Final Basic Assessment Report for Riverwalk Electrical

GAUT Ref: 002/17-18/E0046

Crossings will be along Solomon Mahlangu Drive and R104/K22 road reserves

September 2017

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Bokamoso ENVIRONMENTAL

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GAUTENG PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014 (Version 1)

Kindly note that:

1. This **Basic Assessment Report** is the standard report required by GDARD in terms of the EIA Regulations, 2014.

2. This application form is current as of 8 December 2014. It is the responsibility of the EAP to ascertain whether subsequent versions of the form have been published or produced by the competent authority.

3. **A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to all State Departments administering a law relating to a matter likely to be affected by the activity to be undertaken.**

4. **A draft Basic Assessment Report (1 hard copy and two CD's) must be submitted, for purposes of comments within a period of thirty (30) days, to a Competent Authority empowered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended to consider and decide on the application.**

5. Five (5) copies (3 hard copies and 2 CDs-PDF) of the final report and attachments must be handed in at offices of the relevant competent authority, as detailed below.

6. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.

7. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.

8. An incomplete report may lead to an application for environmental authorisation being refused.

9. **Any report that does not contain a titled and dated full colour large scale layout plan of the proposed activities including a coherent legend, overlain with the sensitivities found on site may lead to an application for environmental authorisation being refused.**

10. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the application for environmental authorisation being refused.

11. No faxed or e-mailed reports will be accepted. Only hand delivered or posted applications will be accepted.

12. Unless protected by law, and clearly indicated as such, all information filled in on this application will become public information on receipt by the competent authority. The applicant/EAP must provide any interested and affected party with the information contained in this application on request, during any stage of the application process.

13. Although pre-application meeting with the Competent Authority is optional, applicants are advised to have these meetings prior to submission of application to seek guidance from the Competent Authority.

DEPARTMENTAL DETAILS

Gauteng Department of Agriculture and Rural Development
Attention: Administrative Unit of the of the Environmental Affairs Branch
P.O. Box 8769
Johannesburg
2000

Administrative Unit of the of the Environmental Affairs Branch
Ground floor Diamond Building
11 Diagonal Street, Johannesburg

Administrative Unit telephone number: (011) 240 3377
Department central telephone number: (011) 240 2500

(For official use only)

NEAS Reference Number:						
File Reference Number:						
Application Number:						
Date Received:						

If this BAR has not been submitted within 90 days of receipt of the application by the competent authority and permission was not requested to submit within 140 days, please indicate the reasons for not submitting within time frame.

Not applicable

Is a closure plan applicable for this application and has it been included in this report? No

if not, state reasons for not including the closure plan.

Not a mining application and thus not applicable

Has a draft report for this application been submitted to a competent authority and all State Departments administering a law relating to a matter likely to be affected as a result of this activity? Yes

Is a list of the State Departments referred to above attached to this report including their full contact details and contact person? Yes

If no, state reasons for not attaching the list.

Have State Departments including the competent authority commented? No

If no, why?

Not yet.

ALL ADDITIONAL TEXT HAVE BEEN ADDED IN RED

PLEASE FIND BELOW THE COMMENTS FROM GDARD ON THE DRAFT BA REPORT AND THE RESPONSE FROM BOKAMOSO.

COMMENT	RESPONSE
This Department received a copy of the Draft Basic Assessment Report dated 31 May 2017 for comment. The proposed project is for the construction of electrical lines from Hatherly substation to the Riverwalk development situated within the road reserve of Solomon Mahlangu drive and the R104/K22. The one crossing is approximately 600m north of the R104 and M10 intersection. The other crossing is approximately 650m east of the R104 and M10. The actual electrical line does not trigger a listed activity but due to it crossing sensitive environmental features (wetland/stream) it's listed.	Noted.
A. Alignment of the activity with applicable legislations and policies The report has made provisions to accommodate all applicable legislations, policies and guidelines. The proposed electrical has an impact in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended). The proposed activity is listed as activity 12, 19 and 48 of Listing Notice 1 and activity 13, 14 and 23 of Listing Notice 3.	Noted.
B. Guidelines GDARD requirements • According to the Gauteng Conservation Plan 3.3 the electrical lines will cross/traverse river/wetland, • All specialist studies must be undertaken by suitably qualified specialists who (1) are registered in accordance with the Natural Scientific Professions Act (2003) as Professional Natural Scientists within the field of Ecological or Aquatic Science (2) have specific post-graduate qualifications relating to wetlands. In the absence of the latter, the specialist must have attended an appropriate course on wetland rehabilitation and delineation (copy of certificate must be provided).	Noted.
C. Alternatives The report did not mention any other alternatives since the proposed activity is only listed due to it traversing wetlands/streams.	Noted.
D. Significant rating of impacts	

Identification of impacts and significant rating must be undertaken for all sensitive features identified to be crossed or disturbed and include mitigation measures.	Noted. This has been done and included in the Draft BA Report.
E. Locality map and layout plans or facility illustrations - Locality Maps and Layout Plans must meet the requirements below – - The scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map; - The locality map and all other maps are in colour; - For gentle slopes the 1m contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; - Areas with indigenous vegetation (even if it is degraded or infested with alien species); - Locality map must show exact position of existing and proposed linear activity and substation sites; - Locality map shows and identifies (if possible) public and access roads; and	Noted.
The layout plan - The layout plan must be printed in colour and overlaid with a sensitivity map; - The layout plan must be printed on A4 size paper and be 1:8000 scale; - Layout plan must show the position of services, electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, storm water infrastructure and existing telecommunication infrastructure (where possible).	Noted.
F. EMPr EMPr must be included in the final report and must be practical, site specific and easily enforceable.	Noted.
G. Public participation process • Relevant sections of City of Tshwane Section must be given an opportunity to comment on the final BA Report.	Noted. Several copies has been sent to CTMM in order to distribute it to the various sections.
• Department of water affairs and sanitation must be consulted so as to provide comments for activities that will take place within watercourses and those comments submitted within the final report and incorporated into the EMPr.	Kindly note that a Water Use License application will be lodged. There has already been communication between the consultant and the official at DWS. Also note that a copy of the Draft

• All wayleave permits must be sought for the proposed activities preferably prior to the activity taking place and proof and comments included in the final report. If you have any queries regarding the contents of this letter, please contact the official of the Department at the number or email address indicated above.	BA Report was sent to DWS for comments however they did not send comments. Comments have also been followed up with DWS. Kindly note that the electrical engineer has received wayleave consents from SANRAL and GDRT. Please refer to Appendix L for letters from these Departments.

SECTION A: ACTIVITY INFORMATION

1. PROPOSAL OR DEVELOPMENT DESCRIPTION

Project title (must be the same name as per application form):

Riverwalk Electrical

This application for Environmental Authorisation is for the proposed electrical line that will run from the Hatherly substation to the Riverwalk development, which already received the go-ahead from the City of Tshwane Metropolitan Municipality (CTMM) and Gauteng Department of Agriculture and Rural Development (GDARD). Balwin Properties Limited is the developer of the Riverwalk development and this application is submitted on behalf of the CTMM. Balwin will assist with the construction and upgrading works required to the electricity supply and therefore Balwin will be responsible for compliance with the Environmental Authorisation (if issued) for the construction phase. Balwin will hand over the electrical infrastructure to the local authority as soon as the installations and upgradings have been completed and the local authority will then be responsible for the long-term management and maintenance of the infrastructure installed. The responsibilities and liabilities will also be explained in the Environmental Management Programme (EMPr) for the construction and operational phases of the electrical infrastructure installation project.

The Riverwalk Residential development is situated in close proximity of the busy Solomon Mahlangu Drive/ R104 intersection to the north and adjacent to the N4 Freeway. Solomon Mahlangu Drive is one of the major access roads into Mamelodi and the vacant land in between Mamelodi and the N4 Freeway has been identified in the Gauteng Spatial Development Framework, the City of Tshwane IDP, the Gauteng Provincial Environmental Management Framework (GPEMF) and various other development frameworks and plans as land suitable for urban development. The lack of development in this area in the past however prevented the upgrading of services and roads in the area and therefor it will be necessary for new developers in the area to assist with the implementation of bulk services if they want to develop in this area.

Many developers already purchased land in this area, but decided to wait with their developments until the municipal services become available and until the necessary road upgradings have been done to accommodate the new developments.

Balwin Properties Limited (a developer that specialises in higher density residential developments) however identified a need in this area for higher density residential units and their market research confirmed that it will be possible to develop a significant number of residential units on the property over the next 5 – 10 years. Balwin therefore purchased the large portion of land to the east of the existing Savannah Country Estate, which is approximately 120ha in extent and the proposed residential development on this land is known as the Riverwalk Development.

An application for environmental authorisation was lodged with GDARD by another development in approximately 2006 and an environmental authorisation was issued on 22 July 2008. A small amendment to the environmental authorisation was granted in September 2010. Another amendment was applied for in 2016 (by Balwin) in order to increase the residential densities approved and to change the layout of the site and this amendment was granted on 11 October 2016. The original Environmental authorisation for the project approved the development of a lower density golf estate and the new Environmental Authorisation issued allows for a higher density residential development with educational facilities and without a golf course.

The Riverwalk Development is a large high density residential development and the developer will assist the local authority as well as other authorities such as South African National Roads Agency Limited (SANRAL) to upgrade and install much needed services to the north of the N4 Freeway.

The electrical upgradings applied for in this application will therefore not only be installed to the benefit of the Riverwalk development, but it will assist with the provision of electrical infrastructure required for other new developments in the area.

Take note that the capacity of the electrical line to be installed is below the threshold that will trigger a listed activity under the Amended 2014 National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations (as amended on 7 April 2017). The proposed line however includes x2 watercourse/wetland crossings and such crossings triggered NEMA listed activities associated with such crossings. This application will therefore only be for the x2 watercourse crossing points and not for the entire electrical line to be installed.

We included figures in this application which supply the details of the entire line, even though the developer only needs authorisation for the x2 watercourse crossing points, because we regarded it as important to present a holistic picture of the electrical line to be installed.

For an electrical line to trigger an activity it should have a capacity of more than

33kV outside urban areas and more then 250kV inside urban areas. This proposed electrical line is only 11kV and thus it does not trigger Activity 11 in Listing Notice 1 (R.983).

Electricity for the Riverwalk development will be supplied by means of an underground bulk 5x 11kV electrical line from the Hatherly substation in Mamelodi. The proposed electrical line will run along Solomon Mahlangu Drive and the R104/K22 road. As mentioned this route for the electrical line includes two watercourse crossings, one along Solomon Mahlangu Drive and the other along the R104/K22 road and this application is only for the watercourse crossing-points where the proposed 11kV underground electrical line will be installed.

This underground electrical line will run within a registered servitude provided for external services. The trenches for the cables will be 1.0m deep and 1.5m wide and the backfilling will be done in accordance with the CTMM specifications. Drilling/ pipe jacking will be done underneath the watercourse areas to limit the impacts on the hydrology, geo-hydrology and river/ watercourse associated eco-systems. ***Please refer to Appendix G for more details regarding the proposed electrical works***

Below is a holistic view of the proposed electrical line indicating the areas where the line will cross the watercourses and where the Riverwalk development is situated. The sensitivity maps in this report will however only focus on the watercourse crossings as those are the areas that trigger activities which are being applied for. Please take note that the way leaves that was approved by SANRAL and Gauteng Department of Roads and Transport (GDRT) makes provision that the underground electrical cable needs to run along the eastern side of Solomon Mahlangu Drive. This is regarded as being a positive change in the alignment as the wetland at the Solomon Mahlangu Drive crossing is smaller on the eastern side than on the western side. Also note that this line is not to scale.

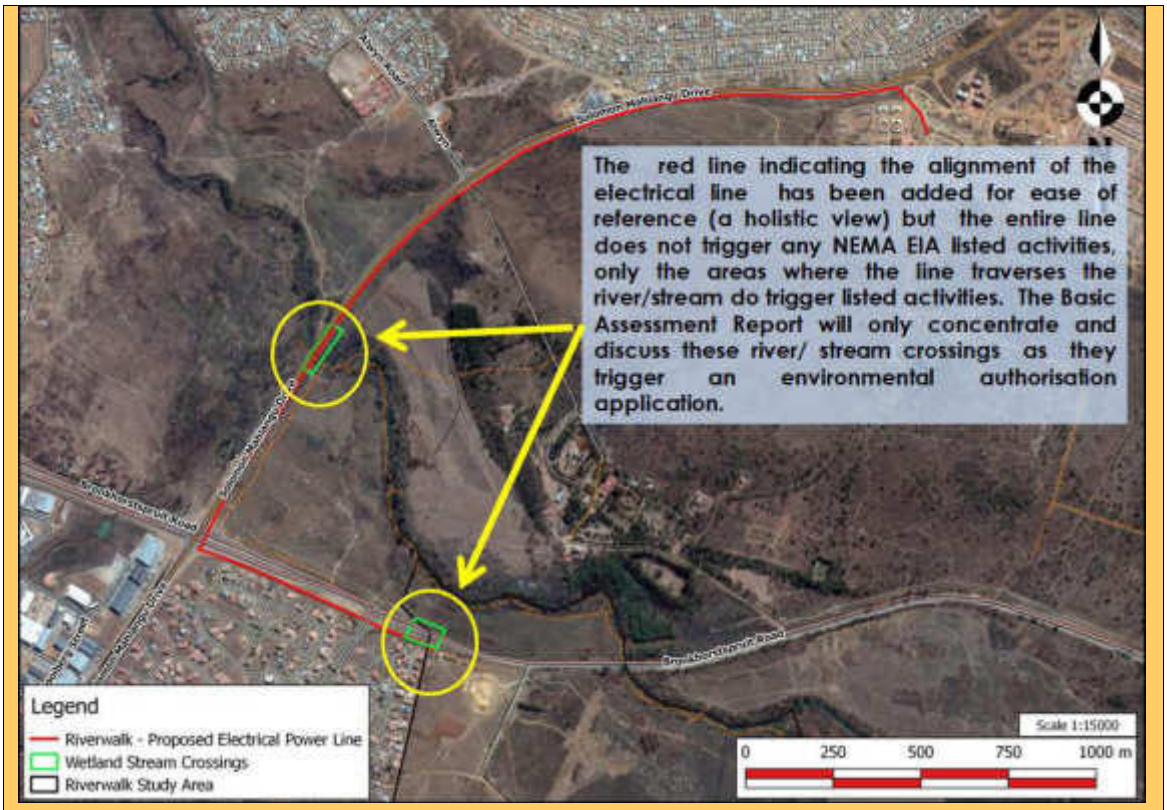


Figure 1 – Holistic Map

Listed activity as described in GN R 983, 984 and 985	Description of project activity that triggers listed activity
GN R. 983 (as amended on 7 April 2017)	
GN R. 983 Activity 12 (as amended):	The development of- (i) Dams and weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square meters; or (ii) Infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse; - **excluding-** (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities

Listed activity as described in GN R 983, 984 and 985	Description of project activity that triggers listed activity
	are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure nor structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.
GN R. 983 Activity 19 (as amended):	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing , dredging, excavation, removal or moving- (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.
GN R.983 Activity 48 (as amended):	The expansion of- (i) Infrastructure or structures with a physical footprint of 100 square meters or more; or (ii) Dams and weirs, where the dam or weir, including infrastructure and

Listed activity as described in GN R 983, 984 and 985	Description of project activity that triggers listed activity	
	water surface area, exceeds 100 square meters or more; where such expansion occurs- (iii) within a watercourse; (iv) in front of a development setback; or (v) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse; excluding- (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves.	
GN R. 985 (as amended on 7 April 2017)		
GN R. 985 Activity 12 (as amended):	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.	(c) Gauteng i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. …; or

Listed activity as described in GN R 983, 984 and 985	Description of project activity that triggers listed activity	
		iii. …
GN R. 985 Activity 14 (as amended):	The development of- (i) Dams and weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square meters; or (ii) Infrastructure or structures with a physical footprint of 10 square meters or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.	(c) Gauteng: i. …; ii. …; iii. …; iv. …; v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004); vi. …; vii. …; viii. …; ix. …; or x. ...
GN R. 985 Activity 23 (as amended):	The expansion of- (i) Dams and weirs, where the dam or weir, including infrastructure	(c) Gauteng: i. …; ii. …; iii. …; iv. …; v. Sites

Listed activity as described in GN R 983, 984 and 985	Description of project activity that triggers listed activity	
	and water surface area, exceeds 100 square meters or more; or (ii) Infrastructure or structures with a physical footprint of 100 square meters or more; where such expansion occurs- a) within a watercourse; b) in front of a development setback adopted in the prescribed manner; or c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse; excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbor.	identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004); vi. …; vii. …; viii. …; ix. …; or x. ...

Select the appropriate box

The application is for an upgrade of an existing development		The application is for a new development	X	Other, specify	

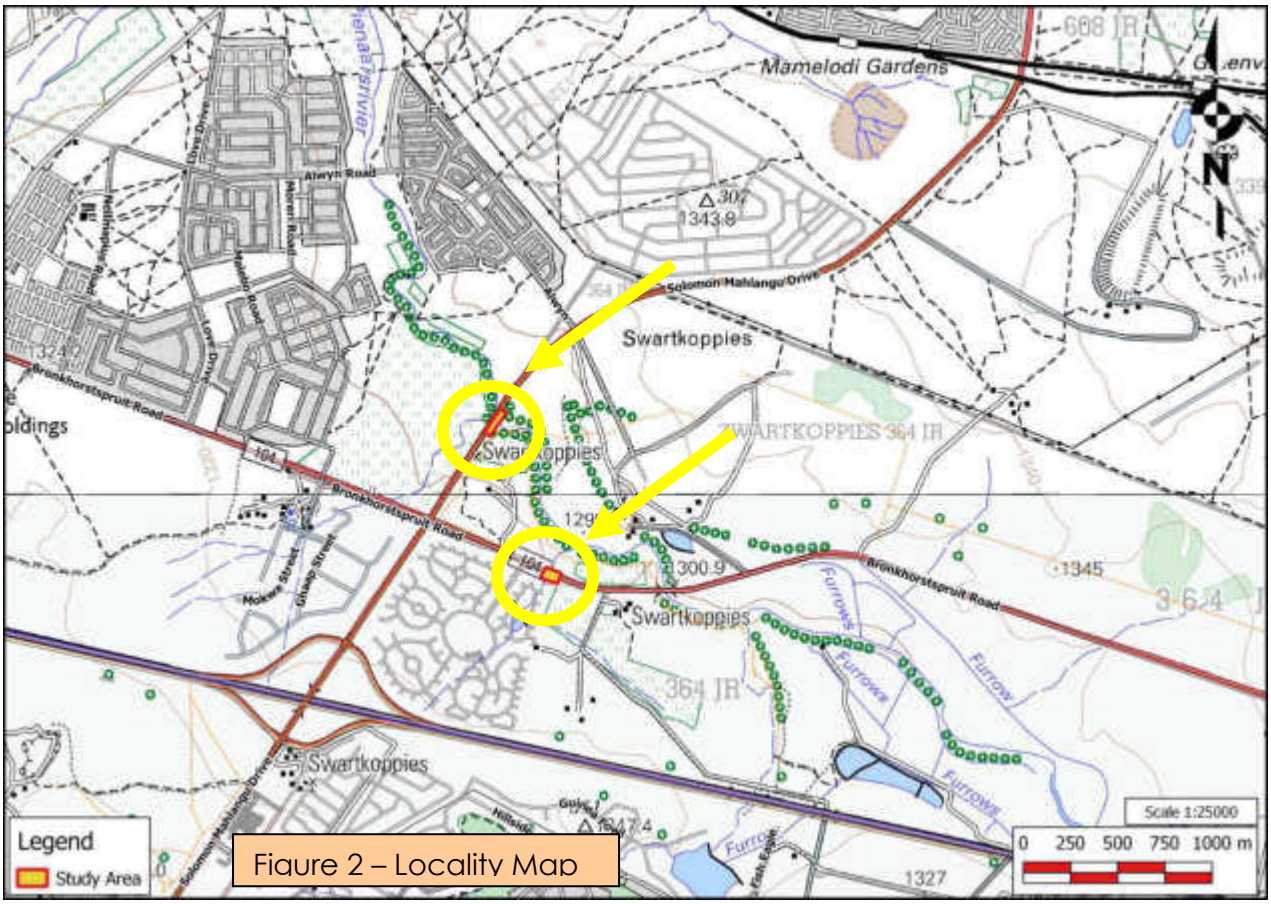


Figure 2 – Locality Map

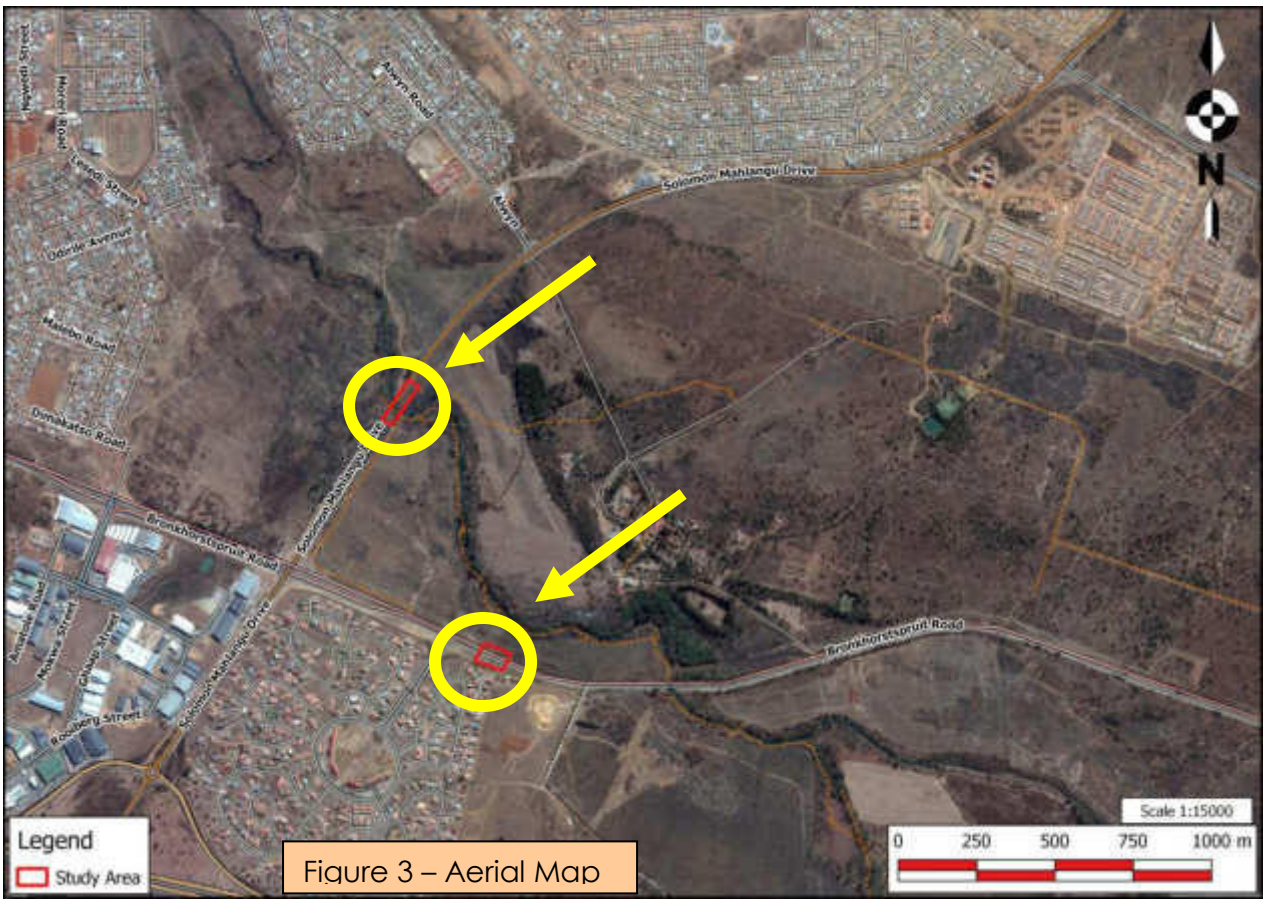


Figure 3 – Aerial Map

(Please refer to Appendix I for enlarged copies of the maps)

Does the activity also require any authorisation other than NEMA EIA authorisation?

YES **Probably**	NO

If yes, describe the legislation and the Competent Authority administering such legislation

National Water Act - The proposed underground electrical line crosses the Pienaars River and a culvert which accommodates a non-perennial tributary of the Pienaars River. The non-perennial tributary is highly modified and Balwin is currently conducting some road upgradings across this tributary. GDARD recently issued an Environmental Authorisation (EA) for the culvert extension for Road R104 and the Department of Water and Sanitation (DWS) recently issued a General Authorisation (GA) for the water-uses associated with the proposed culvert extension.

In terms of Section 21 of the National Water Act, the developer may need to apply for a Section 21 (c) and (i) Water Use License (WUL) or General Authorisation (GA) for the proposed electrical line, this will be confirmed with the Department of Water and Sanitation in a pre-application meeting.

At this stage we are of the opinion that DWS will consider the registration of a GA for the proposed x2 crossing points in terms of General Notice 509 of 26 August 2016.

If yes, have you applied for the authorisation(s)?	YES	**NO** **In process** **WUL/GA to be condition of EA**
If yes, have you received approval(s)? (attach in appropriate appendix)	YES	**N/A**

2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:
National Environmental Management Act (Act No. 107 of 1998 as amended).	**National & Provincial**	**27 November 1998**

The NEMA is primarily an enabling act in that it provides for the development of environmental implementation plans and environmental management plans. The principles listed in the act serve as a general framework within which environmental management and implementation plans must be formulated. The Act includes *inter alia* duty of care provisions and incident reporting requirements. Most importantly, for this application, Chapter 5 of NEMA provides for Integrated Environmental Management and enables the listing of activities for which environmental authorisation is required.

The Minister of Environmental Affairs and Tourism passed (in April 2006) Environmental Impact Assessment Regulations[1] (the Regulations) in terms of Chapter 5 of the National Environmental Management Act, 1998[2] (NEMA). The

new Regulations came into effect on 3 July 2006.

The Minister of Environmental Affairs then again passed (in June 2010) the Amended Environmental Impact Assessment Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA). The Regulations were amended once again in 2014. The Amended Regulations came into effect on 8 December 2014, and therefore all new applications must be made in terms of the Amended NEMA EIA Regulations and not in terms of the 2010 NEMA Regulations. The purpose of this process is to determine the possible negative and positive impacts of a proposed electrical line on the surrounding environment and to provide measures for the mitigation of negative impacts and to maximize positive impacts.

Notice **No. R 983, R 984 and R 985** of the Amended Regulations list the activities that indicate the process to be followed. The activities listed in Notice No. R 983 requires that a Basic Assessment process be followed and the activities listed in terms of Notice No. R 984 requires that the Scoping and EIA process be followed. Notice No. 985 has been introduced to make provision for activities in certain geographical and sensitive areas.

However, please take note that these Regulations have been amended on 7 April 2017 as published in Notice nos. 324 to 327. These are only slight changes and the activities triggered did not change from the original 2014 Regulations.

National Water Act (Act No. 36 of 1998)	**National & Provincial**	**20 August 1998**

The purpose of this Act is to ensure that the Nation's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account, amongst other factors, the following:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Reducing and preventing pollution and degradation of water resources;
- Facilitating social and economic development; and
- Providing for the growing demand for water use.

In terms of the section 21 of the National Water Act (NWA), the developer must obtain water use licences if the following activities are taking place; provided that a general authorisation is not applicable, or the water use is not an existing lawful water use:

a) Taking water from a water resource;
b) Storing water;
c) Impeding or diverting the flow of water in a water course;
d) Engaging in a stream flow reduction activity contemplated in section 36;
e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
f) Discharging waste or water containing waste into a water resource through a pipeline, canal, sewer, sea outfall or other conduit;
g) Disposing of waste in a manner which may detrimentally impact on a water

resource;

h) Disposing in any manner which contains waste from or which has been heated in any industrial or power generation process;
i) Altering the bed, banks, course or disposing of water found underground if it is necessary for the safety of people;
j) Removing, discharging, or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
k) Using water for recreational purposes.

The National Water Act also requires that (where applicable) the 1:50 and 1:100 year flood line be indicated on all the development drawings (even the drawings for the external services) that are submitted for approval.

If a Water Use Licence (WUL) is required then the Regulations regarding the Procedural Requirements for Water Use Licence Applications and Appeals, 2017 would be applicable. In addition the application has also considered the General Authorisations in terms of Section 39 of the NWA.

Figure 4 – Wetland Map

National Heritage Resources Act (Act No. 25 of 1999)	**National & Provincial**	**1999**

The National Heritage Resources Act legislates the necessity and heritage impact assessment in areas earmarked for development, which exceed 0.5ha and linear development exceeding 300m in length. The act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

National Environmental Management: Waste Act (Act No. 59 of 2009)(as amended)	**National**	**2009**

This act came into effect on 1 July 2009. It aims to consolidate waste management in South Africa, and contains a number of commendable provisions, including:

- The establishment of a national waste management strategy, and national and provincial norms and standards, for amongst other, the classification of waste, waste service delivery, and tariffs for such waste services;
- Addressing reduction, reuse, recycling and recovery of waste;
- The requirements for industry and local government to prepare integrated waste management plans;
- The establishment of control over contaminated land;
- Identifying waste management activities that requires a license, which currently include facilities for the storage, transfer, recycling, recovery, treatment and disposal of waste on land;
- Co-operative governance in issuing licenses for waste management facilities, by means of which a licensing authority can issue an integrated or consolidated license jointly with other organs of state that has legislative control over the activity; and
- The establishment of a national waste information system.

On the 29th of November 2013 the Minister of Water and Environmental Affairs amended the list of waste management activities that might have a detrimental effect on the environment.

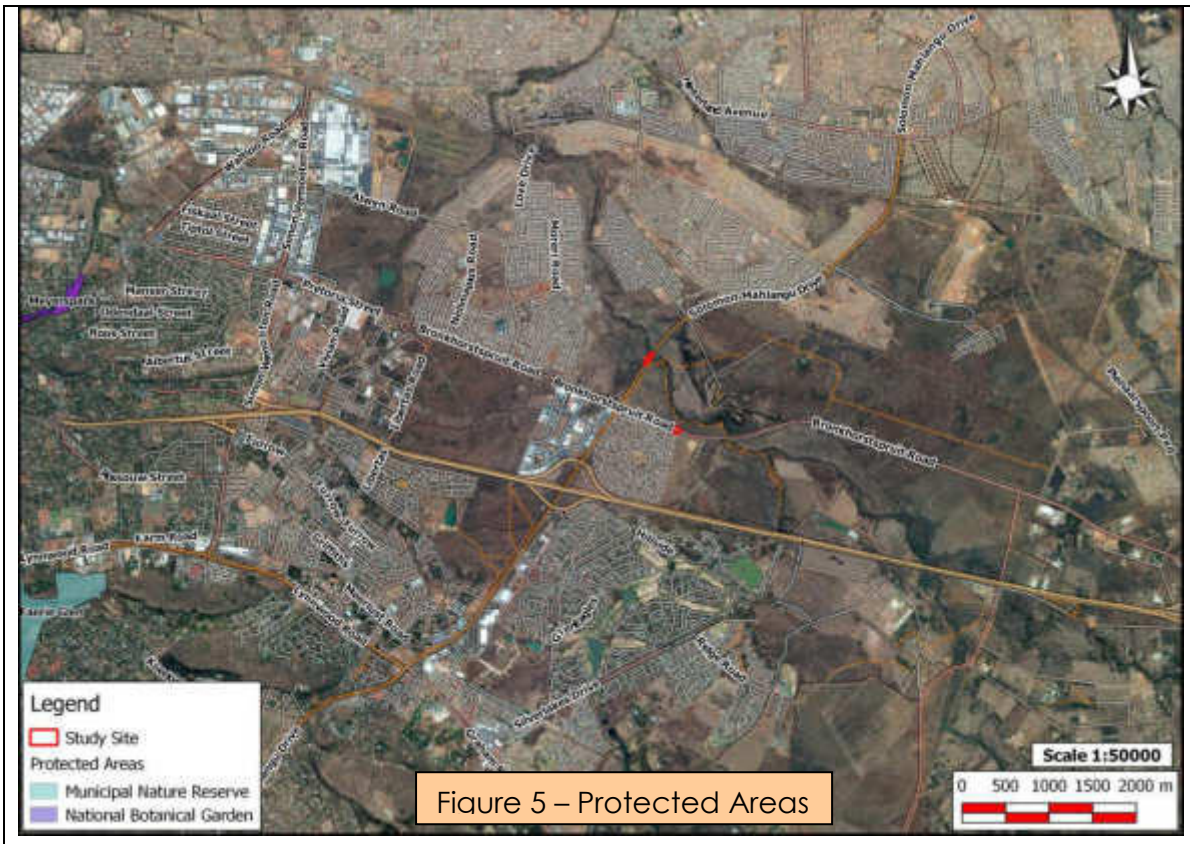
Please take note of the other amendments/publications since 29 November 2013:

- 2 June 2014 – NEM: Waste Amendment Act (26 of 2014)
- 2 May 2014 – Remediation of contaminated land and soil
- 2 May 2014 – Amendment List of Waste Management Activities that have or are likely to have detrimental effect on the environment

National Environmental Management Protected Areas Act (Act No. 57 of 2003)(as amended)	**National**	**2003**

The purpose of this act is to provide for the protection, conservation, and management of ecologically viable areas representative of South Africa's biological biodiversity and its natural landscapes.

Please take note that this Act has been amended in 2004 and 2014.



Fiaure 5 – Protected Areas

National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	National	2004

The Biodiversity Act provides for the management and protection of the country's biodiversity within the framework established by NEMA. It provides for the protection of species and ecosystems in need of protection, sustainable use of indigenous biological resources, equity, and bio prospecting, and the establishment of a regulatory body on biodiversity- **South African National Biodiversity Institute.**

Objectives of the act:

(a) With the framework of the National Environmental Management Act, to provide for:

(i) The management and conservation of biological diversity within the Republic and of the components of such biological diversity:
(ii) The use of indigenous biological resources in a sustainable manner; and
(iii) The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources;

(b) To give effect to ratified international agreements relating to biodiversity which are binding on the republic;

(c) To provide for co-operative governance in biodiversity management and conservation; and

(d) **To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.**

Under this act notices/regulations are published in terms of alien and invasive species or threatened ecosystems in order to promote the biodiversity of natural resources and protect species endemic to South Africa.

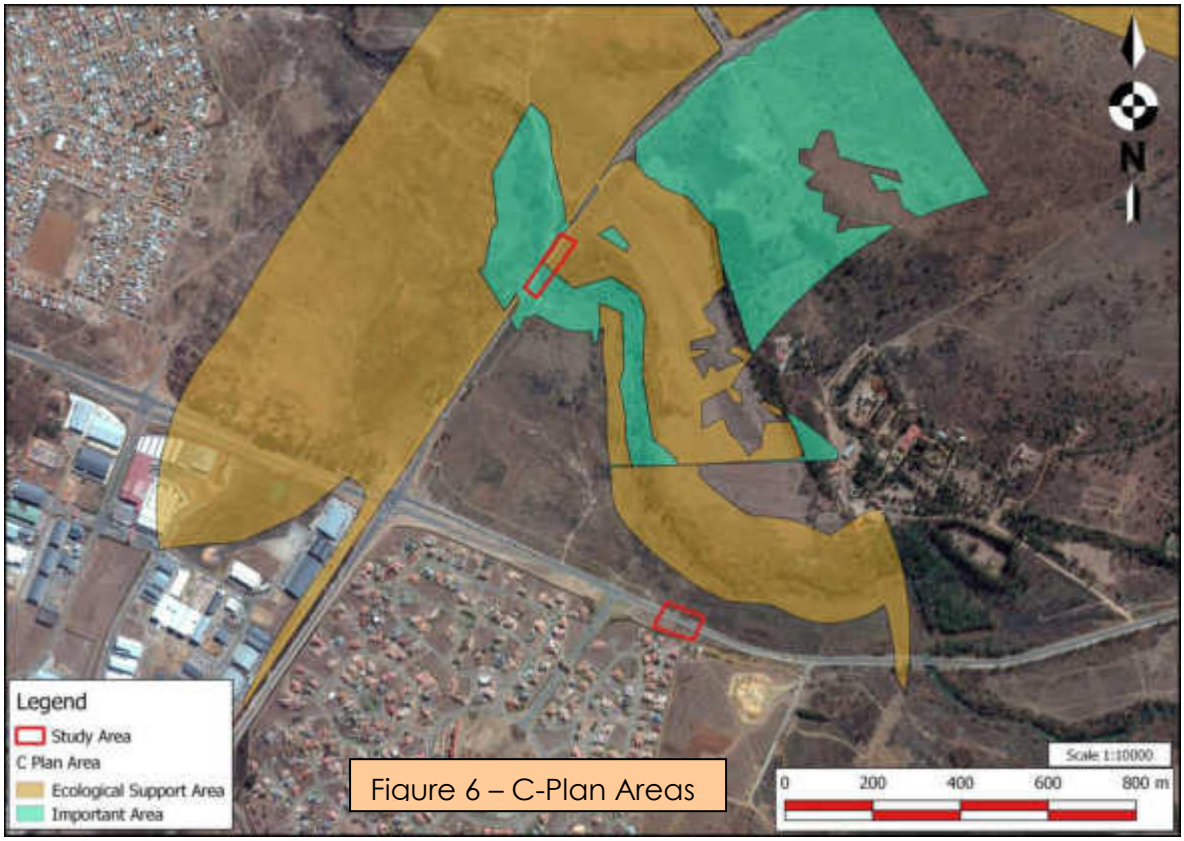


Figure 6 – C-Plan Areas

Figure 7 – Important Areas

Conservation of Agricultural Resources Act (Act No. 43 of 1983)	National	1 June 1983

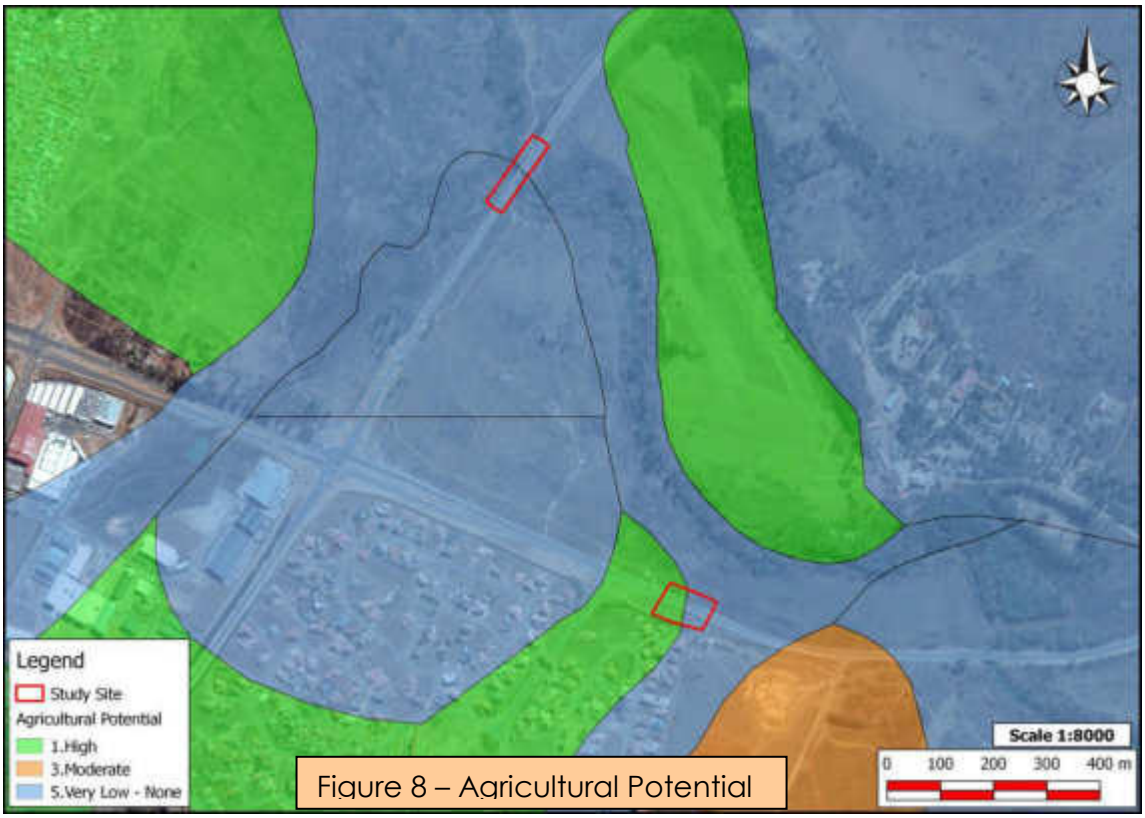


Figure 8 – Agricultural Potential

This act provides for control over the utilization of natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and the vegetation as well as the combating of weeds and invader plants; and for matters connecting therewith.

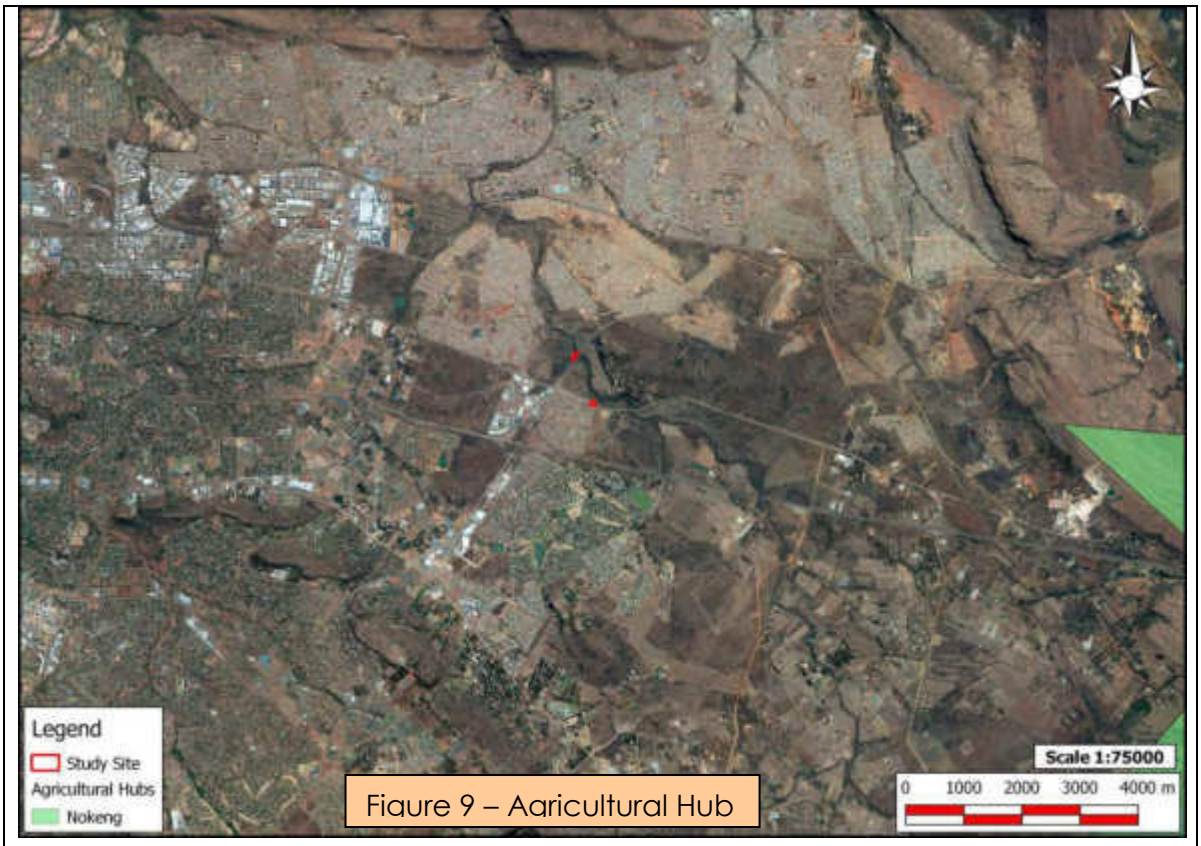


Figure 9 – Agricultural Hub

National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	National & Provincial	2004

The NEM: AQA serves to repeal the Atmospheric Pollution Prevention Act (45 of 1965) and various other laws dealing with air pollution and it provides a more comprehensive framework within which the critical question of air quality can be addressed.

The purpose of the act is to set norms and standards that relate to:

- Institutional frameworks, roles and responsibilities
- Air quality management planning
- Air quality monitoring and information management
- Air quality management measures
- General compliance and enforcement

Amongst other things, it is intended that the setting of norms and standards will achieve the following:

- The protection, restoration and enhancement of air quality in South Africa
- Increased public participation in the protection of air quality and improved public access to relevant and meaningful information about air quality.
- The reduction of risks to human health and the prevention of the degradation of air quality.

The act describes various regulatory tools that should be developed to ensure the implementation and enforcement of air quality management plans. These include:

- Priority areas, which are air pollution 'hot spots'.
- Listed activities, which are 'problem' processes that require an atmospheric emission licence.
- Controlled emitters, which includes the setting of emission standards for 'classes' of emitters, such as motor vehicles, incinerators, etc.
- Control of noise.
- Control of odours.

The following regulations and standards have been published in terms of this act:

- 3 April 2017 – National Greenhouse Gas Emissions Reporting Regulations
- 2 April 2015 – National Atmospheric Emission Reporting Regulations
- 14 March 2014 – National Pollution Prevention Plans Regulations
- 1 November 2013 – NEM:AQA National Dust Control Regulations
- 28 November 2013 - Declaration of Small Boilers as Controlled Emitters and Emission Standards

The Deeds Registries Act (Act No. 47 of 1937)	**National & Provincial**	**1 September 1937**
The act was created to consolidate and amend the laws in force in the Republic relating to the registration of deeds. The act caters for the registration of servitudes.		

Occupational Health & Safety Act (Act No. 85 of 1993) and Occupational Health & Safety Amendment Act (Act No. 181 of 1993)	**National & Provincial**	**1993**
The act was created to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.		

Gauteng Transport Infrastructure Act 8 of 2001, as amended	**Provincial**	**2001**
The aim of this Amendment Act is to amend the Gauteng Transport Infrastructure Act, 2001 so as to amend and insert certain definitions; to provide for the necessary land use rights with respect to stations and for the necessary powers of the MEC to enter into contracts for road and rail projects; to amend the procedure in relation to route determination; to make a second environmental investigation at the stage of preliminary design of a road or railway line unnecessary where the competent environmental authority decides that the environmental investigation at the stage of route determination is adequate; and to provide for incidental matters.		

GDARD Ridges Guidelines	**Provincial**	**2001 AS REVIEWED AND UPDATED IN JANUARY 2004 AND APRIL 2006**
This policy is provided for the protection, conservation, and maintenance of ridges within the Gauteng Province.		

Figure 10 – Ridges

Gauteng Conservation Plan (C-Plan) Version 3.3	Provincial	March 2014

Gauteng Nature Conservation (hereafter Conservation), a component of the Gauteng Department of Agriculture and Rural Development (GDARD) produced the Gauteng Conservation Plan Version 3 (C-Plan 3) in December 2010. The conservation plan was edited on three occasions since then: C-Plan 3.1 was released in July 2011 after it became apparent that some areas were not desirable in Critical Biodiversity Areas (CBAs hereafter). Not all areas were addressed in the first round of editing, so this was done during September 2011 resulting in C-Plan Version 3.2. It was soon released however, that some CBAs became separated by the removal of undesirable areas causing some attributes not to be completely reflective of that CBAs any longer. C-Plan 3.3 technical report is dated March 2014.

The main purposes of C-Plan 3.3 are:

- to serve as the primary decision support tool for the biodiversity component of the Environmental Impact Assessment (EIA) process;
- to inform protected area expansion and biodiversity stewardship programs in the province;
- To serve as a basis for development of bioregional plans in municipalities within the province.

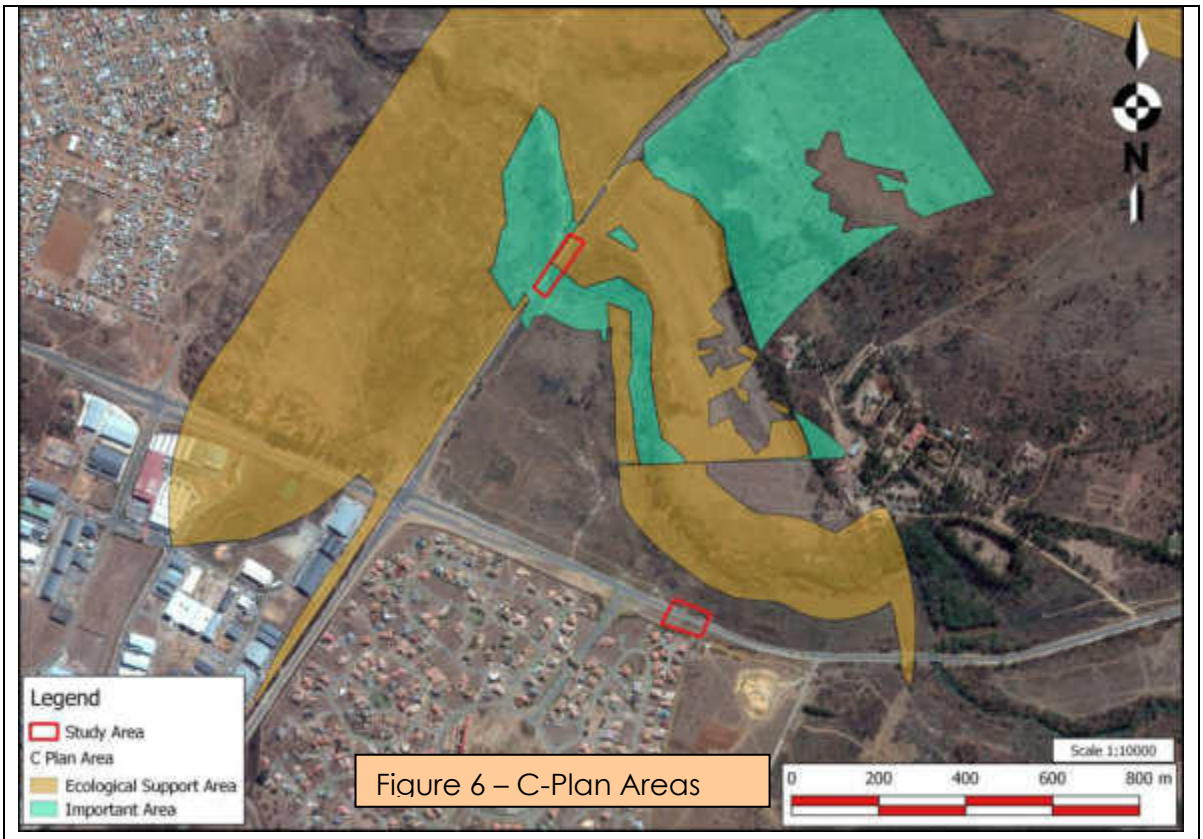


Figure 6 – C-Plan Areas

GDARD Agricultural Hub Policy	Provincial	2006
GDARD identified 7 Agricultural Hubs in Gauteng province. These hubs are earmarked for agricultural activities and there are policies and guidelines that should be taken into consideration when one plans to develop in these hub areas. Urban development is usually not supported in these hubs.		

Guidelines on red list plant species	Provincial	2006
The main purpose of the draft Red Data Policy is to protect red data fauna and flora species in Gauteng Province. This policy requires that red data species are conserved.		

Gauteng Noise Control Regulations	Provincial	1999
The regulation controls noise pollution. According to the acceptable noise levels in a residential area situated within an urban area is 55dBA and the maximum acceptable noise levels in a rural area is 45dBA. The Gauteng Provincial Noise Control Regulations, 1999 was published under Section 25 of the Environment Conservation Act 1989 (Act No 73 of 1989).		

Gauteng Provincial Environmental Management Framework	Provincial	2014
The Gauteng Department of Agriculture and Rural Development (GDARD) decided to produce an Environmental Management Framework for the whole of Gauteng (GPEMF). The GPEMF replaces all other EMFs in Gauteng with the exception of the Cradle of Humankind World Heritage Site which is incorporated within the GPEMF. The objective of the GPEMF to guide sustainable land use management within the Gauteng Province. The GPEMF, inter alia, serve the following purposes:		

- To provide a strategic and overall framework for environmental management in Gauteng;
- Align sustainable development initiatives with the environmental resources, developmental pressures, as well as the growth imperatives of Gauteng;
- Determine geographical areas where certain activities can be excluded from an EIA process; and
- Identify appropriate, inappropriate and conditionally compatible activities in various Environmental Management Zones in a manner that promotes proactive decision-making.

The province has been divided into 5 management zones of which Zone 1: Urban Development Zone and Zone 5: Industrial and Large Commercial focus zone, proposes the exclusion of certain NEMA listed activities in order to streamline development.

Please note that on 13 April 2017, a Notice of Intention to Adopt Gauteng Provincial Environmental Management Framework (GPEMF) Standards and Exclusions of Activities was published for comments in Notice No. 351.

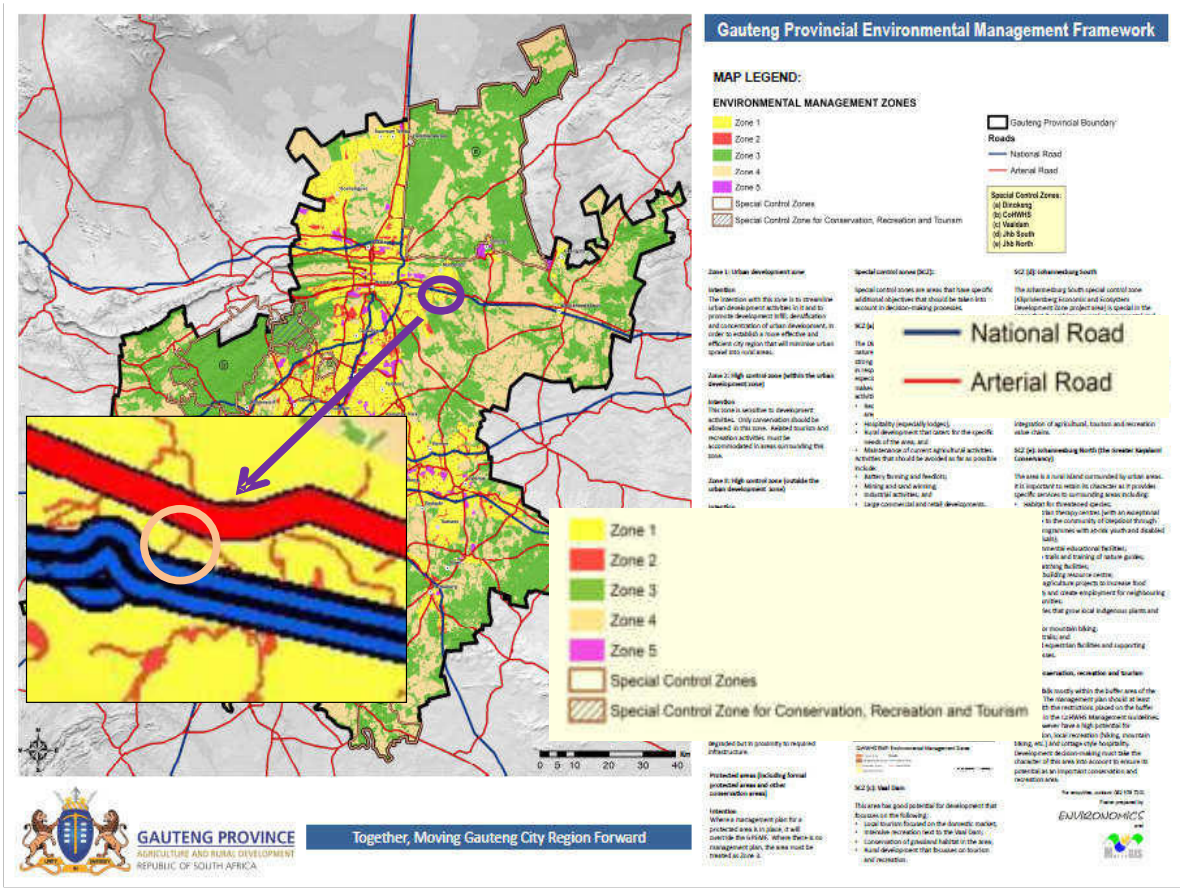


Figure 11 – Gauteng EMF

Gauteng Urban Edge	Provincial	2010
The Urban Edge as indicated on Figure 11 below is the Urban Edge as delineated by GDARD. Take note that the proposed electrical line is aligned to run through an urban area and this promotes the optimum utilisation of services and it also prevents urban sprawl.		

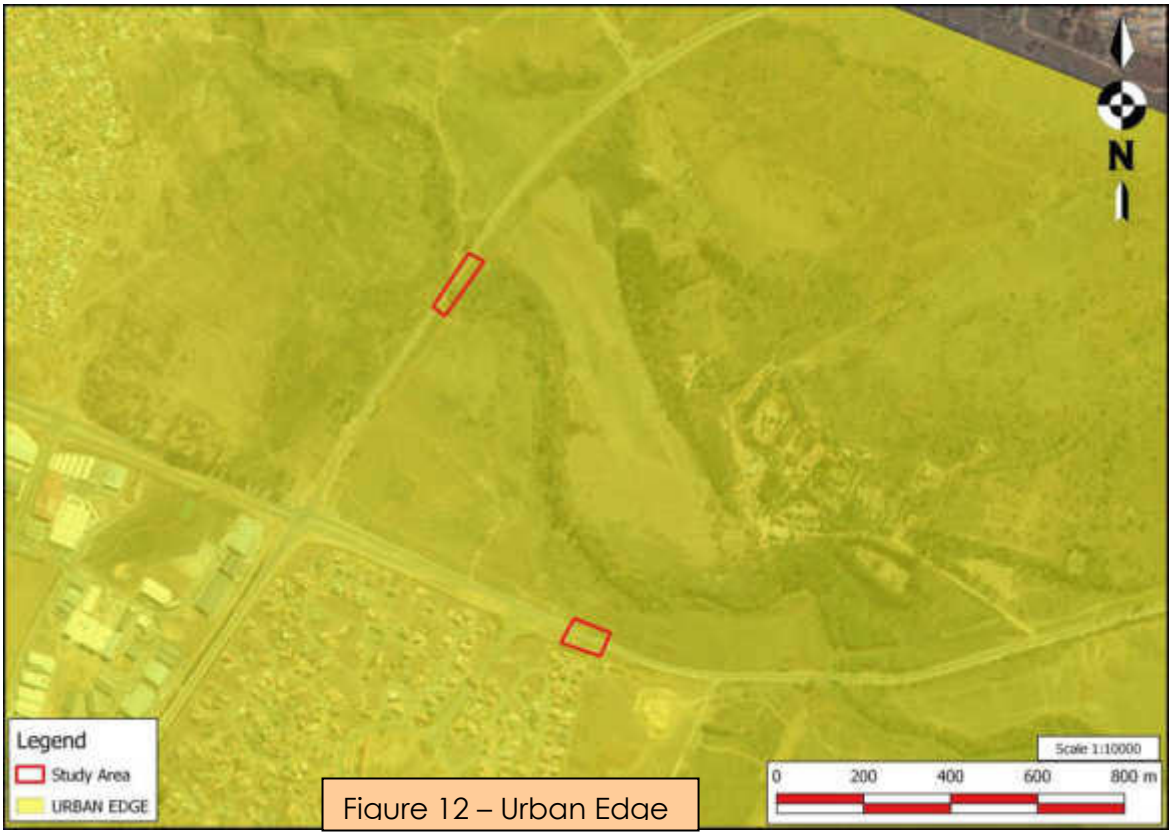


Figure 12 – Urban Edge

Description of compliance with the relevant legislation, policy or guideline:

Legislation, policy of guideline	Description of compliance
National Environmental Management Act (Act No. 107 of 1998 as amended)	The proposed underground electrical line triggered activities as listed in the above-mentioned notices and qualified for a Basic Assessment in terms of the applicable regulations.
National Water Act (Act No. 36 of 1998)	The proposed underground electrical line crosses the Pienaars River and a culvert where a wetland area formed. In terms of Section 21 of the National Water Act, a WUL or GA will most probably need to be lodged at the Department of Water and Sanitation. It is recommended that a WUL/GA be made a condition of the environmental authorisation.
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	The majority of the study area is underlain by very low agricultural potential soils and is not situated within any of the 7 Agricultural Hubs as identified for Gauteng in the Gauteng Agricultural Potential Atlas and in the Agricultural Policy.
National Heritage Resources Act (Act No. 25 of 1999)	The proposed underground electrical line exceeds 300m in length thus requiring a Heritage Impact Assessment (HIA) in terms of the act. A HIA was not deemed necessary due to the disturbed nature of the proposed electrical line route. If any cultural or historical features are discovered during construction

	activities and clearing of the application site, the correct "procedures for an environmental incident" (in the EMPr) must be followed.
National Environmental Management: Waste Act (NEM:WA) (Act No. 59 of 2009)(as amended)	The construction of the proposed underground electrical line does not trigger activities listed in Category A, B or C of NEM: WA Listed Activities, 2013. However general waste will be generated during the construction phase of the proposed electrical line of which the potential impact has been addressed in the EMPr.
National Environmental Management Protected Areas Act (Act No. 57 of 2003)(as amended)	The proposed electrical line does not fall within a protected area.
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	The proposed electrical line, when overlain with the GDARD C-Plan, is within Important and Ecological Support Areas. However, the proposed electrical line is within the road reserve and it is already disturbed. At the river crossing the minimum vegetation will be lost as they will drill underneath the river. According to the specialist the culvert crossing is not suitable for Orange or Red listed plant species. The Pienaars River crossing is suitable for one Red and two Orange listed plant species according to the available data for the larger area, however, during the site visit none of these species were identified by the specialist.
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	During the construction phase of the underground electrical line, generation of dust and noise could become a factor to residence living adjacent to the planned construction route. However if the electrical line is well planned and the mitigating measures are successfully implemented the proposed electrical line's contribution to air and noise pollution can become less significant.
The Deeds Registries Act (Act No. 47 of 1937)	The electrical line will be installed within a registered servitude for external services.
Occupational Health & Safety Act (Act No. 85 of 1993) (as amended)	Considering the electrical line will be constructed within an urban environment adjacent to some residential areas, and crossing public roads, the act not only applies to the persons who will be responsible for construction, but also to the safety of members of the public. The Electrical Installation Regulations (Notice 242 dated 6 March 2009) will also have to be complied with.
Gauteng Transport Infrastructure Amendment Act	The roads affected by the electrical line are mainly local roads. All roads and road reserves will be considered and the appointed engineers and the applicant are responsible for the necessary servitude arrangements and agreements. The proposed underground electrical line will be within the road

	reserve and therefore the electrical engineers are applying for a wayleave from SANRAL along the R104/K22 and they are still in discussions to determine the authority responsible for the wayleave on Solomon Mahlangu.
GDARD Draft Ridges Policy	The proposed route of the underground electrical line does not transect a ridge or an area with a slope steeper than 8.8%.
Gauteng conservation plan (C-Plan) Version 3.3	The proposed electrical line transects an area of ecological importance, however the electrical line will be within the road reserve and limited natural vegetation will be removed.
GDARD Agricultural Hub Policy	The study area is not situated within any of the seven agricultural hubs identified for Gauteng.
Gauteng Draft red data policy	No red or orange listed species were identified by a fauna and flora specialist, however the Pienaars River crossing is suitable for one Red and two Orange listed plant species according to the available data for the larger area. Once again it is important to note that the electrical line will be installed within the road reserve which is already disturbed with little indigenous vegetation.
Gauteng Noise Control Regulations	During the construction phase of the proposed electrical line, the impact of noise could be problematic to residents, but such impacts are generally short term. One should note that practical mitigation measures for noise pollution are low, but certain measures can be implemented to mitigate the severity.
Gauteng Provincial Environmental Management Framework	The proposed underground electrical line occurs within Zone 1 of the GPEMF i.e. identified as urban development zone. There is a certain area (wetland crossing) where it is regarded as Zone 2 which is High Control Zone within the urban development zone.
Gauteng Urban Edge	The study area falls within the Gauteng Provincial Urban Edge, and therefore falls within an area earmarked for development. The proposed construction of an underground electrical line for urban electrical supply occurs within an area earmarked for urban development.

3. ALTERNATIVES

Describe the proposal and alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The determination of whether the site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment.

The no-go option must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. **Do not** include the no go option into the alternative table below.

Note: After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Please describe the process followed to reach (decide on) the list of alternatives below

Various meetings were held with the applicant regarding the Riverwalk development and the vision for the development and the site. The electrical engineers considered various other electrical supply options, because the electrical upgradings as described in this application are very costly.

It became clear that Balwin will have no other choice but to supply the site with an 11kV electrical cable from the Hatherly substation. Due to the electrical line being installed within a registered servitude for external services, this alternative is regarded as the preferred alignment alternative from an ecological, economic and social point of view.

Provide a description of the alternatives considered

No.	**Alternative type**, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other")	**Description**
1	Proposal	The installation of an underground bulk 5x 11kV electrical line from Hatherly substation, along Solomon Mahlangu Drive and the R104/K22 road crossing the Pienaars River and a storm water culvert. Refer to Figure 12 for the engineering layout – please take note that this layout is not to scale.
2	Alternative 1	-

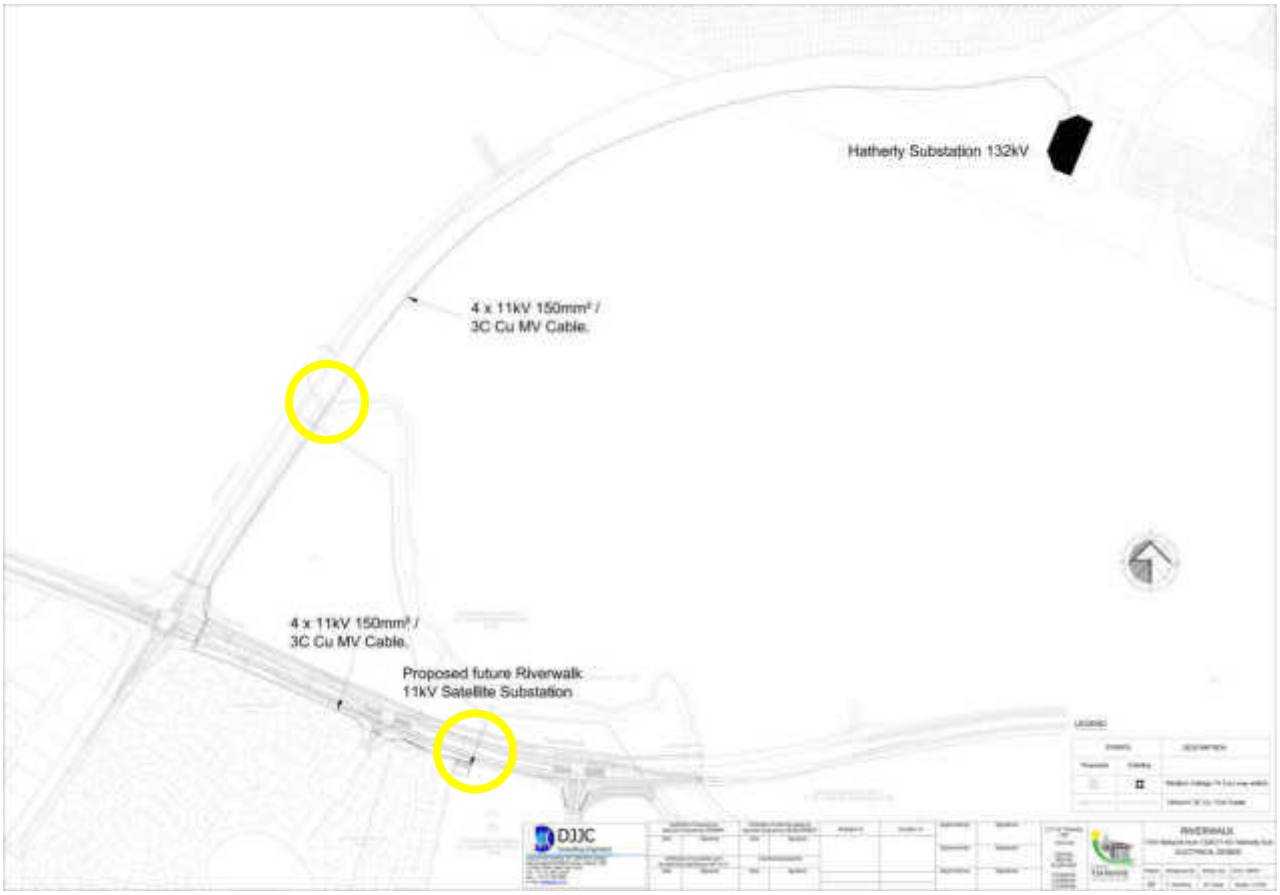


Figure 13 – Electrical Layout

In the event that no alternative(s) has/have been provided, a motivation must be included in the table below.

There is no alternative for this underground electrical line as the line will be installed within a registered servitude for external services.

This route is in a road reserve and therefore the area earmarked for the line is subject to edge effects and the vegetation coverage is almost completely disturbed.

Due to the fact that the line runs immediately adjacent o roads (in road reserves) the proposed new line will not have any negative socio-economic impact on any of the surrounding land-owners. The new line will however have a positive economic and social impact, because the electrical upgradings will increase the electricity capacity in the area. Such additional electricity in the area will also open-up the area for other developers that require electricity for their developments.

Alternative options of electricity provision to the study area have been considered before and during the planning phases of the project. The other options considered could not provide the electricity requirements for all the phases of the Riverwalk Development. Such options were only short term solutions.

There are more specifically some electricity supply options for the first phase of the development, but according to the appointed electrical engineer the proposed upgradings as described in this application, are the best option for the study area and the surrounding area that will still be developed.

Balwin is currently investigating the option of installing solar panels on the roofs of each residential unit to construct. The solar panels will save a significant amount of electricity and will be more cost effective than the gas alternative which was initially considered.

The usage of solar panels in the Riverwalk development will also increase the electrical capacity in the area.

The specifications of the electrical line and the construction works for such line need to be in line with the standards and requirements of the CTMM.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the total physical size (footprint) of the proposal as well as alternatives. Footprints are to include all new infrastructure (roads, services etc), impermeable surfaces and landscaped areas:

	Size of the activity:
Proposed activity ***(Total environmental (landscaping, parking, etc.) and the building footprint)***	
Alternatives:	
Alternative 1 (if any)	
Alternative 2 (if any)	
	Ha/ m^2

or, for linear activities:

	Length of the activity:
Proposed activity	±3.5km Of which only approximately 400m/ 700m^2 is subject to an EIA authorisation in terms of the 2014 NEMA EIA Regulations, as amended in April 2017.
Alternatives:	
Alternative 1 (if any)	
Alternative 2 (if any)	
	m/km

Indicate the size of the site(s) or servitudes (within which the above footprints will occur):

	Size of the site/servitude:
Proposed activity	±3.5km with a width of 1.5m, thus 5250 m^2 however the site/ servitude for which the activity is applied for is only approximately 400 m^2 but it was decided to allow for construction and rehabilitation works in an area with a combined size of ± 700-1000m^2. This will allow some space for the erection of a site camp, for the storage of equipment and for the storage of topsoil and sub-soil.
Alternatives:	
Alternative 1 (if any)	
Alternative 2 (if any)	
	Ha/m^2

5. SITE ACCESS

Proposal

Does ready access to the site exist, or is access directly from an existing road?	**YES X**	NO
If NO, what is the distance over which a new access road will be built		m
Describe the type of access road planned:		

Access to the alignment is directly obtained from the R104/K22 or Solomon Mahlangu Drive and it will be easy to install the proposed line from an accessibility point of view.

Include the position of the access road on the site plan (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 1

Does ready access to the site exist, or is access directly from an existing road?		NO
If NO, what is the distance over which a new access road will be built		m

Describe the type of access road planned:

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 2

Does ready access to the site exist, or is access directly from an existing road?	YES	NO
If NO, what is the distance over which a new access road will be built		m

Describe the type of access road planned:

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

PLEASE NOTE: Points 6 to 8 of Section A must be duplicated where relevant for alternatives

Section A 6-8 has been duplicated **0** Number of times

(only complete when applicable)

6. LAYOUT OR ROUTE PLAN

A detailed site or route (for linear activities) plan(s) must be prepared for each alternative site or alternative activity. It must be attached to this document. The site or route plans must indicate the following:

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
  - A4 size for activities with development footprint of 10sqm to 5 hectares;
  - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
  - A2 size for activities with development footprint of >20 hectares to 50 hectares);
  - A1 size for activities with development footprint of >50 hectares);

- The following should serve as a guide for scale issues on the layout plan:
  - A0 = 1: 500
  - A1 = 1: 1000
  - A2 = 1: 2000
  - A3 = 1: 4000
  - A4 = 1: 8000 (±10 000)
- shapefiles of the activity must be included in the electronic submission on the CD's;
- the property boundaries and Surveyor General numbers of all the properties within 50m of the site;
- the exact position of each element of the activity as well as any other structures on the site;
- the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, septic tanks, storm water infrastructure;
- servitudes indicating the purpose of the servitude;
- sensitive environmental elements on and within 100m of the site or sites (including the relevant buffers as prescribed by the competent authority) including (but not limited thereto):
  - Rivers and wetlands;
  - the 1:100 and 1:50 year flood line;
  - ridges;
  - cultural and historical features;
  - areas with indigenous vegetation (even if it is degraded or infested with alien species);
- Where a watercourse is located on the site at least one cross section of the water course must be included (to allow the position of the relevant buffer from the bank to be clearly indicated)

FOR LOCALITY MAP (NOTE THIS IS ALSO INCLUDED IN THE APPLICATION FORM REQUIREMENTS)

- the scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map;
- the locality map and all other maps must be in colour;

- locality map must show property boundaries and numbers within 100m of the site, and for poultry and/or piggery, locality map must show properties within 500m and prevailing or predominant wind direction;
- for gentle slopes the 1m contour intervals must be indicated on the map and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the map;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of development site or sites;
- locality map showing and identifying (if possible) public and access roads; and
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites.

Refer to Appendix A: Site plan

7. SITE PHOTOGRAPHS

Colour photographs from the center of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under the appropriate Appendix**.** It should be supplemented with additional photographs of relevant features on the site, where applicable.

Refer to Appendix B: Photographs

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity to be attached in the appropriate Appendix.

Not applicable. Refer to Appendix D for the route alignment.

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

Note: Complete Section B for the proposal and alternative(s) (if necessary)

Instructions for completion of Section B for linear activities

1) For linear activities (pipelines etc) it may be necessary to complete Section B for each section of the site that has a significantly different environment.
2) Indicate on a plan(s) the different environments identified
3) Complete Section B for each of the above areas identified
4) Attach to this form in a chronological order
5) Each copy of Section B must clearly indicate the corresponding sections of the route at the top of the next page.

Section B has been duplicated for sections of the route | **0** | times

Instructions for completion of Section B for location/route alternatives

1) For each location/route alternative identified the entire Section B needs to be completed
2) Each alterative location/route needs to be clearly indicated at the top of the next page
3) Attach the above documents in a chronological order

Section B has been duplicated for location/route alternatives | **0** | times | (complete only when appropriate)

Instructions for completion of Section B when both location/route alternatives and linear activities are applicable for the application

Section B is to be completed and attachments order in the following way

- All significantly different environments identified for Alternative 1 is to be completed and attached in a chronological order; then
- All significantly different environments identified for Alternative 2 is to be completed and attached chronological order, etc.

Section B - Section of Route | | (complete only when appropriate for above)

Section B – Location/route Alternative No. | **Alternative 1 (Current proposal) – Electrical supply** | (complete only when appropriate for above)

1. PROPERTY DESCRIPTION

Property description: (Including Physical Address and Farm name, portion etc.)	Solomon Mahlangu Drive (M10) and R104/K22 road reserve *The one crossing is approximately 600m to the north of the R104/ K22 and M10 intersection (along Road M10/ Solomon Mahlangu Drive). The other crossing is approximately 650m to the east of the R104/ K22 and M10/ Solomon Mahlangu Drive intersection.*

2. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in decimal degrees. The degrees should have at least six decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

Alternative:	**Latitude (S):**	**Longitude (E):**
	°	°

In the case of linear activities:

Alternative:	**Latitude (S):**	**Longitude (E):**
Crossing on Solomon Mahlangu Drive		
• Starting point of the activity	-25.745972°	28.372414°
• Middle point of the activity	-25.746568°	28.372003°

• End point of the activity	-25.747148°	28.371543°
	Latitude (S):	**Longitude (E):**

Crossing on R104/K22

• Starting point of the activity	-25.753782°	28.374579°
• Middle point of the activity	-25.753890°	28.375067°
• End point of the activity	-25.754149°	28.375478°

For route alternatives that are longer than 500m, please provide co-ordinates taken every 250 meters along the route and attached in the appropriate Appendix

Addendum of route alternatives attached ☐

The 21 digit Surveyor General code of each cadastral land parcel

PROPOSAL
No Surveyor General (SG) code for the road reserves.

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

The sites are considered flat with a decrease in elevation where the Pienaars River occurs.

4. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site.

Ridgeline	Plateau	Side slope of hill/ridge	Valley	Plain	Undulating plain/low hills	**River front**

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

a) Is the site located on any of the following?

Shallow water table (less than 1.5m deep)	YES	**NO** Not expected
Dolomite, sinkhole or doline areas	YES	**NO X**
Seasonally wet soils (often close to water bodies)	**YES X**	NO
Unstable rocky slopes or steep slopes with loose soil	YES	**NO X**
Dispersive soils (soils that dissolve in water)	YES	**NO X**
Soils with high clay content (clay fraction more than 40%)	**YES** Only in certain areas	NO
Any other unstable soil or geological feature	YES	**NO X**

An area sensitive to erosion	**YES** Maybe. Areas next to a river, considering the slope towards the river, might be prone to erosion.	NO

(Information in respect of the above will often be available at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

b) are any caves located on the site(s)	YES	**NO X**

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	**Longitude (E):**
°	°

c) are any caves located within a 300m radius of the site(s)	YES	**NO X**

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	**Longitude (E):**
°	°

d) are any sinkholes located within a 300m radius of the site(s)	YES	**NO X**

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	**Longitude (E):**
°	°

If any of the answers to the above are "YES" or "unsure", specialist input may be requested by the Department

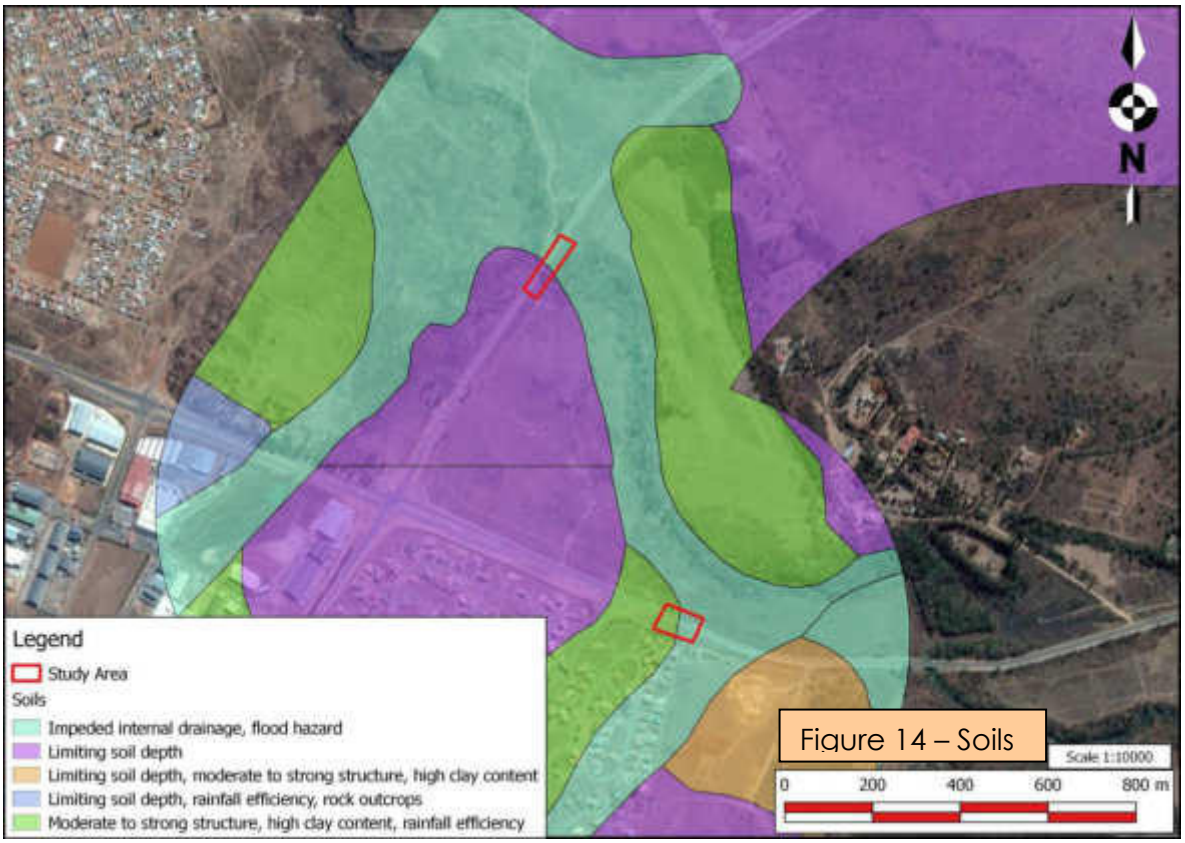


Figure 14 – Soils

6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)?	YES	**NO** only a small section of the one crossing is in a high agricultural potential area (of which the majority is already developed)

Please note: The Department may request specialist input/studies in respect of the above.

The study area is not used for any agricultural activities and falls within the Gauteng Provincial Urban Edge, and does not fall within an Agricultural Hub. The installation of the electrical line will only cause temporary disturbance of soils. Furthermore, the electrical line will be in the road reserve within a registered services servitude. According to the GPEMF the study area is situated within an area earmarked for urban development.

7. GROUNDCOVER

To be noted that the location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Indicate the types of groundcover present on the site and include the estimated percentage found on site

Natural veld - good condition % =	Natural veld with scattered aliens % = **50**	Natural veld with heavy alien infestation % =	Natural veld with heavy alien infestation % = **25**	Veld dominated by alien species % =	Landscaped (vegetation) % =
Sport field % =	Cultivated land % =	Paved surface (hard landscaping) % =	Paved surface (hard landscaping) % =	Building or other structure % =	Bare soil % = **25**

Please note: The Department may request specialist input/studies depending on the nature of the groundcover and potential impact(s) of the proposed activity/ies.

Are there any rare or endangered flora or fauna species (including red list species) present on the site	YES	**NO X**

If YES, specify and explain:

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban area as defined in the Regulations) or within 600m (if outside the urban area as defined in the Regulations) radius of the site.	YES	**NO X**

If YES, specify and explain:

Are there any special or sensitive habitats or other natural features present on the site?	**YES X**	NO

If YES, specify and explain:

The watercourses/wetlands and the associated buffers for both the culvert and river crossings points have been delineated by wetland specialists. The culvert crossing was delineated during the Basic Assessment (BA) process followed for the Riverwalk civil services and upgrades of K22/R104. And this

was done by Dr. Johan van der Waals. His report was updated and the electrical alignment through the watercourse area was taken into consideration during the update of the report.

A separate wetland delineation was recently conducted for the other watercourse crossing along Solomon Mahlangu Drive.

The study site is situated in the Quarter Degree Square (QDS) 2528CB, and in the Vulnerable Marikana Thornveld vegetation unit (Mucina and Rutherford, 2006).

According to the vegetation specialist, the culvert crossing is not suitable for Orange or Red listed plant species. The Pienaars River crossing is suitable for one Red and two Orange listed plant species according to the available data for the larger area, however, during the site visit none of these species were identified by the specialist.

Please refer to Appendix G for the specialist reports.

Was a specialist consulted to assist with completing this section	**YES X**	NO

If yes complete specialist details

Name of the specialist:	Corne Niemandt		
Qualification(s) of the specialist:	MSc Plant Science		
Postal address:	PO BOX 11375, Maroelana, 0161		
Postal code:	0161		
Telephone:	012 346 3810	Cell:	-
E-mail:	corne @bokamoso.net	Fax:	086 570 5659

Are any further specialist studies recommended by the specialist?	YES	**NO X**
If YES, specify:		
If YES, is such a report(s) attached?	YES	NO
If YES list the specialist reports attached below		

Signature of specialist: _____ Date: March 2017

If yes complete specialist details

Name of the specialist:	Dr. J.H. van der Waals		
Qualification(s) of the specialist:	PhD Soil Science, Pr.Sci.Nat		
Postal address:	PO Box 40568, Garsfontein		
Postal code:	0060		
Telephone:	+27 (0) 12 993 0969	Cell:	+27 (0) 82 570 1297
E-mail:	johan@terrasoil.co.za	Fax:	+27 (0) 86 274 6653

Are any further specialist studies recommended by the specialist?	YES	**NO X**
If YES, specify:		
If YES, is such a report(s) attached?	YES	NO
If YES list the specialist reports attached below		

Signature of specialist:		Date:	March 2017

If yes complete specialist details Name of the specialist:	Garth van Rooyen		
Qualification(s) of the specialist:	BSc (Hons) Soil Science		
Postal address:	P.O Box 11375, Maroelana, Pretoria		
Postal code:	0161		
Telephone:	012 346 3810	Cell:	-
E-mail:	info@bokamoso.net	Fax:	086 570 5659

Are any further specialist studies recommended by the specialist?	YES	**NO X**
If YES, specify:		
If YES, is such a report(s) attached?	YES	NO
If YES list the specialist reports attached below		

Signature of specialist:		Date:	July 2016

Please note; If more than one specialist was consulted to assist with the filling in of this section then this table must be appropriately duplicated

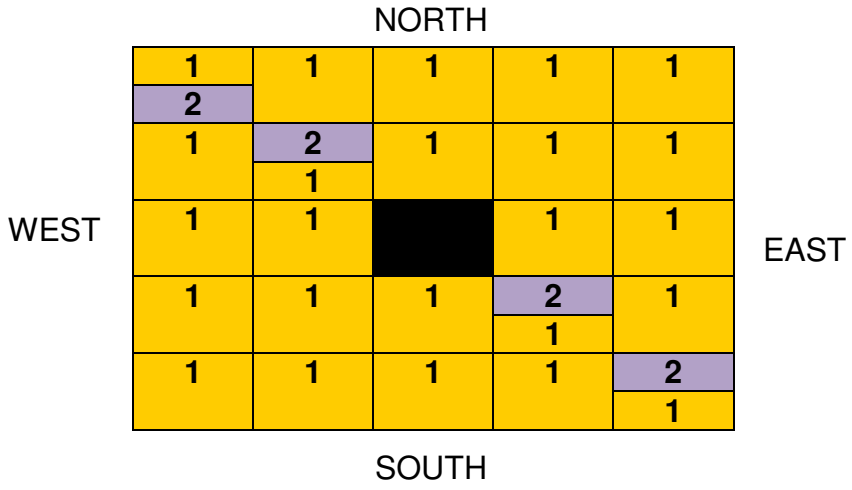
8. LAND USE CHARACTER OF SURROUNDING AREA

Using the associated number of the relevant current land use or prominent feature from the table below, fill in the position of these land-uses in the vacant blocks below which represent a 500m radius around the site

1. Vacant land	**2. River, stream, wetland**	3. Nature conservation area	4. Public open space	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	**8. Low density residential**	9. Medium to high density residential	10. Informal residential
11. Old age home	12. Retail	13. Offices	14. Commercial & warehousing	15. Light industrial
16. Heavy industrialAN	17. Hospitality facility	18. Church	19. Education facilities	20. Sport facilities
21. Golf course/polo fields	22. AirportN	23. Train station or shunting yardN	24. Railway lineN	25. Major road (4 lanes or more)N
26. Sewage treatment plantA	27. Landfill or waste treatment siteA	28. Historical building	29. Graveyard	**30. Archaeological site**
31. Open cast mine	32. Underground mine	33.Spoil heap or slimes damA	34. Small Holdings	**35. Riverwalk Development**
Other land uses (describe):	Hospital		Laboratory	

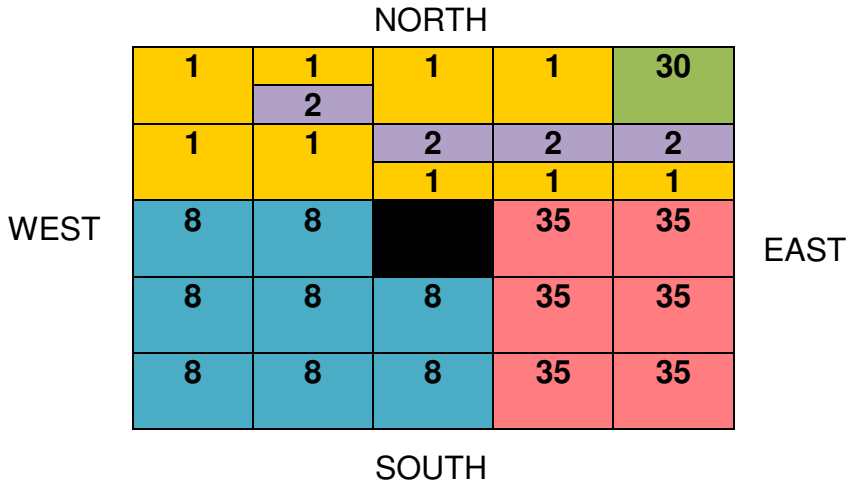
NOTE: Each block represents an area of 250m X250m

= Site



Note: More than one (1) Land-use may be indicated in a block

Crossing on R104/K22



Please **note**: The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed activity/ies. Specialist reports that look at health & air quality and noise impacts may be required for any feature above and in particular those features marked with an "A" and with an "N" respectively.

Have specialist reports been attached	YES	NO
		X

If yes indicate the type of reports below

9. SOCIO-ECONOMIC CONTEXT

Describe the existing social and economic characteristics of the area and the community condition as baseline information to assess the potential social, economic and community impacts.

From a social and economic point of view, there will be no negative impacts as the electrical line will be below the ground and it runs within the road reserve in a registered services servitude.

It will have a positive impact, on a socio-economic level, as it will supply electricity to the new Riverwalk development and the surrounding area. Such an installation

of electrical line contributes to services delivery. The installation of the line opens up the area for development. Temporary employment opportunities will be created during the construction phase and permanent jobs will be created by the new developments in the area which will be possible after the installation of the electricity line.

10. CULTURAL/HISTORICAL FEATURES

Please be advised that if section 38 of the National Heritage Resources Act 25 of 1999 is applicable to your proposal or alternatives, then you are requested to furnish this Department with written comment from the South African Heritage Resource Agency (SAHRA) – Attach comment in appropriate annexure

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site-

(i) exceeding 5 000 m2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Are there any signs of culturally (aesthetic, social, spiritual, environmental) or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	YES	**NO X**

If uncertain, the Department may request that specialist input be provided to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist if one was already appointed:

A Heritage Impact Assessment (HIA) was not deemed necessary due to the disturbed nature of the proposed route (a road reserve) and the short distance of the line at the crossings. Therefore, a specialist has compiled a letter in this regard. ***Appendix G – Heritage Letter***

Will any building or structure older than 60 years be affected in any way?	YES	**NO X**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	**NO X**

If yes, please attached the comments from SAHRA in the appropriate Appendix

SECTION C: PUBLIC PARTICIPATION (SECTION 41)

1. The Environmental Assessment Practitioner must conduct public participation process in accordance with the requirement of the EIA Regulations, 2014.

In terms of the 2014 Amended NEMA EIA Regulations (as amended on 7 April 2017), stakeholders (I&APs) were notified of the environmental evaluation process as follows:

- Site notices were erected (at prominent points on and around the study
- area) on 26 January 2017;
- Land owners and occupiers were notified via hand delivered notices as well as email communication on 26 January 2017;
- Notices regarding the project were further e-mailed, faxed and sent via registered mail to a list of interested and affected parties that registered for the project;
- A list of all persons, organisations and organs of state that were registered as interested and affected parties in this application process is attached;
- An advertisement was placed in Beeld of 26 January 2017;
- SAHRA was informed of the proposed electrical line in writing and receipt was acknowledged by SAHRA in a letter dated 22 February 2017;
- The ward councillor was informed of the applicant's intention to submit an application to the competent authority;
- The Draft Basic Assessment Report will be made available to I&APs for review;
- The following institutions and organs of state were also identified as I & AP's and added to the register of the I & AP's:
    - ◊ Council of Geo-Science;
    - ◊ Gauteng Department of Water and Sanitation (DWS);
    - ◊ South African Heritage Resources Agency (SAHRA);
    - ◊ SANRAL;
    - ◊ Gauteng Department of Roads & Transport (GDRT);
    - ◊ Department of Agriculture, Forestry and Fisheries (DAFF);
    - ◊ Randwater;
    - ◊ Transnet;
    - ◊ Department of Land Claims;
    - ◊ Eskom;
    - ◊ City of Tshwane Metropolitan Municipality; and
    - ◊ The Ward Councillor.

It is the opinion of Bokamoso that the Public Participation process followed was extensive and transparent. All the issues and comments raised by the I&APs, organs of state and stakeholders were addressed in the BAR and in the issues and response report. ***Mitigation measures were incorporated in the EMPr attached as Appendix H***

The proposed electrical line upgrading for the Riverwalk development will only have a short-term impact during the construction phase. Some existing vegetation and eco-systems adjacent to the river/ watercourse will be disturbed whilst installing the line. Once the installation is completed the excavated areas will be backfilled with sub-soil and topsoil and the areas will be revegetated with natural indigenous grass coverage.

The visual impact and other possible social impacts (i.e. blocking of accesses to properties) will only be temporary of nature.

The EMPr will address the possible social impacts during the construction phase.

2. LOCAL AUTHORITY PARTICIPATION

Local authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

Was the draft report submitted to the local authority for comment?	YES X	NO
If yes, has any comments been received from the local authority?	YES X	NO

If "YES", briefly describe the comment below (also attach any correspondence to and from the local authority to this application):

As mentioned Balwin Properties Ltd is applying for the upgradings on behalf of the CTMM. It was requested that the CTMM peruse this report and identify any aspects of the application that was not sufficiently addressed. One hard copy and three electronic copies were delivered to CTMM in order for them to distribute the report to the various sections and deliver comments. The Environmental Planning and Open Space Management Section did submit comments to Bokamoso.

In summary, the CTMM requested some information to be included in the Final BA Report, including the consents for substation connection and way leaves as well as a wetland rehabilitation plan.

The wetland rehabilitation plan has been added to Appendix K as well as the letters from SANRAL and GDRT confirming the way leaves (Appendix L). This appendix also includes a letter from Transnet.

If "NO" briefly explain why no comments have been received or why the report was not submitted if that is the case.

3. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the activity, site or property, such as servitude holders and service providers, should be informed of the application at least **thirty (30) calendar days** before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?	YES	NO
	X	

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

The Final Basic Assessment Report (BAR) has been distributed to the I&AP's and stakeholders for review for 30 days – until 3 July 2017. It was requested that SANRAL and GDRT also supply comments regarding the Draft BAR, because the proposed electrical line will run along a SANRAL and provincial road. However, no comments were received from SANRAL, GDRT or DWS. SANRAL and GDRT however did provide the engineer with way leave approvals.

However, comments were received from SAHRA and Randwater. ***Please refer to Appendix E***

If "NO" briefly explain why no comments have been received

4. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees and ratepayers associations. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was flawed.

The EAP must record all comments and respond to each comment of the public / interested and affected party before the application report is submitted. The comments and responses must be captured in a Comments and Responses Report as prescribed in the regulations and be attached to this application.

Refer to Appendix E6.

5. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The information in this Appendix is to be ordered as detailed below

Appendix 1 – Proof of site notice

Appendix 2 – Written notices issued as required in terms of the regulations

Appendix 3 – Proof of newspaper advertisements

Appendix 4 –Communications to and from interested and affected parties

Appendix 5 – Minutes of any public and/or stakeholder meetings

Appendix 6 - Comments and Responses Report

Appendix 7 –Comments from I&APs on Basic Assessment (BA) Report

Appendix 8 –Comments from I&APs on amendments to the BA Report

Appendix 9 – Copy of the register of I&APs

SECTION D: RESOURCE USE AND PROCESS DETAILS

Note: Section D is to be completed for the proposal and alternative(s) (if necessary)

Instructions for completion of Section D for alternatives

1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed
4) Each alterative needs to be clearly indicated in the box below
5) Attach the above documents in a chronological order

Section D has been duplicated for alternatives	**0**	times	(complete only when appropriate)

Section D Alternative No.	**Alternative 1 - Electricity**	(complete only when appropriate for above)

1. WASTE, EFFLUENT, AND EMISSION MANAGEMENT

Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES X**	NO
If yes, what estimated quantity will be produced per month?	Not Available	

How will the construction solid waste be disposed of (describe)?

During the construction phase of the underground electrical line the disposal of solid waste will be the responsibility of the applicant. An area on the application site will be earmarked for dumping of solid waste to be disposed of during construction. This area must be carefully selected as not to be visual from the surrounding residents and preferably be placed in an already disturbed area. The demarcated area must be easily accessible for dumping trucks to collect waste. The waste will be carted to a registered landfill site.

Where will the construction solid waste be disposed of (describe)?

All construction solid waste will be disposed of at the nearest registered landfill site. No solid waste will be dumped on surrounding open areas or adjacent properties.

Will the activity produce solid waste during its operational phase?	YES	**NO X**
If yes, what estimated quantity will be produced per month?	Not Applicable	

How will the solid waste be disposed of (describe)?

Not Applicable

Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity?	YES	**NO N/A**

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

Not Applicable

Note: If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	YES	**NO X**
If yes, inform the competent authority and request a change to an application for scoping and EIA. Is the activity that is being applied for a solid waste handling or treatment facility?	YES	**NO N/A**

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:

It is proposed that all waste construction materials be sorted into recyclable and non-recyclable materials. The recyclable materials should be re-used where ever possible or disposed of by a recycling company.

Liquid effluent (other than domestic sewage)

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	**NO X**
If yes, what estimated quantity will be produced per month?	Not Applicable	
If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)?	Not Applicable	
Will the activity produce any effluent that will be treated and/or disposed of on site?	Yes	**NO X**
If yes, what estimated quantity will be produced per month?	Not Applicable	

If yes describe the nature of the effluent and how it will be disposed.

Not Applicable

Note that if effluent is to be treated or disposed on site the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA

Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	**NO X**

If yes, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Not Applicable

Liquid effluent (domestic sewage)

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system?	YES	**NO X**
If yes, what estimated quantity will be produced per month?	**N/A**	
If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity(ies)?	YES	**NO X**
Will the activity produce any effluent that will be treated and/or disposed of on site?	YES	**NO X**

If yes describe how it will be treated and disposed off.

Not Applicable

Emissions into the atmosphere

Will the activity release emissions into the atmosphere?	YES	**NO X**
If yes, is it controlled by any legislation of any sphere of government?	Not Applicable	

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

During the construction phase, generation of dust and noise could become a nuisance factor to residents living adjacent to the planned construction route. However, if the electrical line is well planned and the mitigating measures are successfully implemented the proposed electrical line's contribution to air and noise pollution during the construction phase can become less significant.

2. WATER USE

Indicate the source(s) of water that will be used for the activity

Municipal	Directly from water board	groundwater	river, stream, dam or lake	other	**the activity will not use water X**

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month: Not Applicable

If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Annexure

Does the activity require a water use permit from the Department of Water Affairs and Forestry? **YES X** NO

If yes, list the permits required

Section 21 (c) and (i) General Authorisation registration or Water Use License.

If yes, have you applied for the water use permit(s)? In progress

If yes, have you received approval(s)? (attached in appropriate Annexure) In progress

3. POWER SUPPLY

Please indicate the source of power supply e.g. Municipality / Eskom / Renewable energy source

City of Tshwane Metropolitan Municipality and Solar Panels/ Renewable Energy

If power supply is not available, where will power be sourced from?

Not Applicable

4. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

Solar panels may be erected on the roof of each residential unit and the units will mainly have a northern orientation.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

The solar panels may be incorporated into the roofing of each residential units and will contribute to major short term and long term electricity and cost savings. It will also make additional electricity available on the grid for existing and new developments in the area.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts as well as the impacts of not implementing the activity (Section 24(4)(b)(i).

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summarise the issues raised by interested and affected parties.

Refer to Appendix E6

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included)
(A full response must be provided in the Comments and Response Report that must be attached to this report):

Refer to Appendix E6

2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION AND OPERATIONAL PHASE

Briefly describe the methodology utilised in the rating of significance of impacts

Significance Description Methodology

The significance of Environmental Impacts was assessed in accordance with the following method:

Significance is the product of probability and severity. Probability describes the likelihood of the impact actually occurring, and is rated as follows:

Likelihood	Description	Rating
Improbable	Low possibility of impact to occur either because of design or historic experience	2
Probable	Distinct possibility that impact will occur	3
Highly probable	Most likely that impact will occur	4
Definite	Impact will occur, in the case of adverse impacts regardless of any prevention measures	5

The severity factor is calculated from the factors given to "intensity" and "duration". Intensity and duration factors are awarded to each impact, as described below.

The Intensity factor is awarded to each impact according to the following method:

Intensity	Description	Rating
Low intensity	Natural and man-made functions not affected.	1
Medium intensity	Environment affected but natural and man-made functions and processes continue.	2
High intensity	Environment affected to the extent that natural or man-made functions are altered to the extent that it will temporarily or permanently cease or become dysfunctional.	4

Duration is assessed and a factor awarded in accordance with the following:

Duration	Description	Rating
Short term	<1 to 5 years - Factor 2	2
Medium term	5 to 15 years - Factor 3	3
Long term	Impact will only cease after the operational life of the activity, either because of natural process or by human intervention.	4

Permanent	Mitigation, either by natural process or by human intervention, will not way or in such a time span that the impact can be considered transient.	4

The severity rating is obtained from calculating a severity factor, and comparing the severity factor to the rating in the table below. For example:

The Severity factor = Intensity factor X Duration factor
= 2 x 3
= 6

A Severity factor of six (6) equals a Severity Rating of Medium severity (Rating 3) as per table below:

Severity Factor	Severity	Rating
Calculated values 2 to 4	Low Severity	2
Calculated values 5 to 8	Medium Severity	3
Calculated values 9 to 12	High Severity	4
Calculated values 13 to 16	Very High severity	5

A Significance Rating is calculated by multiplying the Severity Rating with the Probability Rating.

Significance	Rating	Influence
Low significance	Rating 4 to 6	Positive impact and negative impacts of low significance should have no influence on the proposed development project.
Medium significance	Rating >6 to 15	Positive impact: Should weigh towards a decision to continue Negative impact: Should be mitigated to a level where the impact would be of medium significance before project can be approved.
High significance	Rating 16 and more	Positive impact: Should weigh towards a decision to continue, should be enhanced in final design. Negative impact: Should weigh towards a decision to terminate proposal, or mitigation should be performed to reduce significance to at least medium significance rating.

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the construction phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Proposal

Potential impacts	Significance rating of impacts	Proposed mitigation	Significance rating of impacts after mitigation	Risk of the impact and mitigation not being implemented
PLANNING PHASE				
Adverse Impacts				
Cultural/Historical				
Low potential for destroying potential paleontological finds.	**Low**	It is not anticipated that any graves or important cultural findings will be discovered during the construction/installation of the electrical line. In addition, the line will be in the road reserve within a registered services servitude.	**Low**	Low risk of study not being conducted.
Ecological Sensitive areas				
Destruction of ecological sensitive areas identified on site	**Medium**	The proposed electrical line alignment is across a river and culvert. Access into these areas should be limited as far as possible, however it is acknowledged that some entry will be required as this is the alignment.	**Low**	Degradation of the wetland areas
Roads and Traffic				
Impact on provincial and national roads	**Medium**	Considering the proposed alignment is along the R104/K22 and Solomon Mahlangu Drive within the road reserve in a registered servitude, special care should be taken to ensure that these activities do not impact on the road and road users. During road upgrades, traffic flow should be regulated and should it be necessary a point's person should be visible on area of concern. Warning signs should also be erected to make drivers aware of the road works.	**Low**	Impact on the road and road users
Hydrology & groundwater				
Impacting wetland functionality	**Medium**	The proposed electrical line will require a section 21 (c) and (i) general authorisation or license.	**None**	GA registration/ WULA in progress
CONSTRUCTION PHASE				
Beneficial Impacts				
Social & Economic Environment				
Creation of Job opportunities during construction and operational phase of the project.	**Medium**	The proposed electrical line will create job opportunities during the construction phase of the project. It is recommended that local employment be sourced.	**None**	No risk due to positive impact
The installation of the new electrical	**Medium**	None	**None**	No risk due to

line will supply electricity to the Riverwalk development				positive impact
Adverse Impacts				
Services				
Disruption of services to adjacent properties during connecting of newly installed services.	**Low/ Unlikely**	Neighbours are to be informed of any service disruptions due to connecting newly installed services at least 48 hours prior to service disruption. Service disruption should be as short as possible.	**Low/ Unlikely**	Low risk due to communica-tion
Protected fauna				
Potential presence of bullfrog species	**Low**	Contractors should be made aware of potential presence of bullfrogs. Take note no bullfrogs were identified during the site investigations. If encountered during the construction phase a Herpetologist should conduct an assessment.	**Low**	Contractors could ignore the presence of Bullfrogs.
Ecological Sensitive areas				
Destruction of ecological sensitive areas identified on site	**Medium**	The proposed electrical line alignment is across a river and culvert. Access into these areas should be limited as far as possible, however it is acknowledged that some entry will be required as this is the alignment and the necessary activities are being applied for. Environmental Compliance Officer (ECO) to monitor.	**Low**	Contractors could disobey signage.
Geology & Soils				
If not planned and managed correctly topsoil will be lost.	**Low**	• Topsoil removed from the proposed excavations should be stored separately from all stockpiled materials and subsoil, according to the stockpiling methods as described below. The stockpiled topsoil should be used for rehabilitation and landscaping purposes after construction/installation has been completed; • The installation of services (electrical) could leave soils exposed and susceptible to erosion. Soils should be stored adjacent to the excavated trenches that are excavated to install services, and this should be filled up with the in-situ material as the services are installed. All stones and rocks bigger than 80 mm should be removed from the top layer of soil and these disturbed areas should be re-vegetated immediately after works in a specific area are completed to prevent erosion; • Excavations on site must be kept to minimum and done only one section at a time. Excavated soils must be stockpiled directly on the demarcated area on site. • Considering that the proposed electrical line occurs in a registered services servitude the residual adverse impact of the line on the soils is anticipated to be low. • Topsoil and sub-soil must be dumped above the 1:100-year flood line and	**Low**	Soil erosion could occur if mitigation is not implemented

		outside the watercourse buffer areas.		
Air quality pollution				
Nuisance to neighbours and road users in terms of dust generation due to construction during the dry and windy season.	**Low**	The construction period for excavation and closing should be quick to prevent dust pollution to nearby residential area and commuters utilising R104/K22 and Solomon Mahlangu Drive. After closing the excavations after installation, the soil should be compacted to avoid dust pollution.	**Low**	If mitigation is not implemented residents could complain about nuisance dust.
The noise created by earthmoving machinery will result in an increase in ambient noise levels. This will be short term, being generated only during the day.	**Low**	All construction activities must be restricted to normal working hours from 8:00 in the morning to no later than 18:00 in the afternoons. No construction may take place on Sundays and public holidays.	**Low**	If mitigation is not implemented residents could complain about nuisance noise.
Hydrology & groundwater				
Impacting wetland functionality	**Medium**	The proposed electrical line installation will require a section 21 (c) and (i) general authorisation or license. Conditions associated with this GA registration or WUL must be adhered to during construction.	**Low**	If mitigation is not implemented wetland function could be impaired.
Hydrocarbon pollution of surface and ground water	**Medium**	Spills from machinery and/or vehicles must be avoided or immediately cleaned up. Temporary storm water management measures should be implemented to manage storm water during the construction phase in order to avoid excavation soils running into the nearby river.	**Low**	Run-off can pollute the nearby river.
Excavated materials that are stockpiled in wrong areas can interfere with the natural drainage and cause sedimentation in the river.	**Low**	An area must be allocated for stockpiling of topsoil before any construction takes place on the application site. The stockpiles must be situated away from any water source or drainage channel. A sediment fence or barrier must be constructed around the stockpile, to prevent soil from washing away by rain or any water. Topsoil and sub-soil must be dumped above the 1:100-year flood line and outside the watercourse buffer areas.	**Low**	If mitigation is not implemented , topsoil could be lost.

Construction during the rainy season can cause delays and damage to the environment.	**Low**	It is recommended that the construction phase be scheduled for the winter months; It is also recommended that the precautionary measures be taken in order to prevent the extensive loss of soil during rainstorms. Large exposed areas should adequately be protected against erosion by matting or cladding; Measures should be implemented during the rainy season to channel storm water away from open excavations and foundations.	**Low**	If mitigation is not implemented , erosion could occur.
Roads and Traffic				
Impact on provincial and national roads	**Medium**	Considering the proposed alignment is along the R104/K22 and Solomon Mahlangu Drive within the road reserve in a registered servitude, special care should be taken to ensure that these activities do not impact on the road and road users. During road upgrades, traffic flow should be regulated and should it be necessary a point's person should be visible on areas of concern. Warning signs should also be erected to make drivers aware of the road works.	**Low**	If mitigation is not implemented impact on road and road users.
Heavy vehicle traffic increase could disrupt the surrounding landowners' daily routines.	**Low**	Heavy vehicles responsible for material deliveries must be instructed to only use the main roads during off-peak hours.	**Low**	If mitigation is not implemented , traffic flow could be negatively affected.
Provision for safe and effective traffic flow.	**Medium**	Health and safety mitigation/precautionary measures should be implemented during the construction work with regards to the electrical line installation near roads with public traffic.	**Low**	If mitigation is not implemented , motorists' safety could be at risk.
Access to existing properties.	**Low**	Construction activities should cater for continued access to existing properties, if applicable.	**Low**	If mitigation is not implemented , residents could complain about accessibility to their properties.
Construction might impact traffic	**Medium**	Liaison is required with the responsible traffic authorities to ensure compliance	**Low**	If mitigation is

flow.		with legal requirements during construction activities. Appropriate signage and barricading will be required to ensure safe construction activities and smooth traffic flow during the construction phase.		not implemented, motorists' safety could be at risk.
Safety and Security				
During the construction phase safety and security problems (especially surrounding residents) are likely to occur.	**Medium**	• Construction must be completed in as short time as possible. • No construction worker or relative may reside on the construction site during the construction phase. All construction workers must leave the site at the end of a day's work. • A security guard should be appointed on site to prevent any loss of materials and damage to construction equipment, if necessary.	**Low**	If mitigation is not implemented, residents and construction companies could be affected by crime.
The excavations associated with proposed electrical line could pose a safety risk to pedestrians.	**Medium**	The necessary safety precautions must be in place i.e. excavations must be fenced off with barrier tape; signage must be in place to identify excavations.	**Low**	If mitigation is not implemented, pedestrians' safety could be at risk.
Construction activities might affect the public e.g. road users	**Medium**	Public safety, especially that of R104/K22 and Solomon Mahlangu Drive users, is to be catered for during the construction phase.	**Low**	If mitigation is not implemented, motorists' safety could be at risk.
Visual Impact				
Dumping of builder's rubble on neighbouring properties.	**Low**	A specific location for building rubble must be allocated on site in order to concentrate and collect the building rubble and cart it to a registered landfill site. The allocated area must be out of sight of neighbouring properties not to have a visual impact.	**None**	If mitigation is not implemented, pollution could occur.
Stockpile areas for construction materials could have a negative visual impact and possibly impair drivers' views.	**Low** **Only if applicable**	An area on the site must be allocated for the stockpile of construction materials. The area must be situated above the flood line and outside of the wetland and wetland buffer areas, and must be situated to have a minimal visual impact on the neighbouring area. Stockpiles should be kept to a reasonable height in	**Low**	If mitigation is not implemented, vehicle accidents

		order to prevent impairing views (line of sight) of drivers utilising the R104/ K22 and Solomon Mahlangu Drive.		could occur.
The construction vehicles, the site camp, and other construction related facilities will have a negative visual impact during the construction phase.	**Low** **Only if required**	Before any construction commence on site, an area on site must be demarcated for a site camp. The selected site should not impair views (line of sight) of drivers utilising upgraded roads, nor should it be a distraction.	**Low**	If mitigation is not implemented, community complaints could occur.
Cultural and Archaeology				
Occurrence of cultural historical assets on the proposed electrical alignment.	**Low**	It is not anticipated that sites or features of cultural/ historical significance will be unearthed during construction; however, if finds are exposed during construction work, it should immediately be reported to an appropriately qualified specialist. Construction workers to be trained in the identification of paleontological finds.	**Low**	Cultural heritage finds unearthed during construction, could be destroyed
Flora & Fauna				
Construction works might cause destruction of protected species	**Low**	No protected species were recorded on site. Considering the proposed electrical line will be below the flood line and within the buffer of the river and culvert, the following must be applied: • Construction personnel should be trained in identification of Bullfrogs species. • The contractors must ensure that no fauna species are trapped, hunted, or killed during the construction phase. • Should any mammal species be encountered during the construction phase, they should be relocated to natural areas in the vicinity.	**Low**	If mitigation is not implemented, protected species could be destroyed.
Uncontrolled fires may cause damage and loss to vegetation and fauna in the area.	**Low**	• No fires are allowed on the construction site. • Smoking only allowed in designated areas away from vegetation which could possibly catch fire. • Cigarette disposal facilities should be catered for in the designated smoking areas.	**Low**	Protected species could be destroyed.
Waste Management				
Site office, camp and associated waste (visual, air and soil pollution)	**Low** **If applicable**	The site camp should not be located in a highly visual area on the study area, or a screen or barrier should be erected as not to have a negative impact on the sense of place. The site camp and the rest of the study area should appear neat at all times; A temporary waste storage point shall be determined and established on site by	**Low**	If mitigation is not implemented, community complaints

		means of demarcation. This storage points shall be accessible by waste removal vehicles. The temporary storage site may not be highly visible from the properties of the surrounding residents. Waste materials should be removed from the site on a regular basis (at least weekly), to a registered landfill site.		could be received.
Disposal of construction waste and waste materials.	**Medium**	All the waste generated by the proposed electrical line construction must be temporarily stored at a preselected area on site to be carted to a registered landfill site allowed to take building rubble; Waste storage should occur in areas that have already been disturbed; Small general waste containers should be provided along the length of roads where installation will take place to prevent windblown waste; These small waste receptacles must be emptied at the temporary waste storage area on a weekly basis for removal; All waste must be removed to a registered landfill site on a weekly basis. No waste materials may be disposed of on or adjacent to the site; The storage of solid waste on site, until such time that it may be disposed of, must be in the manner acceptable to the local authority; and Records of waste reused, recycled, and disposed must be kept for future reference or inspection by authorities.	**Low**	If mitigation is not implemented, pollution might occur.
OPERATIONAL PHASE				
Beneficial Impacts				
Social & Economic Environment				
Compatibility with the Local Municipality's development framework.	**High**	Optimum use of services.	**None**	No risk due to positive impact.
Adverse Impacts				
Fauna and Flora				
Invasive plant species occurrence	**Medium**	Alien plant eradication to continue during operational phase of the project. Should any alien plant species occur in the areas where construction work and ground works took place for the installation and upgrading of services, it should be eradicated from the area.	**Low**	If mitigation is not implemented, invasive plants could spread.

Alternatives:
There is no alternative for this underground electrical line as the line will be installed within a registered servitude for external services. This route is in a road reserve and therefore completely disturbed. Because it is in a road reserve it also does not affect other landowners. Due to the aforementioned there is no alternative alignment.

No-Go Alternative

Potential impacts	Significance rating of impacts	Proposed mitigation	Significance rating of impacts after mitigation	Risk of the impact and mitigation not being implemented
The no-go alternative only proposes negative impacts as there will be no services (in this case electrical) installed for future developments resulting in no future developments being able to take place. This will again have detrimental impacts on the economy as well as the social environment. There is already a services servitude registered in the road reserve that can and will be used.				

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

Electrical Statement
Ecological Scan
Wetland delineation
Heritage Exemption Letter

Describe any gaps in knowledge or assumptions made in the assessment of the environment and the impacts associated with the proposed development.

There are no known gaps in this assessment.

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Proposal

Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**	**Risk of the impact** and **mitigation not being implemented**
Geology & Soils				
Soil erosion, siltation, and gully formation.	**Low**	Compaction of fill material following installation of the electrical line should take place. Topsoil stockpiled should be returned and used to cover the installed electrical line.	**Low**	If no mitigation measures are implemented, erosion of fill material could occur.
Loss of topsoil due to poor rehabilitation.	**Low**	Rehabilitation works must be done immediately after the involved works in an area is completed in order to prevent loss of topsoil and possible erosion.	**Low**	If no mitigation measures are implemented, loss of topsoil could occur.
Hydrology & Groundwater				
Not reinstating natural run-off/drainage following completion of the decommissioning phase.	**Low**	Due to construction activities such as excavations and stockpiling, the natural drainage of the area is likely to temporarily change. Following installation of the electrical line and completion of rehabilitation, natural drainage should be reinstated to its former (prior to construction) state.	**Low**	If no mitigation measures are implemented, natural run-off could be negatively altered.
Demolition works during the rainy season can cause unnecessary delays and damage to the environment, especially damage to existing roads in the area.	**Low**	Should decommissioning take place in the wetter months, frequent rain could cause very wet conditions, which makes it extremely difficult to do the necessary rehabilitation works of disturbed areas. Wet soils are vulnerable to compaction. Wet conditions often causes delays and the draining of water away from the works (in the case of high water tables) into the water bodies of the adjacent properties, could (if not planned and managed correctly) have an impact on the water quality of these water bodies. Rehabilitation should be planned to take place prior to the onset on the rainy season i.e. prior to Spring, if possible.	**Low**	If no mitigation measures are implemented, the environment could be damaged.
Safety & Security				
Decommissioning activities could cause danger to drivers and pedestrians.	**Medium**	The necessary safety precautions must remain in place until decommissioning phase is concluded and the construction site is closed i.e. electrical line is in operation i.e. signage must be in place to identify activities in progress.	**Low**	If no mitigation measures are implemented, erosion of fill material could occur.

Waste Management				
Site office, camp and associated waste (visual, air and soil pollution)	**Medium** **If applicable**	Temporary site camp and waste storage areas are to be decommissioned. Disturbed areas are to be rehabilitated and returned to its former state (prior to construction commencing).	**Low**	If no mitigation measures are implemented, sense of place will be negatively affected.
Disposal of builders waste and waste materials.	**Medium**	All waste generated during the construction phase of the project is to be collected and disposed of at a registered landfill site. Records must be kept of waste reused, recycled, and disposed for inspection by authorities.	**Low**	If no mitigation measures are implemented, the environment will be polluted.
Roads & Traffic				
Heavy vehicle traffic increase could disrupt the surrounding landowners' daily routines.	**Low**	Heavy vehicles responsible for collecting waste or rehabilitation during the decommissioning phase must be instructed to only use the main roads during off-peak hours.	**Low**	If no mitigation measures are implemented, residents might complain.
Restrictions of access to surrounding properties and the construction area during decommissioning and closure phases.	**Low**	To minimize the impacts on local traffic, vehicles associated with decommissioning should avoid using the local road network during peak traffic times. These vehicles should use only specific roads and strictly keep within the speed limits and abide to all traffic laws. No speeding or reckless driving should be allowed. Access to the site for decommissioning vehicles should be planned to minimize the impact on the surrounding network; and Warning signs should be erected on the roads that these vehicles will use, at big crossings/ access roads and on the site if needed.	**Low**	If no mitigation measures are implemented, residents might complain.
Damage to roads.	**Low**	Provisions made for temporary access to and from the construction site along local roads should be removed. Any damage to the local road curbs at access points to construction site caused by construction activities should be repaired.	**None**	If no mitigation measures are implemented, road could be damaged without being repaired.
Air quality and noise				
Demolition works during the dry and windy season.	**Low**	Regular and effective damping down of working areas (especially during the dry and windy periods) must be carried out to avoid dust pollution that will have a negative impact on the surrounding environment. When necessary, these working areas should be damped down at least twice daily.	**Low**	If no mitigation measures are implemented, dust pollution could occur.
The noise created by decommissioning activities will result in an increase in ambient noise levels. This will be short term, being generated only during the	**Low**	All decommissioning and closure activities must be restricted to normal working hours from 8:00 in the morning to no later than 18:00 in the afternoons. No construction may take place on Sundays and public holidays.	**Low**	If no mitigation measures are implemented, noise pollution could occur.

day.				
Visual Impact				
Dumping of builder's rubble on neighbouring properties.	**Medium**	All waste temporarily stored on the construction site during the operational site has to be removed from the site during the decommissioning phase and prior to the project being regarded as closed.	**Low**	If no mitigation measures are implemented, pollution could occur resulting in community complaints.
Flora				
Demolition works might cause destruction of protected species	**Medium**	Demolition may not occur in demarcated areas. Flora species rescued prior to construction, if any, should be returned to rehabilitated areas.	**Low**	If mitigation measures are not implemented, protected species might be lost.

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Annexure.

Electrical Statement
Ecological Scan
Wetland Delineation
Heritage Exemption Letter

Where applicable indicate the detailed financial provisions for rehabilitation, closure and ongoing post decommissioning management for the negative environmental impacts.

Not applicable.

4. CUMULATIVE IMPACTS

Describe potential impacts that, on their own may not be significant, but is significant when added to the impact of other activities or existing impacts in the environment. Substantiate response:

Proposal

Should the proposed installation of the underground electrical line be approved, the majority of cumulative impacts will be related to the construction phase.

- Potential impact on a perennial river as well as a culvert with wetland which could be avoided by implementing mitigation measures. A water use license application/ GA is triggered;
- Surface water flows may be altered in certain areas during the construction phase of the proposed electrical line;
- Visual impact of construction vehicles and construction site on the study area and surrounding views;
- Noise pollution may upset residents in the area – to prevent this, construction activities may only take place during the daytime;
- Dust pollution could cause nuisance to surrounding residents – dust can be effectively controlled through the wetting of exposed surfaces, If necessary, or compacting after electrical line has been installed; and
- Temporary disruption of electrical supply to surrounding area.

The above mentioned cumulative impacts can be mitigated if activities are correctly planned and measures are implemented to manage activities which could cause any negative cumulative impacts.

5. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposal and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Proposal

The major impacts that are likely to occur during the construction and operational phase:

Bio-Physical Environment

The proposed route of the underground electrical line occurs mostly in an urban area comprising mostly of man-made environments and will be installed within existing servitudes or reserves. It does however traverse a perennial river as well as a culvert associated wetland. Due to the afore-mentioned, a Section 21 Water Use License Application (WULA)/ GA registration in terms of the NWA, 1998 is required. The proposed electrical line route/ alignment runs through an area already impacted by urban development and other human activities. An existing services servitude already runs along/ in the road reserve and it is registered.

Social Environment

The Public Participation was done by means of a newspaper notice; site notices placed on prominent points on the application site, hand delivered notices to surrounding tenants and landowners and the distributing of notices to stakeholders such as the Local Authorities, Councillors by means of faxes and e-mails.

The installation (excavation) of the electrical line could pose a safety risk to pedestrians and the necessary precautionary measures (i.e. warning signs) must be implemented at prominent points on the site.

Dangerous excavations can cause injury/ even death to people; this can be prevented by proper signage, access control, and demarcation. Construction vehicles and activities can be temporarily visually unattractive to passers-by and surrounding residents, but such impacts can be mitigated by selecting a construction site camp (if applicable) which is not visible to the public/ which is screened-off by a construction fence and netting.

Construction vehicles and activities can be a temporary nuisance by creating dust and noise, but can be mitigated with the limitation of construction hours from 6:00 to 19:00 to cause minimal disturbance to the community. Heavy vehicular and machinery movement on the already congested roads can cause damage to the road surfaces and can create dangerous conditions on the roads, especially during the peak hours.

Potential air pollution and noise can be mitigated by keeping construction activities to daytime hours. Surrounding residents might experience intervals of service disruptions. This will be mitigated as far as possible by avoiding this, otherwise notifying the residents

Economic Environment
The installation of the electrical line will create a number of employment opportunities for skilled and un-skilled workers during the construction phase of the project. The installation of the electrical line will contribute to service provision and delivery. The installation of the electrical line will contribute to potential urban densification.

Alternative 1

Not applicable

Alternative 2

Not applicable

No-go (compulsory)

The no-go alternative only proposes negative impacts as there will be no services (in this case electrical) installed for future developments resulting in no future developments being able to take place. This will again have detrimental impacts on the economy as well as the social environment.

The proposed electrical line will be installed in a registered servitude next to existing roads. The vegetation coverage in the services servitudes adjacent to these roads are already disturbed by edge effects and pedestrian movement and the installation of the proposed underground line (along the entire length of the line to be installed) will therefore not have a major negative effect on the ecological environment.

6. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE

For proposal:

Bio-Physical Environment

- Despite the electrical line crossing a river and a culvert associated wetland, it is not anticipated that the installation of the electrical line (if the construction phase is well planned and managed) will have any long term detrimental effect on the hydrology and ecological systems associated with these crossings. The EMPr attached as part of this BAR and General Authorisation (GA) requirements (in terms of the NWA) supply planning, management, rehabilitation and monitoring measures for all the development phases and the implementation of such measures will prevent/ restrict short and long term environmental damage.
- Erosion and siltation problems can occur during the construction and operational phases. Temporary storm water management measures during the construction phase can prevent erosion and siltation during the construction phase. If the area is rehabilitated immediately after the installation of the line, the vegetation coverage will prevent erosion and siltation.
- No Red Listed flora or fauna species were recorded on site.

Social Environment

- The electrical line development will create direct temporary employment opportunities during the construction phase. It will also create the potential for other developments in the area, because the costly installation of this much-needed line prevented other small developments from taking place. The other developments that will now be made possible will create temporary jobs during the construction phase and some permanent jobs during the operational phase.
- The services installations (electrical) contribute to services delivery in the area and it will promote the optimum utilization services.
- The developer will have to notify surrounding residents in the case of short term services and access disruptions during the construction phase.
- Hazards associated with construction activities e.g. excavations and increased traffic can be mitigated by means of proper signage, access control, and demarcation. Construction vehicles should not utilise local roads during peak traffic hours.
- Potential noise impacts can be mitigated by keeping construction activities to daytime hours.
- Dust pollution can be prevented by the damping-down of exposed areas during the dry and windy season.

Economic Environment

- The installation of the electrical line will create temporary employment opportunities during the construction phase to several skilled, semi-skilled, and

un-skilled individuals.

- The installation of the electrical line will contribute to service provision and delivery.
- The installation of the electrical line will contribute to the potential for urban densification/ development and such potential new developments will also create numerous jobs during the construction and operational phases.

Institutional

- The proposed installation of the electrical line will result in the optimum utilisation of services.
- The proposed electrical line installation occurs within Zone 1 and 2 of the GPEMF i.e. identified as Urban Development Zone and High Control Zone (within the urban development zone).

Based on the biophysical, institutional, social, and economical characteristics, it is evident that the site is suitable for the proposed electrical line. The electrical line will create job opportunities during the construction phase. It will also create opportunities for new development in the area and such new development will not only create temporary jobs during the construction phase, but it will also create permanent jobs during the operational phases of such new developments. Mamelodi is located in close proximity of the study area and such services upgradings will be beneficial for the community, Local Authority and the Gauteng Province in general.

The impacts associated with the proposed electrical line are limited to the construction phase and even during this phase there are only low to medium impacts. The major impact is the crossing of the river and in order to minimise this impact or ultimately avoid it, they will drill underneath the river and feed the cable through the drilling hole to the other side.

Based on the assessments and findings of this BAR, Bokamoso believes the installation of the proposed underground electrical line, only if planned, implemented, and managed correctly, will not have a significant negative impact on the bio-physical and social environments during the construction phase. The BAR process furthermore confirmed that the long term impacts of the proposed electrical line (during the operational phase) will mainly be positive impacts from a social and economic point of view.

It is therefore requested that the installation be allowed to proceed, so long as the mitigation measures contained in this report and in the ***Environmental Management Programme (Appendix H)*** are implemented, so as to achieve maximum advantage from beneficial impacts, and sufficient mitigation of adverse impacts.

For alternative:

Not applicable

Having assessed the significance of impacts of the proposal and alternative(s), please provide an overall summary and reasons for selecting the proposal or preferred alternative.

Considering the impacts for which mitigation is possible and the temporary impact and nature of the 5 x 11 kV underground electrical line, the proposed development/ installation is regarded as feasible and beneficial to the environment.

If all the mitigation measures recommended are followed there is no reason why this proposed construction of the electrical line cannot take place.

There is no alternative for this underground electrical line as the line will be installed within a registered servitude for external services. This servitude runs adjacent to existing roads that are already subject to edge effects and it will cause minimal social impacts.

7. SPATIAL DEVELOPMENT TOOLS

Indicate the application of any spatial development tool protocols on the proposed development and the outcome thereof.

Spatial data was used to determine the agricultural potential, presence of rivers and wetlands and urban edge.

The GDARD Conservation Plan (C-plan) data was used to assist with the determination of the presence of ecological support areas and protected areas were also established.

8. RECOMMENDATION OF THE PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the Environmental Assessment Practitioner as bound by professional ethical standards and the code of conduct of EAPASA).

YES	NO
X	

If "NO", indicate the aspects that require further assessment before a decision can be made (list the aspects that require further assessment):

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

Important!!

Bokamoso believes both beneficial and adverse impacts associated with the proposed new electrical line were thoroughly identified, assessed and addressed. The findings of the impacts assessment confirmed that the proposed electrical line installation will only have short term adverse impacts on the ecological, hydrological and social environments. Such short-term impacts are mainly associated with the construction phase and the significance of such impacts will be medium to low after the mitigation

measures and guidelines as supplied in the EMPr and in this report, were applied.

The proposed line will be installed underneath the ground and the area affected by any possible excavations and pipe-jacking exercises can be rehabilitated completely. At present, some of the areas earmarked for the pipeline are already very disturbed by edge effects and other human impacts and the rehabilitation works required after the installation of the pipeline creates an ideal opportunity to re-establish indigenous vegetation in the area and to implement erosion and siltation prevention measures.

Based on the above, it is recommended that the proposed electrical line installation project receive the go-ahead subject to the following conditions:

- That the applicant implement the guidelines and mitigation measures as supplied in the EMPr attached hereto as ***Appendix H***; and
- That the applicant obtain the necessary authorisations from DWS for the installation of the electrical line through the watercourse areas.

It is also requested that GDARD take cognisance of the fact that Balwin Properties Limited will only be responsible for the construction phase of this project, which requires the installation of the electrical line in accordance with council specifications. Balwin Properties Limited will be liable for any contraventions associated with the environmental authorisation during the construction phase.

The CTMM will take over the installed line once the construction works have been completed. The CTMM will then be responsible (in the longer term) for the on-going maintenance and management of the electrical line. Upgradings of the line once the line is in operation will also become the responsibility of the CTMM or new developers in that area that will require electricity. The CTMM will be liable for any contraventions associated with the environmental authorisation during the operational and decommissioning phases.

It is therefore regarded as important that GDARD distinguish between the liabilities associated with the construction, operational and decommissioning phases of the project in the environmental authorisation.

It is recommended that GDARD specifically request in the EA that Balwin and CTMM provide GDARD with confirmation that the construction works were completed to the satisfaction of the CTMM and that the project was handed over to the CTMM. GDARD should also require that the CTMM supply the name and contact details of the CTMM for purpose of operational phase enquiries in the hand-over letter/confirmation to be submitted to GDARD.

9. THE NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT (as per notice 792 of 2012, or the updated version of this guideline)

The proposed new powerline will assist with the provision and upgrading of services and infrastructure in an area which has been earmarked for urban development and densification.

The study area is situated along the eastern periphery of Pretoria, to the North of the N4 Freeway and to the south of Mamelodi. The Silver Lakes Golf Estate is situated just south of the N4 freeway and the N4 freeway was regarded as a buffer between Mamelodi and other more upmarket residential areas to the south of the N4 freeway for many years.

Road and services upgrading therefore mainly took place to the south of the N4 freeway. The proposed new Riverwalk development and other developments to the north of the N4 freeway (i.e. the N4 Industrial Park and the Savannah Country Estate) changed this trend and is now attracting development in this area. The Riverwalk development will be a large high-density residential development and this development

Services and road studies conducted in the area confirmed that development will only be possible in this area if some major road and services upgradings are done by local authority or larger developers who can afford to carry some of initial services upgrading costs as part of their developments. Balwin is currently upgrading the Solomon Mahlangu/ R104 intersection and a part of the R104 to the east of the intersection. The road upgrades referred to were much needed upgrades in terms of road safety conditions and road capacity.

Balwin will also be assisting with the construction of a new reservoir and bulk water pipeline for the area.

The electricity line applied for in this BA process is extremely important for the development, expansion, upgrading and upliftment of the area in between the N4 freeway and Mamelodi. Electricity upgradings have already been planned by the local authority, but funding is always an issue. Balwin require a significant amount of electricity for the new Riverwalk development and agreed to assist the local authority with the installation of the required electricity line. Balwin will most probably also assist the local authority with the upgrading of electricity sub-stations in the area.

It is imperative that municipal services are installed in areas earmarked for urban upliftment and expansion. Services delivery is in line with the planning frameworks and the aims of Government.

10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED
(CONSIDER WHEN THE ACTIVITY IS EXPECTED TO BE CONCLUDED)

10 years

11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) (must include post construction monitoring requirements and when these will be concluded.)

If the EAP answers "Yes" to Point 7 above then an EMP is to be attached to this report as an Appendix

EMPr attached	**YES** **X**

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate (this list is inclusive, but not exhaustive):

It is required that if more than one item is enclosed that a table of contents is included in the appendix

Appendix A: Site plan(s) – *(must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)*

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Route position information

Appendix E: Public participation information

Appendix F: Water use license(s) authorisation, SAHRA information, service letters from municipalities, water supply information

Appendix G: Specialist reports

Appendix H: EMPr

Appendix I: Enlarged Figures

Appendix J: CV and Company Profile

Appendix K: Wetland Rehabilitation Plan

Appendix L: Way Leave Consents

Appendix M: Application Form and GDARD letters

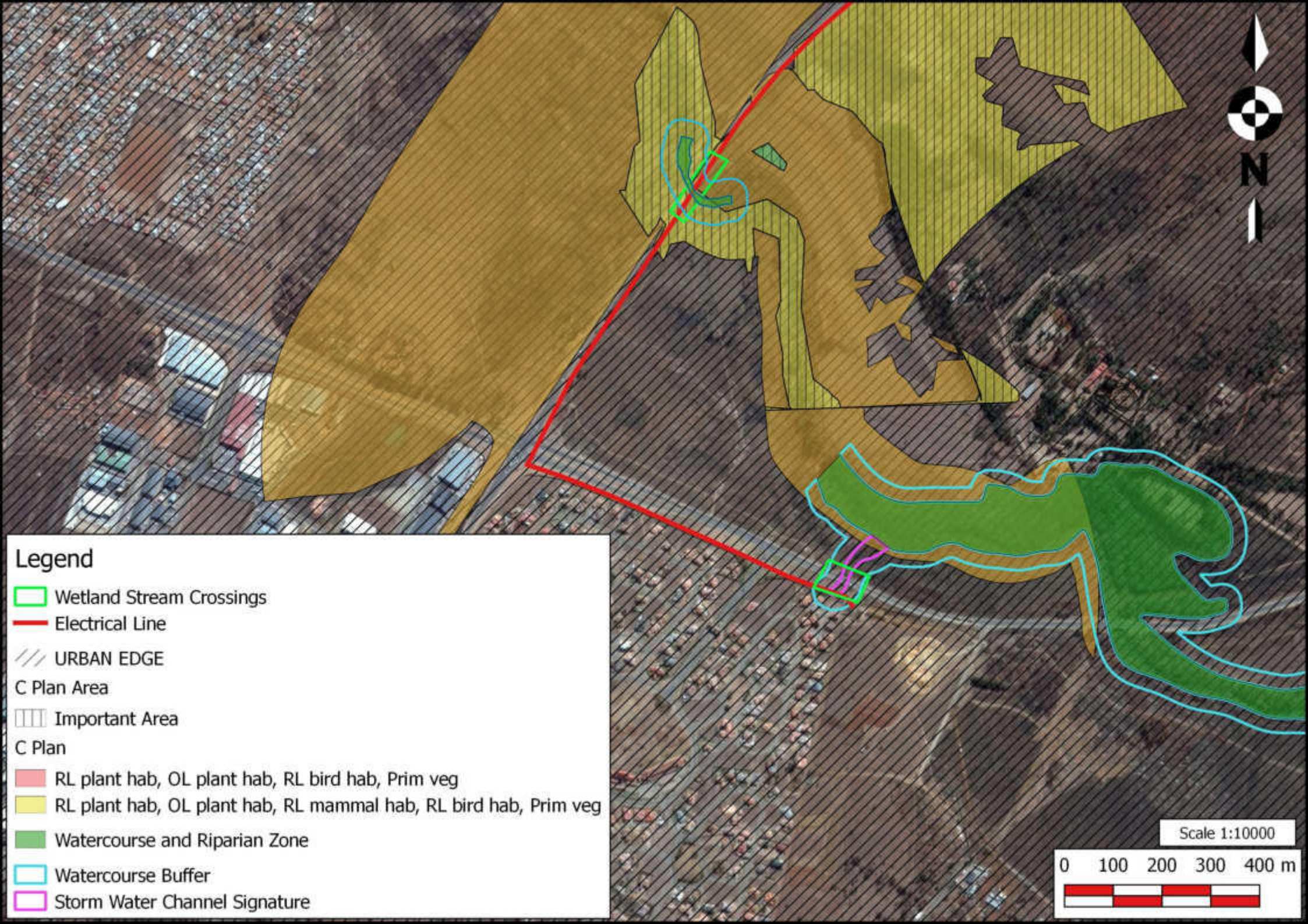
CHECKLIST

To ensure that all information that the Department needs to be able to process this application, please check that:

- Where requested, supporting documentation has been attached;
- All relevant sections of the form have been completed.

Site plan(s)

Appendix A


N
Legend
Wetland Stream Crossings
Electrical Line
URBAN EDGE
C Plan Area
Important Area
C Plan
RL plant hab, OL plant hab, RL bird hab, Prim veg
RL plant hab, OL plant hab, RL mammal hab, RL bird hab, Prim veg
Watercourse and Riparian Zone
Watercourse Buffer
Storm Water Channel Signature
Scale 1:10000
0 100 200 300 400 m

Photographs

Appendix B









Facility Illustration(s)

N/A

Appendix C

Route Position Information

Appendix D


Alwyn Road
Alwyn
Solomon Mahlangu Drive
Solomon Mahlangu Drive
Bronkhorstspruit Road
Solomon Mahlangu Drive
Bronkhorstspruit Road
N
Legend
Riverwalk - Proposed Electrical Power Line
Wetland Stream Crossings
Riverwalk Study Area
Scale 1:15000
0
250
500
750
1000 m

Public Participation Information

Appendix E

Proof of Site Notice

Appendix E1

NOTICE OF BASIC ASSESSMENT PROCESS AND WATER USE LICENCE (WULA)

Notice is given for applications in terms of the **Basic Assessment (BA) Process** to be submitted to the Gauteng Department of Agricultural and Rural Development (GDARD), in terms of Regulation No. R982 published in the Government Notice No. 38282 of 4 December 2014 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) governing **Basic Assessment Procedures (Listing Notice: 1 and 3 – Government Notice R983 & R985)** and a **Water Use License Application (WULA)** in terms of the National Water Act, 1998 (Act No. 36 of 1998) for the following proposed activity:

Project & Property Description: The proposed electrical line will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22. The proposed line will cross along the R104/K22 (Bronkhorstspruit Road) and the Solomon Mahlangu Drive. The Solomon Mahlangu Drive crossing is approximately 600m north of the R104 and M10 intersection and the Bronkhorstspruit crossing is approximately 650m east of the R104 and M10 intersection.

Project Location:
The proposed electrical line is situated within the Bronkhorstspruit area situated east of Pretoria. The Pienaars River bisects the proposed electrical line. The Silver Lakes Golf Estate is situated to the south of the site (just to the south of the N4 Freeway).

Applicant: Balwin Properties Limited.

Listing Activities Applied for in terms of NEMA Regulations, 4 December 2014:
In terms of the NEMA EIA Regulations**,** 4 December 2014:
GNR 983 (Listing Notice 1) – Activity 12, 19 & 48.
GNR 985 (Listing Notice 3) – Activity 12, 14 & 23.

The aforementioned proposed activity requires an application in terms Section 21 of the National Water Act, 1998 (Act 36 of 1998) (NWA) for the following water uses:

- Section 21 (c): Impeding or diverting the flow of water in a watercourse
- Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse

Date of Notice: 26 January 2017 – 27 February 2017

In order to ensure that you are identified as an Interested and/or Affected Party (I&AP) please submit your name, contact information and interest in the matter, in writing, to the contact person given below **within 30 days from start date of this Notice.**

The aforementioned proposed electrical line requires applications subject a WULA and BA and all registered I&APs will be allowed 60 working days to comment on the WULA and 30 days to comment on the EIA upon release of the documentation.

Queries regarding this matter should be referred to:
Bokamoso Landscape Architects and Environmental Consultants CC
Public Participation registration and Enquiries: Juanita De Beer
Project Enquiries: Mary-Lee van Zyl
WULA Enquiries: Ronell Kuppen
P.O. Box 11375
Maroelana 0161
www.bokamoso.net

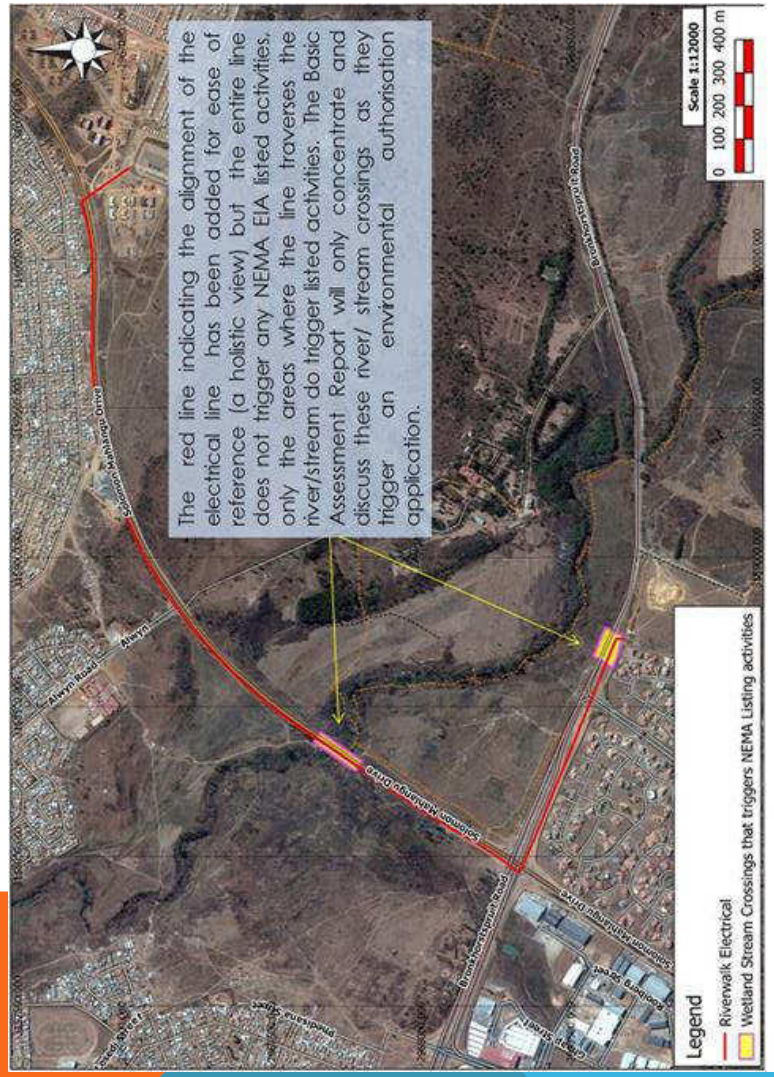
Tel: (012) 346 3810
Fax: (086) 570 5659
E-mail: reception@bokamoso.net


NOTICE OF BASIC ASSESSMENT PROCESS AND
WATER USE LICENCE (WULA)

Written Notices Issued to Those Persons Detailed in 1(b) to 1(f) above

Appendix E2

Review of the Draft Basic Assessment Report for the proposed Riverwalk Electrical



A period of 30 days will be allowed for review and comments on the Draft Basic Assessment Report for the proposed Riverwalk Electrical from **31 May 2017 – 3 July 2017**.

Your comments should be sent directly to our office at Bokamoso. Attention: Mary-Lee van Zyl or Juanita De Beer (reception@bokamoso.net or fax: 086 570 5659).

A copy of the report will be available at:
Venue: The Blyde Site Office
Address: This office is situated to the north of the N4 freeway. The Savannah Country Estate is situated to the immediate west of the office and Solomon Mahlangu Drive. The Sammy Marks Museum is situated to the north and north-east of the site office.
Attention: Jakkie Geldenhuys
Tel: 082 829 2677
Date: 31 May 2017 – 3 July 2017
Also available on our Website: www.bokamoso.net

Please do not hesitate to contact us should you have any queries regarding the abovementioned development.
Contact person: **Juanita De Beer**
Tel: 012 346 3810 Fax: 086 570 5659
E-mail: reception@bokamoso.net

NOTICE OF BASIC ASSESSMENT PROCESS AND WATER USE LICENCE (WULA)

Notice is given for applications in terms of the **Basic Assessment (BA) Process** to be submitted to the Gauteng Department of Agricultural and Rural Development (GDARD), in terms of Regulation No. R982 published in the Government Notice No. 38282 of 4 December 2014 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) governing **Basic Assessment Procedures (Listing Notice: 1 and 3 – Government Notice R983 & R985)** and a **Water Use License Application (WULA)** in terms of the National Water Act, 1998 (Act No. 36 of 1998) for the following proposed activity:

Project & Property Description: The proposed electrical line will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22. The proposed line will cross along the R104/K22 (Bronkhorstspruit Road) and the Solomon Mahlangu Drive. The Solomon Mahlangu Drive crossing is approximately 600m north of the R104 and M10 intersection and the Bronkhorstspruit crossing is approximately 650m east of the R104 and M10 intersection.

Project Location:
The proposed electrical line is situated within the Bronkhorstspruit area situated east of Pretoria. The Pienaars River bisects the proposed electrical line. The Silver Lakes Golf Estate is situated to the south of the site (just to the south of the N4 Freeway).

Applicant: Balwin Properties Limited.

Listing Activities Applied for in terms of NEMA Regulations, 4 December 2014:
In terms of the NEMA EIA Regulations**,** 4 December 2014:
GNR 983 (Listing Notice 1) – Activity 12, 19 & 48.
GNR 985 (Listing Notice 3) – Activity 12, 14 & 23.

The aforementioned proposed activity requires an application in terms Section 21 of the National Water Act, 1998 (Act 36 of 1998) (NWA) for the following water uses:

- Section 21 (c): Impeding or diverting the flow of water in a watercourse
- Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse

Date of Notice: 26 January 2017 – 27 February 2017

In order to ensure that you are identified as an Interested and/or Affected Party (I&AP) please submit your name, contact information and interest in the matter, in writing, to the contact person given below **within 30 days from start date of this Notice.**

The aforementioned proposed electrical line requires applications subject a WULA and BA and all registered I&APs will be allowed 60 working days to comment on the WULA and 30 days to comment on the EIA upon release of the documentation.

Queries regarding this matter should be referred to:
Bokamoso Landscape Architects and Environmental Consultants CC
Public Participation registration and Enquiries: Juanita De Beer
Project Enquiries: Mary-Lee van Zyl
WULA Enquiries: Ronell Kuppen
P.O. Box 11375
Maroelana 0161
www.bokamoso.net

Tel: (012) 346 3810
Fax: (086) 570 5659
E-mail: reception@bokamoso.net

LEBOMBO GARDENS BUILDING
36 LEBOMBO ROAD
ASHLEA GARDENS

P.O. BOX 11375
MAROELANA
0181

Tel: (012) 346 3810
Fax: 086 570 5659
E-mail: reception@bokamoso.net
Website: www.Bokamoso.net

Dear Landowner/Tenant **26 January 2017**

You are hereby informed that Bokamoso Landscape Architects and Environmental Consultants CC were appointed (as Environmental Assessment Practitioner) by Balwin Properties Limited to conduct the **Basic Assessment Process** in terms of the amended 2014 NEMA EIA Regulations for the proposed electrical line that will run from the Hatherly substation to the Riverwalk development, as well as **Water Use License Application** in terms of the National Water Act, 1998 (Act 36 of 1998).

The Project Description:
The proposed electrical line that will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22.

In terms of Regulation No. R982 published in the Government Notice No. 38282 of 4 December 2014 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) governing Basic Assessment (Notice 1 & 3 - Government Notice R983 & R985) of the 2014 amended NEMA Regulations, the EAP must inform all landowners and tenants of properties adjacent to the alignment of the proposed electrical line.

This letter serves as notification to you, (landowner/tenant) of the property of the proposed electrical line. Bokamoso requests that you supply the contact details of any tenants or other interested and affected parties that may reside or work on the property. Bokamoso will supply these parties with the necessary notification letters.

Alternatively, you are also welcome to distribute copies of your notification to these parties. We will however require proof that you supplied the notices to the tenants, landowners, workers etc. An alternative to the above option is to act as representative on behalf of these parties.

Please confirm within 30 days from start date of this notice (via email/fax) that you received the landowners/tenant notification and this letter. Also indicate in this confirmation letter whether you have tenants on your property and your preferred method of tenant/worker notification.

The proposed electrical line requires applications subject to a **Basic Assessment Process** and a **Water Use License Application**. All registered I&APs will be allowed 60 days to comment on the **Water Use License Application** and 30 days on the **Basic Assessment Process** upon release of the documentation.

Please may you notify Bokamoso if you are planning to sell your property as the new owners will be required to be registered as an I&AP.

Regards

……
Lizelle Gregory/Juanita De Beer

Riverwalk - Electricity - Landowner Notification

Acknowledgement of Receipt of land owner notification concerning the proposed Riverwalk - Electricity Project.

	Name	Address	Contact Details	Signature
1	J. Mook	SAVANNAH COUNTRY ESTATE	Email: SAVANNAHCE manager@gmail.com Fax: Tel: 012-8030051	
2			Email: Fax: Tel:	
3			Email: Fax: Tel:	
4			Email: Fax: Tel:	
5			Email: Fax: Tel:	
6			Email: Fax: Tel:	
7			Email: Fax: Tel:	
8			Email: Fax: Tel:	
9			Email: Fax: Tel:	
10			Email: Fax: Tel:	
11			Email: Fax: Tel:	
12			Email: Fax: Tel:	
13			Email: Fax: Tel:	
14			Email: Fax: Tel:	
15			Email: Fax: Tel:	

Proof of Newspaper Advertisement

Appendix E3

maan pote

Tuks se begin 'n turksvy

Die Pukke is die kampioenspan en sal weer geduld wees.

SakeNUUS

Eskom wil 'n sê hê

verdienste per aandeel in die jaar tot einde Desember kan tot 135% hoër wees. Hy maak sy jaarsyfers op 14 Februarie bekend maak.

Hy het Woensdag in 'n sens-verklaring gesê sy wesensverdienste vir die jaar is tussen R8,453 miljoen en R8,890 miljoen terwyl sy basiese verdienste tussen R8,351 miljoen en R8,782 miljoen is.

Kumba sê die hoër verdienste is hoofsaaklik toe te skryf aan die hoër uitvoerprys vir ystererts, asook die waardevermindering van R5,978 miljoen wat by die basiese verdienste ingesluit is, maar van die wesensverdienste uitgesluit is.

Bloomberg het voorheen be-

Ystererts met 'n ertsgraad van 62% het einde 2016 teen $78,87 per ton verhandel in Qingdao, China.

Dit is net laer as die hoogtepunt van die afgelope twee jaar van $83,58 per ton wat op 12 Desember bereik is, berig **Metal Bulletin**.

Die prys van ystererts sal na verwagting vroeg in 2017 op tussen $70 en $80 per ton wees, waarna dit geleidelik tot tussen $50 en $60 per ton teen die middel van die jaar sal daal, voorspel Gavin Wendt, senior hulpbronontleder by MineLife.

Kumba se aandeelprys het gister goed op die nuus gereageer en was teen 15:00 meer as 10% hoër op R193,23.

Communications to and from Persons Detailed in Point 2 and 3 above

Appendix E4

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 31 May 2017 08:48 AM
To: RudzaniM; 'KemmoneM@tshwane.gov.za'; tshinyadzom@tshwane.gov.za; 'jgrobler@geoscience.org.za'; msebesho; 'asalomon@sahra.org.za'; 'keetm@dwaf.gov.za'; 'Siwelane Lilian (GAU)'; 'tshifaror@dwa.gov.za'; 'mathebet@dwa.gov.za'; 'paia@eskom.co.za'; 'central@eskom.co.za'; kumen govender; nkoneigh; mmpshe; 'loveous.tampane@transnet.net'; PhyllystasM; AntonMa (AntonMa@daff.gov.za); 'CLCC@drdlr.gov.za'; magezi.mhlanga@drdlr.gov.za; dgoffice@drdlr.gov.za; Fhulufhedzan Rasimphi (Fhulufhedzan.Rasimphi@drdlr.gov.za); 'botav@nra.co.za'; 'degoede@mweb.co.za'; mike
Subject: Riverwalk Electrical - Review Notice
Attachments: Riverwalk Electrical - Review Notice BA.pdf; image001.jpg

Dear Interested and/or Affected Parties,

Please refer to the attached Review Notice for the Draft Basic Assessment Report regarding the proposed ***Riverwalk Electrical*** Project.

A period of 30 days will be allowed for review and comments on the Draft Basic Assessment Report for the proposed Riverwalk Electrical from ***31 May 2017 – 3 July 2017***.

Your comments should be sent directly to our office at Bokamoso Attention: Mary-Lee van Zyl or Juanita De Beer (reception@bokamoso.net or fax: 086 570 5659).

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects & Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: Mary-Lee van Zyl <marylee@bokamoso.net>
Sent: 14 August 2017 08:16 AM
To: 'Juanita'
Subject: FW: Riverwalk Electrical - Awaiting comments
Attachments: image002.jpg; image003.jpg

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Landscape Architects & Environmental Consultants cc
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: reception@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Mathebe Tshepo (GAU) [mailto:MathebeT@dws.gov.za]
Sent: Friday, August 11, 2017 3:18 PM
To: marylee@bokamoso.net
Cc: Mjona Thato Danny (GAU); 'info'; Siwelane Lilian (GAU)
Subject: RE: Riverwalk Electrical - Awaiting comments

Good afternoon

The file is with me, apologies for the delay. I will work on it and provide comments asap.

Regards

Tshepo Mathebe | Department of Water and Sanitation: Limpopo-North West Proto CMA|
285 Francis Baard Street, Bothongo Plaza-East | Private Bag X 995, Pretoria,0001 |
Tel: 012 392 1406 Cell: 082 658 7833 Fax: 086 573 2897 E-mail: mathebet@dws.gov.za

From: Mary-Lee van Zyl [mailto:marylee@bokamoso.net]
Sent: Friday, August 11, 2017 8:45 AM
To: Mathebe Tshepo (GAU)
Cc: Mjona Thato Danny (GAU); 'info'
Subject: Riverwalk Electrical - Awaiting comments

Dear Mr. Mathebe,

Please note that the Draft Basic Assessment (BA) Report was submitted to your Department on 31 May 2017. See attached for the acknowledgement of receipt signed by your Department.

The review period already lapsed on 3 July 2017. However, to date we have not received any comments from your Department.

Kindly provide us with your comments in this regard.

The Final BA Report will be submitted in due course.

Thank you.

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Bokamoso **Landscape Architects & Environmental Consultants cc**
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: reception@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161
Please consider the environment before printing this email

liability whatsoever for any loss, whether it be direct, indirect or consequential, arising from this e-mail, nor for any consequence of its use or storage.

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 02 February 2017 09:04 AM
To: marylee
Cc: info; lizelle
Subject: FW: Riverwalk - Electricial - Portion 243 Zwartkoppies 364 JR
Attachments: image001.jpg; image002.png

FYI.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: John Carstens [mailto:john.carstens@otagoinvestments.com]
Sent: 02 February 2017 09:02 AM
To: juanita@bokamoso.net; Simon Thirsk
Cc: Robyn Haddon
Subject: RE: Riverwalk - Electricial - Portion 243 Zwartkoppies 364 JR

Hi Juanita

Apologies, I could not see the small plan on my iPhone!

I have no objection whatsoever to Balwin installing the electrical infrastructure. Balwin should be commended for their pro-active approach and their bold investment strategy.

Kind regards

John Carstens
Director: Otago Investments (Pty) Ltd
Mobile in Australia: +61 424 828 962
Mobile in South Africa: +27 82 800 1095
Website: www.otagoinvestments.com

From: juanita@bokamoso.net [mailto:juanita@bokamoso.net]
Sent: Thursday, 2 February 2017 2:47 PM
To: Simon Thirsk
Cc: John Carstens
Subject: RE: Riverwalk - Electricial - Portion 243 Zwartkoppies 364 JR

Hi Simon,

What a relieve, thank you so much!

Bokamoso Environmental notified John Carstens this morning.

We do appreciate your quick assistance.

Have a wonderful day.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Simon Thirsk [mailto:Simon@bridgehead.co.za]
Sent: 02 February 2017 08:44 AM
To: juanita@bokamoso.net
Cc: John Carstens
Subject: Re: Riverwalk - Electricial - Portion 243 Zwartkoppies 364 JR

Ha ha

John Carstens is the owner.

Simon Thirsk

BRIDGEHEAD/RESPUBLICA

Building 1, Ground Floor, Silver Stream Business Park, 10 Muswell Road, Bryanston

M +27 (0) 84 513 1897

T +27 (0) 10 020 0337

simon@bridgehead.co.za

From: "juanita@bokamoso.net" <juanita@bokamoso.net>
Date: Thursday, 2 February 2017 at 08:41
To: Simon Thirsk <simon@bridgehead.co.za>
Subject: Riverwalk - Electricial - Portion 243 Zwartkoppies 364 JR

Dear Simon,

Your telephonic conversation with Anè refers.

Please refer to the attached Aerial Map where Portion 243 of the Farm Zwartkoppies 364 JR is circled in black.

We would like to know whether you have any information on the owner of Portion 243 of the farm Zwartkoppies that is adjacent to your portion (241). We just want to send them a notice as part of our public participation process but we have no name or contact information. We have done Windeed searches and contacted the town planners and no one is able to provide us with any information.

Bokamoso Environmental will appreciate your assistance in this regard.

Thank you.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net Iwww.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: Natalie Koneight <nkoneigh@randwater.co.za>
Sent: 14 June 2017 08:14 AM
To: juanita@bokamoso.net
Subject: Registering as I&AP: Riverwalk Electrical
Attachments: image001.jpg; image002.png; image003.png; image004.png; image005.png; image006.png; Riverwalk Electrical.pdf; Standard Conditions of Crossing RW Pipes_Way Leave.pdf

Dear Sir/Madam

Rand Water is hereby registering as IAP for the above-mentioned project.
Kindly forward confirmation of registration as IAP to Natalie Koneight at nkoneigh@randwater.co.za
Attached is Rand Water's Wayleaves, for your information.

Can you please provide Rand Water with the following:
1. **The shapefiles for the infrastructure proposed as well as road connections/access roads.**

2. Coordinates of the development;
3. A layout plan for the development including development footprint;
4. Specialist studies being undertaken;
5. Confirmation as to whether wayleaves will be required, from Rand Water
6. The detail about the facility that will receive the sewerage.
7. An agreement that the identified sewerage facility is aware of the development and that they have the capacity to accept the sewerage from the site without overloading the facility. Will there be any discharges other than the sewerage system that will increase storm water entering the environment. If so, has the development considered retention and stilling ponds to slow down high peak flows. If the sewerage facility cannot accept the additional load into their facility then this will have a negative impact on the environment and the pollution load into the river systems.

Minimum requirements for shapefiles (spatial data)
The shapefile must be in the geographic (decimal degrees) coordinate system in the WGS84 datum, in other words, not projected e.g. to Transverse Mercator.
It is essential that the shapefile contain at least the following three files having the same prefix, but different extensions:
· .shp – the file that stores the feature geometry (or the shape of the feature).
· .shx – the file that stores the index of the feature geometry.
· .dbf – the dBASE file that stores the attribute information of features.
When shapefiles are created using ESRI's ArcGIS software, a file with the following extension must also be included:
· .prj – the file that stores the coordinate system information. (Check the shapefile's properties and make sure that the coordinate system is set to geographic, WGS84).
Optional extensions to include may be any of the following:
· .xml – the file that stores metadata (information about the data).
· .sbn and .sbx – the files that store the spatial index of the features.
· .fbn and .fbx – the files that store the spatial index of the features for shapefiles that are read-only.
· .ain and .aih – the files that store the attribute index of the active fields in a table or a theme's attribute table.
The collection of files should be treated as one file and should never be separated, or else the shapefile will be rendered unusable.
NB: Please note that a file with any of the following extensions is not a shapefile: .apr, .aep, .axl, .mxd.
These are examples of map documents (commonly referred to as project files) created by different ESRI GIS software. Map document files only contain references to data stored on your hard disk and do not contain the data physically. Such a file cannot be opened without the accompanying shapefiles.

Regards

Name: Natalie
Surname: Koneight
Position: Secretary - Nursery-CD
Tel: 011 724 9366
Fax: (011) 900-2108
Email: nkoneigh@randwater.co.za
Web: **Rand Water Home Page**

Rand Water Customer Service Centre
Tel: 0860 10 10 60
customerservice@randwater.co.za

RAND WATER

Be the Hero Save Water

Disclaimer

REGISTRATION AS IAP

REVIEW OF THE DRAFT BASIC ASSESSMENT REPORT FOR THE RIVERWALK ELECTRICAL

First Name/s:	**GAIL**
Last Name:	**ANDREWS**
Title: (Dr./ Miss/ Mr./ Mrs./ Prof. etc)	**MRS**
If representing an entity (i.e. company or organisation), name of entity:	**RAND WATER**
If representing an entity, position within entity (i.e. CEO, Chairperson, Secretary, Councillor, etc):	**MANAGER ENVIRONMENTAL ASSESSMENTS**
Postal Address:	**P.O. BOX 1127** **JOHANNESBURG** **2000**
Physical Address	
E-mail Address:	**gandrews@randwater.co.za**
Phone Number:	**(011) 724-9360**
Cell Phone Number:	
Fax:	**(011) 900-1208**

Comments:

ALL TRAVERSING ALONG AND OVER RAND WATER PIPELINES. POSSIBLE LEAKS FROM OTHER SERVICES THAT COULD CAUSE GROUND STABILITY TO CHANGE. PLEASE KEEP US INFORMED REGARDING THE ABOVE ASPECTS.

STANDARD CONDITIONS FOR CROSSING OF RAND WATER'S SERVICES

ANNEXURE "A" (OCT 2002)

1. SERVICE CROSSINGS :

1.1 The number of crossings of Rand Water's pipeline/s and servitude/s or proposed servitude/s shall be kept to a minimum; such crossings shall be as close to 90 degrees (right angles) as possible and the cover over its pipeline/s shall not be materially altered.

1.2 No service shall be less than one metre from a joint in Rand Water's pipeline/s and a space of not less than 300 mm shall be maintained between any service and Rand Water's pipeline/s at the point of crossing, or as separately specified. Where Rand Water's prestressed concrete pipeline is crossed, this space shall be measured from the lightning protection wires installed above and below the pipeline. For service crossings under those of Rand Water, where further larger diameter pipelines are installed in the servitude in the future, Rand Water may require the service owner, at its own cost, to lower its service to comply with the foregoing.

1.3 No service running parallel to Rand Water's pipeline/s, no box, manhole, structure supporting any service, footing of any pylon, pole or stay wire and no stormwater culvert and / or appurtenances shall be within two metres of Rand Water's pipeline/s or on Rand Water's servitude/s or proposed servitude/s or discharge thereon unless the prior written permission of Rand Water has been obtained.

1.4 Half-round concrete pipes or other approved protection shall be placed over any cable that is within two metres of Rand Water's pipeline/s or on Rand Water's servitude/s or proposed servitude/s.

1.5 Where any service crosses Rand Water's servitude/s or proposed servitude/s, it shall be laid at minimum grade (sewers and stormwater) / at an even depth below ground level (all other services) over the entire servitude / proposed servitude width and its position where it intersects Rand Water's pipeline/s, servitude/s or proposed servitude/s shall be clearly indicated by suitable markers. Sewer crossings shall be designed to span over Rand Water's existing and proposed pipeline trenches.

2. ROADS AND RAILWAY LINE CROSSINGS :

2.1 Rand Water shall have unimpeded vehicular access to its pipeline/s at all times for inspection and maintenance purposes. Culverts shall be provided at all railway line crossings to provide such access. Under roadways culverts will be required unless it can be proved to Rand Water that traffic density and the cover over the pipeline/s will not adversely affect Rand Water in the exercise of its rights and that excavation through the road layers to gain access to the pipeline/s is acceptable to the service owner. In general, the cover over Rand Water's pipeline/s may vary between 800 mm and 1 500 mm however, an undisturbed layer of at least 300 mm shall be maintained between the pipeline/s and the roadworks during construction unless relaxed by Rand Water in writing. Reinforced concrete box culverts with compartments having minimum internal dimensions as indicated on Rand Water's standard drawings No. B1933 and B1934 shall be provided for both existing and future pipelines. Culverts shall preferably be drained by a gravity system.

2.2 Long diagonal crossings of Rand Water's pipeline/s and servitude/s or crossings of bends in Rand Water's pipeline/s shall be avoided. If this is not possible, Rand Water's pipeline/s shall be deviated so as to cross the proposed road/railway line at approximately right angles.

3. PIPELINE PROTECTION AND / OR DEVIATION AT DESIGN STAGE :

3.1 Where any development affects the discharge of water from Rand Water's scour valves, arrangements shall be made in collaboration with Rand Water's Manager Bulk Water Services to accommodate, channel or divert such flow.

3.2 Detailed proposals, including longitudinal sections along Rand Water's pipeline/s depicting the level of the road/railway line or other service in relation to the pipeline/s, shall be submitted for Rand Water's approval before the commencement of proposed construction work.

3.3 It may be necessary for Rand Water itself to strengthen the lead-caulked joints of its pipeline/s located under roadways or in culverts, by means of double tapers, the fabrication of which requires at least two months notice. Such strengthening shall extend to a distance of at least two metres beyond the road prism/kerb line, measured at right angles to the road direction. (The estimated cost of which is R 7 000 per joint). The actual cost of joint strengthening shall be borne by the service owner who shall be responsible for all excavation and backfilling.

3.4 Since lengthy delays can occur between the planning and construction stages, the proposed dimensions of the culverts shall be confirmed by Rand Water at least 12 months before construction work commences.

3.5 All planning, survey work, preparation of designs, specifications and drawings shall be undertaken by the service owner or its consulting engineers and submitted to Rand Water for approval. A copy / Copies of the relevant specimen specification/s will be provided, on request, when more details of the work to be performed are known.

3.6 Contractors approved by Rand Water shall be engaged to undertake all construction work, including :

(a) manufacture, supply and delivery of pipes;
(b) excavation and backfill of trenches etc;
(c) laying and jointing of pipes;
(d) recovery of redundant pipes; and
(e) construction of the necessary structures.

3.7 Rand Water shall be given reasonable notice prior to the commencement of the fabrication as well as the installation of pipes to enable it to undertake the necessary inspection work.

3.8 Except for the manufacture of pipes, which will be inspected by Rand Water or its agents, all work shall be supervised by the service owner or its consulting engineers who will also undertake all necessary negotiations with property owners and local authorities affected by any possible relocation of Rand Water's pipeline/s and obtain agreement from them in principle for the accommodation of Rand Water's pipeline/s in the proposed relocated position/s.

Continued overleaf .....

3.9 Where Rand Water is required to relocate its pipeline/s or servitude/s, the service owner shall bear the cost of the cancellation of Rand Water=s servitude/s as well as the costs of acquiring, surveying and registering new servitudes that will provide Rand Water with rights equal to those provided by the servitudes to be cancelled

3.10 Co-ordinates of the alignment of any proposed relocation/s shall be submitted to Rand Water to prepare the statutory notices for relocation/s of its pipeline/s. Relocation shall not take place until Rand Water has issued such statutory notices.

3.11 During the period April to August in any year, at a time suited to its water supply operations, Rand Water will, on receipt of 21 days notice, circumstances permitting, make the end connections from the deviations to the existing pipeline/s. Daywork rates shall be included in the pipelaying contract documents to allow for assistance to Rand Water.

3.12 Ownership of portions of the pipeline/s that become redundant as a result of relocations carried out at the service owner=s cost will be transferred to it. If requested, Rand Water may take into stock pipes and / or valves recovered in good condition and credit the service owner with the value determined by Rand Water. Materials thus taken into stock shall be delivered to Rand Water's pipe yard at its Zwartkopjes pumping station by and at the cost of the service owner.

3.13 The service owner hereby indemnifies Rand Water against any claim arising from the non-removal and disposal of any portion of Rand Water=s pipeline/s made redundant by a relocation.

3.14 No pipeline in its relocated position shall be subject to the provisions of the Advertising on Roads and Ribbon Development Act No 21 of 1940 or the National Roads Act No 54 of 1971 as amended.

4. PIPELINE PROTECTION AND / OR DEVIATION AT CONSTRUCTION STAGE :

4.1 Rand Water's Distribution Manager (Telephone (011) 900-1910) shall be notified and his permission obtained before any work is carried out within five metres of Rand Water's pipeline/s, servitude/s or proposed servitude/s and before backfilling any excavation exposing Rand Water's pipeline/s - Please quote inspection order No as specified separately.

4.2 If detailed information of the positions or levels of the pipeline/s is required the pipeline/s may be exposed by the service owner or its consulting engineers, provided that the foregoing condition is complied with.

4.3 In terms of Regulation 10.17.1 of the Explosives Act No 26 of 1956, written confirmation of the measures proposed to protect Rand Water's pipeline/s shall be obtained from Rand Water for any blasting to be undertaken within 500 metres of its pipeline/s. The service owner shall be responsible for ensuring that the approved protection measures are complied with and that Rand Water's Distribution Manager is notified at least 24 hours in advance of each blast.

4.4 The pipeline/s shall be supported at not greater than five metre centres in culverts and where excavation takes place under the pipeline/s during construction.

4.5 No heavy earthmoving or compaction equipment shall be operated within two metres of the steel or five metres of the prestressed concrete pipeline/s unless specific proposals have been approved by Rand Water.

4.6 The prestressed concrete pipeline/s shall be haunched under the road or supported on pedestals where crossed by services located thereunder in accordance with the details depicted on Rand Water's drawing A3993, a print of which is available on request. Such haunching shall extend for a distance of two metres beyond the edge of the roadway on both sides, or to such greater length as may be required to complete the haunching of the nearest whole pipe length.

5. CATHODIC PROTECTION AT STEEL PIPELINE CROSSINGS :

5.1 Two 16 square millimetre leads or one 35 square millimetre lead appropriately marked must be provided at each crossing point and the crossing shall not be backfilled until Rand Water's staff have installed similar test leads on Rand Water's pipeline/s. The
Electrolysis Section ((011) 682-0239 or 0240) must be contacted for the connections to Rand Water's pipelines.

5.2 The pipe to ground potential of Rand Water's pipeline/s at the crossing point will be monitored before installation of the service owner=s steel service and that potential must be maintained irrespective of the cathodic protection applied to the service owner=s steel service after installation.

6. INDEMNITY :

6.1 The service owner shall indemnify Rand Water against all claims for damage arising out of, and will be held liable for any damage that may be caused to Rand Water's pipeline/s and/or appurtenances as a result of any crossing of during construction or the installation/construction and/or the presence of any service/road/railway line and/or appurtenances on Rand Water's servitude/s or within two metres of Rand Water's pipeline/s. Rand Water shall not be liable for any damage to any service/road/railway line and/or appurtenances that may be caused by it in the exercise of its rights, provided that Rand Water will remain liable for any damage that is proved to have resulted directly from the wrongful action of its employees.

7. COSTS :

7.1 The service owner shall bear the cost of any protective measure that may be necessary in order to prevent the exchange of stray direct currents between the cable/s or pipe/s and Rand Water's pipeline/s, the protection of existing installations and of making provision to accommodate future services, as outlined above as well as the cost of repairs to the lightning protection wires installed approximately 100 mm above and below Rand Water's prestressed concrete pipeline/s or to Rand Water's telemetering cable/s necessitated by the installation of the proposed service, and will be debited with all costs incurred by Rand Water on its behalf on the usual terms of actual cost plus 10% (ten per cent) for administration.

8. ACCEPTANCE OF CONDITIONS :

8.1 The above conditions together with Annexure B (Vaal Barrage Conditions) if relevant, and any foregoing special requirements shall be accepted in writing by the service owner before any work may commence. If no reply is received within 60 days from date of Rand Water's written notification, the conditions will be deemed to have been accepted by the service owner.

juanita@bokamoso.net

From: CHAUKE, EMMANUEL (GDARD) <EMMANUEL.CHAUKE@gauteng.gov.za>
Sent: 10 July 2017 03:45 PM
To: marylee@bokamoso.net; juanita@bokamoso.net; reception@bokamoso.ne; marylee@bokamoso.net
Cc: MATLAMELA, PHUTI (GDARD); PHAKULA, ETLELANI (GDARD); MOAGI, WESI (GDARD)
Subject: RE: Comments on Draft Report Gaut 002/17-18/E0046
Attachments: image001.jpg; image002.jpg; image003.jpg; image004.gif; image005.jpg; image006.jpg; SDEPT_AGRIC17071015320.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Good day

May you please find the correct comments for the above motioned file

Regards

Emmanuel Chauke
Environmental Officer: Impact Management
Gauteng Department of Agriculture & Rural Development
56 Eloff Street, Umnotho House, JOHANNESBURG 2000
tel: 011 240 3414 **cell** 073 346 9620 **email:** Emmanuel.Chauke@gauteng.gov.za
website: http://www.gdard.gpg.gov.za

GAUTENG PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

From: MATLAMELA, PHUTI (GDARD)
Sent: 10 July 2017 03:39 PM
To: CHAUKE, EMMANUEL (GDARD)
Subject: FW: Comments on Draft Report Gaut 002/17-18/E0046

From: Mary-Lee van Zyl [mailto:marylee@bokamoso.net]
Sent: Friday, July 7, 2017 11:03 AM
To: MULAUDZI, FULUFHELO (GDARD); teboho.leku@gauteng.gov.za; MATLAMELA, PHUTI (GDARD)
Cc: 'info'
Subject: RE: Comments on Draft Report Gaut 002/17-18/E0046

Dear Fulufhelo,

Please note that the comments that were attached to this email were for the wrong project with a different reference number.

Kindly send us the comments for Gaut 002/17-18/E0046.

Thank you,

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Landscape Architects & Environmental Consultants cc
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: reception@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Bokamoso [mailto:reception@bokamoso.net]
Sent: Friday, July 7, 2017 10:58 AM
To: info; marylee@bokamoso.net; juanita@bokamoso.net
Subject: FW: Comments on Draft Report Gaut 002/17-18/E0046

From: MULAUDZI, FULUFHELO (GDARD) [mailto:FULUFHELO.MULAUDZI2@gauteng.gov.za]
Sent: 07 July 2017 10:51 AM
To: reception@bokamoso.net
Cc: LEKU, TEBO (GDARD); MATLAMELA, PHUTI (GDARD)
Subject: Comments on Draft Report Gaut 002/17-18/E0046

Dear Lizelle Gregory

Please find the attached comments.

Kind Regards

Fulufhelo Mulaudzi
Environmental Officer: Impact Management
Gauteng Department of Agriculture & Rural Development
56 Eloff Street, Umnotho House, JOHANNESBURG 2000
tel: 011 240 3387 **fax**: 086 577 2616 **email:** Fulufhelo.Mulaudzi2@gauteng.gov.za
website: http://www.gdard.gpg.gov.za

GAUTENG PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

GAUTENG PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Umnotho House ,56 Eloff Street, Johannesburg
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Fax: (011) 355-2700
Website: http://www.gdard.gpg.gov.za

FAX COVER SHEET

Receiver's Details		Sender's Details	
To:	Lizelle Gregory	**From:**	Phuti Matlamela
Company:	Bokamoso Environmental Consultants	**Section:**	Impact Management
Fax. no.	086 570 5659	**Floor:**	28 th Floor Umnotho House
Tel. no.	012 346 3810	**Tel:**	011 240 3420
Date:	2017	**Pages:**	03(including fax cover)
SUBJECT:	**GAUT: 002/17-18/E0046** **COMMENTS ON DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED ELECTRICAL LINE FROM HATHERLY SUBSTATION TO RIVERWALK DEVELOPMENT, CITY OF TSHWANE METROPOLITAN MUNICIPALITY**		

CC: City of Tshwane Metropolitan Municipality

Attn: Rudzani Mukheli
Tel: 012 358 8731
Fax: 012 358 8934

GAUTENG PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Umnotho House,56 Eloff Street,Johannesburg
PO Box 8769, Johannesburg, 2000
Tel: 011 240 2500
Fax: 011 240 2700

Reference: Gaut 002/17-18/E0046
Enquiries: Phuti Matlamela
Telephone: 011 240 3420
E-mail: Phuti.Matlamela@gauteng.gov.za

BY FACSMILE: 086 461 8796
BY REGISTERED MAIL

Bokamoso Environmental Consultants CC
P.O Box 11375
MAROELANA
0161

Telephone No.: 012 346 3810

Dear Madam,

COMMENTS ON DRAFT BAR: PROPOSED ELECTRICAL LINE FROM HATHERLY SUBSTATION TO RIVERWALK DEVELOPMENT, CITY OF TSHWANE METROPOLITAN MUNICIPALITY

This Department received a copy of the Draft Basic Assessment Report dated 31 May 2017 for comment.

The proposed project is for the construction of electrical lines from Hatherly substation to the Riverwalk development situated within the road reserve of Solomon Mahlangu drive and the R104/K22. The one crossing is approximately 600m north of the R104 and M10 intersection. The other crossing is approximately 650m east of the R104 and M10.The actual electrical line does not trigger a listed activity but due to it crossing sensitive environmental features (wetland/stream) it's listed.

A. Alignment of the activity with applicable legislations and policies

The report has made provisions to accommodate all applicable legislations, policies and guidelines. The proposed electrical line has an impact in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended). The proposed activity is listed as activity 12, 19 and 48 of Listing Notice 1 and activity 13, 14 and 23 of Listing Notice 3.

B. Guidelines GDRAD requirements

- According to the Gauteng Conservation Plan 3.3 the electrical lines will cross/traverse river/wetland,
- All specialist studies must be undertaken by suitably qualified specialists who (1) are registered in accordance with the Natural Scientific Professions Act (2003) as Professional Natural Scientists within the field of Ecological or Aquatic Science (2) have specific post-graduate qualifications relating to wetlands. In the absence of the latter, the specialist must have attended an appropriate course on wetland rehabilitation and delineation (copy of certificate must be provided).

C. Alternatives

The report did not mention any other alternatives since the proposed activity is only listed due to it traversing wetlands/streams.

D. Significant rating of impacts

Identification of impacts and significant rating must be undertaken for all sensitive features identified to be crossed or disturbed and include mitigation measures.

E. Locality map and layout plans or facility illustrations

- Locality Maps and Layout Plans must meet the requirements below -
- the scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map;
- the locality map and **all** other maps are in colour;
- for gentle slopes the 1m contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of existing and proposed linear activity and substation sites;
- locality map shows and identifies (if possible) public and access roads; and

The layout plan

- The layout plan must be printed in colour and overlaid with a sensitivity map;
- The layout plan must be printed on A4 size paper size and be 1:8000 scale;
- layout plan must show the position of services, electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, storm water infrastructure and existing telecommunication infrastructure (where possible);

F. EMPr

EMPr must be included in the final report and must be practical, site specific and easily enforceable.

G. Public participation process

- Relevant sections of City of Tshwane Section must be given an opportunity to comment on the final BA Report.
- Department of water affairs and sanitation must be consulted so as to provide comments for activities that will take place within watercourses and those comments submitted within the final report and incorporated into the EMPr.
- All wayleave permits must be sought for the proposed activities preferably prior to the activity taking place and proof and comments included in the final report.

If you have any queries regarding the contents of this letter, please contact the official of the Department at the number or email address indicated above.

Yours faithfully

Mr. T. Leku
Acting Director: Impact Management
Date: 30/6/2017

juanita@bokamoso.net

From: Mary-Lee van Zyl <marylee@bokamoso.net>
Sent: 26 June 2017 02:46 PM
To: juanita@bokamoso.net
Subject: FW: DRAFT BASIC ASSESSMENT REPORT FOR THE RIVERWALK ELECTRICAL IN THE CITY OF TSHWANE
Attachments: scan0003.pdf

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Landscape Architects & Environmental Consultants cc
T: (+27)12 346 3810 l F: (+27) 86 570 5659 l E: reception@bokamoso.net l www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria l P.O. Box 11375 Maroelana 0161 Please consider the environment before printing this email

-----Original Message-----
From: Bokamoso [mailto:reception@bokamoso.net]
Sent: Monday, June 26, 2017 2:42 PM
To: marylee@bokamoso.net; lizelle
Cc: info
Subject: FW: DRAFT BASIC ASSESSMENT REPORT FOR THE RIVERWALK ELECTRICAL IN THE CITY OF TSHWANE

-----Original Message-----
From: Rudzani Mukheli [mailto:RudzaniM@TSHWANE.GOV.ZA]
Sent: 26 June 2017 02:35 PM
To: lizelleg@mweb.co.za
Cc: MOTAUNG, DAN (GDARD) (Dan.Motaung@gauteng.gov.za); KHAKA, KHAKA (GDARD) <KHAKA.KHAKA@gauteng.gov.za> (KHAKA.KHAKA@gauteng.gov.za); MATLAMELA, PHUTI (GDARD) (Phuti.Matlamela@gauteng.gov.za); Kemmone Mofela
Subject: DRAFT BASIC ASSESSMENT REPORT FOR THE RIVERWALK ELECTRICAL IN THE CITY OF TSHWANE

Good day

Please receive our comments on the abovementioned application.

Regards

_____

CITY OF TSHWANE
IGNITING EXCELLENCE

Environment and Agriculture Management Department

Room CP 83 | Ground Floor, Block A | Tshwane House Building | 320 Madiba Street | Pretoria | 0002
PO Box 1454 | Pretoria | 0001
Tel: 012 358 2449 / 012 358 1351 | Fax: 012 358 4999
Email: mthobelik@tshwane.gov.za | www.tshwane.gov.za | www.facebook.com/CityOf Tshwane

My ref:	8/4/R/6	Tel:	012 358 7334
Your ref:		Fax:	012 358 8934
Contact person:	K. Mofela	Email:	KemmoneM@tshwane.gov.za
Section:	Enviromental Planning & Open Space Management Section	Date:	23 June 2017

Bokamoso Landscape Architects & Environmental Consultants (Pty) Ltd
P O Box 11375
Maroelana
0161

Attention: Lizette Gregory
Tel: (012) 346 3810
Fax: 086 570 5659
E-mail: lizelleg@mweb.co.za

Dear Madam,

DRAFT BASIC ASSESSMENT REPORT FOR THE RIVERWALK ELECTRICAL IN THE CITY OF TSHWANE, GAUTENG

Your Report dated May 2017 refers,

1. INTRODUCTION

The Environment and Agriculture Management Department (the Department) has considered the Draft Basic Assessment Report in respect of the above-mentioned application. The Draft Basic Assessment Report is submitted to the Environment and Agriculture Management Department of the City of Tshwane, hereafter referred to as "the City", as a commenting authority in terms of the National Environmental Management Act (NEMA) and EIA Regulations of August 2014.

2. PROJECT LOCATION AND DESCRIPTION

Bokamoso Landscape Architects & Environmental Consultants (Pty) Ltd has been appointed by the Balwin Properties Limited as an independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for the proposed Riverwalk electrical line that will run from the existing Hatherley substation to the Riverwalk development within the road reserves of Solomon mahlangu drive and road R104/M22 (Bronkhorstspruit road). The proposed electrical line will cross along road R104/M22 and Solomon Mahlangu Drive. The Solomon Mahlangu Drive crossing Bronskhorstspruit crossing is approximately 600m north of the R104 and M10 intersection and approximately 650m east of the R104 and M10, respectively.

The threshold of the proposed powerline is 11kV and thus does not trigger a listed activity 11 in Listing Notice 1 under the Amended 2014 NEMA EIA regulations. However, the proposed underground electrical line will traverse 2 watercourses namely Pienaars River as well as wetland under a culvert. The proposed development entails the installation of five (5) underground electrical lines, 1.0m deep x by 1.5m wide trenches for cables as well as drilling/pipe jacking methods through the watercourse.

The activity triggers listed activity in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Assessment Regulation, 2014 under

Listing Notice 1 GN 983 **Activity** 12, 19, 48
Listing Notice 3 GN 985 **Activity** 12, 14, 23

3. DISCUSSION

In reviewing the application the Department made the following findings:

a) According to the Tshwane Open Space Framework the proposed site is situated within and in close proximity to the following open space typologies:
   - A **Blue Way**, namely Pienaars River. A **Blue Node**, namely channelled valley bottom wetlands associated with Pienaars River Blue ways are the most important elements in the provisioning of environmental goods and services, the protection of biodiversity, endangered species and ecological systems as well as eco-based activity. Blue Nodes have a secondary socio-economic function. Blue ways and nodes must therefore be conserved.

b) The majority of the proposed electrical line is planned on the already disturbed road reserve. The report indicates that the proposed underground electrical line will traverse the Pienaars River as well as a wetland formed around the culvert. The two Orange and Red data plant species known to occur in the region was not observed at the proposed development site as indicated in the Vegetation Survey report.

c) The Wetland Delineation and Functional Assessment report scored the present ecological status of the Pienaars River as moderately modified (C) which is attributed to urbanisation impacts from the surrounding areas. The engineer and contractor are put liable for the potential remediation costs that will emanate from the construction activities as informed by the EMPr.

d) The vegetation specialist recommends the use of pipe-jacking method which will result in a minimal vegetation clearance beneath the river. The Department support the pipe-jacking but also request the watercourse Rehabilitation Plan aimed addressing the post-construction activities.

e) According to the GDARD C-Plan version 3, the northern edge of the proposed development site is situated within the **Important and Ecological Support Area**.

f) According to the Bioregional Plan for the Gauteng Metropolitan Municipalities the proposed site is situated within the following areas:
   - **Critical Biodiversity Areas 1 & 2:** The proposed development is situated within the Critical Biodiversity Area 1 and Critical Biodiversity Area 2. Critical Biodiversity Area, in relation to the class 3 ridge, implies that the area is either natural or near natural terrestrial or aquatic as well as have some cultivated landscapes required to meet biodiversity pattern and/or thresholds. Critical Biodiversity Area One must obtain formal conservation protection where possible to avoid net loss of intact habitat or intensification of land-use.
   - **Ecological Sensitivity Area (ESA) 1. & 2.** Supporting zone required to prevent degradation of Critical Biodiversity Areas and Protected Areas. These include remaining corridor, catchment, wetland and other process areas that are required to prevent degradation of Critical Biodiversity Areas and formal Protected Areas; and areas which would otherwise have been identified as Critical Biodiversity Areas except that have been transformed or degraded, but which are currently or potentially still important for supporting ecological processes e.g. floodplain areas that have transformed or degraded. These areas are a focus for rehabilitation rather than the intensification of land uses.

g) The report indicates that the proposed development will take place within the existing road reserve which is already transformed. Therefore, proposed development within the transformed road reserve does not conflict with the Bioregional Plan's conservation objectives.

h) The report indicates that the proposed 300m length of the electrical line triggers a Heritage Impact Study which was not conducted due to the disturbed nature of the receiving environment. An exemption letter was submitted to Provincial heritage Resources Authority Gauteng (PHRAG) for approval. In light of the above, the Department awaits the response from PHRAG wherein final decision will be based.

i) The report indicates that the proposed electrical line is planned on the reserve of the provincial road R104/K22. The associated wayleave application on Solomon Mahlangu is yet to be lodged with the relevant authority. Associated comments from the City of Tshwane Roads and Stormwater are not included in the report.

j) According to the Tshwane GIS, the proposed development crosses the proposed Rand water servitude. However, associated comments are not included in the report. The Department request that the associated consent should be sought from Rand Water.

k) According to the Gauteng Environmental Management Framework (GEMF), the proposed development site is located with the Zone 1: Urban development zone which is streamlined to allow development and to avoid urban sprawl. The proposed development is thus aligned to the GEMF's objectives.

4. RECOMMENDATIONS

In light of the above, the Department request the following to be addressed

a) Consent regarding connection to the substation in terms of capacity and type of cables to be used should be sought from the City of Tshwane Utilities department and included in the Final Basic Assessment report.

b) Consent regarding development within the road reserve should be sought from the City of Tshwane Roads & Transport and Gauteng Department of Roads and Transport.

c) A detailed Wetland Rehabilitation Plan should be compiled and included in the Final Basic Assessment report.

5. CONCLUSION

The Department will provide final comments upon the receipt of the Final Basic Assessment report addressing the above-mentioned recommendations.

Yours faithfully,

..... 23/06/2017.....

Mr Aluoneswi Mafunzwaini **Date:**
EXECUTIVE DIRECTOR: ENVIRONMENTAL MANAGEMENT AND PARKS DIVISION
Letter signed by: Rudzani Mukheli
Designation: Director: Environmental Planning & Open Space Management

CC Gauteng Department of Agriculture and Rural Development Attn: Mr. Steven Mukhola Tel: (011) 240 2572 Fax: (011) 240 2700

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 26 January 2017 01:56 PM
To: RudzaniM; 'kemmonem@tshwane.gov.za'; 'tshinyadzom@tshwane.gov.za'; 'jgrobler@geoscience.org.za'; msebesho; 'asalomon@sahra.org.za'; 'keetm@dwaf.gov.za'; 'Siwelane Lilian (GAU)'; 'tshifaror@dwa.gov.za'; 'mathebet@dwa.gov.za'; 'paia@eskom.co.za'; 'central@eskom.co.za'; kumen govender; nkoneigh; mmpshe; 'loveous.tampane@transnet.net'; PhyllystasM; CLCC; magezi.mhlanga@drdlr.gov.za; dgoffice@drdlr.gov.za; Fhulufhedzan Rasimphi (Fhulufhedzan.Rasimphi@drdlr.gov.za); 'botav@nra.co.za'; 'degoede@mweb.co.za'; 'mike@ward101.co.za'
Subject: Riverwalk Electrical - Public Participation Process
Attachments: Riverwalk Electrical - Public Notice.pdf; image001.jpg

Dear Interested and/or Affected Parties,

Please refer to the attached Public Notice regarding the proposed ***electrical line that will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22. The proposed line will cross along the R104/K22 (Bronkhorstspruit Road) and the Solomon Mahlangu Drive. The Solomon Mahlangu Drive crossing is approximately 600m north of the R104 and M10 intersection and the Bronkhorstspruit crossing is approximately 650m east of the R104 and M10 intersection*** Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 02 February 2017 10:30 AM
To: 'RudzaniM@tshwane.gov.za'; 'kemmonem@tshwane.gov.za'; tshinyadzom@tshwane.gov.za
Subject: Riverwalk - Electricity - Public Participation Process
Attachments: Riverwalk Electrical - Public Notice.pdf; Riverwalk Electrical - Landowner Tenants Letter.pdf; image001.jpg

Dear City of Tshwane,

Please refer to the attached Public Notice and Landowner & Tenant Letter regarding the proposed ***electrical line that will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22*** Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 02 February 2017 08:41 AM
To: 'Simon@bridgehead.co.za'
Subject: Riverwalk - Electricial - Portion 243 Zwartkoppies 364 JR
Attachments: doc00765720170202064122.pdf; image001.jpg

Dear Simon,

Your telephonic conversation with Anè refers.

Please refer to the attached Aerial Map where Portion 243 of the Farm Zwartkoppies 364 JR is circled in black.

We would like to know whether you have any information on the owner of Portion 243 of the farm Zwartkoppies that is adjacent to your portion (241). We just want to send them a notice as part of our public participation process but we have no name or contact information. We have done Windeed searches and contacted the town planners and no one is able to provide us with any information.

Bokamoso Environmental will appreciate your assistance in this regard.

Thank you.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 01 February 2017 12:10 PM
To: 'mario@masters.co.za'
Subject: Riverwalk - Electrical - Public Participation Process
Attachments: Riverwalk Electrical - Public Notice.pdf; image001.jpg; Riverwalk Electrical - Landowner Tenants Letter.pdf

Dear Mario Pretorius (Snowy Owl 90 (Pty) Ltd),

Please refer to the attached Public Notice and Landowner & Tenant Letter for the proposed ***electrical line that will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22*** Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 01 February 2017 12:03 PM
To: 'robyn.haddon@telkomsa.net'
Subject: Riverwalk - Electrical - Public Participation Process
Attachments: Riverwalk Electrical - Public Notice.pdf; image001.jpg; Riverwalk Electrical - Landowner Tenants Letter.pdf

Dear Living 4U Development (Pty) Ltd,

Please refer to the attached Public Notice and Landowner & Tenant Letter for the proposed ***electrical line that will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22*** Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 01 February 2017 12:03 PM
To: 'robyn.haddon@telkomsa.net'
Subject: Riverwalk - Electrical - Public Participation Process
Attachments: Riverwalk Electrical - Public Notice.pdf; image001.jpg; Riverwalk Electrical - Landowner Tenants Letter.pdf

Dear Living 4U Development (Pty) Ltd,

Please refer to the attached Public Notice and Landowner & Tenant Letter for the proposed ***electrical line that will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22*** Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 01 February 2017 12:03 PM
To: 'robyn.haddon@telkomsa.net'
Subject: Riverwalk - Electrical - Public Participation Process
Attachments: Riverwalk Electrical - Public Notice.pdf; image001.jpg; Riverwalk Electrical - Landowner Tenants Letter.pdf

Dear Living 4U Development (Pty) Ltd,

Please refer to the attached Public Notice and Landowner & Tenant Letter for the proposed ***electrical line that will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22*** Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

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Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: Mary-Lee van Zyl <marylee@bokamoso.net>
Sent: 01 June 2017 08:34 AM
To: mike58strange@gmail.com
Cc: 'info'; juanita@bokamoso.net
Subject: RE: Riverwalk Electrical - Review Notice
Attachments: image002.jpg; image003.jpg

Follow Up Flag: Follow up
Flag Status: Flagged

Good day Mike,

You will see in the report on Figure 1 it shows the alignment in red. The areas in yellow are areas that trigger an environmental authorisation application and what we therefore applied for. It will be underground cables.

Trust you will find this in order. Do not hesitate to contact us should you have any other questions.

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Landscape Architects & Environmental Consultants cc
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: reception@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Mike Strange [mailto:mike58strange@gmail.com]
Sent: 31 May 2017 08:03 PM
To: juanita@bokamoso.net
Subject: Re: Riverwalk Electrical - Review Notice

Thanks Juanita.
Quick question. Are the cables in the area marked in yellow on the map at the river crossing 11kva and are they below or above ground?
Regards
Mike Strange
076 701 5286

On 31 May 2017 8:48 AM, <juanita@bokamoso.net> wrote:

Dear Interested and/or Affected Parties,

Please refer to the attached Review Notice for the Draft Basic Assessment Report regarding the proposed ***Riverwalk Electrical*** Project.

A period of 30 days will be allowed for review and comments on the Draft Basic Assessment Report for the proposed Riverwalk Electrical from ***31 May 2017 – 3 July 2017***.

Your comments should be sent directly to our office at Bokamoso Attention: Mary-Lee van Zyl or Juanita De Beer (reception@bokamoso.net or fax: 086 570 5659).

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects & Environmental Consultants

T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net

36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

juanita@bokamoso.net

From: Mary-Lee van Zyl <marylee@bokamoso.net>
Sent: 20 June 2017 08:26 AM
To: 'Kemmone Mofela'
Cc: info@bokamoso.net; juanita@bokamoso.net
Subject: RE: request for shapefile of Riverwalk electrical line
Attachments: image004.jpg; image007.jpg; image009.jpg; image010.png; image012.png; image013.png; image014.jpg; image015.png; Riverwalk Electrical Line.shp; Riverwalk Electrical Line.shx; Wetland Stream Crossings.cpg; Wetland Stream Crossings.dbf; Wetland Stream Crossings.prj; Wetland Stream Crossings.qpj; Wetland Stream Crossings.shp; Wetland Stream Crossings.shx; Riverwalk Electrical Line.cpg; Riverwalk Electrical Line.dbf; Riverwalk Electrical Line.prj; Riverwalk Electrical Line.qpj

Dear Kemmone,

Please find attached the shapefile for the wetland crossings that trigger an environmental application. You also requested the shapefile for the electrical line alignment.

Trust you will find this in order.

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Bokamoso **Landscape Architects & Environmental Consultants cc**
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: reception@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Kemmone Mofela [mailto:KemmoneM@TSHWANE.GOV.ZA]
Sent: Monday, June 19, 2017 12:29 PM
To: marylee@bokamoso.net
Cc: info@bokamoso.net; juanita@bokamoso.net
Subject: RE: request for shapefile of Riverwalk electrical line

Good day

Noted, however we still request to see the shapefile of the entire line .

Kindly share the shapefile of the entire electrical line along with the submitted wetland crossing .

Kindly take us through the process of converting .kml to .shp or alternatively send the .shp format

Regards,

Kemmone Mofela
Environmental Impact Management

Environmental and Agriculture Management (EAM) Department

Tel: 012 358 7334 | Fax: 086 673 2162 | Email: KemmoneM@tshwane.gov.za

From: Mary-Lee van Zyl [mailto:marylee@bokamoso.net]
Sent: Monday, 19 June 2017 12:22 PM
To: Kemmone Mofela <KemmoneM@TSHWANE.GOV.ZA>
Cc: info@bokamoso.net; juanita@bokamoso.net
Subject: RE: request for shapefile of Riverwalk electrical line

Dear Kommene,

Please find attached the kml file for the two crossings that trigger an environmental application. The electrical line itself does not trigger an activity, this was explained in the report.

We trust this will be in order.

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Bokamoso Landscape Architects & Environmental Consultants cc
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: reception@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Kemmone Mofela [mailto:KemmoneM@TSHWANE.GOV.ZA]
Sent: Monday, June 19, 2017 12:09 PM
To: bokamoso10@gmail.com; juanita@bokamoso.net; marylee@bokamoso.net
Subject: request for shapefile of Riverwalk electrical line

Good day

We are currently reviewing the DBA for the proposed Riverwalk electrical line.

Kindly share with us the shapefile of the proposed Riverwalk powerline to superimpose over the environmental sensitivities

Regards,

Kemmone Mofela
Environmental Impact Management

Environmental and Agriculture Management (EAM) Department
| Ground Floor, Block A | Tshwane House Building | 320 Madiba Street |Pretoria | PO Box 1454| 0001
| www.tshwane.gov.za|www.facebook.com/CityOfTshwane

Tel: 012 358 7334 | Fax: 086 673 2162 | Email: KemmoneM@tshwane.gov.za

http://www.tshwane.gov.za/Pages/Email_disclaimer.aspx

juanita@bokamoso.net

From: Mary-Lee van Zyl <marylee@bokamoso.net>
Sent: 19 June 2017 01:14 PM
To: 'Kemmone Mofela'
Cc: info@bokamoso.net; juanita@bokamoso.net
Subject: RE: request for shapefile of Riverwalk electrical line
Attachments: image004.jpg; image007.jpg; image009.jpg; image010.png; image012.png; image013.png; image014.jpg; image015.png

Dear Kemmone,

I will try and convert it for you to shapefiles and send it to you as soon as possible.

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Bokamoso **Landscape Architects & Environmental Consultants cc**
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: reception@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Kemmone Mofela [mailto:KemmoneM@TSHWANE.GOV.ZA]
Sent: Monday, June 19, 2017 12:29 PM
To: marylee@bokamoso.net
Cc: info@bokamoso.net; juanita@bokamoso.net
Subject: RE: request for shapefile of Riverwalk electrical line

Good day

Noted, however we still request to see the shapefile of the entire line .

Kindly share the shapefile of the entire electrical line along with the submitted wetland crossing .

Kindly take us through the process of converting .kml to .shp or alternatively send the .shp format

Regards,

CITY OF TSHWANE
IGNITING EXCELLENCE

Kemmone Mofela
Environmental Impact Management

Environmental and Agriculture Management (EAM) Department

Tel: 012 358 7334 | Fax: 086 673 2162 | Email: KemmoneM@tshwane.gov.za

From: Mary-Lee van Zyl [mailto:marylee@bokamoso.net]
Sent: Monday, 19 June 2017 12:22 PM
To: Kemmone Mofela <KemmoneM@TSHWANE.GOV.ZA>
Cc: info@bokamoso.net; juanita@bokamoso.net
Subject: RE: request for shapefile of Riverwalk electrical line

Dear Kommene,

Please find attached the kml file for the two crossings that trigger an environmental application. The electrical line itself does not trigger an activity, this was explained in the report.

We trust this will be in order.

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Landscape Architects & Environmental Consultants cc
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: reception@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Kemmone Mofela [mailto:KemmoneM@TSHWANE.GOV.ZA]
Sent: Monday, June 19, 2017 12:09 PM
To: bokamoso10@gmail.com; juanita@bokamoso.net; marylee@bokamoso.net
Subject: request for shapefile of Riverwalk electrical line

Good day

We are currently reviewing the DBA for the proposed Riverwalk electrical line.

Kindly share with us the shapefile of the proposed Riverwalk powerline to superimpose over the environmental sensitivities

Regards,

Kemmone Mofela
Environmental Impact Management

Environmental and Agriculture Management (EAM) Department
| Ground Floor, Block A | Tshwane House Building | 320 Madiba Street |Pretoria | PO Box 1454| 0001
| www.tshwane.gov.za|www.facebook.com/CityOfTshwane

Tel: 012 358 7334 | Fax: 086 673 2162 | Email: KemmoneM@tshwane.gov.za

---

http://www.tshwane.gov.za/Pages/Email_disclaimer.aspx

juanita@bokamoso.net

From: Mary-Lee van Zyl <marylee@bokamoso.net>
Sent: 19 June 2017 12:22 PM
To: 'Kemmone Mofela'
Cc: info@bokamoso.net; juanita@bokamoso.net
Subject: RE: request for shapefile of Riverwalk electrical line
Attachments: image006.jpg; image007.jpg; image009.png; image011.png; image001.jpg; image002.png; Wetland Stream Crossings.kml

Dear Kommene,

Please find attached the kml file for the two crossings that trigger an environmental application. The electrical line itself does not trigger an activity, this was explained in the report.

We trust this will be in order.

Vriendelike Groete/ Kind Regards,

Mary-Lee van Zyl
Senior Environmental Assessment Practitioner

Bokamoso Landscape Architects & Environmental Consultants cc
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: reception@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Kemmone Mofela [mailto:KemmoneM@TSHWANE.GOV.ZA]
Sent: Monday, June 19, 2017 12:09 PM
To: bokamoso10@gmail.com; juanita@bokamoso.net; marylee@bokamoso.net
Subject: request for shapefile of Riverwalk electrical line

Good day

We are currently reviewing the DBA for the proposed Riverwalk electrical line.

Kindly share with us the shapefile of the proposed Riverwalk powerline to superimpose over the environmental sensitivities

Regards,

CITY OF TSHWANE
IGNITING EXCELLENCE

Kemmone Mofela
Environmental Impact Management

Environmental and Agriculture Management (EAM) Department
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| www.tshwane.gov.za|www.facebook.com/CityOfTshwane

Tel: 012 358 7334 | Fax: 086 673 2162 | Email: KemmoneM@tshwane.gov.za

---

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 19 June 2017 12:16 PM
To: Kemmone Mofela
Subject: RE: request for shapefile of Riverwalk electrical line
Attachments: Riverwalk Electrical Line.kml; image006.jpg; image007.jpg; image008.jpg; image009.png; image010.png; image011.png

Dear Kemmone Mofela,

Thank you for your response, please refer to the attached kml file as requested.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects & Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Kemmone Mofela [mailto:KemmoneM@TSHWANE.GOV.ZA]
Sent: 19 June 2017 12:09 PM
To: bokamoso10@gmail.com; juanita@bokamoso.net; marylee@bokamoso.net
Subject: request for shapefile of Riverwalk electrical line

Good day

We are currently reviewing the DBA for the proposed Riverwalk electrical line.

Kindly share with us the shapefile of the proposed Riverwalk powerline to superimpose over the environmental sensitivities

Regards,

Kemmone Mofela

Environmental Impact Management

Environmental and Agriculture Management (EAM) Department
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| www.tshwane.gov.za|www.facebook.com/CityOfTshwane

Tel: 012 358 7334 | Fax: 086 673 2162 | Email: KemmoneM@tshwane.gov.za

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 30 January 2017 09:27 AM
To: AntonMa
Cc: PhyllystasM
Subject: RE: Registration
Attachments: image001.jpg; image002.png; image004.jpg

Dear Anton Maluka,

Thank you for your response, Bokamoso Environmental registered you as an Interested and/or Affected Party for the proposed **electrical line that will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22** Project.

Bokamoso Environmental will keep you updated regarding the process in the future.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: AntonMa [mailto:AntonMa@daff.gov.za]
Sent: 30 January 2017 09:22 AM
To: juanita@bokamoso.net
Cc: PhyllystasM
Subject: RE: Registration

River walk Development

From: juanita@bokamoso.net [mailto:juanita@bokamoso.net]
Sent: 30 January 2017 09:05 AM
To: AntonMa
Cc: PhyllystasM
Subject: RE: Registration

Dear Anton Maluka,

Thank you for your response, can you please refer to the Project Name due to the huge amount of projects.

Bokamoso Environmental would appreciate your response in this regard.

Thank you.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects &
Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: AntonMa [mailto:AntonMa@daff.gov.za]
Sent: 30 January 2017 08:36 AM
To: juanita@bokamoso.net
Cc: PhyllystasM
Subject: Registration

Morning Juanita

I hereby register as an Interested and Affected Party, in terms of Regulation 8 of Conservation of Agricultural Resources Act, 1983 (Act no. 43 of 1983) (CARA).

Regards,

Anthon Maluka

Resource Auditor

agriculture, forestry & fisheries
Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

Directorate: Land Use and Soil Management
Department of Agriculture, Forestry and Fisheries

Tel: 012 319 7560
Fax: 012 319 5938
Web: www.daff.gov.za
E-mail: AntonMa@daff.gov.za

juanita@bokamoso.net

From: juanita@bokamoso.net
Sent: 14 June 2017 08:39 AM
To: Natalie Koneight
Subject: RE: Registering as I&AP: Riverwalk Electrical
Attachments: image001.jpg; image007.jpg; image008.png; image009.png; image010.png; image011.png; image012.png

Dear Natalie Koneight,

Thank you for your response, Bokamoso Environmental registered Rand Water as an Interested and/or Affected Party for the proposed ***Riverwalk Electrical*** Project.

Bokamoso Environmental noted your comments on our Issues and Comments Register and will keep you updated regarding the process in the future.

Kind Regards/Vriendelike Groete

Juanita De Beer

Senior Public Participation Consultant & EAP in training

Landscape Architects & Environmental Consultants
T: (+27)12 346 3810 I F: (+27) 86 570 5659 I E: juanita@bokamoso.net I www.bokamoso.net
36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

From: Natalie Koneight [mailto:nkoneigh@randwater.co.za]
Sent: 14 June 2017 08:14 AM
To: juanita@bokamoso.net
Subject: Registering as I&AP: Riverwalk Electrical

Dear Sir/Madam

Rand Water is hereby registering as IAP for the above-mentioned project.
Kindly forward confirmation of registration as IAP to Natalie Koneight at nkoneigh@randwater.co.za
Attached is Rand Water's Wayleaves, for your information.

Can you please provide Rand Water with the following:
1. **The shapefiles for the infrastructure proposed as well as road connections/access roads.**
2. Coordinates of the development;
3. A layout plan for the development including development footprint;
4. Specialist studies being undertaken;
5. Confirmation as to whether wayleaves will be required, from Rand Water
6. The detail about the facility that will receive the sewerage.
7. An agreement that the identified sewerage facility is aware of the development and that they have the capacity to accept the sewerage from the site without overloading the facility. Will there be any discharges other than the sewerage system that will increase storm water entering the environment. If so, has the development considered retention and stilling ponds to slow down high peak flows. If the sewerage facility cannot accept the additional load into their facility then this will have a negative impact on the environment and the pollution load into the river systems.

Minimum requirements for shapefiles (spatial data)
The shapefile must be in the geographic (decimal degrees) coordinate system in the WGS84 datum, in other words, not projected e.g. to Transverse Mercator.
It is essential that the shapefile contain at least the following three files having the same prefix, but different extensions:
· .shp – the file that stores the feature geometry (or the shape of the feature).
· .shx – the file that stores the index of the feature geometry.
· .dbf – the dBASE file that stores the attribute information of features.
When shapefiles are created using ESRI's ArcGIS software, a file with the following extension must also be included:
· .prj – the file that stores the coordinate system information. (Check the shapefile's properties and make sure that the coordinate system is set to geographic, WGS84).
Optional extensions to include may be any of the following:
· .xml – the file that stores metadata (information about the data).
· .sbn and .sbx – the files that store the spatial index of the features.
· .fbn and .fbx – the files that store the spatial index of the features for shapefiles that are read-only.
· .ain and .aih – the files that store the attribute index of the active fields in a table or a theme's attribute table.
The collection of files should be treated as one file and should never be separated, or else the shapefile will be rendered unusable.
NB: Please note that a file with any of the following extensions is not a shapefile: .apr, .aep, .axl, .mxd.
These are examples of map documents (commonly referred to as project files) created by different ESRI GIS software. Map document files only contain references to data stored on your hard disk and do not contain the data physically. Such a file cannot be opened without the accompanying shapefiles.

Regards

Name: Natalie
Surname: Koneight
Position: Secretary - Nursery-CD
Tel: 011 724 9366
Fax: (011) 900-2108
Email: nkoneigh@randwater.co.za
Web: **Rand Water Home Page**

Riverwalk Electrical

Our Ref: 10610

an agency of the
Department of Arts and Culture

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South African Heritage Resources Agency | 111 Harrington Street | Cape Town
P.O. Box 4637 | Cape Town | 8001
www.sahra.org.za

Enquiries: Andrew Salomon
Tel: 021 462 4502
Email: asalomon@sahra.org.za
CaseID: 10610

Letter

In terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999)

Attention: Balwin Properties Limited

The proposed electrical line will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22. The proposed line will cross along the R104/K22 (Bronkhorstspruit Road) and the Solomon Mahlangu Drive. The Solomon Mahlangu Drive crossing is approximately 600m north of the R104 and M10 intersection and the Bronkhorstspruit crossing is approximately 650m east of the R104 and M10 intersection.

Thank you for your notification regarding this development.

In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that prior to development it is incumbent on the developer to ensure that a **Heritage Impact Assessment** is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.

The quickest process to follow for the archaeological component is to contract an accredited specialist (see the web site of the Association of Southern African Professional Archaeologists www.asapa.org.za) to provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any large development takes place.

The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites.

Where bedrock is to be affected, or where there are coastal sediments, or marine or river terraces and in potentially fossiliferous superficial deposits, a Palaeontological Desk Top study must be undertaken to assess whether or not the development will impact upon palaeontological resources - or at least a letter of exemption from a Palaeontologist is needed to indicate that this is unnecessary. If the area is deemed sensitive, a full

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Phase 1 Palaeontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary. **Please note that a nationwide fossil sensitivity map is now available on SAHRIS to assist with determining the fossil sensitivity of a study area .**

If the property is very small or disturbed and there is no significant site the heritage specialist may choose to send a letter to the heritage authority motivating for exemption from having to undertake further heritage assessments.

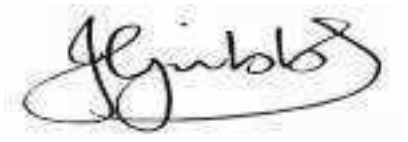
Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewscapes must also be assessed.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully

_____

Andrew Salomon
Heritage Officer: Archaeology
South African Heritage Resources Agency



_____

John Gribble
Manager: Maritime and Underwater Cultural Heritage Unit / Acting Manager: Archaeology, Palaeontology and Meteorites Unit
South African Heritage Resources Agency

Riverwalk Electrical

Our Ref: 10610

an agency of the
Department of Arts and Culture

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Enquiries: Andrew Salomon
Tel: 021 462 4502
Email: asalomon@sahra.org.za
CaseID: 10610

Date: Wednesday February 22, 2017

ADMIN:
Direct URL to case: http://www.sahra.org.za/node/385335
(GDARD, Ref:)

Terms & Conditions:

1. This approval does not exonerate the applicant from obtaining local authority approval or any other necessary approval for proposed work.
2. If any heritage resources, including graves or human remains, are encountered they must be reported to SAHRA immediately.
3. SAHRA reserves the right to request additional information as required.

Minutes of Any Public and/or Stakeholders Meetings

(Not available)

Appendix E5

Comments and Responses Report

Appendix E6

COMMENT AND RESPONSE REPORT-
FOR THE PROPOSED ELECTRICAL LINE THAT WILL RUN FROM THE HATHERLY SUBSTATION TO THE RIVERWALK DEVELOPMENT WITHIN THE ROAD RESERVES OF SOLOMON MAHLANGU DRIVE AND THE R104/K22

Issue	Commentator	Response
I hereby register as an Interested and Affected Party, in terms of Regulation 8 of Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)(CARA).	Anthon Maluka **Department of Agriculture, Forestry and Fisheries** AntonMa@daff.gov.za 30 January 2017	Thank you for your response, Bokamoso Environmental registered you as an Interested and/or Affected Party for the proposed electrical line that will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22 Project. Bokamoso Environmental will keep you updated regarding the process in the future.
Telephonic conversation to confirm who is the landowner of Portion 243 of the Farm Zwartkoppies 364 JR.	Simon Thirsk simon@bridgehead.co.za 2 February 2017	Your telephonic conversation with Anè Agenbacht refers. Please refer to the attached Aerial Map where Portion 243 of the Farm Zwartkoppies 364 JR is circled in black. We would like to know whether you have any information on the owner of Portion 243 of the farm Zwartkoppies that is adjacent to your portion (241). We just want to send them a notice as part of our public participation process but we have no name or contact information. We have done Windeed Searches and contacted the town planners and no one is able to provide us with any information.

		Bokamoso Environmental will appreciate your assistance in this regard.
John Carstens is the owner.		Bokamoso Environmental notified John Carstens this morning. We do appreciate your quick assistance.
Apologies, I could not see the small plan on my iPhone. I have no objection whatsoever to Balwin installing the electrical infrastructure. Balwin should be commended for their pro-active approach and their bold investment strategy.	John Carstens John.carstens@otagoinventments.com 2 February 2017	Noted. Thank you.
Thank you for your notification regarding this development. In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that prior to development it is incumbent on the developer to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required. The quickest process to follow for the archaeological component is to contract an accredited specialist (see the website of the Association of Southern African Professional Archaeologists www.asapa.org.za) to provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any large development takes place. The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the	Andrew Salomon asalomon@sahra.org.za **Sahra** 22 February 2017	A heritage specialist was consulted and due to the location of the proposed electrical line an exemption letter was written. Please refer to Appendix G for this letter.

process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites. Where bedrock is to be affected, or where there are coastal sediments, or marine or river terraces and in potentially fossiliferous superficial deposits, a Palaeontological Desk Top study must be undertaken to assess whether or not the development will impact upon palaeontological resources – or at least a letter of exemption from a Palaeontologist is needed to indicate that this is unnecessary. If the area is deemed sensitive, a full Phase 1 Palaeontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary. Please note that a nationwide fossil sensitivity map is now available on SAHRIS to assist with determining the fossil sensitivity of a study area. If the property is very small or disturbed and there is no significant site the heritage specialist may choose to send a letter to the heritage authority motivating for exemption from having to undertake heritage assessments. Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewscapes must also be assessed.		
Quick question. Are the cables in the area marked in yellow on the map at the river crossing 11kva and are they below or above ground?	Mike Strange Mike58strange@gmail.com 31 May 2017	You will see in the report on Figure 1 it shows the alignment in red. The areas in yellow are areas that trigger an environmental authorisation application and what we therefore applied for. It will be underground cables.
After DBAR Review Process		
Rand Water is hereby registering as IAP for the above-mentioned	Natalie Koneight	Thank you for your response, Bokamoso

project. Kindly forward confirmation of registration as IAP to Natalie Koneight at nkoneigh@randwater.co.za Attached is Rand Water's Wayleaves, for your information. Can you please provide Rand Water with the following: 1. The shapefiles for the infrastructure proposed as well as road connections/access roads. 2. Coordinates of the development; 3. A layout plan for the development including development footprint; 4. Specialist studies being undertaken; 5. Confirmation as to whether wayleaves will be required, from Rand Water; 6. The detail about the facility that will receive the sewerage. 7. An agreement that the identified sewerage facility is aware of the development and that they have the capacity to accept the sewerage from the site without overloading the facility. Will there be any discharges other than the sewerage system that will increase storm water entering the environment. If so, has the development considered retention and stilling ponds to slow down high peak flows. If the sewerage facility cannot accept the additional load into their facility then this will have a negative impact on the environment and the pollution load into the river systems.	nkoneigh@randwater.co.za **Rand Water** 14 June 2017	Environmental registered Rand Water as an Interested and/or Affected Party for the proposed Riverwalk Electricity Project. Please note that the information that was requested is not applicable as this is not a development, it is an electrical line for which only the water crossings are applied for in this application. Sewerage, water connection and access roads are therefore not applicable to this application. Coordinates, route design and specialist studies have been attached to Draft BA Report.
We are currently reviewing the DBA for the proposed Riverwalk electrical line. Kindly share us the shapefile of the proposed Riverwalk powerline to superimpose over the environmental sensitivities.	Kemmone Mofela KemmoneM@tshwane.gov.za **City of Tshwane** 19 June 2017	Thank you for your response, please refer to the attached kml file as requested. Please find attached the kml file for the two crossings that trigger an environmental application. The electrical line itself does not trigger an activity, this was explained in the report.
Noted, however we still request to see the shapefile of the entire line.		Please find attached the shapefile for the

Kindly share the shapefile of the entire electrical line along with the submitted wetland crossing. Kindly take us through the process of converting .kml to .shp or alternatively send the .shp format.		wetland crossings that trigger an environmental application. You also requested the shapefile for the electrical line alignment.
Your Report dated May 2017 refers. **1. Introduction** The Environment and Agriculture Management Department (the Department) has considered the Draft Basic Assessment Report in respect of the above-mentioned application. The Draft Basic Assessment report is submitted to the Environment and Agriculture Management Department of the City of Tshwane, hereafter referred to as "the City", as a commenting authority in terms of the National Environmental Management Act (NEMA) and EIA Regulations of August 2014. **2. Project location and description** Bokamoso Landscape Architects and Environmental Consultants has been appointed by the Balwin Properties Limited as an independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for the proposed Riverwalk electrical line that will run from the existing Hatherley substation to the Riverwalk development within the road reserves of Solomon Mahlangu drive and road R104/M22 (Bronkhorstspruit road). The proposed electrical line will cross along road R104/M22 and Solomon Mahlangu Drive. The Solomon Mahlangu Drive crossing Bronkhorstspruit crossing is approximately 600m north of the R104 and M10 intersection and approximately 650m east of the R104 and M10, respectively. The threshold of the proposed powerline is 11kV and thus does not trigger a listed activity 11 in Listing Notice 1 under the Amended 2014 NEMA EIA regulations. However, the proposed underground electrical line will traverse 2 watercourses namely Pienaars River as well as wetland under a culvert. The proposed development entails the installation of five (5) underground electrical lines, 1.0m deep x	Kemmone Mofela KemmoneM@tshwane.gov.za **City of Tshwane** 23 June 2017	Noted. Noted.

by 1.5m wide trenches for cables as well as drilling/pipe jacking methods through the watercourse. The activity triggers listed activity in terms of the National Environmental Management Act, 1998 (Act No, 107 of 1998) and Environmental Impact Assessment Regulations, 2014 under: Listing Notice 1 – GN 983 Activity 12, 19, 48 Listing Notice 3 – GN 985 Activity 12, 14, 23 **3. Discussion** In reviewing the application the Department made the following findings: a) According to the Tshwane Open Space Framework the proposed site is situated within and in close proximity to the following open space typologies: • A Blue Way, namely Pienaars River. A Blue Node, namely channeled valley bottom wetlands associated with Pienaars River Blue Ways are the most important elements in the provisioning of environmental goods and services, the protection of biodiversity, endangered species and ecological systems as well as eco-based activity. Blue Nodes have a secondary socio-economic function. Blue ways and nodes must therefore be conserved. b) The majority of the proposed electrical line is planned on the already disturbed road reserve. The report indicates that the proposed underground electrical line will traverse the Pienaars River as well as a wetland formed around the culvert. The two Orange and Red data plant species know to occur in the region was not observed at the proposed development site as indicated in the Vegetation Survey report. c) The Wetland Delineation and Functional Assessment report scored the present ecological status of the Pienaars River as moderately modified (C) which is attributed to urbanization impacts from the surrounding areas. The engineer and		Noted. Noted. Noted.

contractor are put liable for the potential remediation costs that will emanate from the construction activities as informed by the EMPr. d) The vegetation specialist recommends the use of pipe-jacking method which will result in a minimal vegetation clearance beneath the river. The Department support the pipe-jacking but also request the watercourse Rehabilitation Plan aimed addressing the post-construction activities. e) According to the GDARD C-Plan version 3, the northern edge of the proposed development site is situated within the Important and Ecological Support Area. f) According to the Bioregional Plan for Gauteng Metropolitan Municipalities the proposed site is situated within the following areas: • Critical Biodiversity Areas 1 & 2: The proposed development is situated within the Critical Biodiversity Area 1 and Critical Biodiversity Area 2. Critical Biodiversity Area, in relation to the class 3 ridge, implies that the area is either natural or near natural terrestrial or aquatic as well as have some cultivated landscapes required to meet biodiversity pattern and/or possible to avoid net loss of intact habitat or intensification of land-use. • Ecological Sensitivity Area (ESA) 1 & 2. Supporting zone required to prevent degradation of Critical Biodiversity Areas and Protected Areas. These include remaining corridor catchment, wetland and other process areas that are required to prevent degradation of Critical Biodiversity Areas and formal Protected Areas; and areas which would otherwise have been identified as Critical Biodiversity Areas except that have been transformed or degraded, but which are currently or potentially still important for supporting ecological processes e.g. floodplain areas that have transformed or degraded. These areas are a focus for rehabilitation rather than the intensification of land uses.		A Wetland Rehabilitation Plan has been added to the Final BA Report. Noted. Noted.

g) The report indicates that the proposed development will take place within the existing road reserve which is already transformed. Therefore, proposed development within the transformed road reserve does not conflict with the Bioregional Plan's conservation objectives.		Noted.
h) The report indicates that the proposed 300m length of the electrical line triggers a Heritage Impact Study which was not conducted due to the disturbed nature of the receiving environment. An exemption letter was submitted to Provincial heritage Resources Authority Gauteng (PHRAG) for approval. In light of the above, the Department awaits the response from PHRAG wherein final decision will be based.		The Draft and Final BA Report is/has been made available to PHRAG for comments.
i) The report indicates that the proposed electrical line is planned on the reserve of the provincial road R104/K22. The associated wayleave application on Solomon Mahlangu is yet to be lodged with the relevant authority. Associated comments from the City of Tshwane Roads and Stormwater are not included in the report.		The wayleave approvals have been obtained.
j) According to the Tshwane GIS, the proposed development crosses the proposed Rand Water servitude. However, associated consent should be sought from Rand Water.		The proposed electrical do not trigger the Rand Water servitude. Please refer to Appendix L for this letter together with the wayleave consents.
k) According to the Gauteng Environmental Management Framework (GEMF), the proposed development site is located with the Zone 1: Urban development zone which is streamlined to allow development and to avoid urban sprawl. The proposed development is thus aligned to the GEMF's objectives.		Noted.
4. Recommendations In light of the above, the Department request the following to be addressed.		
a) Consent regarding connection to the substation in terms of capacity and type of cables to be used should be sought from the City of Tshwane Utilities department and included in		This has been attached to Appendix L

the Final Basic Assessment report. b) Consent regarding development within the road reserve should be sought from the City of Tshwane Roads and Transport and Gauteng Department of Roads and Transport. c) A detailed Wetland Rehabilitation Plan should be compiled and included in the Final Basic Assessment report. **5. Conclusion** The Department will provide final comments upon the receipt of the Final Basic Assessment report addressing the above-mentioned recommendations.		This has been attached to Appendix L This has been attached to Appendix K Noted.
This Department received a copy of the Draft Basic Assessment Report dated 31 May 2017 for comment. The proposed project is for the construction of electrical lines from Hatherly substation to the Riverwalk development situated within the road reserve of Solomon Mahlangu drive and the R104/K22. The one crossing is approximately 600m north of the R104 and M10 intersection. The other crossing is approximately 650m east of the R104 and M10. The actual electrical line does not trigger a listed activity but due to it crossing sensitive environmental features (wetland/stream) it's listed. **A. Alignment of the activity with applicable legislations and policies** The report has made provisions to accommodate all applicable legislations, policies and guidelines. The proposed electrical has an impact in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended). The proposed activity is listed as activity 12, 19 and 48 of Listing Notice 1 and activity 13, 14 and 23 of Listing Notice 3. **B. Guidelines GDARD requirements** • According to the Gauteng Conservation Plan 3.3 the electrical lines will cross/traverse river/wetland, • All specialist studies must be undertaken by suitably qualified specialists who (1) are registered in accordance	Phuti Matlamela Phuti.Matlamela@gauteng.gov.za **GDARD** 30 June 2017	Noted. Noted. Noted.

with the Natural Scientific Professions Act (2003) as Professional Natural Scientists within the field of Ecological or Aquatic Science (2) have specific post-graduate qualifications relating to wetlands. In the absence of the latter, the specialist must have attended an appropriate course on wetland rehabilitation and delineation (copy of certificate must be provided). **C. Alternatives** The report did not mention any other alternatives since the proposed activity is only listed due to it traversing wetlands/streams. **D. Significant rating of impacts** Identification of impacts and significant rating must be undertaken for all sensitive features identified to be crossed or disturbed and include mitigation measures. **E. Locality map and layout plans or facility illustrations** - Locality Maps and Layout Plans must meet the requirements below – - The scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map; - The locality map and all other maps are in colour; - For gentle slopes the 1m contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; - Areas with indigenous vegetation (even if it is degraded or infested with alien species); - Locality map must show exact position of existing and proposed linear activity and substation sites; - Locality map shows and identifies (if possible) public and access roads; and **The layout plan** - The layout plan must be printed in colour and overlaid with a		Noted. Noted. This has been done and included in the Draft BA Report. Noted. Noted.

sensitivity map; - The layout plan must be printed on A4 size paper and be 1:8000 scale; - Layout plan must show the position of services, electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, storm water infrastructure and existing telecommunication infrastructure (where possible). **F. EMPr** EMPr must be included in the final report and must be practical, site specific and easily enforceable. **G. Public participation process** • Relevant sections of City of Tshwane Section must be given an opportunity to comment on the final BA Report. • Department of water affairs and sanitation must be consulted so as to provide comments for activities that will take place within watercourses and those comments submitted within the final report and incorporated into the EMPr. • All wayleave permits must be sought for the proposed activities preferably prior to the activity taking place and proof and comments included in the final report. If you have any queries regarding the contents of this letter, please contact the official of the Department at the number or email address indicated above.		Noted. Noted. Several copies has been sent to COT in order to distribute it to the various sections. Kindly note that a Water Use License application will be lodged. There has already been communication between the consultant and the official at DWS. Also note that a copy of the Draft BA Report was sent to DWS for comments however they did not send comments. Comments have also been followed up with DWS. Kindly note that the electrical engineer has received wayleave consents from SANRAL and GDRT. Please refer to Appendix L for letters from these Departments.
	Tshepo Mathebe **DWS**	**<u>Bokamoso sent an email to DWS:</u>** Please note that the Draft Basic

	MathebeT@dws.gov.za 11 August 2017	Assessment (BA) Report was submitted to your Department on 31 May 2017. See attached for the acknowledgement of receipt signed by your Department. The review period already lapsed on 3 July 2017. However, to date we have not received any comments from your Department. Kindly provide us with your comments in this regard. The Final BA Report will be submitted in due course.
The file is with me, apologies for the delay. I will work on it and provide comments asap.		Noted.

Comments from I&Ap's on Basic Assessment (BA) Report

(Not Available)

Appendix E7

Comments from I&Ap's on Amendments to the BA Report

(Not yet available)

Appendix E8

Copy of the Register of I&AP's

Appendix E9

REGISTERED INTERESTED AND AFFECTED PARTIES

Please include all authorities as well as attendees from the public meetings

PROJECT TITLE:_____

CONTACT	NAME	PHONE	FAX	E-MAIL	ADDRESS (Postal/Physical)
Client	Balwin Properties Limited.				
Competent Authority - GDARD					
City of Tshwane	Rudzani			RudzaniM@tshwane.gov.za / kemmonem@tshwane.gov.za / tshinyadzom@tshwane.gov.za	
Council Geo-Science	J. Grobler			jgrobler@geoscience.org.za / msebesho@geoscience.org.za	
SAHRA	Andrew Salomon			asalomon@sahra.org.za ;	
DWS	Lilian Siwelane			keetm@dwaf.gov.za; siwelanel@dwa.gov.za; tshifaror@dwa.gov.za; mathebet@dwa.gov.za	
Eskom				paia@eskom.co.za ; central@eskom.co.za	
GDRT	Kumen Govender			kumen.govender@gauteng.gov.za	
Randwater	Gail Andrews	Tel: 011 724-9360		gandrews@randwater.co.za	
Randwater	Natalie Koneight			nkoneigh@randwater.co.za; mmpshe@randwater.co.za	
Spoornet	Loveous Tampane			loveous.tampane@transnet.net	
Department of Agriculture Forestry & Fisheries	Ms.Phyllystas Ramatsemela Mmakola / Anthon Maluka	Tel: 012 319 7484	012 328 5938	PhyllystasM@daff.gov.za / AntonMa@daff.gov.za	
Department of Land Claims	Ms Nomfundo Gobodo			CLCC@drdlr.gov.za; magezi.mhlanga@drdlr.gov.za; DGOffice@drdlr.gov.za; Fhulufhedzan.Rasimphi@drdlr.gov.za	
SANRAL	Victoria Bota			BotaV@nra.co.za	
Constituency head Old East	Justus De Goede	Cell: 083 733 2557		degoede@mweb.co.za	
Ward Councillor - Ward 101	Mike Strange			mike@ward101.co.za	
Local Newspaper	Beeld				

Dept/ Company/ Private	NAME	PHONE	FAX	E-MAIL	ADDRESS

Comments from I&AP's
on the Application
(Not available)

Appendix E10

Water Use Lisence(s), SAHRA Information, Service Letters from Municipalities & Water Supply Information

Appendix F

Riverwalk Electrical

Our Ref: 10610

an agency of the
Department of Arts and Culture

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Enquiries: Andrew Salomon
Tel: 021 462 4502
Email: asalomon@sahra.org.za
CaseID: 10610

Date: Wednesday February 22, 2017

Letter

In terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999)

Attention: Balwin Properties Limited

The proposed electrical line will run from the Hatherly substation to the Riverwalk development within the road reserves of Solomon Mahlangu Drive and the R104/K22. The proposed line will cross along the R104/K22 (Bronkhorstspruit Road) and the Solomon Mahlangu Drive. The Solomon Mahlangu Drive crossing is approximately 600m north of the R104 and M10 intersection and the Bronkhorstspruit crossing is approximately 650m east of the R104 and M10 intersection.

Thank you for your notification regarding this development.

In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that prior to development it is incumbent on the developer to ensure that a **Heritage Impact Assessment** is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.

The quickest process to follow for the archaeological component is to contract an accredited specialist (see the web site of the Association of Southern African Professional Archaeologists www.asapa.org.za) to provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any large development takes place.

The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites.

Where bedrock is to be affected, or where there are coastal sediments, or marine or river terraces and in potentially fossiliferous superficial deposits, a Palaeontological Desk Top study must be undertaken to assess whether or not the development will impact upon palaeontological resources - or at least a letter of exemption from a Palaeontologist is needed to indicate that this is unnecessary. If the area is deemed sensitive, a full

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Phase 1 Palaeontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary. **Please note that a nationwide fossil sensitivity map is now available on SAHRIS to assist with determining the fossil sensitivity of a study area .**

If the property is very small or disturbed and there is no significant site the heritage specialist may choose to send a letter to the heritage authority motivating for exemption from having to undertake further heritage assessments.

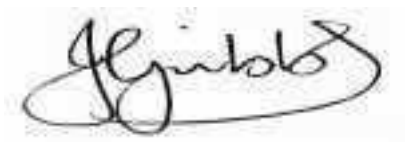
Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewscapes must also be assessed.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully

_____

Andrew Salomon
Heritage Officer: Archaeology
South African Heritage Resources Agency



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John Gribble
Manager: Maritime and Underwater Cultural Heritage Unit / Acting Manager: Archaeology, Palaeontology and Meteorites Unit
South African Heritage Resources Agency

Riverwalk Electrical

Our Ref: 10610

an agency of the
Department of Arts and Culture

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South African Heritage Resources Agency | 111 Harrington Street | Cape Town
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Enquiries: Andrew Salomon
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CaseID: 10610

Date: Wednesday February 22, 2017

ADMIN:
Direct URL to case: http://www.sahra.org.za/node/385335
(GDARD, Ref:)

Terms & Conditions:

1. This approval does not exonerate the applicant from obtaining local authority approval or any other necessary approval for proposed work.
2. If any heritage resources, including graves or human remains, are encountered they must be reported to SAHRA immediately.
3. SAHRA reserves the right to request additional information as required.

Specialist Reports

Appendix G

Ecological Report

Appendix G1

Vegetation survey for the proposed Riverwalk Electrical Line

Report Author: Corné Niemandt (*Cand. Sci. Nat.*)

Reviewed by: J.V. van Greuning (*Pr. Sci. Nat.*)

March 2017

Landscape Architects &
Environmental Consultants: Specialist Division

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36 Lebombo Street, Ashlea Gardens, Pretoria I P.O. Box 11375 Maroelana 0161

Verification statement

This communication serves to verify that the flora report compiled by Corné Niemandt has been prepared under my supervision, and I have verified the contents thereof.

Declaration of independence: I, Dr. J.V. van Greuning (*Pr. Sci. Nat*. reg. no. 400168/08) declare that I:

- am committed to biodiversity conservation but concomitantly recognise the need for economic development. Whereas I appreciate the opportunity to also learn through the processes of constructive criticism and debate, I reserve the right to form and hold my own opinions and therefore will not willingly submit to the interests of other parties or change my statements to appease them.
- abide by the Code of Ethics of the S.A. Council of Natural Scientific Professions.
- act as an independent specialist consultant in the field of Botany.
- am subcontracted as specialist consultant by Bokamoso Environmental Consultants for the proposed electrical line which will run from the Hatherly substation to the Riverwalk development in this report.
- have no financial interest in the proposed development other than remuneration for work performed.
- have or will not have any vested or conflicting interests in the proposed development.
- undertake to disclose to Bokamoso Environmental Consultants and its client as well as the competent authority any material information that have or may have the potential to influence the decision of the competent authority required in terms of the Environmental Impact Assessment Regulations, 2014.

Dr. J. V. van Greuning

Specialist investigator: Mr. C. Niemandt (*Cand. Sci. Nat.; M.Sc. Plant Science*)

Declaration of independence:

The specialist investigators responsible for conducting this particular specialist vegetation study declare that:

• I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);

• At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development, except for financial compensation for work done in a professional capacity;

• Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part;

• I declare that there are no circumstances that may compromise our objectivity in performing this specialist investigation. I do not necessarily object to or endorse the proposed development, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data;

• I do not have any influence over decisions made by the governing authorities;

• I have the necessary qualifications and guidance from professional experts (registered *Pr. Sci. Nat*.) in conducting specialist reports relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

• This document and all information contained herein are and will remain the intellectual property of Bokamoso Environmental: Specialist Division. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigator.

• I will comply with the Act, regulations and all other applicable legislation.

Corné Niemandt

Cand. Sci. Nat Reg. No. 116598
M.Sc. Plant Science

Table of Contents

1. Introduction and Objectives

The proposed development is for underground bulk 5x 11kV electrical line which will run from the Hatherly substation to the Riverwalk development, Gauteng Province. More specifically, 5x 150mm² 11kV armoured 3-Core, PILC, stranded copper cable as per Tshwane specification will be supplied from the Hatherly 132kV/11kV substation to the Riverwalk Development which requires electricity. In addition, 12.2m Street light poles with a 1m single overhang and with luminaries at 10.5 mounting height will be installed alongside new constructed roads and existing roads where lighting standards are not met.

The proposed electrical line will run within the road reserve where no indigenous vegetation is expected to occur along Solomon Mahlangu Drive (M10) and the Bronkhorstspruit road (R104) road. The capacity of the electrical line is below the threshold that will trigger a listed activity under the Amended 2014 NEMA EIA Regulations. However, the application is for the locations where the electrical line crosses wetlands/rivers and the impacts associated with such activities. At the crossings, a route will be drilled approximately 2.5 to 3 meter underneath the river in order to impact as little as possible on the watercourse. Accordingly, the flora associated with the watercourse need to be assessed. The objectives of this report are to highlight sensitive areas, give a broad description of the plant species being influenced, indicate possible habitats of Red and Orange List plant species, and provide recommendations if the proposed electrical line is approved.

2. Study site

The proposed electrical line will run in servitudes for external services along Solomon Mahlangu Drive (M10) and the Bronkhorstspruit road (R104) road. The area where the cable will be in trenches, the trench will be 1.0m deep and 1.5m wide. There are two localities where the electrical line crosses wetlands/rivers. The first location (hereafter site 1) is a bridge located on Solomon Mahlangu Drive (M10) which crosses the Pienaarsriver, GPS locality 25°44'47.88"S, 28°22'19.00"E. The second location (hereafter site 2) is a culvert crossing the Bronkhorstspruit road (R104), GPS locality 25°45'13.87"S, 28°22'30.45"E (Figure 1).

Figure 1: Locality map

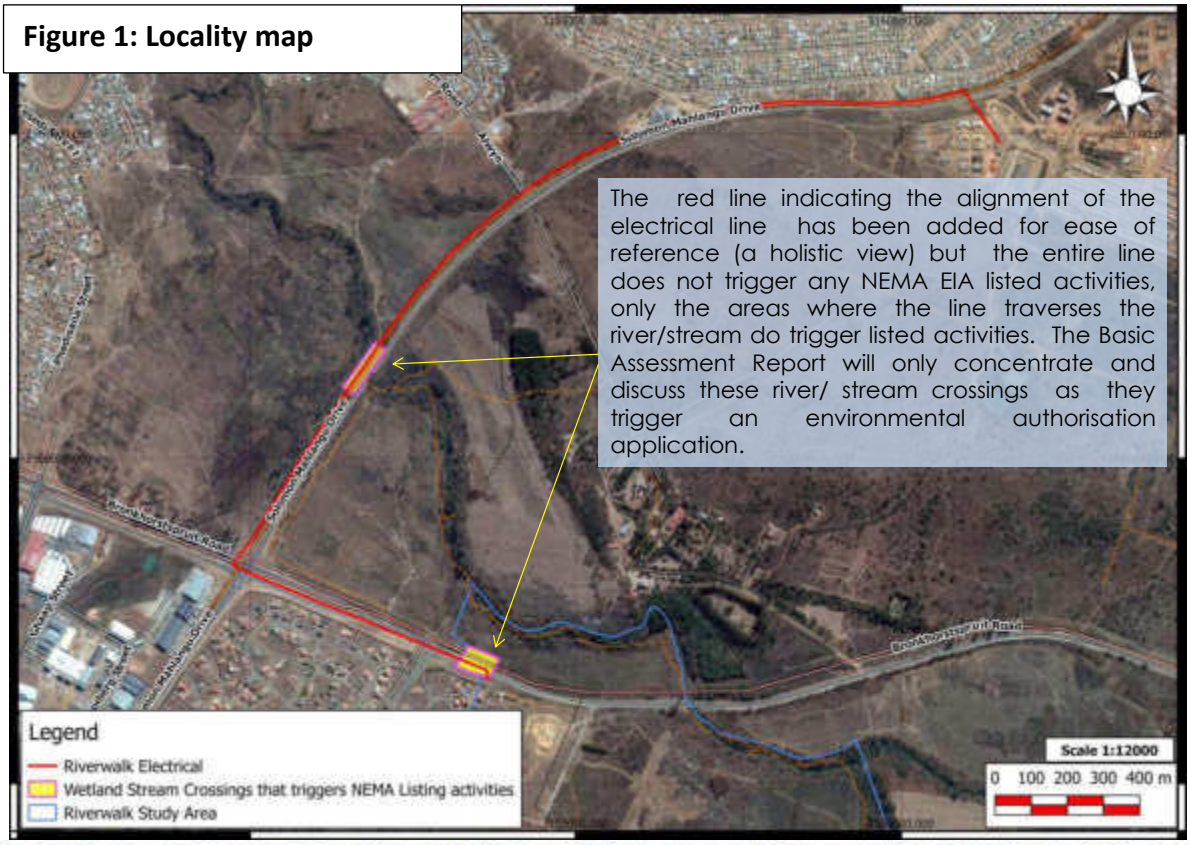
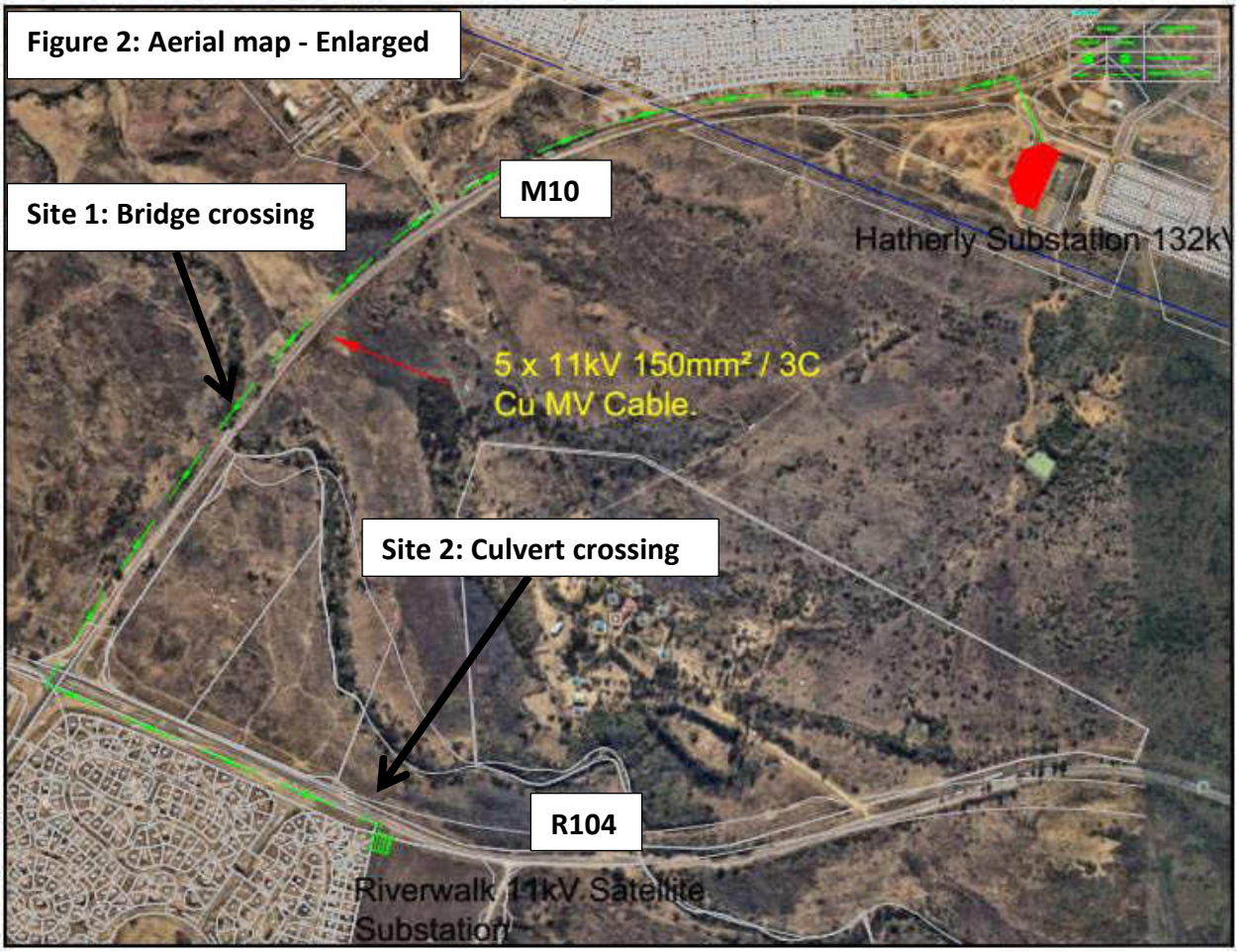


Figure 2: Aerial map - Enlarged



Regional Vegetation

The study site is situated in the Quarter Degree Square (QDS) 2528CB, and in the Vulnerable Marikana Thornveld vegetation unit (Mucina and Rutherford, 2006). The authors described this vegetation type as *Vachellia karroo* open woodland, which naturally occurs in valleys and slightly undulating plains. This area is underlain by mafic intrusive rocks of the Rustenburg Layered Suit of Bushveld Igneous Complex.

3. Methods

The study site was visited on 2 March 2017. Plant species were identified for each site. Field guides such as those by Bromilow (2010), Germishuizen and Meyer (2003), Koekemoer *et al*. (2014), Pooley (1998), van Ginkel *et al.* (2011), van Oudtshoorn *et al.* (2014), van Wyk and Malan (1998), van Wyk *et al*., (2013), and van Wyk (2013) were used to identify the species. If necessary, the H.G.W.J. Schweickerdt Herbarium, University of Pretoria, was visited to confirm the correct identification of species.

The following legislation was consulted:

- Technical report for the Gauteng Conservation Plan (Gauteng C-Plan v3.3) (GDARD, 2014)
- GDARD Requirements for Biodiversity Assessments. Version 3. (GDARD, 2014)
- NEMBA Alien and Invasive Species Lists, Gazette 40166, Notice R864 (2016).

4. Results

4.1. Bridge crossing (Site 1)

The first site is a bridge crossing located on Solomon Mahlangu Drive (M10) which crosses the Pienaarsriver, GPS locality 25°44'47.88"S, 28°22'19.00"E. The proposed electrical line will run in servitude for external services along the M10 and cross underneath the western section of the bridge. The proposed method for implementing the electrical line will be non-invasive according to the engineer and will cause limited disturbance to the riverine vegetation.

The riverine floral composition is a mixture of indigenous and alien species (Figure 3-5). Dominant species identified in the riverine area includes *Celtis africana, Combretum erythrophyllum, Phragmites australis, Euphorbia heterophylla, Cymbopogon pospischilii, Bidens pilosa, Zinnia peruviana, Ipomoea purpurea, Hyparrhenia* sp*., Cynodon dactylon, Verbena brasiliensis, Vachellia karroo, Salix babylonica* and *Searsia lancea*. Most of these species such as *C. erythrophyllum* and *P. australis* are typical of riverine areas, which are essential for ecological functioning and providing habitat for aquatic fauna species.

There is suitable habitat for Red and Orange Listed species, including *Crinum macowanii, Stenostelma umbelluliferum* and *Gunnera perpensa.*

Figure 3: Riverine vegetation indicating dominant species *Combretum erythrophyllum* and *Phragmites australis*.

Figure 4: Riverine vegetation indicating dominant species *Combretum erythrophyllum, Searsia lancea, Celtis africana* and *Phragmites australis*.

Figure 5: The bridge crossing on the M10 where the electrical line will cross (on the western section).

4.2. Culvert crossing (Site 2)

The second site is a culvert crossing the Bronkhorstspruit road (R104), GPS locality 25°45'13.87"S, 28°22'30.45"E. A stormwater outlet occurs on the southern section of the R104 road, and a drainage area on the northern side of the R104 road which is channelled towards the Pienaarsriver. Dominant species identified in the drainage area includes *Typha capensis*, *Veronica anagallis-aquatica* and *Berkheya radula* (Figure 6). These species are typical of drainage areas, which provide essential ecological functions such as water quality, habitat creation for fauna species, maintaining ecological and biodiversity functioning of the system. On the northern section of the R104, the drainage area connects with the Pienaarsriver. Dominant species on the northern side include *Typha capensis, Berkheya radula, Hilliardiella oligocephala, Combretum erythrophyllum, Vachellia karroo* and *Imperata cylindrica* (Figure 7).

There is no suitable habitat for Red or Orange Listed species on the southern section of the R104 where the electrical line will cross.

Figure 6: Stormwater channel with *Typha capensis* and *Veronica anagallis-aquatica*. On the banks *Berkheya radula* thrives as the dominant species.

Figure 7: Drainage area on northern section of the R104.

5. Recommendations and Mitigation Measures

If the proposed electrical line is approved, the following mitigation measures are recommended:

- Where a pipeline traverse a watercourse, measures are required to ensure minimal effect on the flow of water as well as the biodiversity component;
- Clearing of indigenous vegetation should be limited and only be done if necessary. Trimming of trees may be allowed, but if indigenous it should preferably not be removed;
- Construction activities at or close to wetlands, drainage lines and water bodies should be limited;
- Engineering measures are recommended to lower the risk of spillages into any watercourses located in and surrounding the proposed development;
- An alien invasive plants control, monitoring and eradication programme must be implemented along with an on-going monitoring programme by the appropriate agency within the servitude;
- Immediate rehabilitation of damage caused to the watercourse should be implemented;
- Where active rehabilitation or restoration is mandatory, it should make use of indigenous plant species native to the study area. The species selected should strive to represent habitat types typical of the ecological landscape prior to construction. As far as possible, indigenous plants naturally growing within the vicinity of the study area, but would otherwise be destroyed during construction, should be used for re-vegetation/landscaping purposes;
- No vehicles should be allowed to move in or through the watercourse and associated buffer zone without permission. The area should be demarcated prior to construction;
- It is recommended that all concrete and cement works be restricted to areas of low ecological sensitivity and defined on site and clearly demarcated. Cement powder has a high alkalinity pH rating, which can contaminate and affect both soil and water pH dramatically. A shift in the pH can have serious consequences on the functioning of soil, vegetation and fauna;
- Sealing of surfaces under a bridge or gabion construction should be avoided.

6. Conclusions

Should the proposed electrical line be approved, the above-mentioned recommendations should be implemented to reduce impacts. It is the responsibility of the Environmental Control Officer to ensure that these recommendations are followed and that no unlawful activities take place. Working within the watercourse and its associated buffer areas (as

determined by a qualified wetland specialist) are strongly prohibited without the necessary approval from the relevant authority. Removal of indigenous tree species should be avoided and clearing of indigenous vegetation should be limited. Furthermore, all alien species, especially in Category 1 and 2 should be eradicated by the appropriate agency. No rubble may be left on site or disposed of in the watercourse.

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Wetland Reports

Appendix G2

REPORT

HYDROPEDOLOGY WETLAND IMPACT ASSESSMENT AND MANAGEMENT REPORT:

RIVER WALK DEVELOPMENT, GAUTENG PROVINCE

15 January, 2016
(Maps Amended: 8 November, 2016)
(Electrical Infrastructure Layout Added: 31 March 2017)

Compiled by:
J.H. van der Waals
(PhD Soil Science, Pr.Sci.Nat.)
Member of:
Soil Science Society of South Africa (SSSSA)

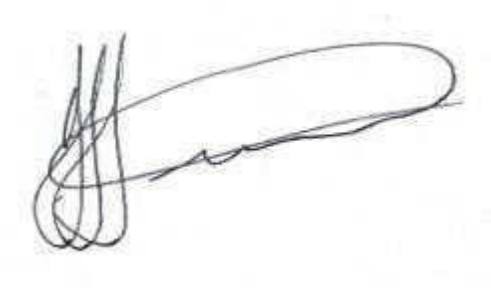
Accredited member of:
South African Soil Surveyors Organisation (SASSO)

Registered with:
The South African Council for Natural Scientific Professions
Registration number: 400106/08

Declaration

I, Johan Hilgard van der Waals, declare that:

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing
  - any decision to be taken with respect to the application by the competent authority; and
  - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



J.H. VAN DER WAALS
TERRA SOIL SCIENCE

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HYDROPEDOLOGY WETLAND IMPACT ASSESSMENT AND MANAGEMENT REPORT: RIVER WALK DEVELOPMENT, GAUTENG PROVINCE

1. INTRODUCTION

1.1 TERMS OF REFERENCE

Terra Soil Science was appointed by the **Bokamoso** to conduct a hydropedology based wetland delineation, status and functional assessment of the wetland/watercourse on the River Walk development site in the Gauteng Province. The focus of the investigation is to address aspects that include wetland distribution and functioning, landscape hydropedology and impacts of the urban and site development on the hydrological functioning of the wetland.

1.2 AIM OF THIS REPORT

The aim of this report is to provide a perspective on the distribution, status and functioning of the wetland/watercourse on the River Walk development site, provide a description and contextualisation of the hydropedology of the site, describe the historical impacts and to provide specific management recommendations regarding the hydrology of the wetland and site post development.

1.3 DISCLAIMER

This report was generated under the regulations of NEMA (National Environmental Management Act) that guides the appointment of specialists. The essence of the regulations are 1) independence, 2) specialisation and 3) duty to the regulator. The independent specialist has, in accordance with the regulations, a duty to the competent authority to disclose all matters related to the specific investigation should he be requested to do such (refer to declaration above).

It is accepted that this report can be submitted for peer review (as the regulations also allow for such). However, the intention of this report is not to function as one of several attempts by applicants or competent authorities to obtain favourable delineation outcomes. Rather, the report is aimed at addressing specific site conditions in the context of current legislation, guidelines and best practice with the ultimate aim of ensuring the conservation and adequate management of the water resource on the specific site.

Due to the specific legal liabilities wetland specialists face when conducting wetland delineations and assessments this author reserves the right to, in the event that this report becomes part of a delineation comparison exercise between specialists, submit the report to the competent authorities, without entering into protracted correspondence with the client, as an independent report.

1.4 METHODOLOGY

The report was generated through:

1. The collection and presentation of baseline land type and topographic data for the site;
2. The thorough consideration of the statutory context of wetlands assessment and the process of wetland delineation;
3. The identification of water related landscape parameters (conceptual and real) for the site;
4. Aerial photograph interpretation of the site;
5. Assessment of historical impacts and changes on the site through the accessing of various historical aerial photographs and topographic maps;
6. Focused soil and site survey in terms of soil properties as well as drainage feature properties;
7. Assessment of the functioning, status and hydropedology of the wetlands on the site; and
8. Presentation of the findings of the various components of the investigation.

2. SITE LOCALITY AND DESCRIPTION

2.1 SURVEY AREA BOUNDARY

The site lies between 25° 45' 11'' and 25° 45' 56'' south and 28° 22' 25'' and 28° 23' 15'' east approximately 10 km east of Pretoria city centre in the Gauteng Province (**Figure 1**).

2.2 LAND TYPE DATA

Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC). The land type data is presented at a scale of 1:250 000 and entails the division of land into land types, typical terrain cross sections for the land type and the presentation of dominant soil types for each of the identified terrain units (in the cross section). The soil data is classified according to the Binomial System (MacVicar et al., 1977). The soil data was interpreted and re-classified according to the Taxonomic System (Soil Classification Working Group, 1991).

The site falls into the **Ba9** land type (Land Type Survey Staff, 1972 - 2006). **Figure 1** also provides the land type distribution around the site. **Ba** land types denote areas with dominantly plinthic catena where red soils occur frequently. Following on the field survey it is evident that the broad land type data (**Ba9**) is not representative of the survey area and that the site consists predominantly of soil derived from shale and andesite (no plinthic character). A dedicated discussion of the specific site conditions will be provided later in the report.

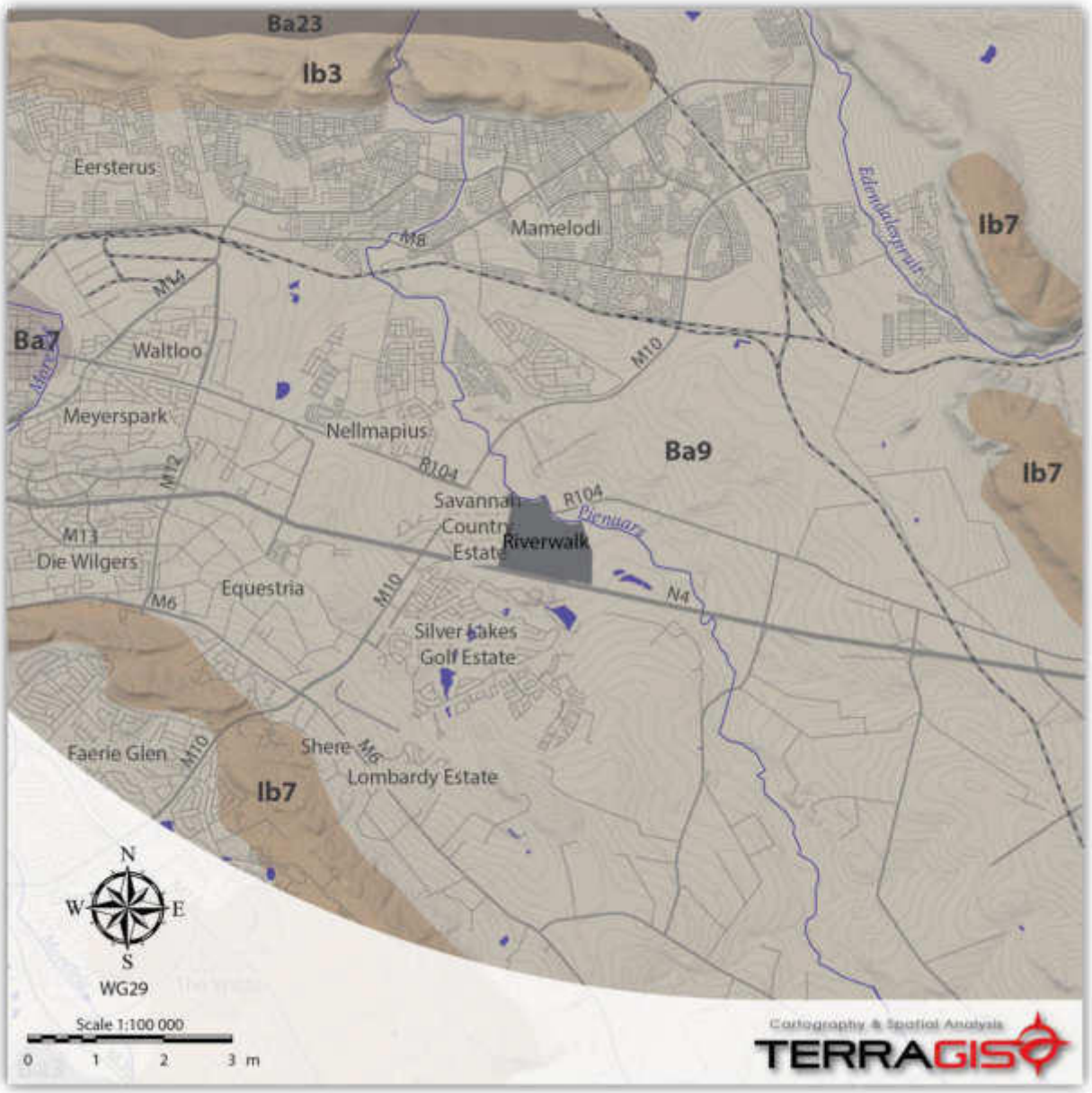

Figure 1 Locality of the survey site with the land types indicated in colour shaded areas

2.3 TOPOGRAPHY

The topography of the site is generally flat with a distinct small rocky hill in the south. The contour map for the site is provided in **Figure 2**. From the contour data a digital elevation model (DEM) was generated (**Figure 3**). The topographic data was further interpreted and the approaches and results are discussed later in the report.

Figure 2 Contours of the survey area superimposed on an aerial photograph

3. PROBLEM STATEMENT

The wetland / watercourse on the River Walk site is part of a landscape dominated by shale and diabase/andesite with distinct signs of old colluvial transportation of material. The complex nature of the geology as well as the dominance of basic igneous rock leads to the expression of soil properties that are sometimes incorrectly interpreted in the wetland delineation guidelines (DWAF, 2005). Within this context extent of the wetland and impacts have to be determined to plan for development surrounding the wetland as well as mitigate impacts from the historical activities. The description and assessment of wetlands in urban environments, both by specialists and the regulator, pose several problems within the context of legislation that pertains to wetlands. This investigation will focus on the delineation of the wetland features based on soil hydromorphy,

landscape hydrology as well as various historical modifiers through a dedicated assessment and elucidation of hydropedological processes experienced in the catchment and on the site.

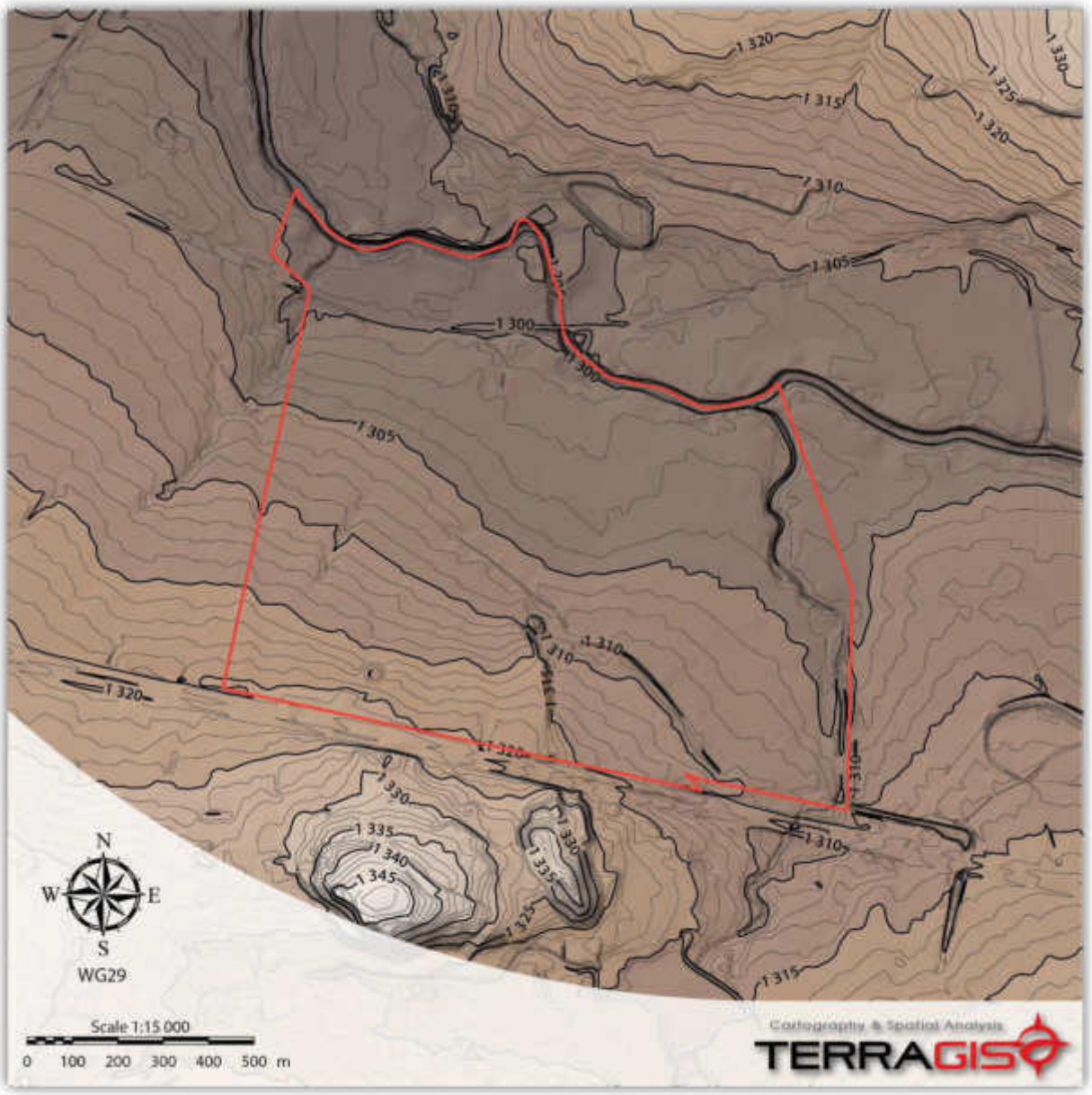

Figure 3 DEM of the survey site

4. STATUTORY CONTEXT

The following is a brief summary of the statutory context of wetland delineation and assessment. Where necessary, additional comment is provided on problematic aspects or aspects that, according to this author, require specific emphasis.

4.1 WETLAND DEFINITION

Wetlands are defined, in terms of the National Water Act (Act no 36 of 1998) (NWA), as:

"Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."

4.2 WATERCOURSE DEFINITION

"Catchment" is defined, in terms of the National Water Act (Act no 36 of 1998) (NWA), as:

"…, in relation to a watercourse or watercourses or part of a watercourse, means the area from which any rainfall will drain into the watercourse or watercourses or part of a watercourse, through surface flow to a common point or common points;"

"Watercourse" is defined, in terms of the National Water Act (Act no 36 of 1998) (NWA), as:

"*(a)* a river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the *Gazette*, declare to be a water course,
and a reference to a watercourse includes, where relevant, its bed and banks;"

4.3 THE WETLAND DELINEATION GUIDELINES

In 2005 the Department of Water Affairs and Forestry published a manual entitled "A practical field procedure for identification and delineation of wetland and riparian areas" (DWAF, 2005). The "…manual describes field indicators and methods for determining whether an area is a wetland or riparian area, and for finding its boundaries." The definition of a wetland in the guidelines is that of the NWA and it states that wetlands must have one or more of the following attributes:

- "**Wetland (hydromorphic) soils** that display characteristics resulting from prolonged saturation"
- "The presence, at least occasionally, of **water loving plants (hydrophytes)**"
- "A **high water table** that results in saturation at or near the surface, leading to anaerobic conditions developing in the top 50cm of the soil."

The guidelines further list four indicators to be used for the finding of the outer edge of a wetland. These are:

- Terrain Unit Indicator. The terrain unit indicator does not only identify valley bottom wetlands but also wetlands on steep and mild slopes in crest, midslope and footslope positions.

- Soil Form Indicator. A number of soil forms (as defined by MacVicar et al., 1991) are listed as indicative of permanent, seasonal and temporary wetland zones.
- Soil Wetness Indicator. Certain soil colours and mottles are indicated as colours of wet soils. The guidelines stipulate that this is the primary indicator for wetland soils. (Refer to the guidelines for a detailed description of the colour indicators.) In essence, the reduction and removal of Fe in the form of "bleaching" and the accumulation of Fe in the form of mottles are the two main criteria for the identification of soils that are periodically or permanently wet.
- Vegetation Indicator. This is a key component of the definition of a wetland in the NWA. It often happens though that vegetation is disturbed and the guidelines therefore place greater emphasis on the soil form and soil wetness indicators as these are more permanent whereas vegetation communities are dynamic and react rapidly to external factors such as climate and human activities.

The main emphasis of the guidelines is therefore the use soils (soil form and wetness) as the criteria for the delineation of wetlands. The applicability of these guidelines in the context of the survey site will be discussed in further detail later in the report.

Due to numerous problems with the delineation of wetlands there are a plethora of courses being presented to teach wetland practitioners and laymen the required techniques. Most of the courses and practitioners focus on ecological or vegetation characteristics of landscapes and soil characteristics are often interpreted incorrectly due to a lacking soil science background of these practitioners. As such this author regularly presents, in conjunction with a colleague (Prof. Cornie van Huysteen) from the University of the Free Sate, a course on the aspects related to soil classification and wetland delineation.

4.4 THE RESOURCE DIRECTED MEASURES FOR PROTECTION OF WATER RESOURCES

The following are specific quotes from the different sections of the "Resource Directed Measures for Protection of Water Resources." as published by DWAF (1999).

4.4.1 The Resource Directed Measures for Protection of Water Resources: Volume 4: Wetland Ecosystems.

From the Introduction:

"This set of documents on Resource Directed Measures (RDM) for protection of water resources, issued in September 1999 in Version 1.0, presents the procedures to be followed in undertaking **preliminary determinations of the class, Reserve and resource quality objectives for water resources**, as specified in sections 14 and 17 of the South African National Water Act (Act 36 of 1998).

The development of procedures to determine RDM was initiated by the Department of Water Affairs and Forestry in July 1997. Phase 3 of this project will end in March 2000. Additional refinement and development of the procedures, and development of the full water resource classification system, will continue in Phase 4, until such time as the detailed procedures and full classification system are ready for publication in the Government Gazette.

It should be noted that until the final RDM procedures are published in the Gazette, and prescribed according to section 12 of the National Water Act, all determinations of RDM, whether at the rapid, the intermediate or the comprehensive level, will be considered to be preliminary determinations."

4.4.2 The Resource Directed Measures for Protection of Water Resources: Generic Section "A" for Specialist Manuals – Water Resource Protection Policy Implementation Process

"Step 3: Determine the reference conditions of each resource unit"

"What are reference conditions?"

"The determination of reference conditions is a very important aspect of the overall Reserve determination methodology. Reference conditions describe the natural unimpacted characteristics of a water resource. Reference conditions quantitatively describe the ecoregional type, specific to a particular water resource."

4.4.3 The Resource Directed Measures for Protection of Water Resources: Appendix W1 (Ecoregional Typing for Wetland Ecosystems)

<u>Artificial modifiers are explained namely:</u>

"Many wetlands are man-made, while others have been modified from a natural state to some degree by the activities of humans. Since the nature of these alterations often greatly influences the character of such habitats, the inclusion of modifying terms to accommodate human influence is important. In addition, many human modifications, such as dam walls and drainage ditches, are visible in aerial photographs and can be easily mapped. The following Artificial Modifiers are defined and can be used singly or in combination wherever they apply to wetlands:
Farmed: the soil surface has been physically altered for crop production, but hydrophytes will become re-established if farming is discontinued
Artificial: substrates placed by humans, using either natural materials such as dredge spoils or synthetic materials such as concrete. Jetties and breakwaters are examples of Non-vegetated Artificial habitats
Excavated: habitat lies within an excavated basin or channel
Diked/Impounded: created or modified by an artificial barrier which obstructs the inflow or outflow of water

Partially Drained: the water level has been artificially lowered, usually by means of ditches, but the area is still classified as wetland because soil moisture is sufficient to support hydrophytes."

4.4.4 The Resource Directed Measures for Protection of Water Resources: Appendix W4 IER (Floodplain Wetlands) Present Ecological Status (PES) Method

In Appendix W4 the methodology is provided for the determination of the present ecological status (PES) of a palustrine wetland.

The present ecological state (PES) of the wetland was determined according to the method described in "APPENDIX W4: IER (FLOODPLAIN WETLANDS) PRESENT ECOLOGICAL STATUS (PES) METHOD" of the "Resource Directed Measures for Protection of Water Resources. Volume 4: Wetland Ecosystems" as published by DWAF (1999). However, the PES methodology already forms an adaptation from the methodology to assess palustrine wetlands. Hillslope seepage wetlands have a range of different drivers and as such some modification of the criteria has been made by this author to accommodate the specific hydropedology drivers of hillslope seepage wetlands.

The criteria as described in Appendix 4 is provided below with the relevant modification or comment provided as well.

The summarised tasks in the PES methodology are (for detailed descriptions refer to the relevant documentation):

1. Conduct a literature review (review of available literature and maps) on the following:
    a. Determine types of development and land use (in the catchment in question).
    b. Gather hydrological data to determine the degree to which the flow regime has been modified (with the "virgin flow regime" as baseline). The emphasis is predominantly on surface hydrology and hydrology of surface water features as well as the land uses, such as agriculture and forestry, that lead to flow modifications. Important Note: The hydropedology of landscapes is not explicitly mentioned in the RDM documentation and this author will make a case for its consideration as probably the most important component of investigating headwater systems and seepage wetlands and areas.
    c. Assessment of the water quality as is documented in catchment study reports and water quality databases.
    d. Investigate erosion and sedimentation parameters that address aspects such as bank erosion and bed modification. Important Note: The emphasis in the RDM documentation is again on river and stream systems with little mention of erosion of headwater and seepage zone systems. Again a case will be made for the emphasis of such information generation.
    e. Description of exotic species (flora and fauna) in the specific catchment in question.
2. Conduct and aerial photographic assessment in terms of the parameters listed above.

3. Conduct a site visit and make use of local knowledge.
4. Assess the criteria and generate preliminary PES scores.
5. Generation of report.

Table 1 presents the scoresheet with criteria for the assessment of habitat integrity of palustrine wetlands (as provided in the RDM documentation).

Table 1 "Table W4-1: Scoresheet with criteria for assessing Habitat Integrity of Palustrine Wetlands (adapted from Kleynhans 1996)"

Criteria and attributes	**Relevance**	**Score**	**Confidence**
Hydrologic			
Flow modification	Consequence of abstraction, regulation by impoundments or increased runoff from human settlements or agricultural land. Changes in flow regime (timing, duration, frequency), volumes, velocity which affect inundation of wetland habitats resulting in floristic changes or incorrect cues to biota. Abstraction of groundwater flows to the wetland.		
Permanent Inundation	Consequence of impoundment resulting in destruction of natural wetland habitat and cues for wetland biota.		
Water Quality			
Water Quality Modification	From point or diffuse sources. Measure directly by laboratory analysis or assessed indirectly from upstream agricultural activities, human settlements and industrial activities. Aggravated by volumetric decrease in flow delivered to the wetland		
Sediment load modification	Consequence of reduction due to entrapment by impoundments or increase due to land use practices such as overgrazing. Cause of unnatural rates of erosion, accretion or infilling of wetlands and change in habitats.		
Hydraulic/Geomorphic			
Canalisation	Results in desiccation or changes to inundation patterns of wetland and thus changes in habitats. River diversions or drainage.		
Topographic Alteration	Consequence of infilling, ploughing, dykes, trampling, bridges, roads, railwaylines and other substrate disruptive activities which reduces or changes wetland habitat directly or through changes in inundation patterns.		
Biota			
Terrestrial Encroachment	Consequence of desiccation of wetland and encroachment of terrestrial plant speciesdue to changes in hydrology or geomorphology. Change		

	from wetland to terrestrial habitat and loss of wetland functions.		
Indigenous Vegetation Removal	Direct destruction of habitat through farming activities, grazing or firewood collection affecting wildlife habitat and flow attenuation functions, organic matter inputs and increases potential for erosion.		
Invasive plant encroachment	Affect habitat characteristics through changes in community structure and water quality changes (oxygen reduction and shading).		
Alien fauna	Presence of alien fauna affecting faunal community structure.		
Overutilisation of biota	Overgrazing, Over-fishing, etc		
TOTAL MEAN			

Scoring guidelines per attribute:
natural, unmodified = 5; Largely natural = 4, Moderately modified = 3; largely modified = 2; seriously modified = 1; Critically modified = 0.
Relative confidence of score:
Very high confidence = 4; High confidence = 3; Moderate confidence = 2; Marginal/low confidence = 1.

Important Note: The present ecological state (PES) determination is, as discussed earlier in the report, based on criteria originally generated for palustrine and floodplain wetlands. Seepage wetlands very rarely have the same degree of saturation or free water and consequently often do not have permanent wetland zones. These wetlands are therefore often characterised by seasonal or temporary properties and as such a standard PES approach is flawed. The existing criteria is provided below as is a comment on the applicability as well as proposed improvements.

Criteria

Hydrological Criteria

- "Flow modification: Consequence of abstraction, regulation by impoundments or increased runoff from human settlements or agricultural land. Changes in flow regime (timing, duration, frequency), volumes, velocity which affect inundation of wetland habitats resulting in floristic changes or incorrect cues to biota. Abstraction of groundwater flows to the wetland." Comment: Although the description is wide it is very evident that seepage or hillslope wetlands do not become inundated but rather are fed by hillslope return flow processes. The main criterion should therefore be the surface and subsurface hydrological linkages expressed as a degree of alteration in terms of the surface, hydropedology and groundwater hydrology.

- "Permanent inundation: Consequence of impoundment resulting in destruction of natural wetland habitat and cues for wetland biota." Comment: Mostly not applicable to hillslope seepage wetlands.

Water Quality Criteria

- "Water quality modification: From point or diffuse sources. Measure directly by laboratory analysis or assessed indirectly from upstream agricultural activities, human settlements and industrial activities. Aggravated by volumetric decrease in flow delivered to the wetland." Comment: Water quality in this context applies generally but cognisance should be taken of seepage water quality that can be natural but significantly different to exposed water bodies. The main reason for this being the highly complex nature of many redox processes within the hillslope.
- "Sediment load modification: Consequence of reduction due to entrapment by impoundments or increase due to land use practices such as overgrazing. Cause of unnatural rates of erosion, accretion or infilling of wetlands and change in habitats." Comment: This is a very relevant concept but on hillslopes should be linked to erosivity of the soils as well as the specific land use influences.

Hydraulic / Geomorphic Criteria

- "Canalisation: Results in desiccation or changes to inundation patterns of wetland and thus changes in habitats. River diversions or drainage." Comment: Again this is a very relevant concept but on hillslopes should be linked to erosivity of the soils as well as the specific land use influences. This concept does however not address the influences on the hydropedology of the hillslope. These aspects should be elucidated and contextualised.
- "Topographic Alteration: Consequence of infilling, ploughing, dykes, trampling, bridges, roads, railwaylines and other substrate disruptive activities which reduces or changes wetland habitat directly or through changes in inundation patterns." Comment: Again this is a very relevant concept but on hillslopes should be linked to erosivity of the soils as well as the specific land use influences. This concept does however not address the influences on the hydropedology of the hillslope. These aspects should be elucidated and contextualised.

Biological Criteria

- "Terrestrial encroachment: Consequence of desiccation of wetland and encroachment of terrestrial plant species due to changes in hydrology or geomorphology. Change from wetland to terrestrial habitat and loss of wetland functions." Comment: Again this is a very relevant concept but on hillslopes should be linked to erosivity of the soils as well as the specific land use influences. This concept does however not address the influences on the hydropedology of the hillslope. These aspects should be elucidated and contextualised.
- "Indigenous vegetation removal: Direct destruction of habitat through farming activities, grazing or firewood collection affecting wildlife habitat and flow attenuation functions, organic matter inputs and increases potential for erosion."
- "Invasive plant encroachment: Affect habitat characteristics through changes in community structure and water quality changes (oxygen reduction and shading)."
- "Alien fauna: Presence of alien fauna affecting faunal community structure."
- "Overutilisation of biota: Overgrazing, Over-fishing, etc."

Scoring Guidelines

Scoring guidelines per attribute:
Natural, unmodified = 5
Largely natural = 4
Moderately modified = 3
Largely modified = 2
Seriously modified = 1
Critically modified = 0

Relative confidence of score:
Very high confidence = 4
High confidence = 3
Moderate confidence = 2
Marginal/low confidence = 1

4.4.5 The Resource Directed Measures for Protection of Water Resources: Appendix W5 IER (Floodplain Wetlands) Determining the Ecological Importance and Sensitivity (EIS) and the Ecological Management Class (EMC)

In Appendix W5 the methodology is provided for the determination of the ecological importance and sensitivity (EIS) and ecological management class (EMC) of floodplain wetlands.

"Ecological importance" of a water resource is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales. "Ecological sensitivity" refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred. The Ecological Importance and sensitivity (EIS) provides a guideline for determination of the Ecological Management Class (EMC)." Please refer to the specific document for more detailed information.

The following primary determinants are listed as determining the EIS:

1. Rare and endangered species
2. Populations of unique species
3. Species / taxon richness
4. Diversity of habitat types or features
5. Migration route / breeding and feeding site for wetland species
6. Sensitivity to changes in the natural hydrological regime
7. Sensitivity to water quality changes
8. Flood storage, energy dissipation and particulate / element removal

The following modifying determinants are listed as determining the EIS:

1. Protected status
2. Ecological integrity

4.5 SUMMARY AND PROPOSED APPROACH

When working in environments where the landscape and land use changes are significant (such as urban and mining environments) it is important to answer the following critical questions regarding the assessment and management planning for wetlands:

1. What is the reference condition?
2. What is the difference between the reference condition and the current condition and how big is this difference from a hydrological driver perspective?
3. What are the hydrological drivers (as a function of geology, topography, rainfall and soils) and what are the relative contributions of these drivers to the functioning of the wetland system?
4. What is the intended or planned land use in the wetland as well as terrestrial area and how will these developments impact on the hydrology of the landscape and wetlands?
5. How can the intended land use be plied to secure the best possible hydrological functioning of the landscape in terms of storm water attenuation, erosion mitigation and water quality?

The key to the generation of adequate information lies in the approach that is to be followed. In the next section an explanation about and motivation in favour of will be provided for a hydropedology assessment approach. Due to the detailed nature of the information that can be generated through such an approach it is motivated that all wetland assessments be conducted with the requirements of criminal law in mind. The main reason for this is the fact that many well-meaning administrative exercises often yield not tangible results due to the gap in terms of information that is required should there be a compliance process followed.

To Summarise:

During wetland assessments and delineations it is important to provide a perspective on assessment tools, the original or reference state of the wetland, the assessment process and outcome as well as the intended or possible state of the wetland and site post development. Urban and mining developments are good examples of cases where surrounding developments and land use changes have significant effects on wetland integrity and water quality emanating from the site.

5. CHALLENGES REGARDING WETLAND DELINEATION IN COMPLEX GEOLOGICAL ENVIRONMENTS

Disclaimer: The following section represents a discussion that I use as standard in describing the challenges regarding wetland delineation and management in complex geological environments. This implies that the section is verbatim the same as in other reports provided to clients and the authorities. Copyright is strictly reserved.

In order to discuss the procedures followed and the results of the wetland identification exercise it is necessary at the outset to provide some theoretical background on soil forming processes, soil wetness indicators, water movement in soils and topographical sequences of soil forms (catena). Complex geological environments are considered to be those where a narrow set of pH and redox chemistry parameters do not exist and where the expression of soil morphology and hydromorphy is a function of a wide range of chemical, physical and mineralogical determinants.

5.1 PEDOGENESIS

Pedogenesis is the process of soil formation. Soil formation is a function of five (5) factors namely (Jenny, 1941):

- Parent material;
- Climate;
- Topography;
- Living Organisms; and
- Time.

These factors interact to lead to a range of different soil forming processes that ultimately determine the specific soil formed in a specific location. Central to all soil forming processes is water and all the reactions (physical and chemical) associated with it. The physical processes include water movement onto, into, through and out of a soil unit. The movement can be vertically downwards, lateral or vertically upwards through capillary forces and evapotranspiration. The chemical processes are numerous and include dissolution, precipitation (of salts or other elements) and alteration through pH and reduction and oxidation (redox) changes. In many cases the reactions are promoted through the presence of organic material that is broken down through aerobic or anaerobic respiration by microorganisms. Both these processes alter the redox conditions of the soil and influence the oxidation state of elements such as Fe and Mn. Under reducing conditions Fe and Mn are reduced and become more mobile in the soil environment. Oxidizing conditions, in turn, lead to the precipitation of Fe and Mn and therefore lead to their immobilization. The dynamics of Fe and Mn in soil, their zones of depletion through mobilization and accumulation through precipitation, play an important role in the identification of the dominant water regime of a soil and could therefore be used to identify wetlands and wetland conditions.

5.2 WATER MOVEMENT IN THE SOIL PROFILE

In a specific soil profile, water can move upwards (through capillary movement), horizontally (owing to matric suction) and downwards under the influence of gravity.

The following needs to be highlighted in order to discuss water movement in soil:

- Capillary rise refers to the process where water rises from a deeper lying section of the soil profile to the soil surface or to a section closer to the soil surface. Soil pores can be regarded as miniature tubes. Water rises into these tubes owing to the adhesion

(adsorption) of water molecules onto solid mineral surfaces and the surface tension of water.

The height of the rise is inversely proportional to the radius of the soil pore and the density of the liquid (water). It is also directly proportional to the liquid's surface tension and the degree of its adhesive attraction. In a soil-water system the following simplified equation can be used to calculate this rise:

$$\text{Height} = 0.15/\text{radius}$$

Usually the eventual height of rise is greater in fine textured soil, but the rate of flow may be slower (Brady and Weil, 1999; Hillel, 1983).

- Matric potential or suction refers to the attraction of water to solid surfaces. Matric potential is operational in unsaturated soil above the water table while pressure potential refers to water in saturated soil or below the water table. Matric potential is always expressed as a negative value and pressure potential as a positive value.

  Matric potential influences soil moisture retention and soil water movement. Differences in the matric potential of adjoining zones of a soil results in the movement of water from the moist zone (high state of energy) to the dry zone (low state of energy) or from large pores to small pores.

  The maximum amount of water that a soil profile can hold before leaching occurs is called the field capacity of the soil. At a point of water saturation, a soil exhibits an energy state of 0 $J.kg^{-1}$. Field capacity usually falls within a range of -15 to -30 $J.kg^{-1}$ with fine textured soils storing larger amounts of water (Brady and Weil, 1999; Hillel, 1983).

- Gravity acts on water in the soil profile in the same way as it acts on any other body; it attracts towards earth's centre. The gravitational potential of soil water can be expressed as:

  $$\text{Gravitational potential} = \text{Gravity} \times \text{Height}$$

  Following heavy rainfall, gravity plays an important part in the removal of excess water from the upper horizons of the soil profile and recharging groundwater sources below.

  Excess water, or water subject to leaching, is the amount of water that falls between soil saturation (0 $J.kg^{-1}$) or oversaturation (> 0 $J.kg^{-1}$), in the case of heavy rainfall resulting in a pressure potential, and field capacity (-15 to -30 $J.kg^{-1}$). This amount of water differs according to soil type, structure and texture (Brady and Weil, 1999; Hillel, 1983).

- Under some conditions, at least part of the soil profile may be saturated with water, resulting in so-called saturated flow of water. The lower portions of poorly drained soils are

often saturated, as are well-drained soils above stratified (layers differing in soil texture) or impermeable layers after rainfall.

The quantity of water that flows through a saturated column of soil can be calculated using Darcy's law:

$$Q = Ksat.A.\Delta P/L$$

Where Q represents the quantity of water per unit time, Ksat is the saturated hydraulic conductivity, A is the cross sectional area of the column through which the water flows, ΔP is the hydrostatic pressure difference from the top to the bottom of the column, and L is the length of the column.

Saturated flow of water does not only occur downwards, but also horizontally and upwards. Horizontal and upward flows are not quite as rapid as downward flow. The latter is aided by gravity (Brady and Weil, 1999; Hillel, 1983).

- Mostly, water movement in soil is ascribed to the unsaturated flow of water. This is a much more complex scenario than water flow under saturated conditions. Under unsaturated conditions only the fine micropores are filled with water whereas the macropores are filled with air. The water content, and the force with which water molecules are held by soil surfaces, can also vary considerably. The latter makes it difficult to assess the rate and direction of water flow. The driving force behind unsaturated water flow is matric potential. Water movement will be from a moist to a drier zone (Brady and Weil, 1999; Hillel, 1983).

The following processes influence the amount of water to be leached from a soil profile:

- Infiltration is the process by which water enters the soil pores and becomes soil water. The rate at which water can enter the soil is termed infiltration tempo and is calculated as follows:

$$I = Q/A.t$$

Where I represents infiltration tempo ($m.s^{-1}$), Q is the volume quantity of infiltrating water (m^3), A is the area of the soil surface exposed to infiltration (m^2), and t is time (s).

If the soil is quite dry when exposed to water, the macropores will be open to conduct water into the soil profile. Soils that exhibit a high 2:1 clay content (swelling-shrinking clays) will exhibit a high rate of infiltration initially. However, as infiltration proceeds, the macropores will become saturated and cracks, caused by dried out 2:1 clay, will swell and close, thus leading to a decline in infiltration (Brady and Weil, 1999; Hillel, 1983).

- Percolation is the process by which water moves downward in the soil profile. Saturated and unsaturated water flow is involved in the process of percolation, while the rate of percolation is determined by the hydraulic conductivity of the soil.

During a rain storm, especially the down pouring of heavy rain, water movement near the soil surface mainly occurs in the form of saturated flow in response to gravity. A sharp boundary, referred to as the wetting front, usually appears between the wet soil and the underlying dry soil. At the wetting front, water is moving into the underlying soil in response to both matric and gravitational potential. During light rain, water movement at the soil surface may be ascribed to unsaturated flow (Brady and Weil, 1999; Hillel, 1983).

The fact that water percolates through the soil profile by unsaturated flow has certain ramifications when an abrupt change in soil texture occurs (Brady and Weil, 1999; Hillel, 1983). A layer of course sand, underlying a fine textured soil, will impede downward movement of water. The macropores of the coarse textured sand offer less attraction to the water molecules than the macropores of the fine textured soil. When the unsaturated wetting front reaches the coarse sand, the matric potential is lower in the sand than in the overlying material. Water always moves from a higher to a lower state of energy. The water can, therefore, not move into the coarse textured sand. Eventually, the downward moving water will accumulate above the sand layer and nearly saturate the fine textured soil. Once this occurs, the water will be held so loosely that gravitational forces will be able to drag the water into the sand layer (Brady and Weil, 1999; Hillel, 1983).

A coarse layer of sand in an otherwise fine textured soil profile will also inhibit the rise of water by capillary movement (Brady and Weil, 1999; Hillel, 1983).

Field observations and laboratory based analysis can aid in assessing the soil-water relations of an area. The South African soil classification system (Soil Classification Working Group, 1991.) comments on certain field observable characteristics that shed light on water movement in soil. The more important of these are:

- Soil horizons that show clear signs of leaching such as the E-horizon – an horizon where predominantly lateral water movement has led to the mobilisation and transport of sesquioxide minerals and the removal of clay material;
- Soil horizons that show clear signs of a fluctuating water table where Fe and Mn mottles, amongst other characteristics, indicate alternating conditions of reduction and oxidation (soft plinthic B-horizon);
- Soil horizons where grey colouration (Fe reduction and redox depletion), in an otherwise yellowish or reddish matrix, indicate saturated (or close to saturated) water flow for at least three months of the year (Unconsolidated/Unspecified material with signs of wetness);
- Soil horizons that are uniform in colouration and indicative of well-drained and aerated (oxidising) conditions (e.g. yellow brown apedal B-horizon).

5.3 WATER MOVEMENT IN THE LANDSCAPE

Water movement in a landscape is a combination of the different flow paths in the soils and geological materials. The movement of water in these materials is dominantly subject to gravity and as such it will follow the path of least resistance towards the lowest point. In the landscape

there are a number of factors determining the paths along which this water moves. **Figure 4** provides a simplified schematic representation of an idealised landscape (in "profile curvature". The total precipitation (rainfall) on the landscape from the crest to the lowest part or valley bottom is taken as 100 %. Most geohydrologists agree that total recharge, the water that seeps into the underlying geological strata, is less than 4 % of total precipitation for most geological settings. Surface runoff varies considerably according to rainfall intensity and distribution, plant cover and soil characteristics but is taken as a realistic 6 % of total precipitation for our idealised landscape. The total for surface runoff and recharge is therefore calculated as 10 % of total precipitation. If evapotranspiration (from plants as well as the soil surface) is taken as a very high 30 % of total precipitation it leaves 60 % of the total that has to move through the soil and/or geological strata from higher lying to lower lying areas. In the event of an average rainfall of 750 mm per year it results in 450 mm per year having to move laterally through the soil and geological strata. In a landscape there is an accumulation of water down the slope as water from higher lying areas flow to lower lying areas.

To illustrate: If the assumption is made that the area of interest is 100 m wide it follows that the first 100 m from the crest downwards has 4 500 m^3 (or 4 500 000 litres) of water moving laterally through the soil (100 m X 100 m X 0.45 m) per rain season. The next section of 100 m down the slope has its own 4 500 m^3 of water as well as the added 4 500 m^3 from the upslope section to contend with, therefore 9 000 m^3. The next section has 13 500 m^3 to contend with and the following one 18 000 m^3. It is therefore clear that, the longer the slope, the larger the volume of water that will move laterally through the soil profile.

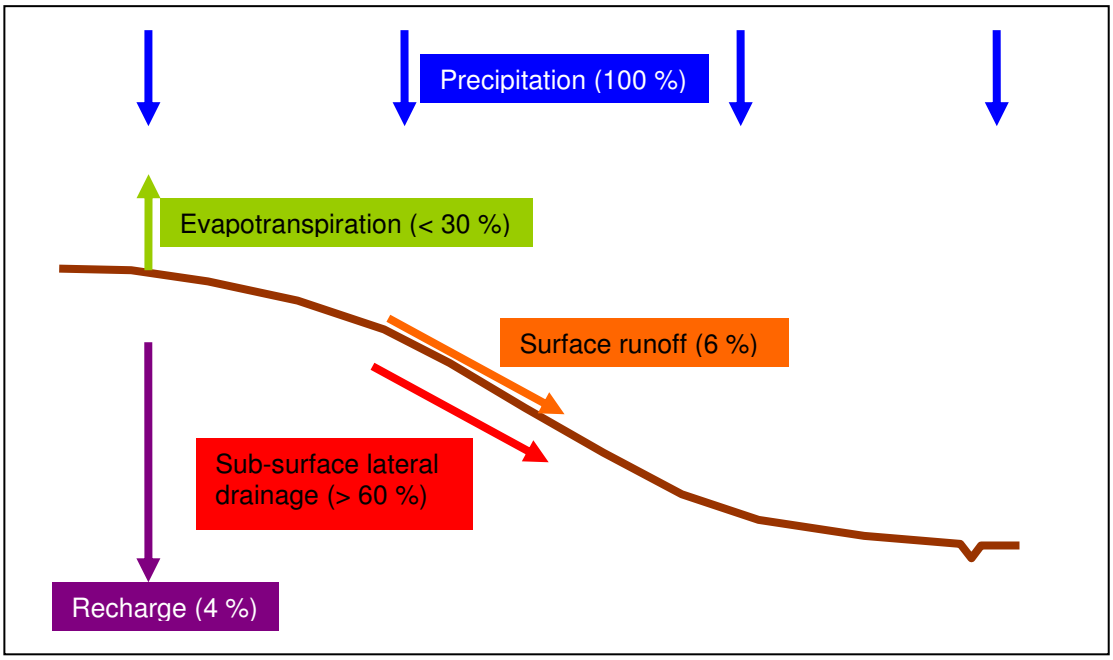

Figure 4 Idealised landscape with assumed quantities of water moving through the landscape expressed as a percentage of total precipitation (100 %).

Flow paths through soil and geological strata, referred to as “interflow” or “hillslope water”, are very varied and often complex due to difficulty in measurement and identification. The difficulty in identification stems more from the challenges related to the physical determination of these in soil profile pits, soil auger samples and core drilling samples for geological strata. The identification of the morphological signs of water movement in permeable materials or along planes of weakness (cracks and seams) is a well-established science and the expression is mostly referred to as “redox morphology”. In terms of the flow paths of water large variation exists but these can be grouped into a few simple categories. **Figure 5** provides a schematic representation of the different flow regimes that are usually encountered. The main types of water flow can be grouped as 1) recharge (vertically downwards) of groundwater; 2) lateral flow of water through the landscape along the hillslope (interflow or hillslope water); 3) return flow water that intercepts the soil/landscape surface; and 4) surface runoff. Significant variation exists with these flow paths and numerous combinations are often found. The main wetland types associated with the flow paths are: a) valley bottom wetlands (fed by groundwater, hillslope processes, surface runoff, and/or in-stream water); b) hillslope seepage wetlands (fed by interflow water and/or return flow water); and wetlands associated with surface runoff, ponding and surface ingress of water anywhere in the landscape.

Amongst other factors, the thickness of the soil profile at a specific point will influence the intensity of the physical and chemical reactions taking place in that soil. **Figure 6** illustrates the difference between a dominantly thick and a dominantly thin soil profile. If all factors are kept the same except for the soil profile thickness it can be assumed with confidence that the chemical and physical reactions associated with water in the landscape will be much more intense for the thin soil profile than for the thick soil profile. Stated differently: The volume of water moving through the soil per surface area of an imaginary plane perpendicular to the direction of water flow is much higher for the thin soil profile than for the thick soil profile. This aspect has a significant influence on the expression of redox morphology in different landscapes of varying soil/geology/climate composition.

5.4 THE CATENA CONCEPT

Here it is important to take note of the “catena” concept. This concept is one of a topographic sequence of soils in a homogenous geological setting where the water movement and presence in the soils determine the specific characteristics of the soils from the top to the bottom of the topography. **Figure 7** illustrates an idealised topographical sequence of soils in a catena for a quartz rich parent material. Soils at the top of the topographical sequence are typically red in colour (Hutton and Bainsvlei soil forms) and systematically grade to yellow further down the slope (Avalon soil form). As the volume of water that moves through the soil increases, typically in midslope areas, periodic saturated conditions are experienced and consequently Fe is reduced and removed in the laterally flowing water. In the event that the soils in the midslope positions are relatively sandy the resultant soil colour will be bleached or white due to the colour dominance of the sand quartz particles. The soils in these positions are typically of the Longlands and Kroonstad forms. Further down the slope there is an accumulation of clays and leaching products from higher lying

soils and this leads to typical illuvial and clay rich horizons. Due to the regular presence of water the dominant conditions are anaerobic and reducing and the soils exhibit grey colours often with bright yellow and grey mottles (Katspruit soil form). In the event that there is a large depositional environment with prolonged saturation soils of the Champagne form may develop (typical peat land). Variations on this sequence (as is often found on the Mpumalanga Highveld) may include the presence of hard plinthic materials instead of soft plinthite with a consequent increase in the occurrence of bleached soil profiles. Extreme examples of such landscapes are discussed below.

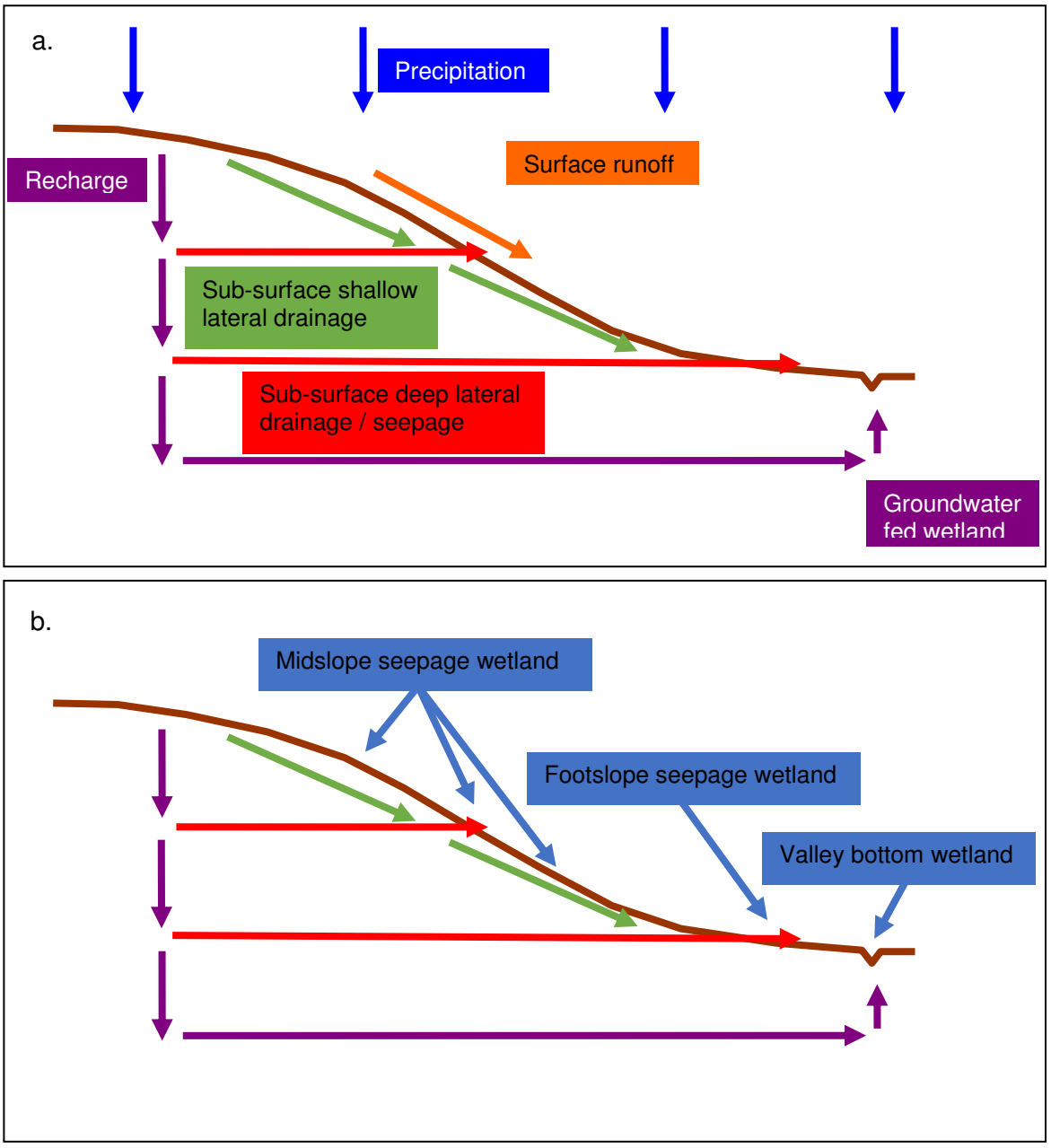

Figure 5 Different flow paths of water through a landscape (a) and typical wetland types associated with the water regime (b)

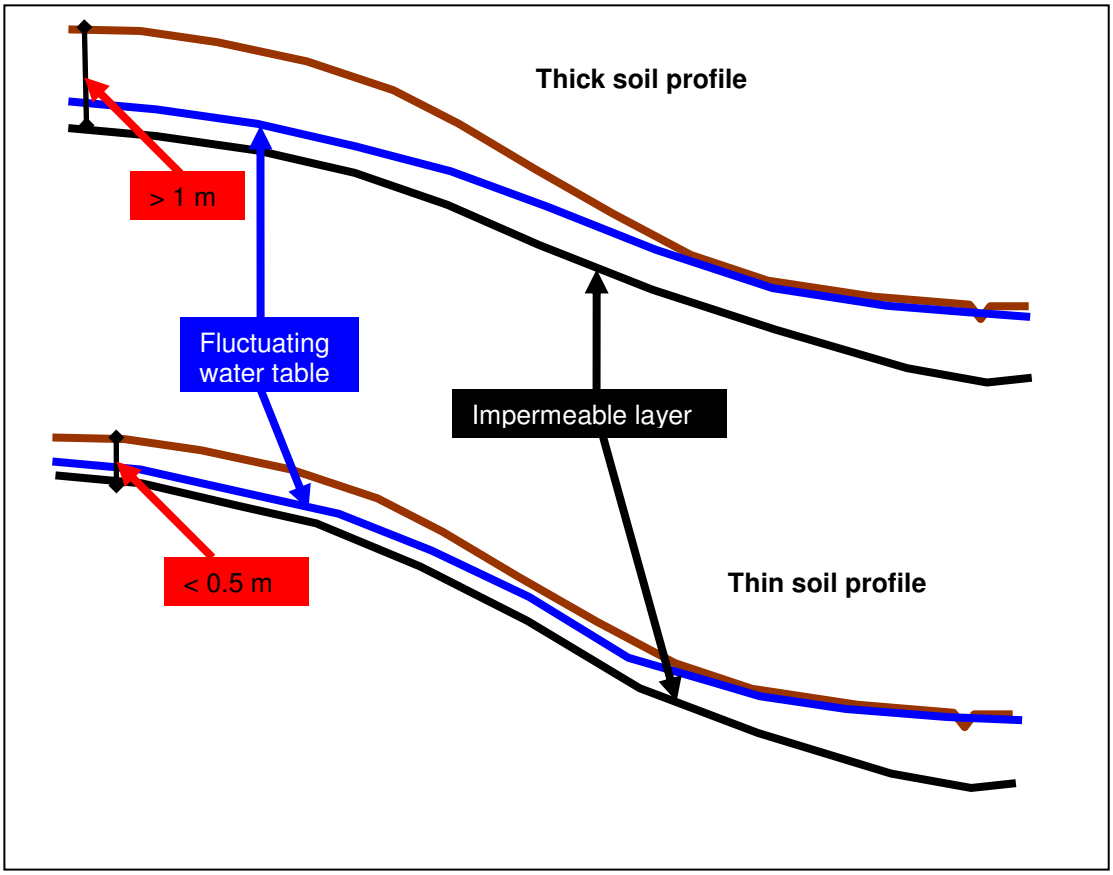

Figure 6 The difference in water flow between a dominantly thick and dominantly thin soil profile.

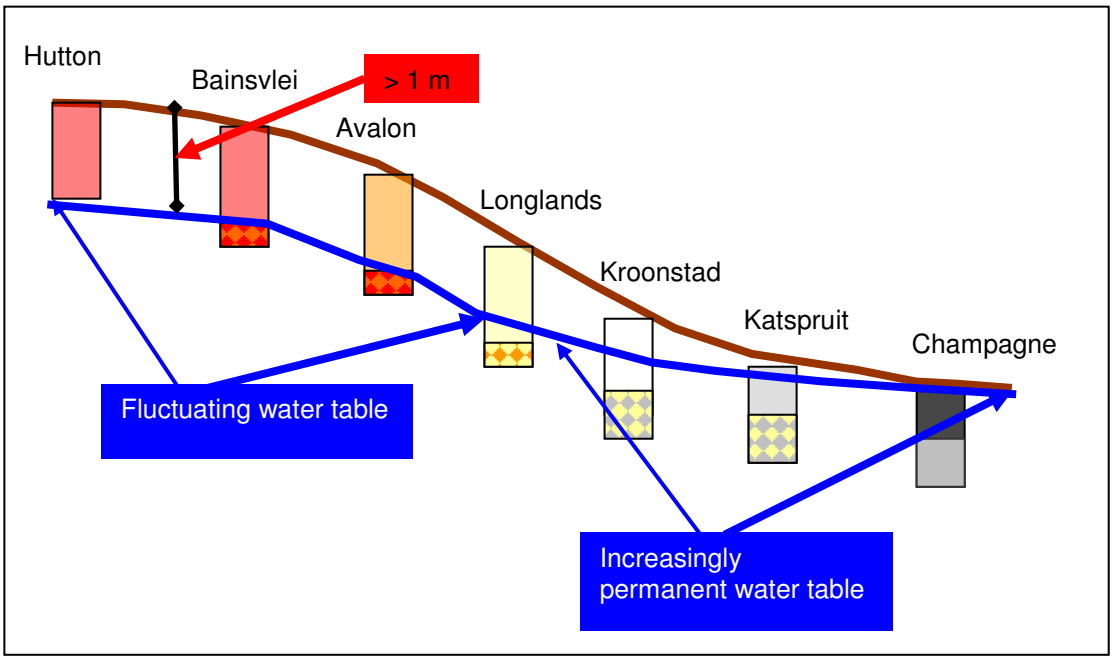

Figure 7 Idealised catena on a quartz rich parent material

5.5 CONVEX VERSUS CONCAVE LANDSCAPES IN AN IDEALISED CATENA

An additional factor of variation in all landscapes is the shape of the landscape along contours (referred to a "plan curvature"). Landscapes can be either concave or convex, or flat. The main difference between these landscapes lies in the fact that a convex landscape is essentially a watershed with water flowing in diverging directions with a subsequent occurrence of "dryer" soil conditions. In a concave landscape water flows in converging directions and soils often exhibit the wetter conditions of "signs of wetness" such as grey colours, organic matter and subsurface clay accumulation. **Figure 8** presents the difference between these landscapes in terms of typical soil forms encountered in an idealised catena. In the convex landscape the subsurface flow of water removes clays and other weathering products (including Fe) in such a way that the midslope position soils exhibit an increasing degree of bleaching and relative accumulation of quartz (E-horizons).

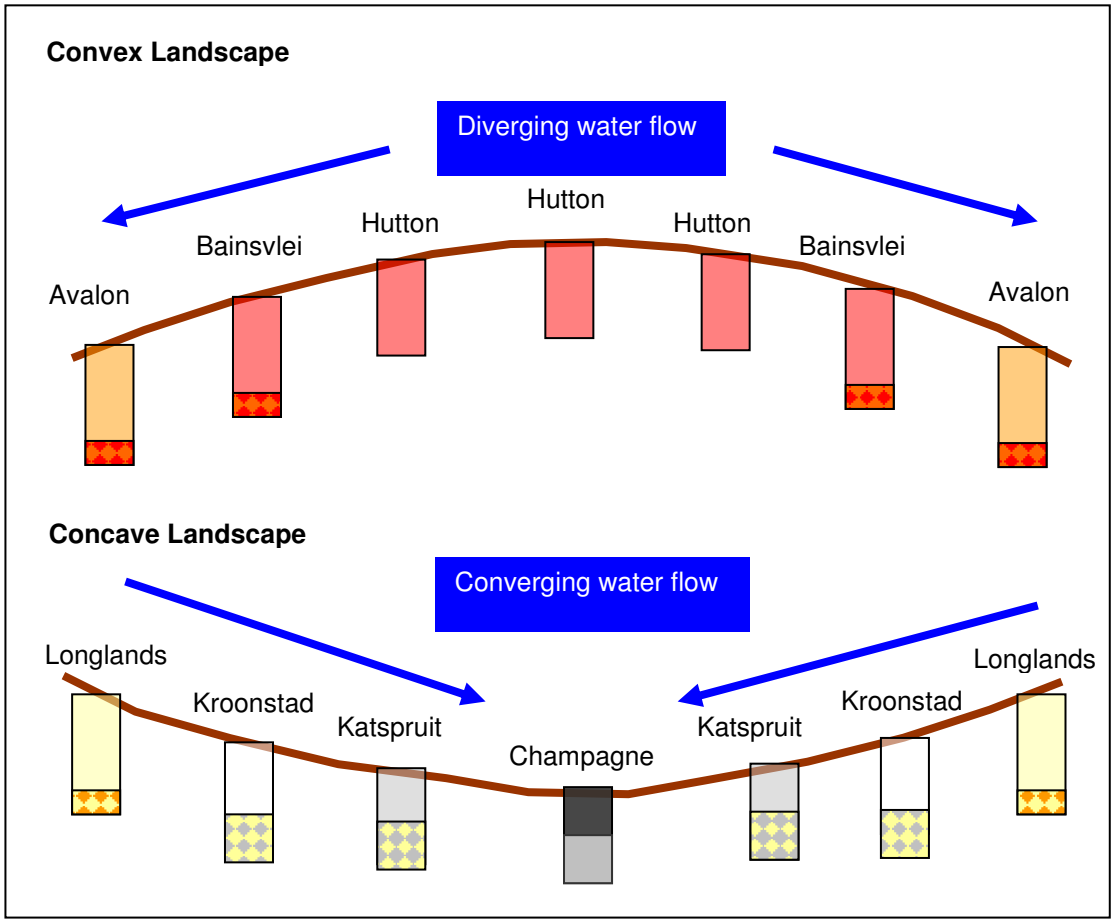

Figure 8 Schematic representation of the soils in convex and concave landscapes in an idealised catena

In the concave landscapes clays and weathering products are transported through the soils into a zone of accumulation where soils start exhibiting properties of clay and Fe accumulation. In addition, coarse sandy soils in convex environments tend to be thinner due to the removal of sand particles through erosion and soils in concave environments tend to be thicker due to colluvial

accumulation of material transported from upslope positions. Similar patterns are observed for other geological areas with the variation being consistent with the soil variation in the catena.

Often these concave and convex topographical environments occur in close proximity or in one topographical sequence of soils. This is often found where a convex upslope area changes into a concave environment as a drainage depression is reached (**Figure 9**). The processes in this landscape are the same as those described for the convex and concave landscapes above.

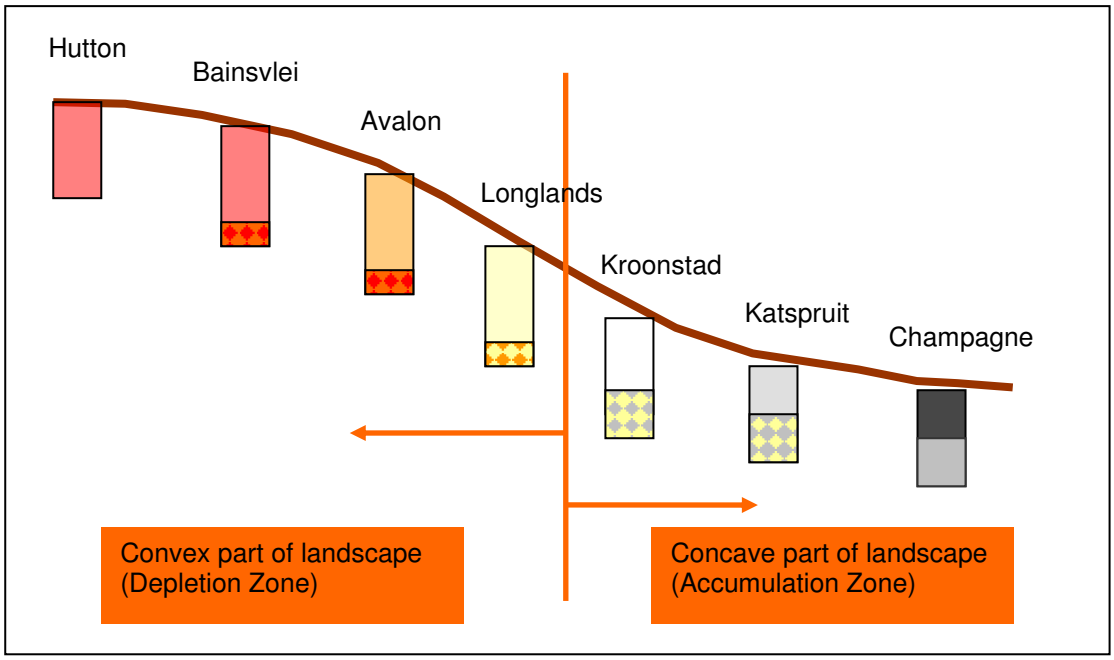

Figure 9 Schematic representation of the soils in a combined convex and concave landscape in an idealised catena.

5.6 THE BA9 LAND TYPE CATENA CHALLENGE

The Ba9 land type covers a large area of the eastern part of Pretoria and comprises a wide range of geological materials. As such it is not possible to describe a typical catena. In the north-eastern section the geology is dominated by shale and andesite or diabase. The shale leads to the formation of shallow soils in most areas and the formation of deeper silty soils in valley bottom positions. The diabase and andesite lead to the dominance of rocky soils on crests and highly structured soils in footslope and valley bottom positions. In the specific land type there are many instances of structured soil material overlying shale dominated subsoil material due to colluvial transport of the soil material. In these cases extensive areas of structured soils occur in gently sloping terrain

The typical catena that forms in the **Ab9** land type in the areas as discussed above is presented in **Figure 10**. It differs from the idealised one discussed above in the previous section in a number of respects namely that 1) the soils throughout the higher lying parts of the landscape are predominantly rocky with red structured clay soil, 2) the soils in the lower lying landscape positions

predominantly exhibit high clay content, structure and swelling properties and 3) the drainage features are dominated by younger soils that range from recently eroded and deposited alluvial material to soil with signs of incipient soil formation. The soils in the drainage features exhibit higher chroma than the structured soils immediately outside of the features and this aspect complicates the understanding of the drainage channels in a strict wetland delineation guideline context. A part of the elucidation problem is that fact that the structure soils with swelling properties allow for no lateral movement (or seepage) of water within the profile due to a very low saturated hydraulic conductivity. In such cases the dominant water flow regime is one of surface runoff with this runoff entering the drainage feature directly with the clear signs of erosion and surface soil removal once the vegetative cover has been compromised. The vegetation associated with these drainage features is very rarely classified as wetland vegetation. Rather, these drainage features exhibit a clear expression of riparian character in its tree, forb and grass species composition.

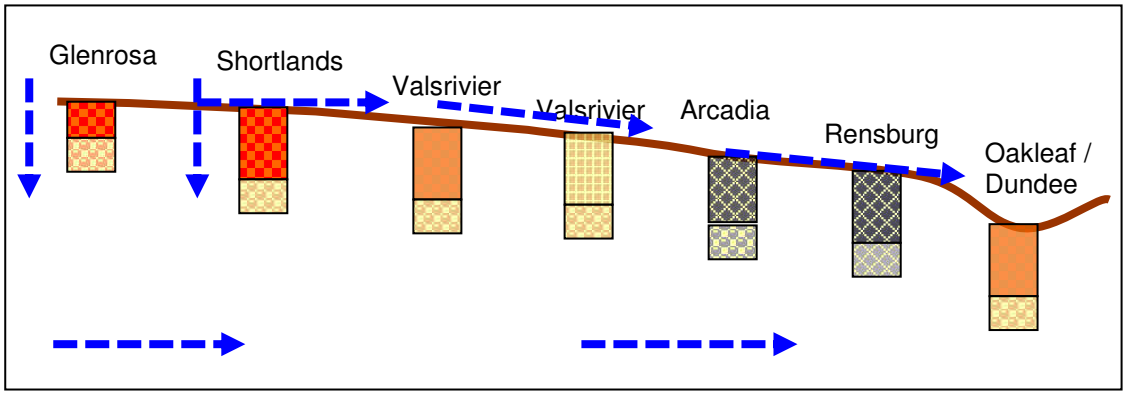

Figure 10 Idealised lower portion of the catena in the Ba9 land type in areas dominated by shale and basic igneous rock

A problematic aspect of this type of landscape in terms of wetland delineation is that the high clay content and often structured soils have a high base status with above neutral pH values. The specific clay minerals (2:1 swelling and non-swelling clays) that occur in these landscapes form under above neutral pH conditions. This aspect has very specific implications for the identification of morphological signs of wetness. Wetlands are invariably associated with the lowest points in the landscape and as such this aspect is critical (and therefore addressed in more detail later). Due to the high clay content (and often swelling nature) the soils are characterised predominantly by surface flow of water with very slow percolation rates through the profiles. Lateral flow of water on impervious layers is therefore not encountered with the exception being planes of weakness in the underlying weathered and hard rock. The drainage depressions in these landscapes often exhibit signs of high energy flow events in the form of eroded soils as well as young recently transported soil material.

Below follows a discussion on the expression of redox morphology in alkaline (swelling clay soils) environments.

5.7 REDOX MORPHOLOGY IN ALKALINE SOILS

Wetland delineation is a very challenging exercise in areas dominated by alkaline soils such as lime containing and/or vertic/melanic soils. This is mainly due to the almost complete absence of Fe-mottles in the soils that grade from the terrestrial to the wetland areas. There are a number of reasons that will be explained in more detail below.

In order to illustrate the stability and distribution of Fe minerals in soils the figure provided below (**Figure 11**) was copied from page 124 of a book entitled "Soil Chemistry" by Bohn, et al., (1990). The essence is that when reduction and oxidation reactions of Fe (in this case) are considered in soils both the electron activity (driver of reducing conditions) and pH have to be considered as they are intimately linked and dependent on each other. Suffice to say that for redox and mineral stability purposes they are indicated on the same graph. From Figure 4.6 (**Figure 11**) it is clear that as the Eh decreases (increasing reducing conditions) the dominant Fe species in solution changes from Fe^{3+} (insoluble and forming brightly coloured minerals) to Fe^{2+} (soluble and essentially colourless). Once pH is included in the observation it is clear that distinct Fe minerals come into play. Applying the decreasing Eh values to Fe minerals at high pH it is clear that the dominant Fe mineral under oxidizing conditions is FeOOH (Goethite – predominantly yellow). As the conditions become more reducing the equilibrium shifts to $FeCO_3$ (Siderite – white) and thereafter to FeS_2 (Pyrite). Whereas goethite has a distinct colour in soil, siderite and pyrite are less conspicuous in small quantities. It follows therefore that Fe minerals are much less visible in high pH reduced soils than in oxidised soils. In addition, vertic and melanic soils are dark coloured and it is therefore also clear that this dark colour will mask the presence of the above mentioned Fe minerals.

Another factor related to pH is the degree of reduction that is required to reduce Fe from its oxidised to its reduced state. From the graph it is clear that there is a steep decreasing gradient as the pH of the soil increases. This implies that much more intensive reducing conditions are required for the same degree of Fe reduction when high pH conditions (as those experienced in vertic and melanic soils) are compared to low pH conditions.

The situation becomes even more complex as other intermediate Fe minerals (blue green rusts) come into play. The essence of the presence of blue-green rusts is that they are tints that occur extensively in poorly drained and poorly aerated soils such as G-horizons under vertic and/or melanic A-horizons. These minerals are not stable and often disappear within a few minutes of exposure to the atmosphere. They in all probability form some of the most important Fe phases in vertic soils but disappear rapidly. Before they disappear it is also evident that these minerals are visible against a grey matrix but poorly visible against a black or dark background.

In essence therefore, a number of factors, including degree of reduction, soil pH and dominant Fe minerals, conspire against the use of Fe indicators in vertic, melanic and lime containing soils for the delineation of wetlands. There is no quick solution to this problem and delineators should use as many other indicators of wetland conditions in such soils as they can.

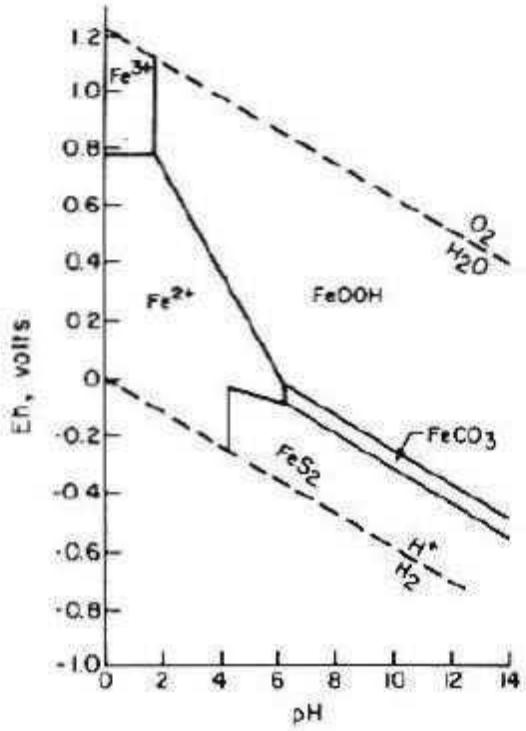

FIGURE 4.6. The *Eh*–pH diagram of various iron ions and compounds.

Figure 11 Eh pH diagram as sourced from Bohn, et al., (1990) p124

One word of caution: The wetland delineation guidelines (DWAF, 2005) indicate the Rensburg and Willowbrook soil forms as occurring in the permanent wetland zone. This is somewhat erroneous. Although these can occur in permanent wetland zones their formation is dependent on distinct cycling between wet and dry seasons. The development of 2:1 clays (found in these soils) depends on the accumulation of weathering products and clays in lower lying landscape positions. These clays are, depending on a range of factors, either swelling or non-swelling and their formation requires a distinct time (seasonally) where evaporation exceeds precipitation, with consequent drying of the soil, to lead to a concentration of bases (Ca and Mg). These clay minerals (such as smectite) often express themselves in the form of distinct cracks in Vertic soils. From this discussion it follows that the Rensburg and Willowbrook soils could only have formed in conditions that resemble a **seasonal wetland**. Drainage lines on the site can, if dominated by Rensburg or Willowbrook soils, therefore not be classified as permanent wetlands unless there are other characteristics indicating conditions of permanent saturation.

5.8 IMPLICATIONS FOR WETLAND DELINEATION AND APPLICATION OF THE GUIDELINES

The main implication for the delineation of wetlands and the application of the guidelines is the fact that highly variable conditions occur in the specific land type. The problem is compounded by the fact that the parent materials lead to the formation of high clay content soils of which the dominant ones are vertic in nature. As indicated earlier vertic soils are not necessarily and indication of wetland conditions and the determined wetland boundary in such environments is sometimes

incorrect. One set of indicators of hydromorphism cannot be used as many of the clayey soils do not exhibit mottling or grey colours. A delineation exercise is therefore a complex process with a very distinct possibility of not elucidating the hydrological parameters needed for the making of informed decision regarding the impact of the development on the wetland.

5.9 IMPLICATIONS FOR WETLAND CONSERVATION IN URBAN ENVIRONMENTS

Whether an area is designated a wetland or not loses some of its relevance once drastic influences on landscape hydrology are considered. If wetlands are merely the expression of water in a landscape due to proximity to the land surface (viz. the 50 cm mottle criterion in the delineation guidelines) it follows that potentially large proportions of the water moving in the landscape could fall outside of this sphere – as discussed in detail above. **Figures 12** and **13** provide schematic representations (as contrasted with **Figure 5**) of water dynamics in urban environments with distinct excavations and surface sealing activities respectively.

Through the excavation of pits (**Figure 12**) for the construction of foundations for infrastructure or basements for buildings the shallow lateral flow paths in the landscape are severed. As discussed above these flow paths can account for up to 60 % of the volume of water entering the landscape in the form of precipitation. These severed flow paths often lead to the ponding of water upslope from the structure with a subsequent damp problem developing in buildings. Euphemistically we have coined the term “wet basement syndrome” (WBS) to describe the type of problem experienced extensively on the HHGD. A different impact is experienced once the surface of the land is sealed through paving (roads and parking areas) and the construction of buildings (in this case the roof provides the seal) (**Figure 13**). In this case the recharge of water into the soil and weathered rock experienced naturally is altered to an accumulation and concentration of water on the surface with a subsequent rapid flowing downslope. The current approach is to channel this water into storm water structures and to release it in the nearest low lying position in the landscape. These positions invariable correlate with drainage features and the result is accelerated erosion of such features due to a drastically altered peak flow regime.

The result of the above changes in landscape hydrology is the drastic alteration of flow dynamics and water volume spikes through wetlands. This leads to wetlands that become wetter and that experience vastly increased erosion pressures.

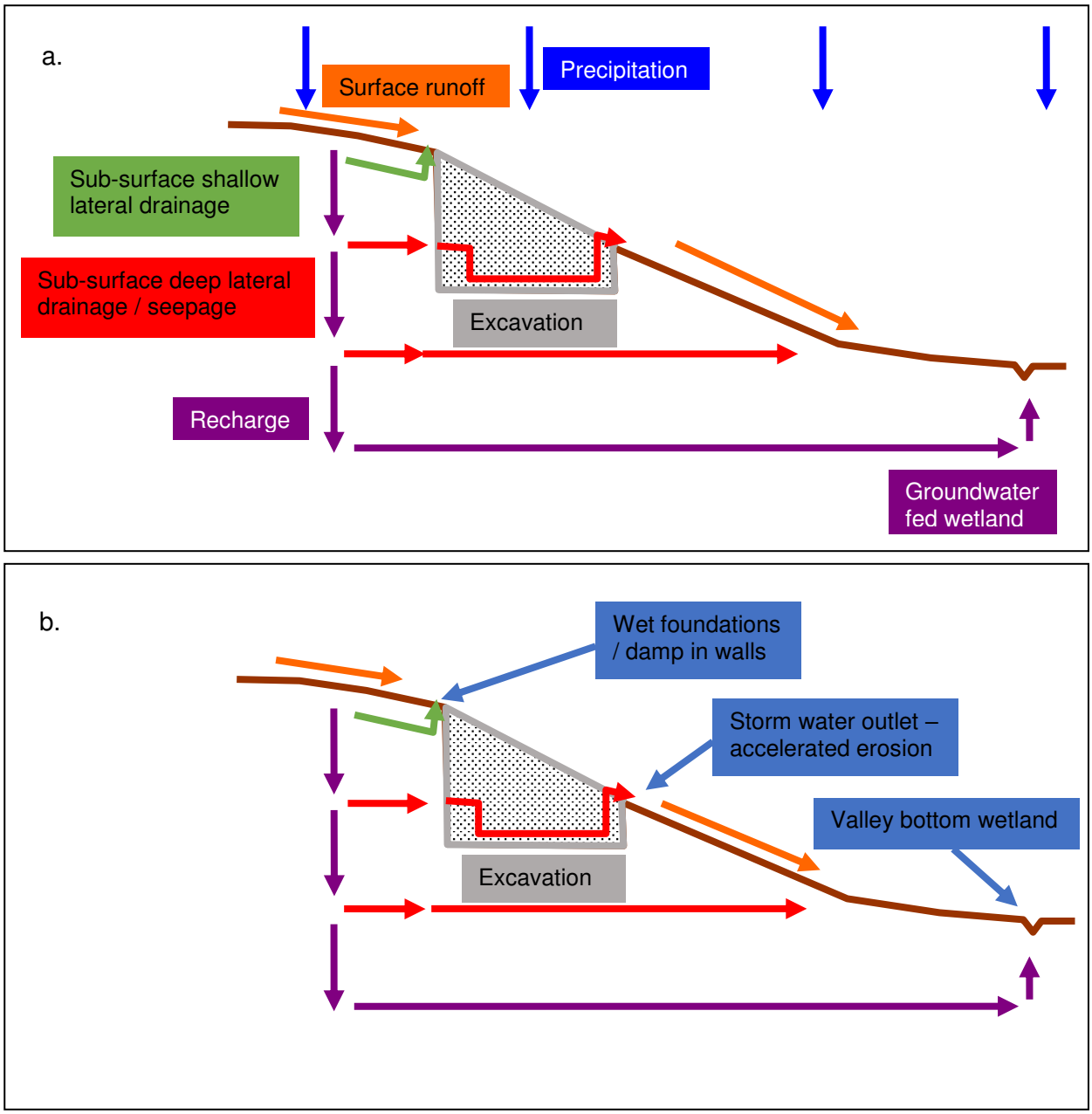

Figure 13 Different flow paths of water through a landscape with an excavated foundation (a) and typical wetland types associated with the altered water regime (b)

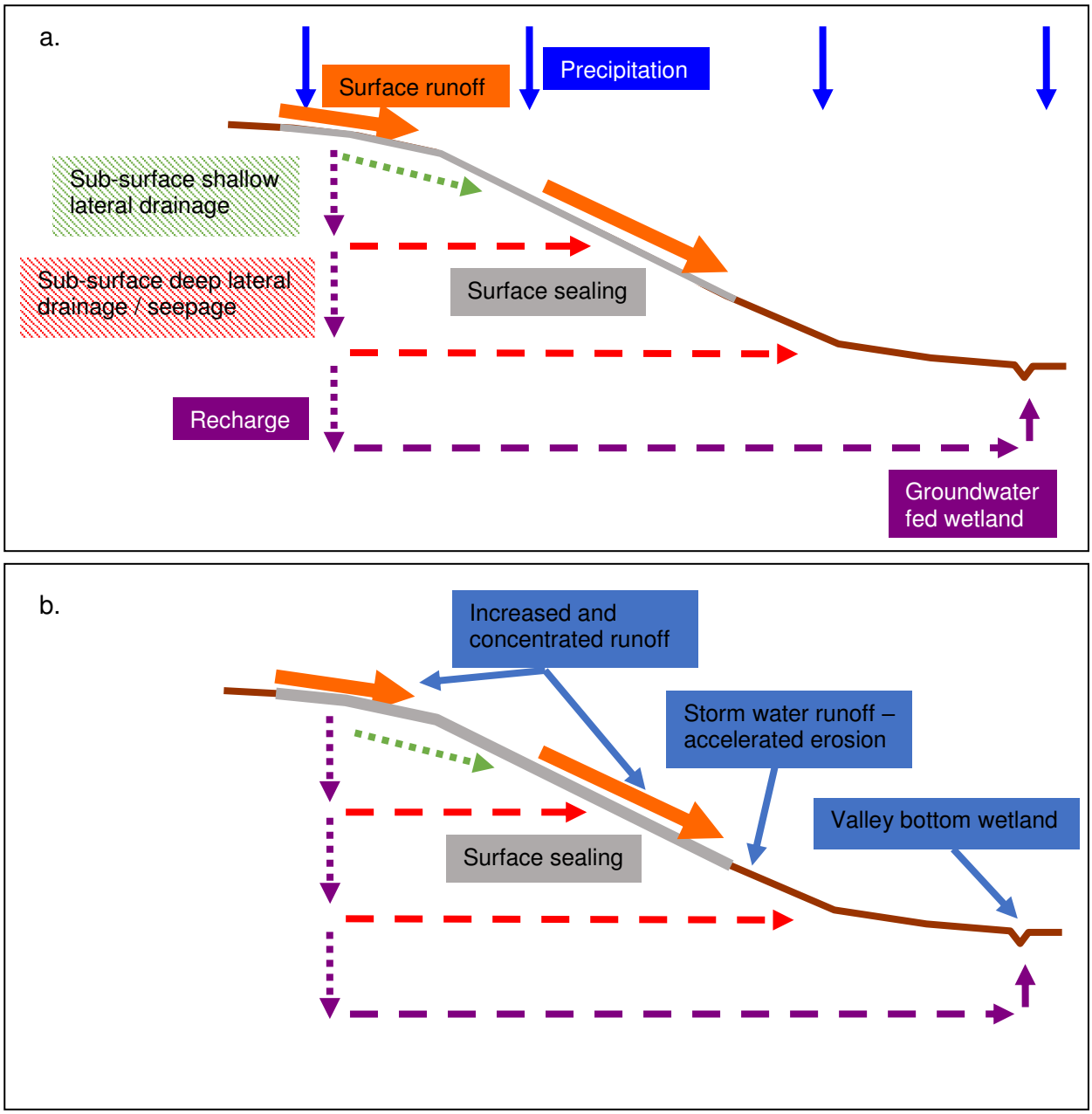

Figure 14 Different flow paths of water through a landscape with surface sealing (buildings and paving) (a) and typical wetland types associated with the altered water regime (b)

5.10 RECOMMENDED ASSESSMENT APPROACH – HYDROPEDOLOGY INVESTIGATION

5.10.1 Hydropedology Background

The identification and delineation of wetlands rest on several parameters that include topographic, vegetation and soil indicators. Apart from the inherent flaws in the wetland delineation process, as discussed earlier in this report, the concept of wetland delineation implies an emphasis on the wetlands themselves and very little consideration of the processes driving the functioning and presence of the wetlands. One discipline that encompasses a number of tools to elucidate landscape hydrological processes is “hydropedology” (Lin, 2012). The crux of the understanding of

hydropedology lies in the fact that pedology is the description and classification of soil on the basis of morphology that is the result of soil and landscape hydrological, physical and chemical processes. But, the soils of which the morphology are described, also take part in and intimately influence the hydrology of the landscape. Soil is therefore both an indicator as well as a participator in the processes that require elucidation.

Wetlands are merely those areas in a landscape where the morphological indicators point to prolonged or intensive saturation near the surface to influence the distribution of wetland vegetation. Wetlands therefore form part of a larger hydrological entity that they cannot be separated from.

5.10.2 Hydropedology – Proposed Approach

In order to provide detailed pedohydrological information both detailed soil surveys and hydrological investigations are needed. In practice these intensive surveys are expensive and very seldom conducted. However, with the understanding of soil morphology, pedology and basic soil physics parameters as well as the collection and interpretation of existing soil survey information, assessments at different levels of detail and confidence can be conducted. In this sense four levels of investigation are proposed namely:

1. Level 1 Assessment: This level includes the collection and generation of all applicable remote sensing, topographic and land type parameters to provide a “desktop” product. This level of investigation rests on adequate experience in conducting such information collection and interpretation exercises and will provide a broad overview of dominant hydropedological parameters of a site. Within this context the presence, distribution and functioning of wetlands will be better understood than without such information.
2. Level 2 Assessment: This level of assessment will make use of the data generated during the Level 1 assessment and will include a reconnaissance soil and site survey to verify the information as well as elucidate many of the unknowns identified during the Level 1 assessment.
3. Level 3 Assessment: This level of assessment will build on the Level 1 and 2 assessments and will consist of a detailed soil survey with sampling and analysis of representative soils. The parameters to be analysed include soil physical, chemical and mineralogical parameters that elucidate and confirm the morphological parameters identified during the field survey.
4. Level 4 Assessment: This level of assessment will make use of the data generated during the previous three levels and will include the installation of adequate monitoring equipment and measurement of soil and landscape hydrological parameters for an adequate time period. The data generated can be used for the building of detailed hydrological models (in conjunction with groundwater and surface hydrologists) for the detailed water management on specific sites.

For most wetland delineation exercises a Level 2 or Level 3 assessment should be adequate. For this investigation a Level 2 assessment was conducted due to the extensive urban development in the area and on the site.

The process of the hydropedology assessment entails the aspects listed in the methodology description below. These items also correspond with the proposed PES assessment methodology discussed in section 4.4.4. The results of the assessment will therefore be structured under the headings as provided below.

6. METHOD OF SITE INVESTIGATION

6.1 WETLAND CONTEXT DETERMINATION

For the purposes of the wetland assessment the context of the specific wetland was determined. This was done through the thorough consideration of the geological, topographical, climatic, hydropedological and catchment context of the site. In this sense the relative contribution of water flow from the catchment upstream was compared to the contribution from the slopes on the specific site. The motivation being that the larger the contribution of the catchment upstream the smaller the impacts of the proposed developments on the site would be in terms of modification of the wetland. The elements of context are described in more detail below.

6.2. AERIAL PHOTOGRAPH INTERPRETATION

An aerial photograph interpretation exercise was conducted through the use of Google Earth images of the site. This data was used to obtain an indication of the extent of the wetlands on the site as well as to provide an indication of the artificial modifiers evident on the site and in the catchment.

6.3 TERRAIN UNIT INDICATOR

Detailed contours of the site were used to provide an indication of drainage depressions and drainage lines. From this data the terrain unit indicator was deduced.

6.4 SOIL FORM AND SOIL WETNESS INDICATORS

The soil form and wetness indicators were assessed on the site through a dedicated soil survey within the context of the description as provided in sections 5.5 to 5.7.

Historical impacts were identified as the impacts on the soils are very distinct. Soil characteristics could therefore be used to provide a good indication of the historical impacts on the grounds of a forensic approach. In areas where soil impacts are limited the standard approach in terms of identification of soil form and soil wetness indicators was used.

6.5 VEGETATION INDICATOR

Due to the extent of the historical impacts as well as the timing of the investigation a dedicated vegetation survey for the purpose of wetland delineation was not conducted. Relevant vegetation parameters were noted and these are addressed in the report where applicable.

6.6 ARTIFICIAL MODIFIERS

Artificial modifiers of the landscape and wetland area were identified during the different components of the investigation and are addressed in the context of the wetland management plan.

7. SITE SURVEY RESULTS AND DISCUSSION

7.1 WETLAND CONTEXT

The land type, topography and geological setting of the site have been elucidated in sections 2, 5.6 and 5.7 of this document. The most important aspect to keep in consideration here is the explanation of the challenges to wetland delineation in alkaline soils in section 5.7. The wetland under investigation is limited to a stream / watercourse that runs along the eastern border of the site. The catchment of the wetland / watercourse is situated to the south in a built-up area that comprises Silver Lakes and its associated developments as well as the N4 highway. The investigation into the wetland on the site indicated that there are several historical impacts and modifiers applicable. These are discussed in further detail below through the use of historical Google Earth images spanning the period 2004 to 2015.

7.2 AERIAL PHOTOGRAPH INTERPRETATION

The Google Earth images of the site were used to identify specific impacts and their timing in high resolution. **Figure 15** indicates the land use during 2005 compared to 2015. The main changes on the site are the cessation of crop production and the increase in dumping of rubble (**Figures 16** and **17**). It is evident that the entire site, excluding the watercourse and shallow soil areas to the southwest was used for the production of crops and therefore tilled. The soils of the site will be discussed later but it is important to note that the entire crop production area is characterised by structured swelling soils (often erroneously associated with wetland conditions) and that the crop stands indicate no signs of poor growth due to waterlogging. It is therefore safe to assume that no waterlogging occurred on these soils and that, given that the crops grow during the wet season, there was no permanent or even seasonal wetland zone associated with the tilled area.

Figure 15 Google Earth images from 2005/04/21 (top) and 2015/09/09 (bottom) indicating land use changes on and around the site as well as dumping of rubble (yellow arrows)

Figure 16 Dumping of rubble on the site

Figure 17 Dumping of rubble on the site

7.3 TERRAIN UNIT INDICATOR

The contour data for the site was used to generate a topographic wetness index (TWI) (**Figure 18**).

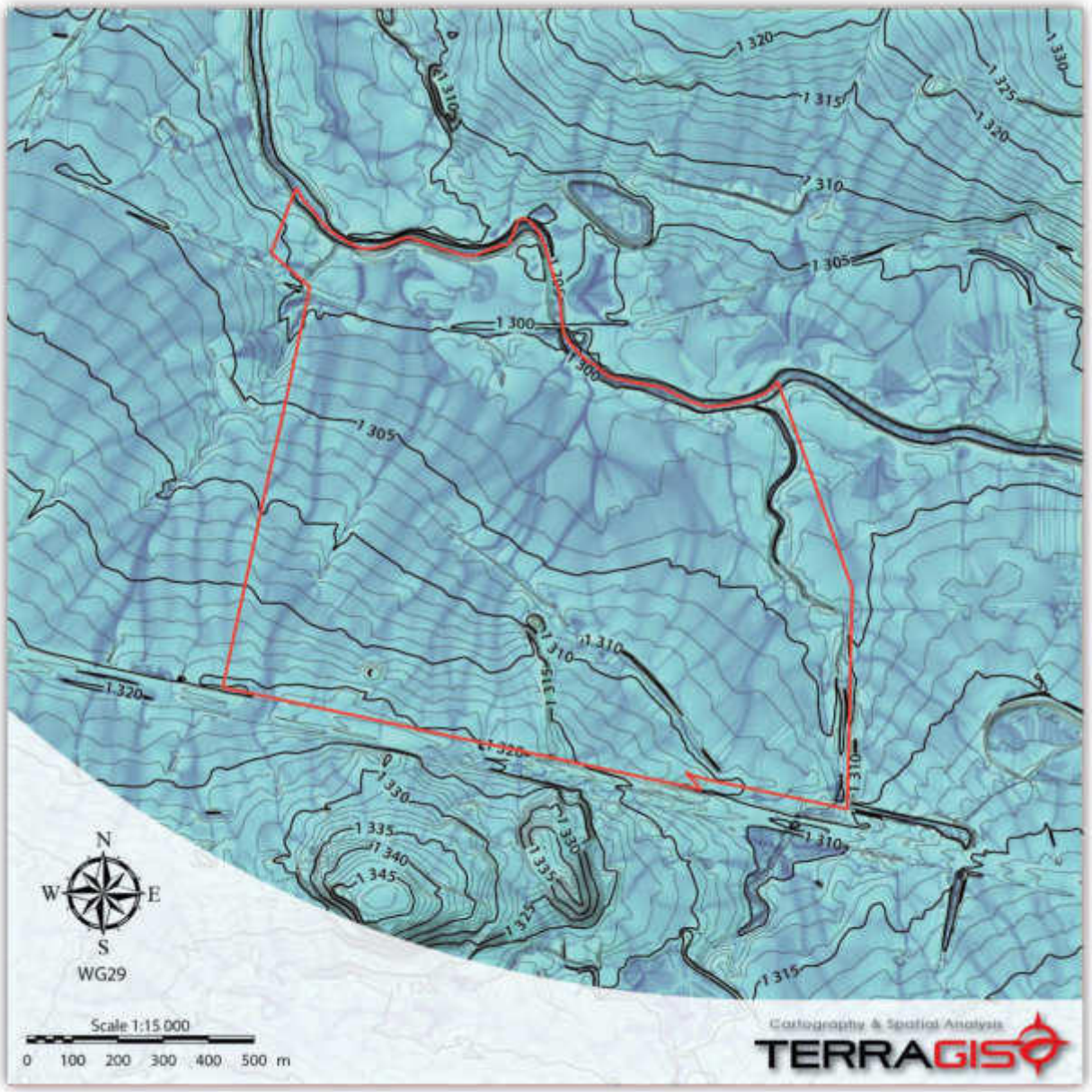

Figure 18 Topographic wetness index (TWI) of the survey site

From extensive experience on the field of hydropedology it is evident that the TWI provides a very accurate indication of water flow paths and areas of water accumulation that are often correlated with wetlands. This is a function of the topography of the site and ties in with the dominant water flow regime in the soils and the landscape (refer to previous section where the concept of these flows was elucidated). Areas in darker shades of blue indicate concentration of water in flow paths with lighter shades of blue indicating areas with very little surface water flow.

From the terrain unit indicator it is evident that the site is not characterised by any other watercourses or concentrated water flow areas that may form wetlands. The only area that qualifies as a distinct watercourse (from the site investigation) exhibits no signs of concentrated flow emanating from the specific site. This leads to the conclusion that the water flowing in the watercourse / stream emanates from upslope areas to the south of the site.

7.4 SOIL FORM AND SOIL WETNESS INDICATORS (AND VEGETATION)

A reconnaissance soil survey conducted during the wetland investigation indicated that the site consisted of four distinct soil zones (**Figure 19**). These are: 1) rocky soils and rock outcrops to the south; 2) shallow and high chroma structured soils on shale predominantly on the eastern section of the site, 3) a band of structured swelling soils from north to south along the eastern edge of the site and 4) young and alluvial soils associated with the drainage feature on the eastern edge.

Figure 19 Generalised soil map of the investigation site

The following soils were found to dominate in the four soil areas:

1. Rocky soils and rock outcrops to the south: Mispah (Ms – orthic A horizon / hard rock) and Glenrosa (Gs – orthic A horizon / lithocutanic B horizon) (**Figures 20** and **21**);
2. Shallow and high chroma structured soils on shale predominantly on the eastern section of the site: Glenrosa (Gs – orthic A horizon / lithocutanic B horizon), Valsrivier (Va – orthic A horizon / pedocutanic B horizon / unconsolidated material without signs of wetness) and Swartland (Sw – orthic A horizon / pedocutanic B horizon / lithocutanic B horizon) (**Figures 22**);
3. Structured swelling soils: Rensburg (Rg – vertic A horizon / G horizon) and Arcadia (Ar – vertic A horizon / unspecified – usually hard or weathering rock) (**Figures 23** to **25**); and
4. Young and alluvial soils associated with the drainage feature on the eastern edge: Oakleaf (Oa – orthic A horizon / neocutanic B horizon / unspecified material without signs of wetness), Dundee (Du – orthic A horizon / stratified alluvium) and Valsrivier (Va – orthic A horizon / pedocutanic B horizon / unconsolidated material without signs of wetness) (**Figures 26** to **30**).

None of the soils on the site qualify as wetland soils as described in the wetland delineation guidelines. Sections 5.6 and 5.7 provide a contextualisation of the structured soils indicated on the map as Rensburg and Arcadia. From the soil map it is evident that the distribution of the vertic soils on the site is landscape and geology related rather than wetness related. In this sense the Rensburg soils found on the site are not considered to be wetland soils but rather soils with poor internal drainage only. As discussed earlier, these soils often occur in level topography where geological drivers dominate without any wetland associated drivers.

The soils that are considered to be indicative of watercourse conditions are the Oakleaf and Dundee forms. Although these exhibit no signs of wetness or redox morphology (by definition) they are indicative of high energy erosion and deposition environments with varying degrees of soil formation. In this sense these soils fall within the category of riparian zone soils and as such form the basis for the wetland delineation outcome below.

7.5 VEGETATION INDICATORS

Although a dedicated vegetation survey was not conducted it was observed that extensive alien vegetation (especially tree species) has established within the riparian zone identified in this report (**Figures 31** to **33**).

7.6 ARTIFICIAL MODIFIERS

The historical artificial modifiers within the drainage feature / watercourse are considered to be limited to erosion and deposition of materials on an accelerated basis due to intensifying human activities upslope in the catchment. On the other parts of the site the historical modifiers include extensive soil surface alteration through tillage as well as large areas of rubble dumping.

Figure 20 Rocky soils in the southern part of the site

Figure 21 Rocky soils in the southern part of the site

Figure 22 High chroma structured soils in the western part of the site

Figure 23 Rocky soils in the southern part of the site

Figure 24 Rocky soils in the southern part of the site

Figure 25 Rocky soils in the southern part of the site

Figure 26 Eroded channel along the watercourse

Figure 27 Eroded channel along the watercourse

Figure 28 Eroded channel along the watercourse

Figure 29 Eroded channel along the watercourse

Figure 30 Exposed lime nodules in a subsoil horizon with surface horizons removed through erosion along the watercourse

Figure 31 Riparian vegetation along the watercourse

Figure 32 Eucalyptus trees along the watercourse

Figure 33 Syringa trees along the watercourse

8. WETLAND ASSESSMENT

8.1 PROPOSED DELINEATION AND BUFFER

The wetland area is limited to the watercourse and as such the riparian character dominates. The outcome of a riparian wetland delineation is provided in **Figure 34**. Due to the fact that the watercourse is not fed significantly from water emanating form the specific site but rather from water generated upslope in the catchment an extensive buffer is considered unnecessary. Rather, effort should be made to conserve the current riparian zone, stabilise the banks of the channel and remove alien vegetation.

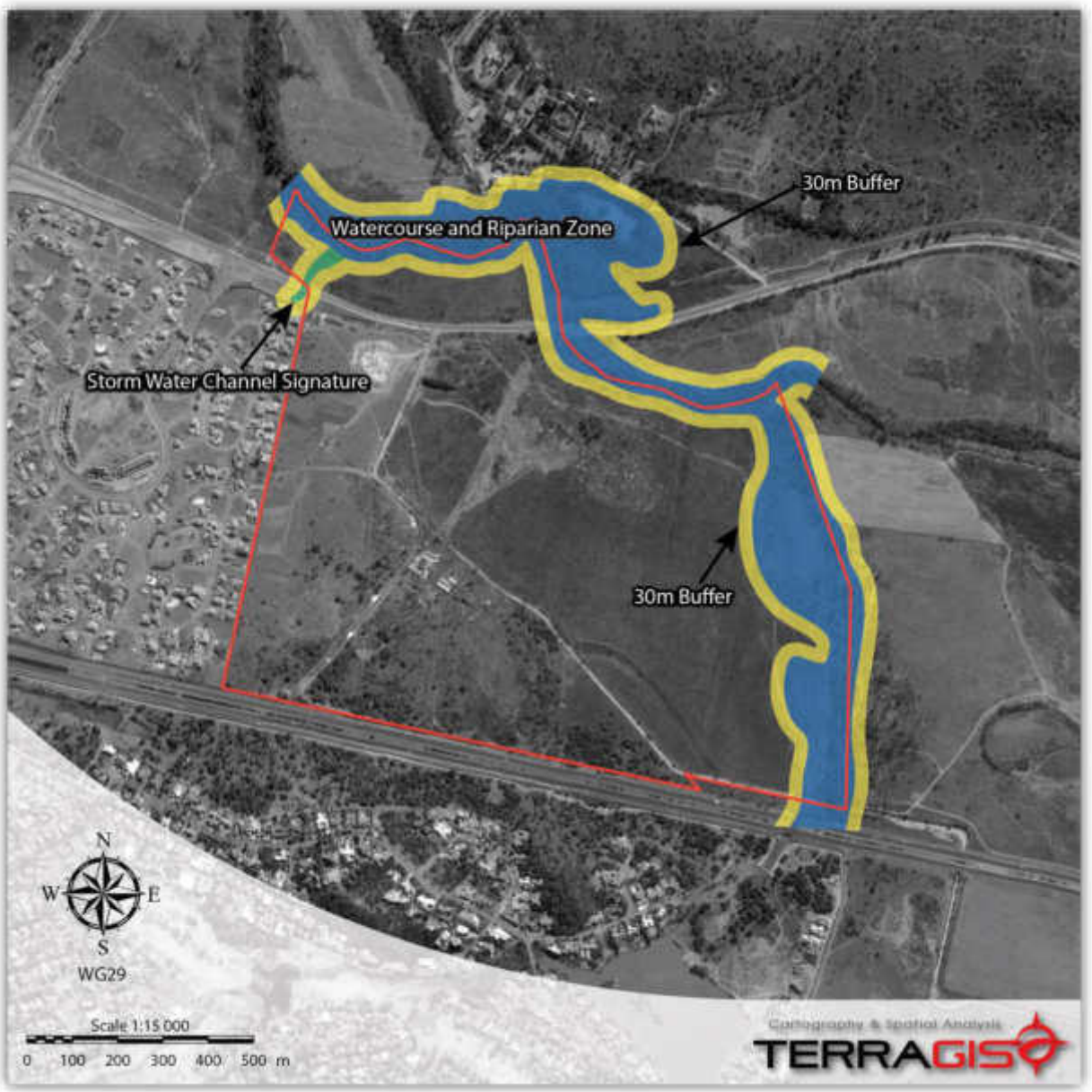

Figure 34 Wetland area on the site

8.2 WETLAND CLASSIFICATION / TYPES

Based on the information generated in this document the wetland area is classified as an erosion impacted watercourse with riparian vegetation.

8.3 WETLAND FUNCTIONALITY

The functionality of the watercourse is dominantly the channelling of water from the upslope areas through the site to the Pienaars River. The catchment area has been altered significantly through urban infrastructure development and as such storm water pulses are expected to increase in size within the watercourse on the site.

8.4 PRESENT ECOLOGICAL STATUS (PES) DETERMINATION

Hydrological Criteria:

- Flow modification: Large modification due to urban infrastructure in the catchment with significant erosion in the channel and on the banks. Score 2, Confidence 4.
- Permanent inundation: Permanent inundation not possible due to the extensive modification as well as the rainfall and catchment characteristics. Permanent inundation not part of the reference state. Score 2, Confidence 4.

Water Quality Criteria

- Water quality modification: Score 2, Confidence 4
- Sediment load modification: Score 2, Confidence 4

Hydraulic / Geomorphic Criteria

- Canalisation: Score 2, Confidence 4
- Topographic Alteration: Score 3, Confidence 4

Biological Criteria

- Terrestrial encroachment: Score 2, Confidence 3
- Indigenous vegetation removal: Score 2, Confidence 4
- Invasive plant encroachment: Score 1, Confidence 3
- Alien fauna: Score 2, Confidence 3
- Overutilisation of biota: Score 1, Confidence 4

Score

PES category D-E

From the data generated as well as the extent of the identified alterations the conclusion is that the watercourse system on the site has a PES rating of a D to an E. This is mainly due to the extensive alteration of runoff characteristics in the catchment as well as the alteration of the channel and encroachment of alien plant species.

9. IMPACTS OF INFRASTRUCTURE

9.1 INFRASTRUCTURE TYPES

The proposed infrastructure developments on the site that will encroach on the wetland area are (detailed engineer drawings to be viewed on the relevant plans not included in this report):

1. Storm water infrastructure and pipelines (**Figure 35**);
2. Sewer infrastructure and pipelines (**Figure 36**);
3. Water pipeline infrastructure (**Figure 37**);
4. Bridge over the watercourse (Option 1: **Figure 38**; Option 2: **Figure 39**)
5. Electrical infrastructure crossing the storm water channel / culvert (**Figure 40**)

Figure 35 Extract from engineer drawings of storm water pipelines and layout

Figure 36 Extract from engineer drawings of sewer pipelines and layout

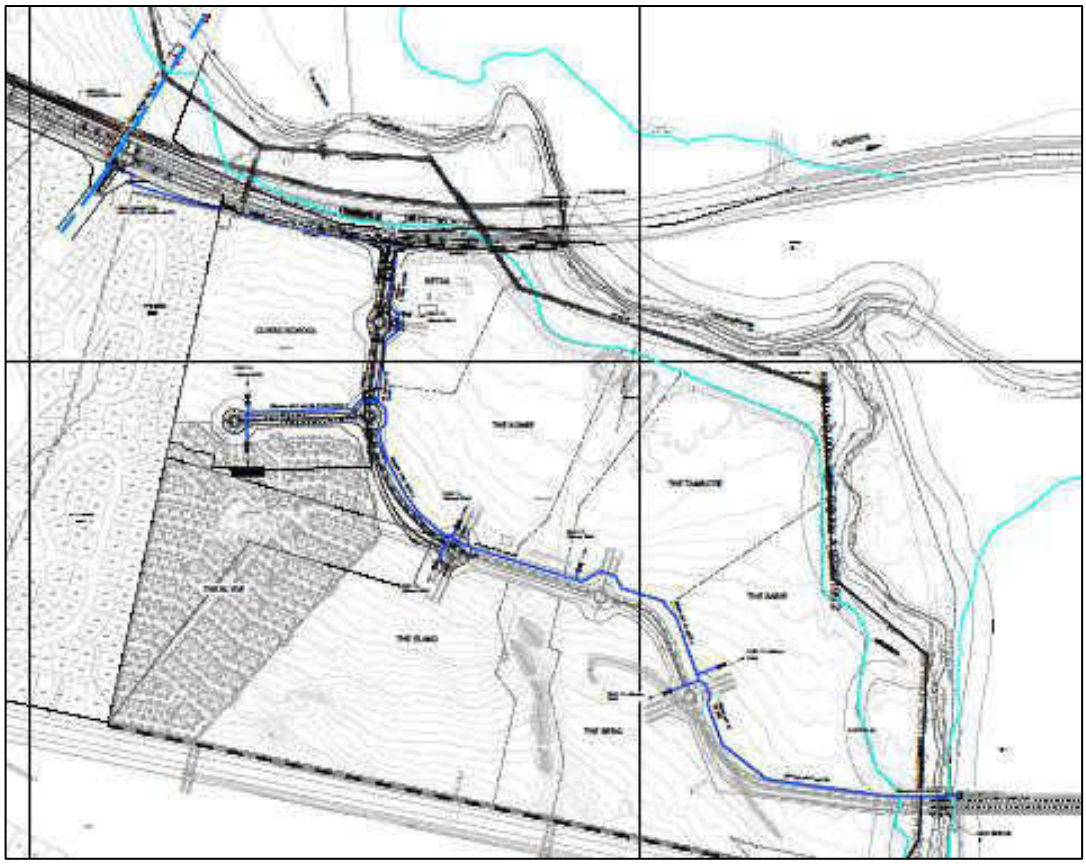

Figure 37 Extract from engineer drawings of water pipelines and layout

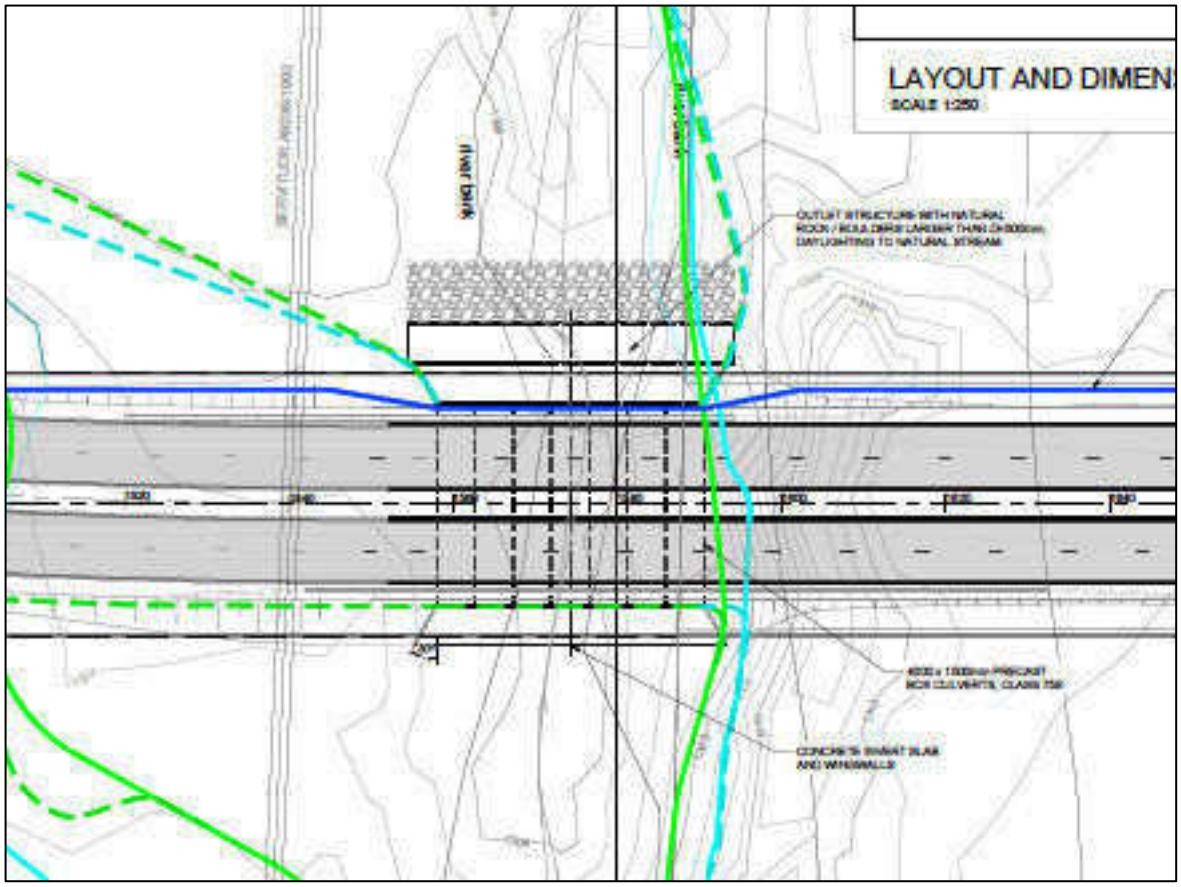

Figure 38 Extract from engineer drawings of bridge layout Option 1

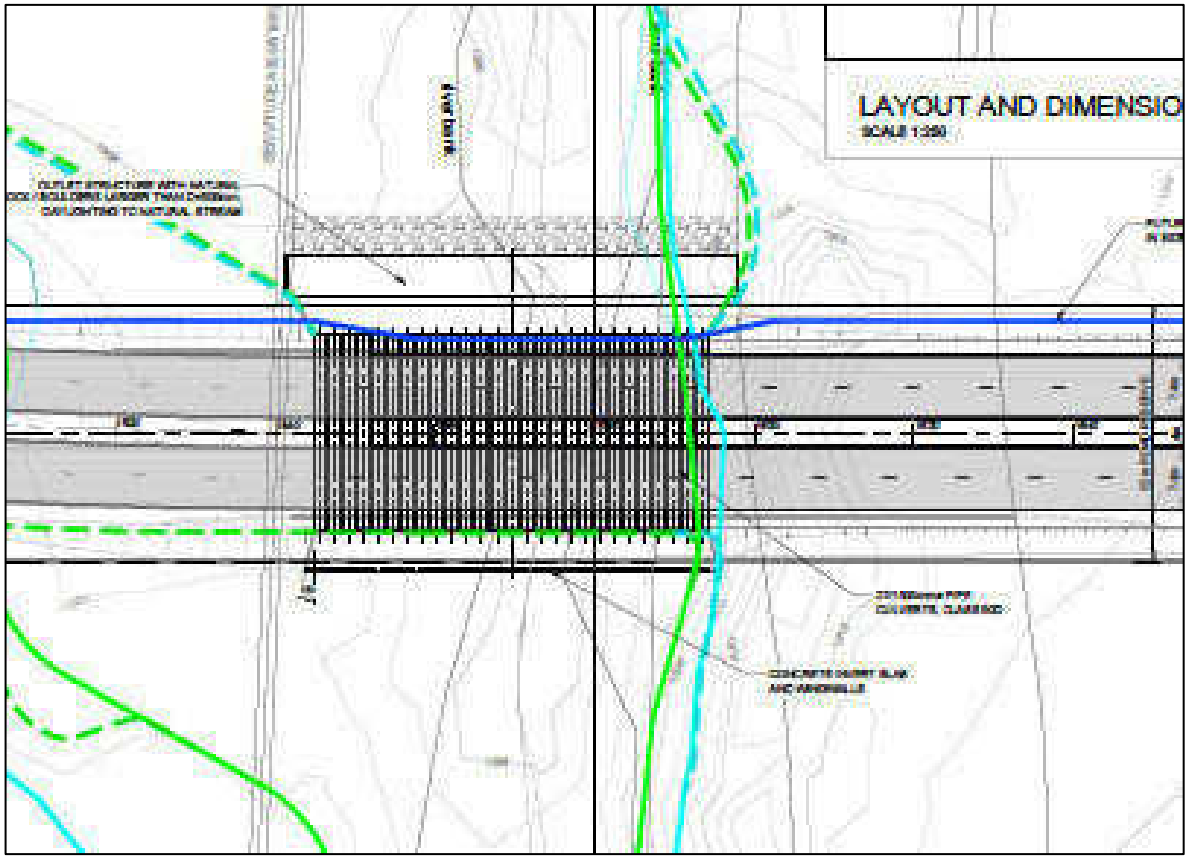

Figure 39 Extract from engineer drawings of bridge layout Option 2

Figure 40 Electrical infrastructure for the development running in the road reserve and crossing a wetland / storm water structure

9.2 MITIGATION MEASURES AND REHABILITATION STRATEGY

IMPORTANT NOTE: The mitigation and rehabilitation measures for the pipeline cannot be separated from the impacts expected for the development for which the pipeline is earmarked. The mitigation measures and rehabilitation strategy will therefore be discussed in the context of the future developments as well as the current state of the site.

The important mitigation measures for the construction and maintenance of the infrastructure include the following:

1. Sediment generation should be prevented through adequate housekeeping during construction as the swelling soils are particularly dispersive and erodible. The specific mitigation measures should be generated by the project engineer and implemented by the site manager. These measure include:
   a. The establishment of earth bunds on the downslope area to trap sediment.
   b. Timing of the excavation (if possible) to coincide with the dry season.
   c. Compaction of fill material on the surface to increase hardness and resistance to erosion. This is not possible if swelling soil material is used and it is recommended non-swelling soil material be used for the infilling.

d. Identification of preferential flow areas of water on the surface (as a function of local topography) and the establishment of stabilised vegetated or concreted preferential flow areas into the storm water infrastructure.

2. Post development the exposed surface area of the pipeline corridor should be stabilised against erosion on slopes.
3. Lateral seepage water that accumulates upslope of the compacted fill area of the pipeline trench should be mitigated and managed to allow for flowing over the in-filled trench area without causing erosion. This can be done through the establishment of stabilised overflow areas and vegetation of the soil covering.
4. The hydrological impact of the trenching and compaction of the fill material cannot be mitigated but is negligible in the presence of a roadbed that runs along the pipeline corridor. In this regard the hydrological attenuation should be conducted along with the approved and established storm water management infrastructure associated with the roads on the site.
5. Bridge crossing of the watercourse should be stabilised on the banks and within the stream bed making use of the erosion mitigation and control procedures described above.

10. CONCLUSIONS AND RECOMMENDATIONS

A wetland investigation and soil survey yielded that:

1. A drainage feature is located on the eastern boundary of the investigation site.
2. The drainage feature is a watercourse with distinct riparian character.
3. There are no seepage wetlands on the site feeding into the wetland / watercourse. Due to the structured and swelling nature of the soils on the site the dominant water movement into the drainage feature is via surface runoff.
4. The structured and swelling soils on the site do not qualify as wetland soils as described in the wetland delineation guidelines. The main reason is the explanation provided earlier regarding the origin of swelling clay minerals as well as the geological driver for the formation of the soils outside of the watercourse area.
5. Due to the fact that the water that flows in and through the channel on the site emanates from upslope areas that have been impacted by human activities and infrastructure development a dedicated buffer on the watercourse will contribute little to its protection. Rather, it is recommended that an integrated storm water plan be generated for the entire site and immediate upslope catchment area.

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