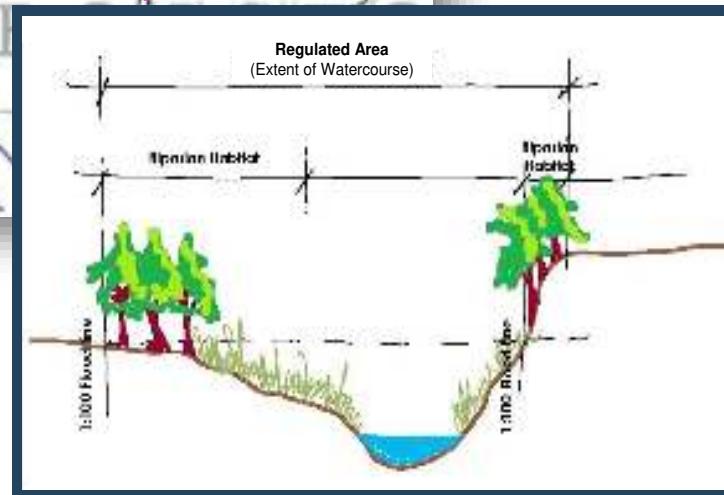
Typical layout of a Construction Working Strip



Pipeline being laid



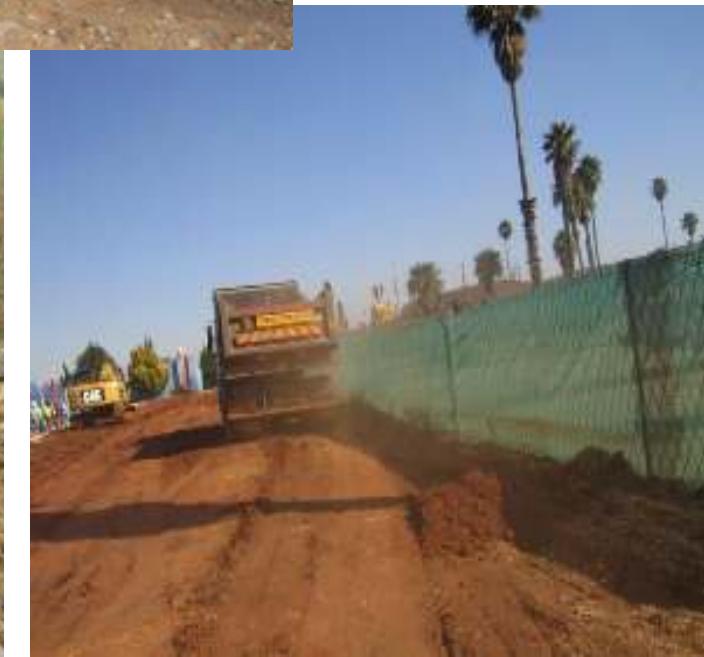
Regulated areas - Legislation



- Heritage
 - Plants
 - Protected land
- Delineated wetland zone
— Fpc site
- - - 500m radius



Take care to contain impacts



Expectation to look after the environment and keep degradation to a minimum



Big Brother

Scorpions flag on polluters

By DAVID SABBE

(SAIS) executive was not available for comment.

Govt Vines, the SAIS's executive of shareholders, said that an R50-million programme had to be implemented with environmental regulators.

"The idea behind the SAIS programme is that you cannot have environmental compliance without environmental governance."

However, a bettered outcome would not be reflected, he said.

Amidst this, SA is currently developing more stringent regulations to combat hazardous waste on an unauthorised site at its Nelspruit plant.

The Green Scorpions have launched a national investigation into the matter.

Other investigations by the state services include persistent emissions, ground water, refuse to judge waste removals and a series of activities undertaken without the required environmental authorisations.

At ArcelorMittal's downstream plant in Cape Edge, which was given SAISCA accreditation by the SAIS, Green Scorpions found significant environmental contraventions including failure to comply with a hazardous waste site permit, and at least one unpermitted hazardous waste site.

The Green Scorpions yesterday stated Edenvale Steel and Vanadium's Vulture plant as the third serious transgressor after Sasolpetro. At the end of August yielded previous extensive evidence of sulphur dioxide, ammonia and particulates, as well as "significant" concentrations of ground water, among other things.

Siegert said it was remarkable the report "it would not recommend".

Business Week, Page 2

'Green Scorpions' descend on Eastern Cape

'Compliance needs co-operative governance'

By DAVID SABBE
Investigative editor

GREENVILLE became the scorpions' environmental target last week, as South Africa's environmental department launches its first major investigation in the Eastern Cape.

Last night saw the launch of the project's Environmental and Compliance Audit, which will comprise a comprehensive inspection of sites in all 12 districts.

Speaking at the launch, Department of Economic Development and Environmental Affairs (Dede) Minister Dr Mmasekgoa said the department's environmental department would commence with the audit.

"This will involve the process to audit with a view

to making improvements, identifying problems,

and setting up a framework for continuous improvement," she said.

"Our task is to facilitate the reporting of environmental contraventions and to bring out enforcement. There are aspects of legislation of plants and activities being carried out that do not conform to what is required by law."

"The main focus of the investigation will be the protection of public health and safety, and the protection of the environment through the prevention of pollution, damage to the environment and degradation of ecosystems and loss of biodiversity."

On Wednesday, while the scorpions had initially been focused on green sites – those areas requiring directly or indirectly work on development, including mining, agriculture and infrastructure – they turned their focus to illegal operations on the Wild Coast.

As a result, however, their focus was still on what was described as unpermitted mining, which is illegal.

"The Wild Coast is in a state of growth. It is usually the result of unauthorised economic activities, such as water scarcity or the sale of waste, such as operating irrigation equipment, waste disposal or unauthorised mining," Siegert said.

The environmental audit was always aimed at allowing regulators to inspect and monitor illegal mining. These issues highlight the need for greater government intervention and enforcement, and the review from Parliament and the Dede that would go to the power to introduce offences against them apprehending and arrest without permission to get information or evidence.

National Environmental Compliance and Enforcement Lekgotla • 2015



Green Scorpions clean up firm's act

The Times p. 10/11
SARAH PATRICK

THREE truck loads of legally stored medical waste have been removed from the Bullele Medical Waste warehouse in Germiston.

The two-week R1.5-million clean-up by the "Green Scorpions", inspectors from the department of environmental affairs and labour, comes after an expose by the Sunday Times that found that the tons of rotting medical waste, collected from about 300 state hospitals in Gauteng and Limpopo, had been stored in the warehouse.

Rotting medical waste stockpiled in warehouse

The waste started on Monday, and by Tuesday it had been taken to the Mohlakane high-hazard landfill site in Brakpan for safe disposal.

Patricia said: "Environmental management inspectors from the department are on the scene and will continue to monitor the progress of the clean-up and compliance with the directive issued to Bullele Waste."

The clean-up was to have started at the weekend, but was hampered by heavy rains.

The Gauteng MEC for agriculture, conservation and the environment, Khomo Motsepe, said his department's inspectors had been stirred in the warehouse.

An environmental management inspector from the department, Michael Pheube, said the removal of

rotting environmental waste.

The Gauteng MEC for agriculture, conservation and the environment, Khomo Motsepe, said his department's inspectors had been stirred in the warehouse.

The installation of the drive is a listed activity that requires authorisation in terms of the National Environmental Management Act (Gema).

Department spokesman Pheliso Mokwa said his department would impose an undischarged fine on the company for its non-compliance with the act.

Furthermore, Sesame Noukied will have to submit the necessary application for approval.

"In addition to complying with Gema, Sesame will have to apply to the national Department of Environmental Affairs and Tourism to amend their air quality permit in line with the National Air Quality Management Act," said Mokwa.

This backlog comes in the wake of department MEC Dina Pule's call for the intensive implementation of environmental legislation.

A number of developers and industries have felt the heat, with some being ordered to stop their development and others facing heavy fines.

BONSTER (Pretoria)
Tuesday, 13 January 2015, p. 5

Eco-scorpions sting factory

Alfred Mmasekgoa

The Green Scorpions of Mpumalanga's department of agriculture and land administration have stung a pseudoboard factory in Nelspruit for Tshwane MEC Sesile Pule.



Tshwane MEC Sesile Pule has issued a new order on its plant that would allow it to increase production without government approval.

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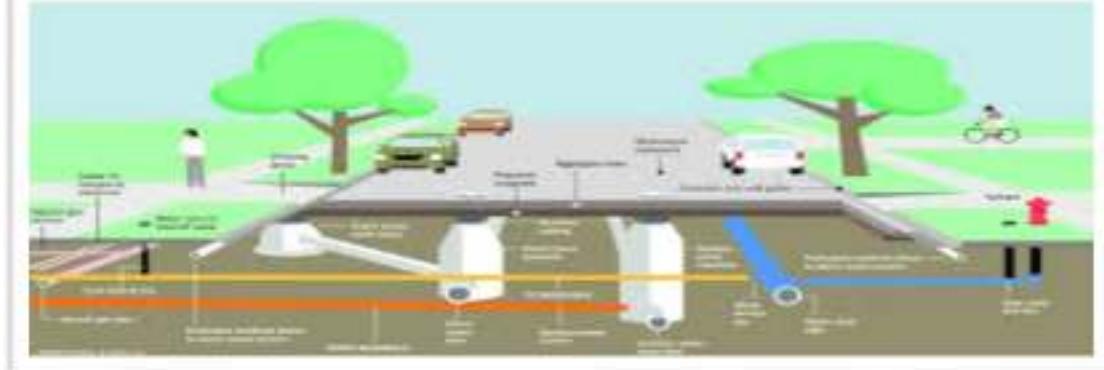
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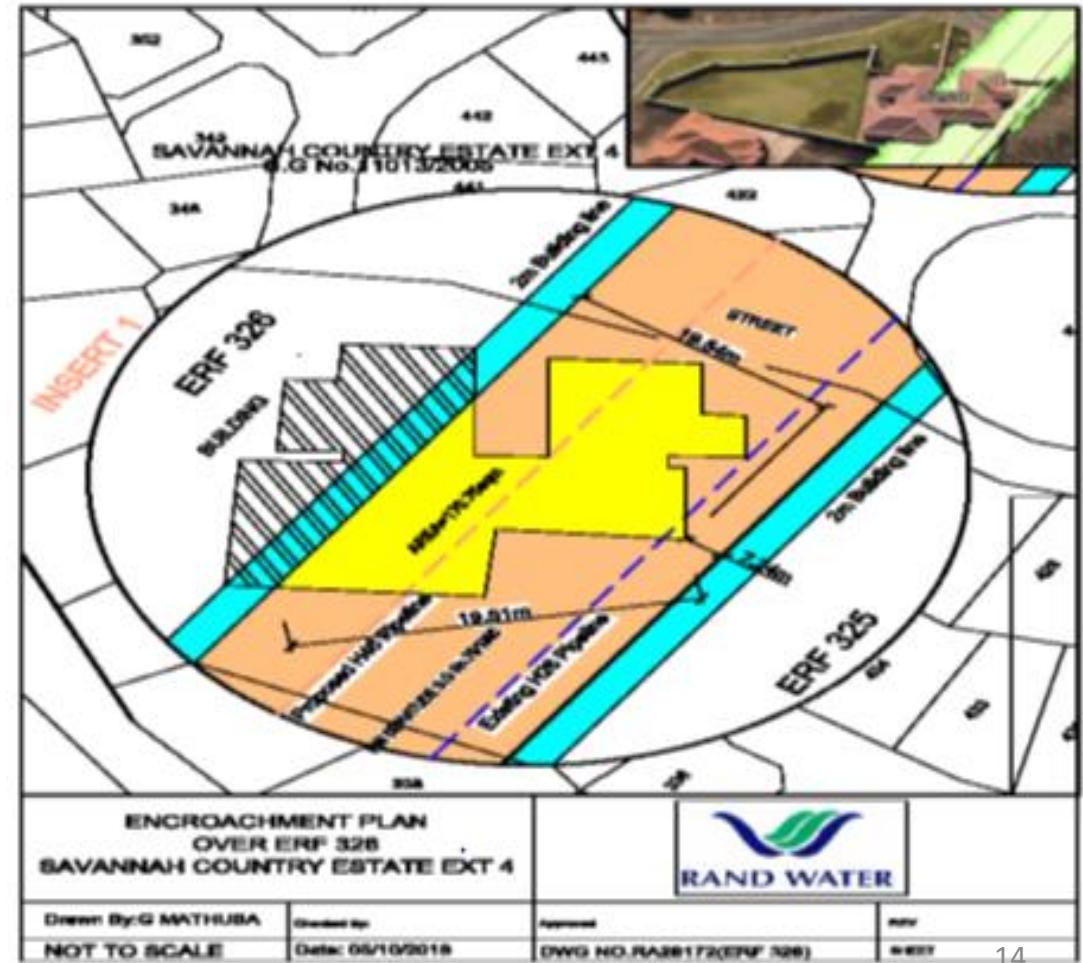
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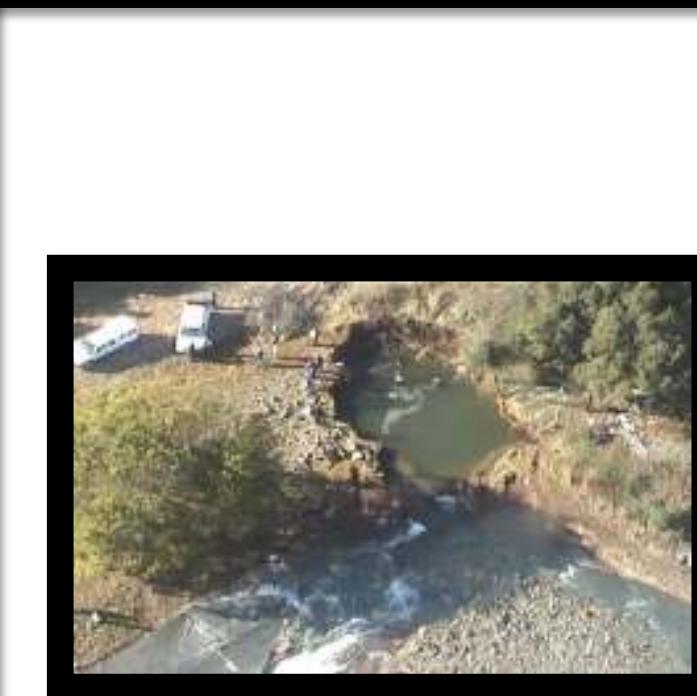
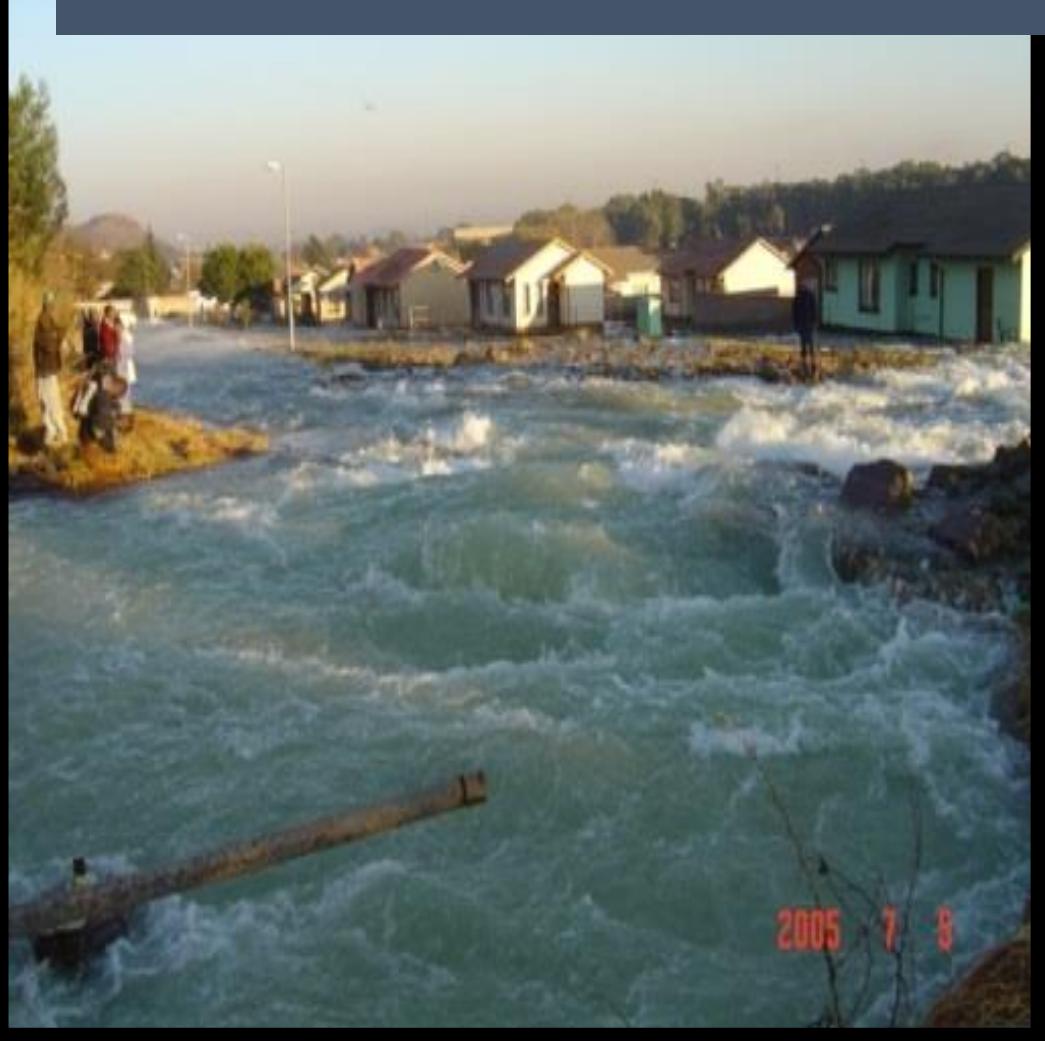
Services under the ground/ small spaces- hand digging



R5 Encroachment (Savana Estate)



Leaks can be very dangerous



Islands of very sensitive fauna and flora



Lycaenidae

- *Aloeides dentatis*

https://upload.wikimedia.org/wikipedia/commons/e/e3/Aloeides_dentatis%2C_J_Dobson%2C_a.jpg



Cineraria longipes S.Moore



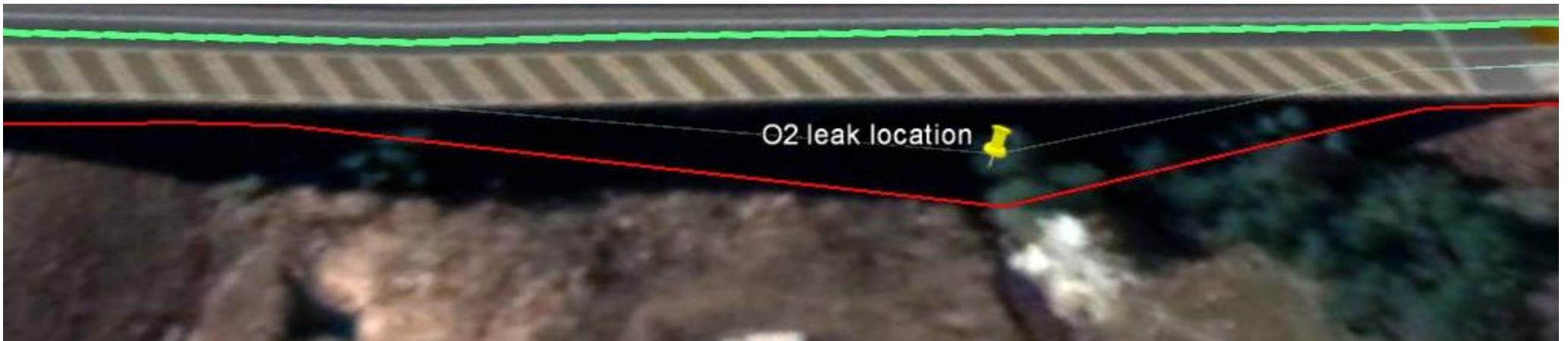
Regional Red List status (2016)	Endangered B2ab(iii)*
<i>Bronberg Ridge subpopulation</i>	Critically Endangered B1ab(ii,iii,iv) + 2ab (ii,iii,iv)*†
National Red List status (2004)	Vulnerable B2ab(ii,iii)
<i>Bronberg Ridge subpopulation</i>	Critically Endangered A2c; B1ab (i-v) + B2ab (i-v)

Julianae Goldern Mole

Daily encounters



When we impact on other services
“Changing a river to suit a bridge”



What can SARWA do about these challenges??



Tomorrow

Today

yesterday

Grow the business, reduce your foot print

Literature review

Servitudes form part of “green land” which includes natural and artificial green spaces which range from urban parks to forest, farmlands to street-side green strips providing, ecosystem services such as maintaining microclimates, filtering air, developing biodiversity or providing aesthetical appeal to urban environments. Li et al., 2016

Secondary values of ecological services,..... biodiversity, recreational and physiological services can be obtained from the same spaces

Green areas in our ever increasing urbanising spaces need to be more valuable as a **business case**,



Biodiversity ?

- Servitudes in urban space has received growing innovative recognition globally for their potential to preserve and enhance biodiversity ([Farinha-Marques, et al., 2015](#))
 - viable biodiversity corridor is thought to be 40m, however the wider servitude the better the potential for a biodiversity corridor
 - Many rail way edges and road reserves foster orchids ([Kloof conservation project](#)).
 - Many reptiles, birds and small animals can retain an existence in these servitudes ([Farmar-Bowers., 1999](#)).



Compatibility of shared servitudes for multiple uses for society ?

Aspect	Rand Water	Eskom	Sasol
Fire	neutral	no	no
Digging	no	neutral	no
Recreation cycling	possible	no	possible
Working with a crane	neutral	no	neutral
Graves	no	possibly	no
Biodiversity	Yes	yes	yes
Out door church	possible	possible	possible
Trees	no	no	no



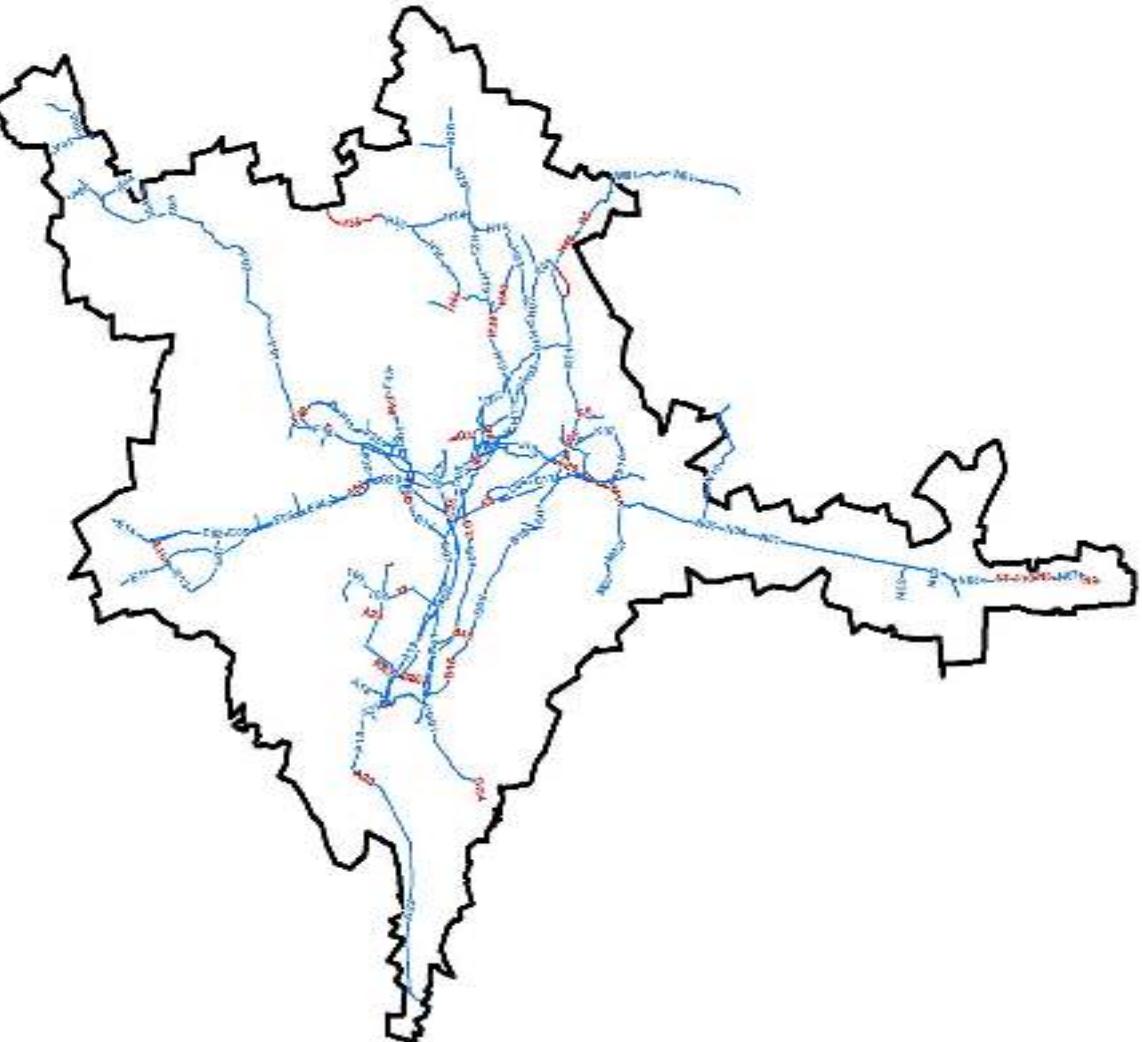
Area of Supply - Rivers and Wetlands

Area of Supply - Ridges

Area of Supply - Protected Areas

Area of Supply - Ecological Support Areas

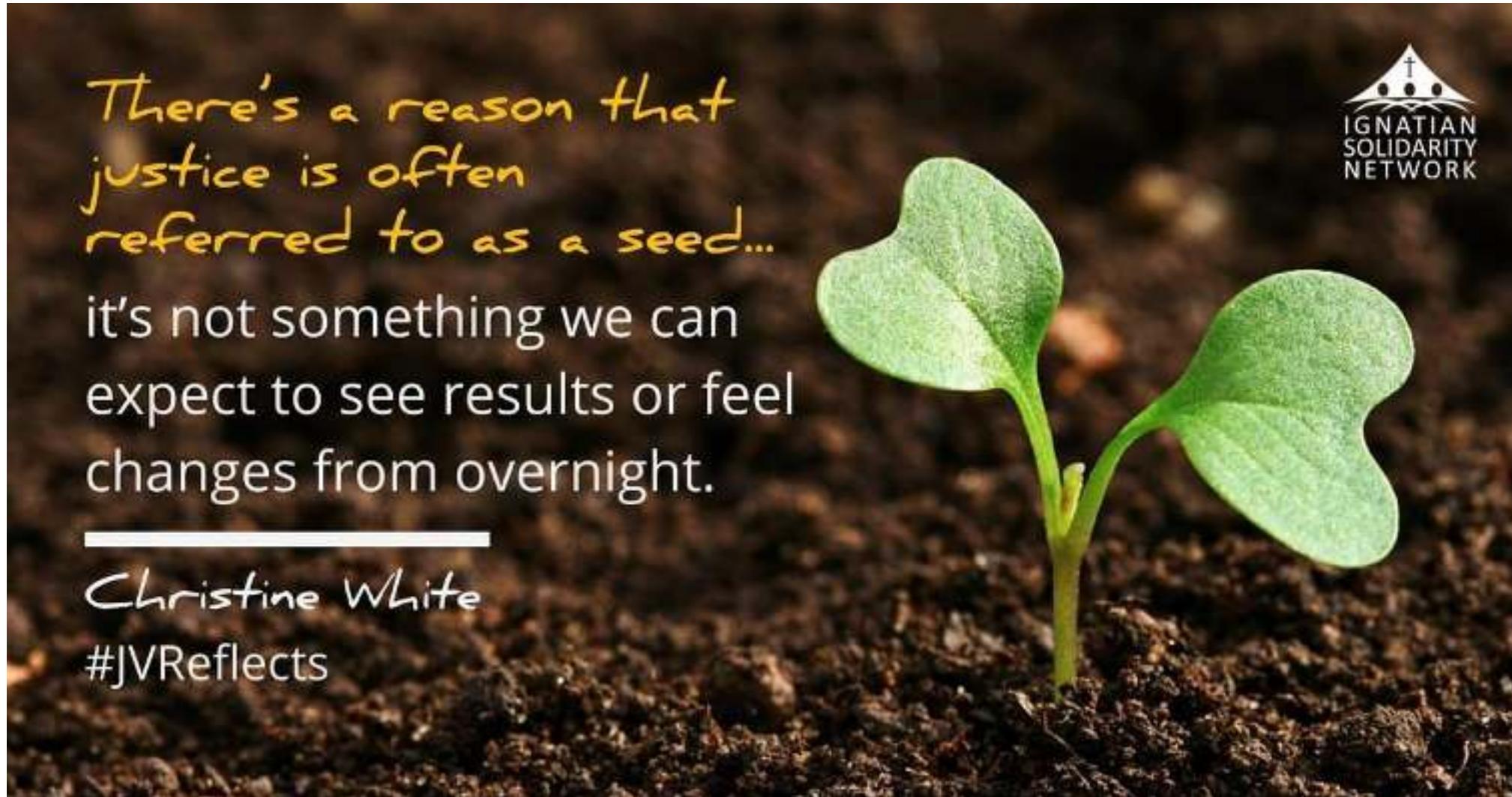
Area of Supply - Pipelines



Change the mind set!



Recommendation and conclusion



*Our servitudes can be
“Green infrastructure” with a
“value!*

- **The value of underground pipeline servitudes is less than that of pristine land but it still has a value (Chenowetha et al., 2018).**
- The challenge is in co-operative thinking to will it in to existence!

