400KV TRANSMISSION POWER LINE FROM FOSKOR SUBSTATION TO SPENCER SUBSTATION AND SPENCER MAIN TRANSMISSION SUBSTATION UPGRADING, WETLAND DELINEATION AND ASSESSMENT: FINAL REPORT

6 JULY 2017 VS 1

TITLE:	**400KV TRANSMISSION POWER LINE FROM FOSKOR SUBSTATION TO SPENCER SUBSTATION AND SPENCER MAIN TRANSMISSION SUBSTATION UPGRADING, WETLAND DELINEATION AND ASSESSMENT: DRAFT REPORT**
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Date: 6 July 2017

Indemnity

This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken. The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as information available at the time of study. Therefore the author reserves the right to modify aspects of the report, including the recommendations, if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

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EXECUTIVE SUMMARY

1. Introduction

Sazi environmental consulting was appointed by Diges Group to undertake a wetland delineation and assessment as part of a full EIA. Diges Group was appointed by Eskom as the lead Environmental Assessment Practitioner (EIA) for the proposed construction of a 400kV transmission power line from Foskor Substation (Phalaborwa) to Spencer Substation (near Giyani) and Spencer Main Transmission Substation (MTS) upgrading, Limpopo Province. The project at hand will trigger listing notice 1 (983) activity 14 and 27 and listing notice 2 (984) activity 9 of the 2014 EIA regulations.

The wetland assessment report is compiled and submitted as part of the EIA process applied for. The walk down was undertaken on the 1st of February 2017 with the client (Diges) and other specialists. An extensive wetland delineation and field assessment was then conducted on the 2nd and the 3rd of February 2017.

The study area stretches from Mohlabaneng (Spencer power station) to Phalaborwa (Foskor power station), covering a distance of +- 120 km. The power line transverses a number of watercourses (rivers, wetlands, and drainage lines), and according to the National Water Act (NWA) Section 21 (c) and (i) guidelines, any development that takes place within 500m of a watercourse constitutes a water use, which requires a Water Use Licence before development can commence. This wetland delineation and assessment study was undertaken to supplement the (WUL) application process.

2. Approach and Methodology

The activities for this assessment include the following:

- Desktop assessment of the site;
- A site visit to confirm the presence or absence of wetland areas within the proposed project site area as well as verification of wetland boundaries;
- Assessment of the catchment;
- Assessment of the Present Ecological Status of wetlands on site (Level 1, Wet-Health);
- Assessment of Ecological Importance and Sensitivity of wetlands on site; and
- Impact assessment of the proposed activities on the wetlands.

3. Wetland Assessment Results

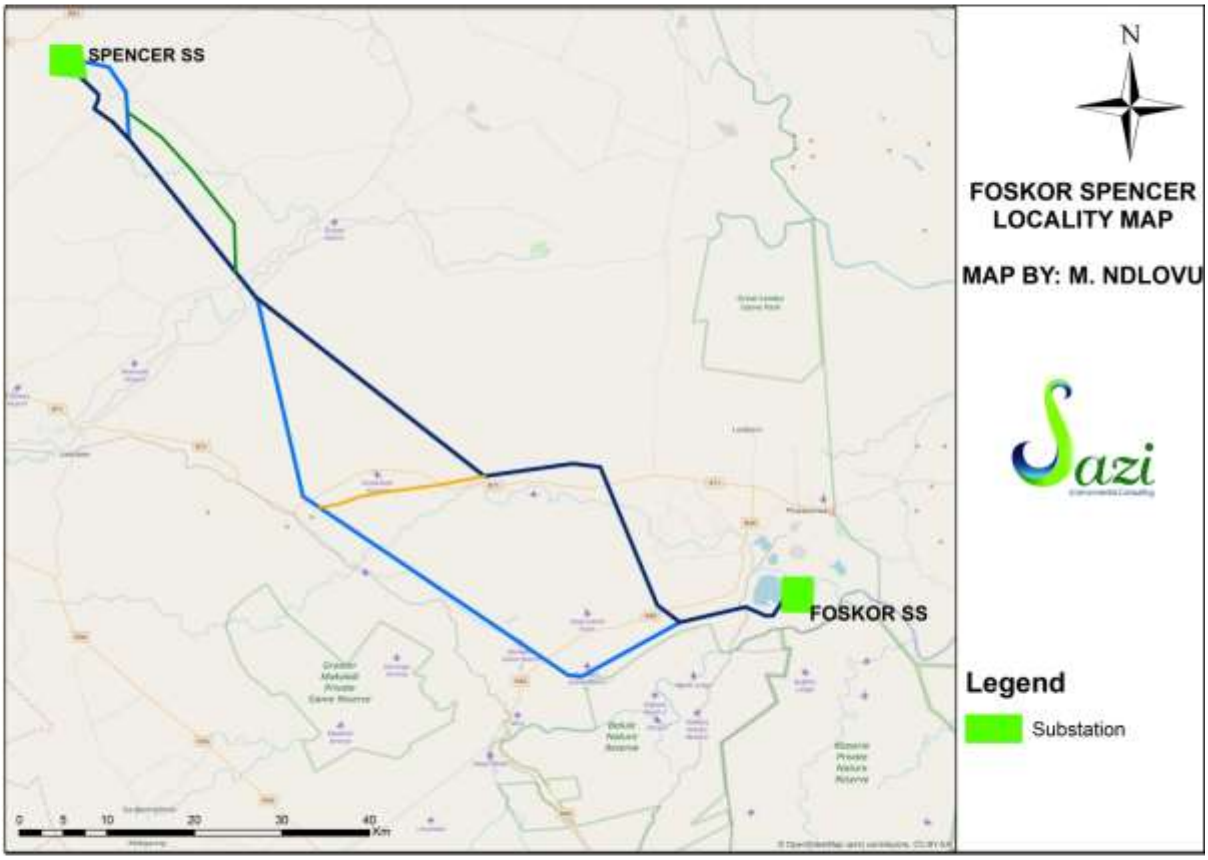
The study area was dominated by sandy rivers and alluvial soils with most associated rivers being intermittent. The study area comprised of a number of intermittent streams namely:

- Molototsi River;
- Leshogole River; and
- Motlatke River;

Perennial streams within the study area are;

- Groot Letaba River;
- Ga-selati River; and
- Olifants River.

River channels are in most cases associated with channelled valley bottom wetlands and floodplains, but are in some cases only associated with the riparian zones and do not have a wetland area nor any wetland indicators. During the field assessment, some of the streams mentioned above and their tributaries comprised of wetland indicators such as soil wetness, terrain, vegetation and hydrology. Two floodplain HGM units were identified. The first floodplain wetland was associated with the Groot Letaba River. The second floodplain wetland was associated with the Olifants River.



4. WETLAND HEALTH ASSESSMENT

Wetland health status was assessed by considering impacts to wetland hydrology, geomorphology and vegetation in accordance with the Wet-Health modules. Individual modules are discussed in the sections below, for each wetland assessed. The impacts that were observed on site largely informed the hydrological, geomorphological and vegetation impact scores. In this summary of impact scores, the wetlands were explained individually due to their geographic location and vegetation cover. The impact scores are summarised on the table below for each HGM unit assessed. The two assessed wetlands were largely modified with a PES score of D.

Summary of impact scores for Floodplain 1 wetland

	Hydrology	Geomorphology	Vegetation
	Impact Score	Impact Score	Impact Score
Area weighted impact scores	7.5	2.8	2.7
PES Category	E	C	C
OVERALL IMPACT SCORES	4.7		
PES SCORE	D (Largely Modified)		

Summary of impact scores for Floodplain 2 wetland

	Hydrology	Geomorphology	Vegetation
	Impact Score	Impact Score	Impact Score
Area weighted impact scores	6.5	1.0	3.6
PES Category	E	B	C
OVERALL IMPACT SCORES	4.1		
PES SCORE	D (Largely Modified)		

5. WETLAND ECOLOGICAL IMPORTANCE AND SENSITIVITY

The two wetlands were assessed to have moderate ecological functioning. The EIS scores and their explanations are shown below.

Explanation of EIS scores for assessed wetlands

ECOLOGICAL IMPORTANCE & SENSITIVITY-FLOODPLAIN 1	**1.4**
ECOLOGICAL IMPORTANCE & SENSITIVITY-FLOODPLAIN 2	**1.4**
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	>1 and <=2

6. ASSESSMENT OF IMPACT

An impact assessment was undertaken and mitigation measures prescribed for the proposed Foskor-Spencer power line and all other alternatives. However, linear projects are regarded to have less impacts when it comes to wetland degradation. Impacts anticipated that will be caused by the construction activities include;

- Loss and disturbance of wetland habitat;
- Increased sediment transport into wetlands;
- Altered flow characteristics within wetlands; and
- Water quality deterioration within wetlands.

Implementation of proper mitigation measures should be able to minimise the severity of the impacts during construction.

7. CONCLUSION

The proposed power line from Foskor and Spencer and its associated substations crossed watercourses (rivers, wetlands). Based on the PES and EIS and site assessment undertaken for the identified wetlands, the proposed activity will not pose detrimental impacts on wetlands. The wetlands have already experienced natural impacts that have degraded the wetlands integrity. Furthermore, none of the wetlands were regarded as those of natural importance. In light of the above, proposed power line activities should be conducted with all mitigation measures put in place. Construction of the power line should be undertaken during dry seasons.

The current study approved the proposed construction of the Foskor-Spencer power line. All alternatives cross watercourses, however alternative 2 cuts through less watercourses and wetlands, therefore, is the recommended alternative.

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LIST OF TERMS AND ABBREVIATIONS

Delineation – the technique of establishing the boundary of an aquatic resource such as a wetland or riparian area.

Drain – In the context of wetlands, refers to a natural or artificial feature such as a ditch or trench created for the purpose of removing surface and sub-surface water from an area (commonly used in agriculture).

Ecological Importance – An expression of the importance of an environmental resource for the maintenance of biological diversity and ecological functioning on local and wider scales.

Ecological Sensitivity – A system's ability to resist disturbance and its capability to recover from disturbance once it has occurred.

EIS – Ecological Importance & Sensitivity.

GIS – Geographical Information Systems.

GPS – Global Positioning System.

Gulley (or erosion gulley) - A gully (commonly called a "donga") is an erosion landform or feature, created by running water eroding sharply into soil. Gullies generally resemble small ditches that can be several meters in depth and width. Gullying or gully erosion is the process by which gullies are formed.

HGM – Hydro-Geomorphic.

NFEPA – National Freshwater Ecosystem Priority Areas, identified to meet national freshwater conservation targets (CSIR, 2010).

PES – Present Ecological State, referring to the current state or condition of an environmental resource in terms of its characteristics and reflecting change from its reference condition.

RESERVE - The quantity and quality of water needed to sustain basic *human needs* and *ecosystems* (e.g. estuaries, rivers, lakes, groundwater and wetlands) to ensure ecologically sustainable development and utilisation of a water resource. The *Ecological Reserve* pertains specifically to aquatic ecosystems.

1 INTRODUCTION

Sazi environmental consulting was appointed by Diges Group to undertake a wetland delineation and assessment as part of a full Environmental Impact Assessment (EIA). Diges Group was appointed by Eskom as lead Environmental Assessment Practitioner (EAP), for the proposed construction of a 400kV transmission power line from Foskor Substation (Phalaborwa) to Spencer Substation (near Giyani) and Spencer Main Transmission Substation (MTS) upgrading, Limpopo Province. The project at hand will trigger listing notice 1 (983) activity 14 and 27 and listing notice 2 (984) activity 9 of the 2014 EIA regulations.

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The study area stretches from Mohlabaneng (Spencer power station) to Phalaborwa (Foskor power station), covering a distance of +-120 km. The power line transverses a number of watercourses (rivers, wetlands, and drainage lines), and according to the National Water Act (NWA), Section 21 (c) and (i) guidelines, any development that takes place within 500m of a watercourse constitutes a water use, which requires a Water Use Licence before development can commence. This wetland delineation and assessment study was undertaken to supplement the (WUL) application process.

1.1 TERMS OF REFERENCE

The terms of reference applicable to the specialist study include:

- Desktop assessment of the project site (identify wetlands within the site by examining existing national and provincial wetland databases, 1: 50 000 topographical maps, google maps and ortho/ aerial photographs, if available);
- Identify riparian areas where they occur;
- A site visit to confirm the presence or absence of wetland areas within the proposed project site area as well as verify wetland boundaries;
- Where wetlands occur on or near the site alternatives identified on site only, delineation is to be performed (according to the DWAF proposed methodology of the delineation of wetlands) and classification of the wetland hydrogeomorphic types using the hydrogeomorphic method (as specified within Wet-Ecoservices) will be undertaken;
- Assessment of the catchment;
- Assessment of the Present Ecological Status of wetlands on site (Level 1, Wet-Health);
- Assessment of Ecological Importance and Sensitivity of wetlands on site; and
- Impact assessment of the proposed activities on the wetlands.

1.2 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are applicable to this report:

- The current information received from the client and existing data is correct.

- The maps available are still relevant and can be used as representation of site conditions.
- Global Positioning System (GPS) technology is inherently inaccurate and some inaccuracies, due to the use of handheld GPS instrumentation, may occur. If more accurate assessments are required the wetlands will need to be surveyed and pegged according to surveying principles.
- Aquatic, wetland and riparian ecosystems are dynamic and complex. The effects of natural seasonal and long-term variation in the ecological conditions are therefore largely unknown.
- Fauna and flora assessments undertaken were mainly for the purposes of supporting the Present Ecological Status and Ecological Importance and Sensitivity that is required as part of the wetland assessment. Extensive fauna and flora assessment outside of the wetland system did not form part of this report.

1.3 DEFINITIONS AND LEGAL FRAMEWORK

In a South African legal context, the term watercourse is often used rather than the terms wetland, or river. The NWA includes wetlands and rivers into the definition of the term watercourse (DWAF, 2005).

The NWA, defines a riparian habitat as follows: “Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse, which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas."

The NWA defines a wetland 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".

The assessment of the Spencer-Foskor wetland was undertaken within the context of the definitions as mentioned above. The figure below (Figure 1-1) illustrates the location of the project site.

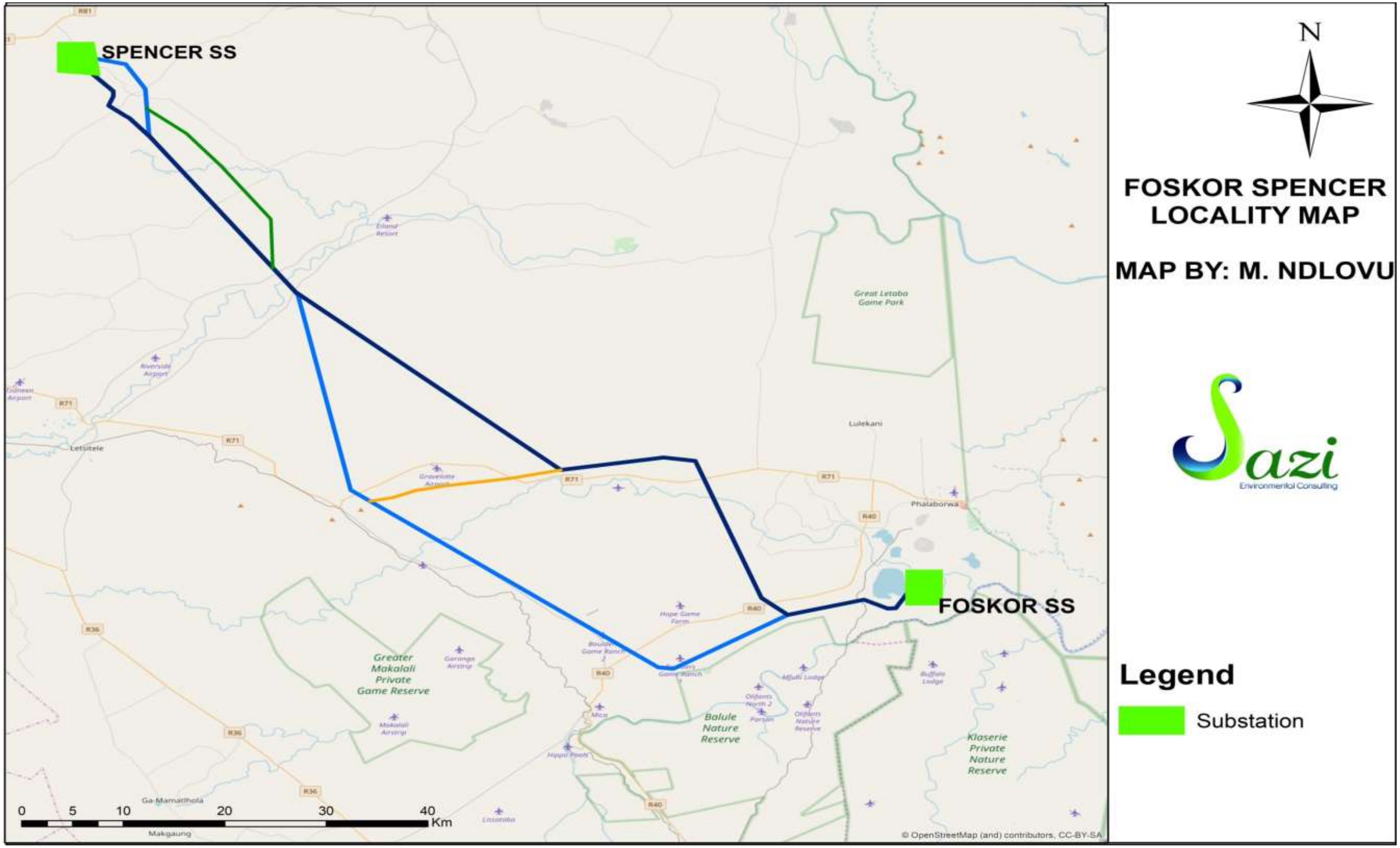

Figure 1-1 Location of the Foskor-Spencer wetland delineation and assessment site

2 METHODOLOGY FOLLOWED

2.1 DESKTOP ASSESSMENT

The following data sources were used to inform the desktop assessment:

- National Freshwater Ecosystem Priority Areas (NFEPA) wetland coverage, which shows location of FEPA wetland sites;
- 1:50,000 imagery as well as latest Google Map Imagery for desktop assessment of the site;
- Biodiversity GIS (BGIS) to obtain conservation areas;
- Wet-Health tool for the assessment of the present ecological status or health of the wetland;
- Department of Water and Sanitation (DWS) Wetland Reserve tool for the assessment of ecological importance and sensitivity of the wetland;
- DWS website;
- The topography data was obtained from the Surveyor General's 1:50 000 top sheet data for the region; and
- Background information received from client.

2.2 WETLAND DELINEATION AND CLASSIFICATION

Verification of wetland boundaries was undertaken on site according to the DWS, previously known as the Department of Water Affairs and Forestry (DWAF) guideline, 2013: A practical guideline procedure for the identification and delineation of wetlands and riparian zones.

The guidelines indicate 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); and
- A high water table that results in saturation at or near surface, leading to anaerobic conditions developing in the top 50 centimetres of the soil.

Wetland indicators that were identified on site included the terrain unit indicator, wetland vegetation and soil wetness. These were used to confirm the boundary of the Foskor Spencer wetlands.

The Hydro-Geomorphic types (HGM) classification was based on geomorphic wetland setting (e.g. hillslope or valley bottom), water source (surface water dominated or sub-surface water dominated) and how water flows through the wetland unit (diffusely or channelled).

Figure 2-1 below indicates the wetland hydro-geomorphic setting of inland wetlands in South Africa as well as wetland classification applied on wetlands for assessment.

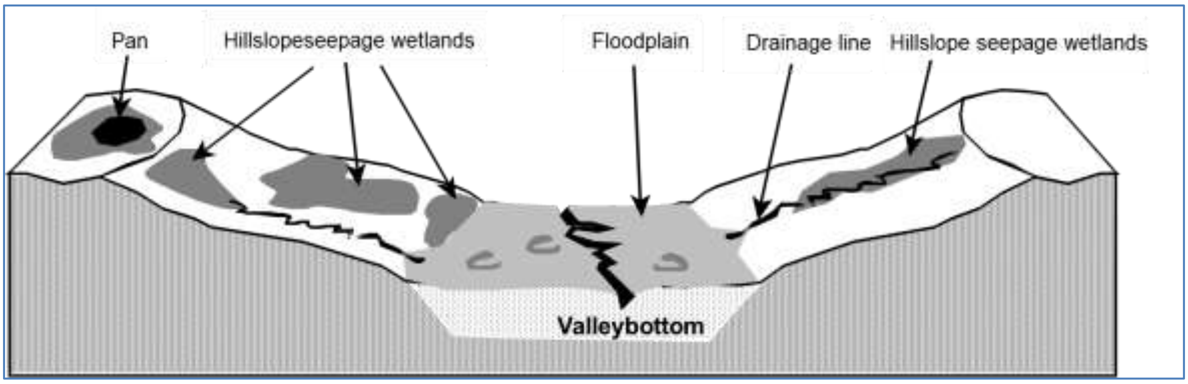

Figure 2-1 Hydro-geomorphic setting

2.3 EXISTING IMPACTS AND CATCHMENT CONTEXT

Using available information, existing impacts to the wetlands and within the delineated micro-catchment were mapped and described.

2.4 WETLAND HEALTH ASSESSMENT

This assessment was made in accordance with the level 1 Wet-Health method to describe the Present Ecological Status (PES) (Macfarlane, *et al*. 2008). The method utilises geomorphology, hydrology and vegetation to determine the health of a wetland.

The hydrology module assesses the land use descriptors (irrigation, level of reduction or increase in flows, hydro-geomorphic setting of the wetland and extent of canalisation and gully formations). The vegetation module assesses the level of vegetation transformation, which is indicated by level of alien species invasion, terrestrial species encroachment and encroachment by indigenous invasive species. The geomorphology module captures deviations in the sedimentary inputs and outputs to and from wetlands that are consequence of human activities.

Values range from Class A (largely natural) to Class F (critically modified). Table 2-1 below describes the overall HGM health categories and their scores. This is calculated as 10 -Impact scores to get the overall impact score.

Table 2-1Health categories used by WET-Health for describing the integrity of wetlands

HEALTH CATEGORY	DESCRIPTION	Min Score
A	Unmodified, natural.	0 – 0.9
B	Largely natural with few modifications. A slight change in ecosystem processes is discernable and a small loss of natural habitats and biota may have taken place.	1 – 1.9
C	Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact.	2 – 3.9
D	Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred.	4 – 5.9
E	The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.	6 – 7.9
F	Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8 – 10

An overall wetland health score was calculated by weighting the scores obtained for each module and combining them to give an overall combined score using the following formula:

Overall health rating = [(Hydrology*3) + (Geomorphology*2) + (Vegetation*2)] / 7

This overall score assists in providing an indication of wetland health/condition which can in turn be used for recommending appropriate management measures.

2.5 WETLAND ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS)

An assessment of the importance and sensitivity of wetland systems using the DWS Reserve tool. Data input was populated using the outcomes of the WET-Health assessment and other valuable information gathered in the field as well as available desktop information. Ecological Importance and Sensitivity is a concept introduced in the reserve methodology to evaluate a wetland in terms of:

- Ecological Importance;
- Hydrological Functions; and
- Direct Human Benefits.

The maximum score for these components was taken as the importance rating for the wetland which is rated using Table 2-2 below.

Table 2-2 Ecological Importance and Sensitivity rating table

ECOLOGICAL IMPORTANCE AND SENSITIVITY CATEGORIES	RANGE OF EIS SCORE
Very high: Wetlands that are considered ecologically important and sensitive on a **national or even international** level. The biodiversity of these systems is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers.	>3 and <=4
High: Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these systems may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.	>2 and <=3
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	>1 and <=2
Low/marginal: Wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.	>0 and <=1

2.6 IMPACT ASSESSMENT

The information gained from the functional integrity and EIS assessments was used to inform an assessment of the likelihood and significance of potential impacts associated with the proposed mining activities. The following methodology (Table 2-3) has been adopted from the DWS's Operational Guideline, 2010 entitled "Operational Guideline: Integrated Water and Waste Management Plan'.

Table 2-3 Ranking scales for impact assessment

DURATION (D)	**MAGNITUDE (M)**
5 - Permanent 4 - Long term (ceases with operational life) 3 - Medium term (5-15 years) 2 - Short term (0-5 years) 1 – Immediate	10 - Very high/do not know 8 - High 6 - Moderate 4 - Low 2 – Minor
SCALE (S)	**PROBABILITY (P)**
5 – International 4 - National 3 - Regional 2 - Local 1 - Site 0 – None	5 - Definite/do not know 4 - Highly probable 3 - Medium probability 2 - low probability 1- Improbable 0 – None
SIGNIFICANCE POINTS (SP) = (D+M+S) X P	
HIGH (H) = >60 POINTS	
MODERATE (M) = 30-60 POINTS	
LOW (L) = <30 POINTS	
NO SIGNIFICANCE = 0	
POSITIVE IMPACT	

The maximum value of significance points is 100. Environmental effects could therefore be rated as either high (H), moderate (M), or low (L) significance, as seen above.

3 WATERCOURSE ASSESSMENT RESULTS

This section provides the findings of the wetland assessment undertaken on the 2nd and 3rd of February 2017. It gives a description of the water resources found within the study area and surrounds; the wetland types (HGM units) assessed and also describes the wetland delineation process and lastly, the wetland Present Ecological Status (PES) and Ecological Importance and Sensitivity (EIS) are presented and discussed in relation to the impacts on the wetlands identified on site.

The study area was dominated by sandy rivers and alluvial soils with most associated rivers being intermittent. The study area comprised of a number of intermittent streams namely:

- Molototsi River;
- Leshogole River;
- Motlatke River;

Perennial streams within the study area are;

- Groot Letaba River;
- Ga-selati River; and
- Olifants River.

River channels are in most cases associated with channelled valley bottom wetlands and floodplains, but are in some cases only associated with riparian zones and does not have a wetland area or any wetland indicators. During the field assessment, some of the streams mentioned above and their tributaries comprised of wetland indicators such as soil wetness, terrain, vegetation and hydrology. Two floodplain HGM units were identified. The first Floodplain wetland was associated with the Groot Letaba River. The second floodplain wetland was associated with the Olifants River.

3.1 DESCRIPTION OF WATER RESOURCES

The study area falls under one of the Water Management Areas (WMAs), the Olifants WMA. The power line falls under 5 quaternary catchments (refer to figure 3-2 below). These quaternary catchments are, the B81G, B81F, B72J, B72K and B72D of the Olifants WMA (DWS 2012, https://www.dwa.gov.za/). Main Rivers flowing within this catchment are the Elands, Wilge, Steelpoort, Olifants and Letaba River (Olifants WMA) figure 3-1. Amongst the major rivers identified, the Letaba and the Olifants Rivers formed part of the assessed areas.

Figure 3-1 zooms in on the quaternary catchments within the study area and table 3-1 summarises the water resources in the catchment.

Table 3-1 Summary of the water resources

DESCRIPTION	WMA	QUATERNARY CATCHMENT	MAIN WATER RESOURCES
Floodplain 1	Olifants WMA	B81F	Groot Letaba
	Olifants WMA	B72J	Molatie
	Olifants WMA	B72K	Ga-Selati
Floodplain 2	Olifants WMA	B72D	Olifants

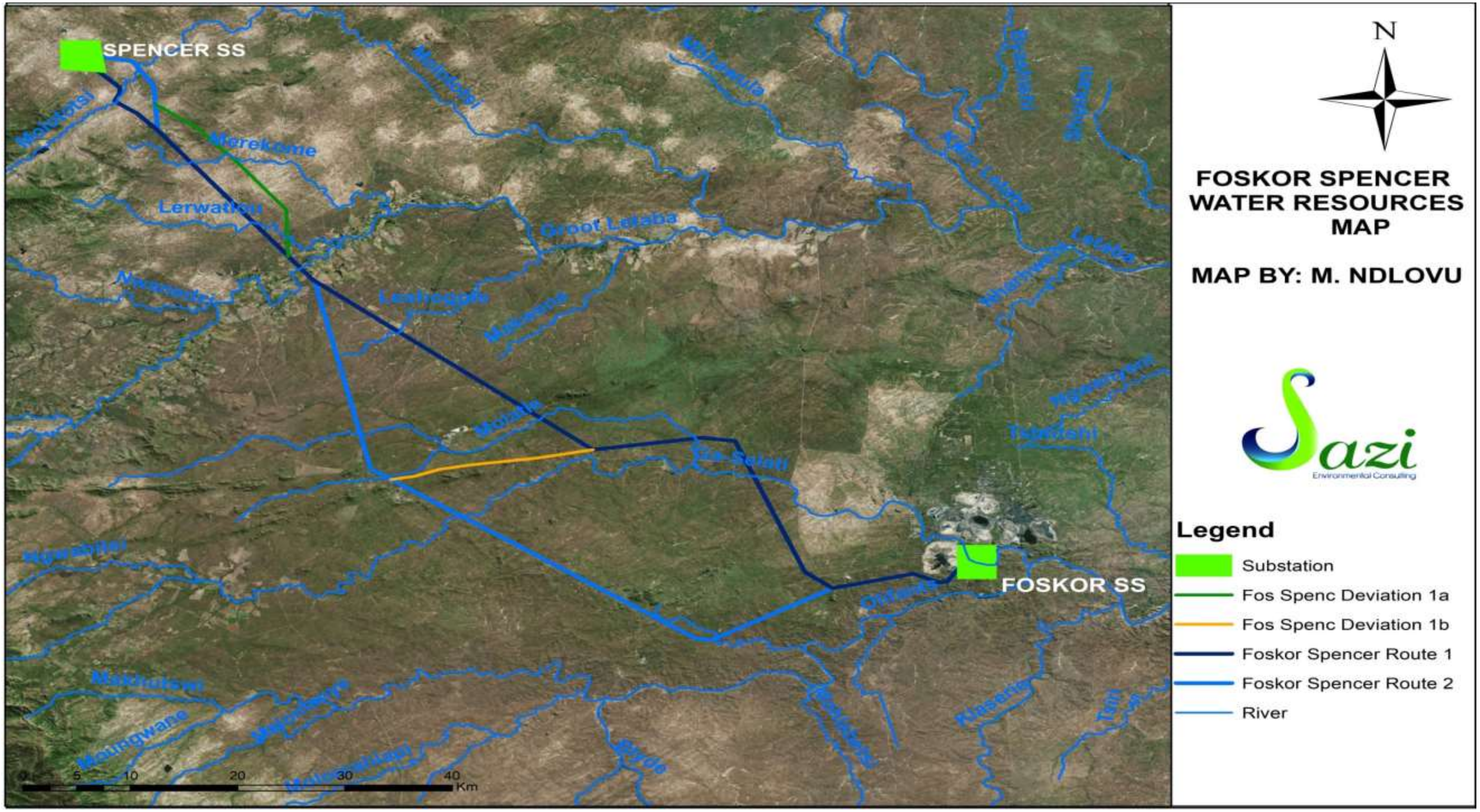

Figure 3-1 Map indicating the water resources within the study area

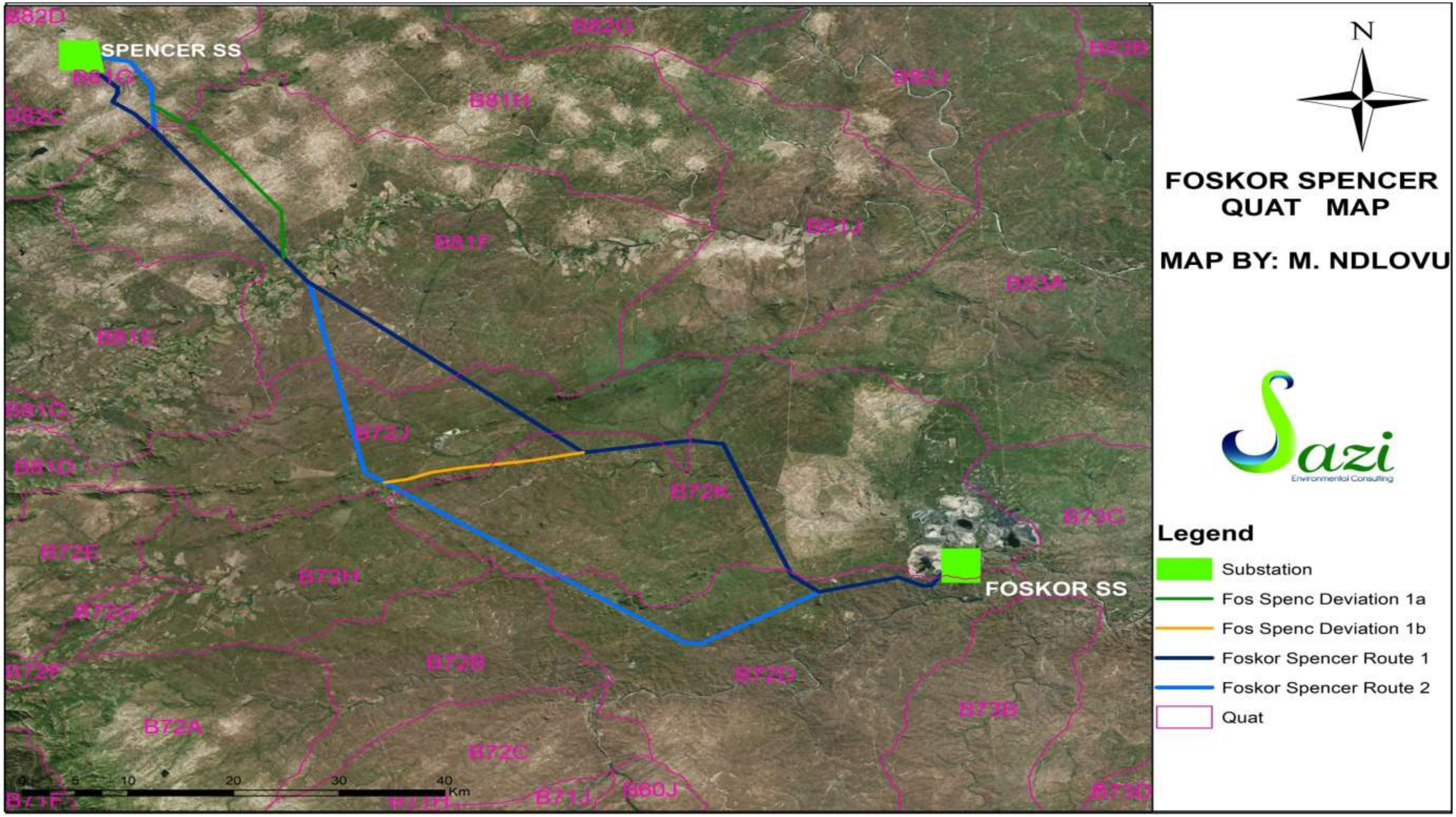

Figure 3-2 Map indicating the quaternary catchment within the study area

3.2 CLASSIFICATION OF WETLANDS

One wetland was identified, namely a floodplain wetland associated with a tributary to the Groot Letaba River. Table 3-3 below gives a description and characteristics of the HGM types identified and a photo thereafter of the exact HGM identified. A riparian area was also identified in this Olifants WMA which comprised of a boundary more distinctive that than that of wetlands (see table 3-2). Riparian indicators used in identifying the riparian area were; Topography associated with a watercourse, vegetation, and alluvial soils and deposited material.

Table 3-2 Riparian Area identified within the Olifants WMA

	

Another floodplain wetland was identified within the Olifants WMA, which was associated with the Olifants River, one of the major rivers within the catchment. The floodplain wetland was characterised by alluvial sedimentation, braided streams and flat surface (see table 3-3).

Table 3-3 Description of the wetlands identified on site

WETLAND TYPE	DESCRIPTION
Floodplain 	Valley bottom areas with a well defined stream channel, gently sloped and characterized by floodplain features such as oxbow depressions and natural levees and the alluvial (by water) transport and deposition of sediment, usually leading to a net accumulation of sediment. Water inputs from main channel (when channel banks overspill) and from adjacent slopes.  Floodplain wetland

4 WETLAND DELINEATION

During the extensive field work undertaken for the entire study area, wetland indicators such as terrain unit indicator, hydrology, hydrophytes and soil wetness were used. A soil auger was used in the delineation process of the wetlands. Wetland edges were delineated and assessed in order to determine the extent of the wetland boundaries.

According to the NWA Section 21 (c) and (i) guidelines, any development that takes place within 500m of a watercourse constitutes a water use, which requires a Water Use Licence before development can commence. The proposed power line and its alternatives will transverse watercourses (rivers, wetlands) and therefore the delineation and classification of the affected watercourses is undertaken in this study. However linear projects are regarded to pose minimal impacts on watercourses and therefore a 32m buffer was created for these wetlands. The figures below (figure 4-1; 4-2) is an illustration of wetlands delineation.

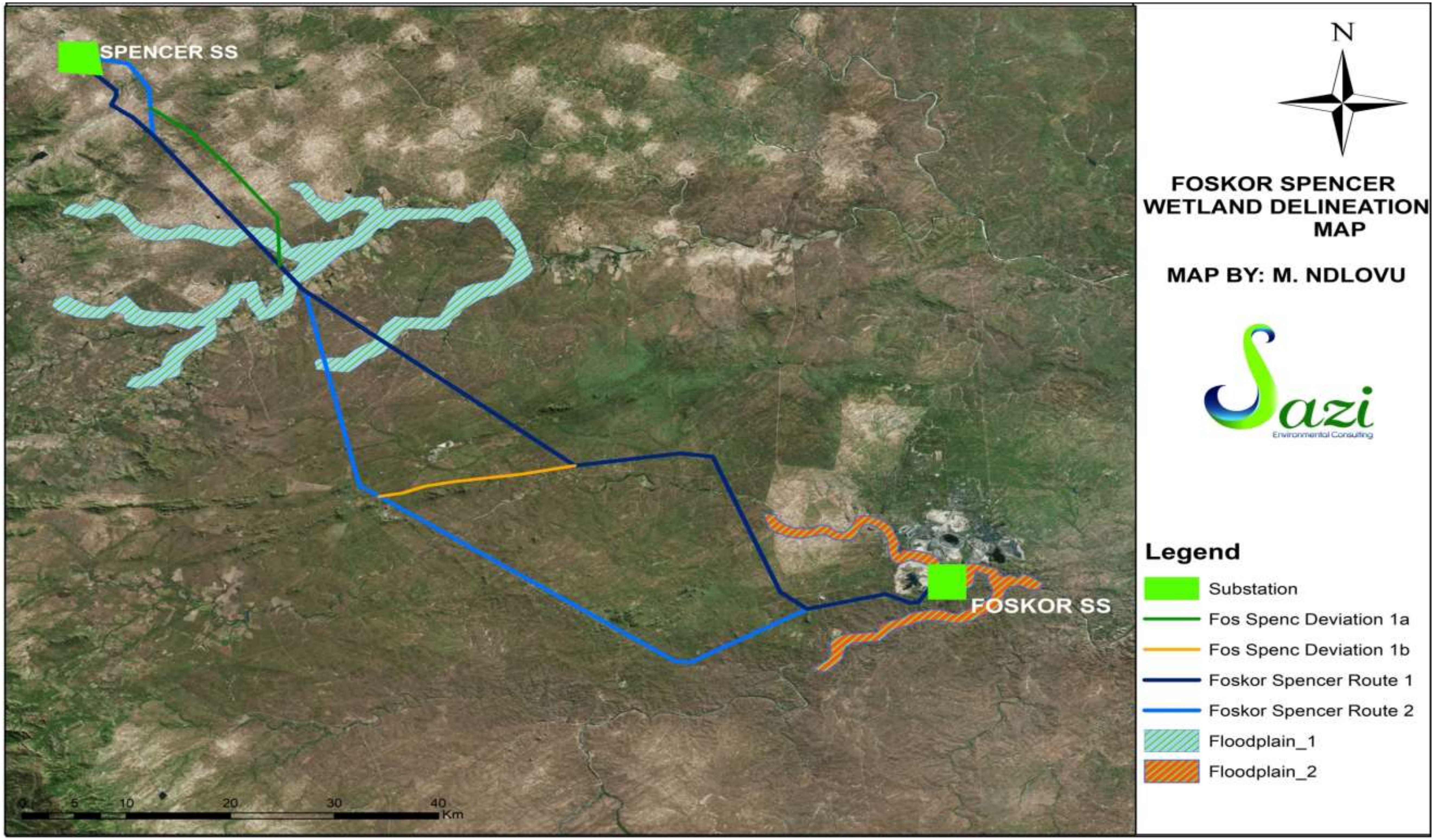

Figure 4-1 Floodplain Wetlands Delineation

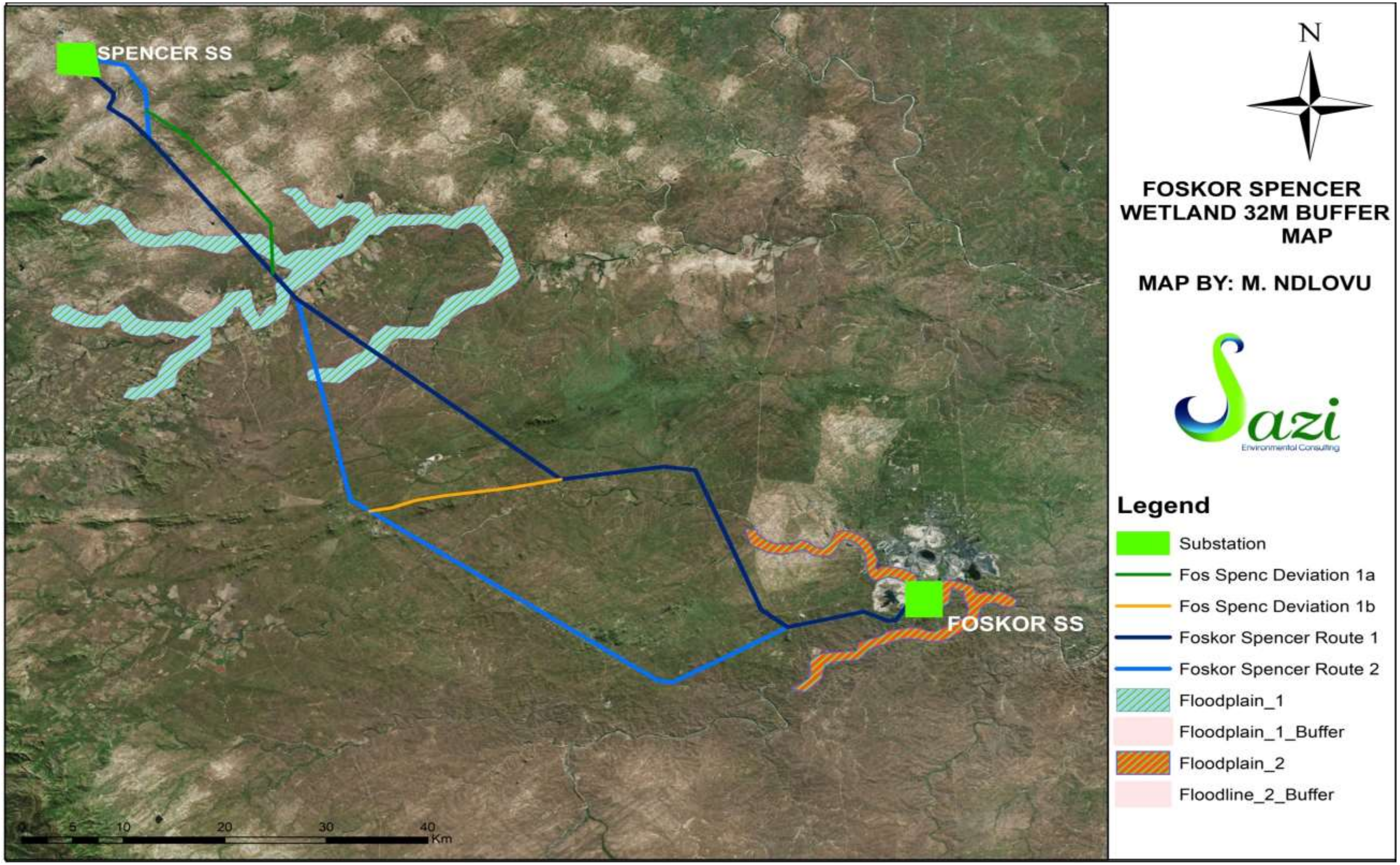

Figure 4-2 Floodplain wetlands 32m buffer

5 PRESENT ECOLOGICAL CATEGORY OF THE BERENICE WETLANDS

Wetland health status was assessed by considering impacts to wetland hydrology, geomorphology and vegetation in accordance with the Wet-Health modules. Individual modules are discussed in the sections below, for each wetland assessed.

5.1 HYDROLOGICAL CHANGES

The formation, persistence, size, and function of wetlands are controlled by hydrologic processes. Seasonal changes in water levels and the effect of recent precipitation events must be considered when evaluating an area's hydrology, particularly outside of the growing season or during the dry summer months. Hence, wetlands are characterised by movement of water through or within them, water quality, and the degree of natural or human-induced disturbance.

FLOODPLAIN 1 WETLAND HYDROLOGICAL CHANGES

Major hydrological impacts associated with the Groot Letaba wetland were caused by high water input that further caused erosion. Other impacts identified included impeding structures (concrete bridges) and residential areas located in close vicinity to the wetland. Furthermore, a more natural hydrological impact was that caused by tree vegetation within the wetland that has resulted in reduction of water within the wetland. The floodplain wetland was considered seriously modified with a class score E. Refer to table 5-1 below for examples of hydrological impacts experienced in the Floodplain wetland.

Table 5-1 Hydrological impacts on the Floodplain 1 wetland

	
a. Stagnant water	b. Alien trees located on the riparian zone

FLOODPLAIN 2 WETLAND HYDROLOGICAL CHANGES

Floodplain 2 did not comprise of high hydrological impacts based on site observations and site assessment undertaken. The floodplain wetland received water from the associated Olifants stream that was flowing in a southerly direction. The wetland ranked class D, largely modified due to the bridge created for access road and mining activities occurring upstream (see table 5-2). Aquatic life was observed in the associated stream which symbolises the healthy state of the stream.

Table 5-2 Hydrological impacts on the Floodplain 2 wetland

a. Bridge and road construction

5.2 GEOMORPHOLOGICAL CHANGES

The geomorphology of the study area is described in terms of relief, geology and dominant soils. Geomorphic features observed in the study area were plains, hills and valleys with highly erodible soils. Erosion may possibly be worsened by overgrazing and intensive cultivation which results in degradation of the land cover and destabilisation of the riverbanks.

FLOODPLAIN 1 WETLAND GEOMORPHOLOGICAL CHANGES

The floodplain wetland consists of plains and lowlands with low to moderate relief. The soil types in the study area is alluivial soils and sands. The geomorphological impact observed onsite was extensive erosional surface on the seasonal zone of the wetland that was attributed to the construction of a bridge resulting in soil degradation. The creation of surface water flow paths on the permanent and seasonal zone may result in channel diversion which has a negative impact on the natural wetland. The geomorphology of the floodplain wetland is largely modified. Geomorphological impacts on the Floodplain are presented in the table below.

Table 5-3 Geomorphological impacts on the floodplain 1 wetlands

	
a. Bank erosion	b. Lateral sediment deposition

FLOODPLAIN 2 WETLAND GEOMORPHOLOGICAL CHANGES

Floodplain 2 did not show much geomorphological impacts based on the site assessment undertaken. However limited erosional surfaces were observed. These surfaces have influenced the groundwater levels as well as the creation of groundwater and surface water flow paths within the wetland. The creation of surface water flow paths may result in channel diversion which could have a negative impact on the natural wetland.

REGIONAL GEOLOGY AND SOILS

The outcrops in the project site can be assigned to five different lithological units according to the regional geology. Basement rocks are comprised of Archaean granulite-grade gneisses of the Limpopo Mobile Belt, which are overlain by a series of younger, generally non-metamorphosed volcanos and sedimentary Proterozoic successions: the Blouberg Formation, the Waterberg Group and the Soutpansberg Group. Some strata of the Phanerozoic Karoo Supergroup also occur locally, but the extent of their outcrop is minor. Before considering the detailed geology of the strata within the farm boundaries, this section will provide an outline of the general characteristics of the lithological units which are most important to this study. In this section, the existing stratigraphic names and classifications used by the South African Committee for Stratigraphy (S.A.C.S., 1980) will be retained.

The Soutpansberg Group:

The volcano-sedimentary Soutpansberg Group outcrops in the north of South Africa, mainly in the Soutpansberg Mountains. The mountains form a long south-facing escarpment from Kruger National Park in the east to Vivo in the west. The Soutpansberg Group is preserved in an elongate basin, which extends from the western end of the present study area to Pund Maria. Generally, the Soutpansberg strata have a moderate to steep northerly dip, and are cut by several E.N.E-W.S.W. trending faults (van Eeden et al., 1955).

The basal Tshifhefhe Formation only locally developed at the eastern end of the Soutpansberg basin, and is only a few metres thick. It is comprised of strongly epidote clastic sediments, including shale, greywacke and locally-derived conglomerate

(Barker et al., in press). The Sibasa Formation comprises subaerially extruded basalt, with intercalated pyroclastic and sandstone lenses. Generally the basalts are massive, epidotised and locally amygdaloidal (Barker et al., in press). The pyroclastic lenses locally reach a thickness of 200m, whereas the laterally persistent clastic lenses locally attain a thickness of 400m (Barker at al., in press). The preponderance of inferred fluvial sediments and subaerial lavas suggest that the Soutpansberg Group was deposited within a continental setting. Although originally no unconformities were identified between the formations (Jansen, 1974), more recent work (Cheney et ai., 1990) identified a regionally-developed, low-angle unconformity beneath the Wyllies Poort Formation.

5.3 VEGETATION CHANGES

This module has an important contribution to the composition, structure and function of a wetland, and is also important in terms of the habitat. A robust vegetation cover assists in holding soil particles therefore minimising soil erosion intensity. This is also important for water retention, which aids in water quality improvement. Vegetation within a wetland is regarded as one of the major indicators of wetlands.

The vegetation type that exists in an area can serve as an indication of the type of landscape features that area may host. Some vegetation types do not have the capacity to host permanent wetlands and/or perennial rivers. The study area falls within three vegetation types; the Mopani Bushveld (covering a majority of the study area), the mixed low veld bushveld (covering the southern part of the study area- the Olifants WMA), and the sour low veld bushveld (covering small patches of the study area), refer to figure 5-1 below.

Using vegetation as a wetland indicator is considered one of the indicator tools; however, the use of vegetation as an indicator may bring along confusion based on the fact that, vegetation differs with season, especially when working with seasonal wetlands that are not permanently inundated to hold hydrophytes. Vegetation indicator during rainy season is ideal; however during dry season it may not be easy to identify certain vegetation species.

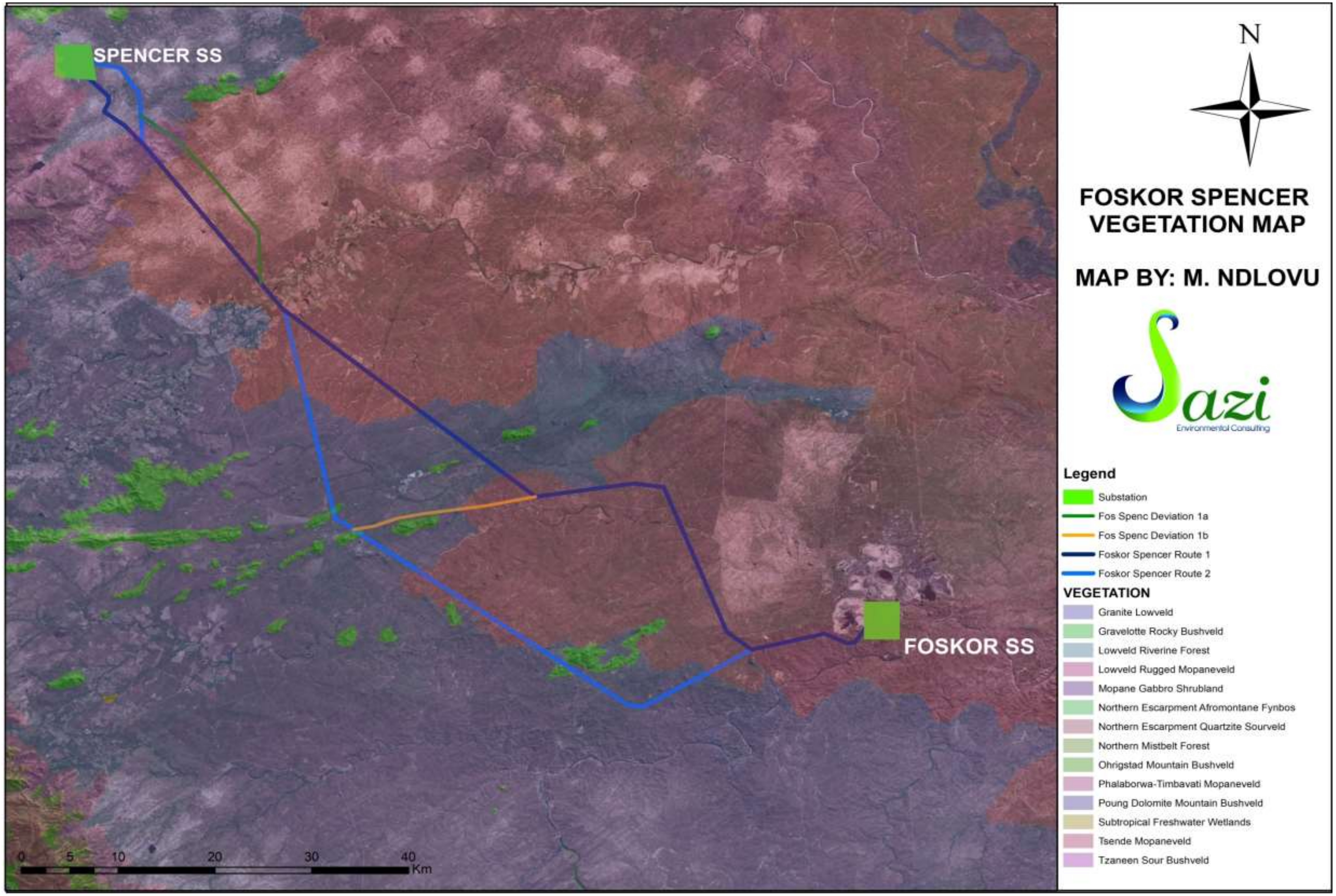

Figure 5-1 Vegetation type within the study area

FLOODPLAIN 1 VEGETATION CHANGES

The floodplain wetland types are usually characterised by abundant vegetation. Most floodplain wetlands are characterised by alluvial soil. Impacts on vegetation were caused by geomorphological impacts; these impacts were caused by erosion which has further resulted in reduction of vegetation at the riparian zones and permanent zones of the wetland. Another impact resulted from alien vegetation that was observed at the seasonal zones of the wetland. The list of vegetation associated with the wetland is listed below (Table 5-4).

Table 5-4 Vegetation observed on Floodplain 1 wetlands

Vegetation type	**Identification**	**Extent (%)**
Grasses	*Eragrostis nindensis Tragus berteronianus, Enteropogon macrostachyus, Setaria verticillata*	70
Shrubs	*Lannea , Neuracanthus africana; Combretum hereroense*	10
Trees	*Salix mucronata, Rhamus prinoides, Bridelia mollis, Colophospermum mopane , commiphora africana*	20

FLOODPLAIN 2 VEGETATION CHANGES

The floodplain 2 wetland had a high vegetation quantity. The riparian zone was dominated by trees and shrubs, a few shrubs were also identified. Below is a summary of the vegetation observed and their extent.

Table 5-5 Vegetation observed on Floodplain 2 wetland

Vegetation type	**Identification**	**Extent (%)**
Grasses	*Eragrostis nindensis Tragus berteronianus, Enteropogon macrostachyus, Setaria verticillata*	60
Herb	*Amaranthus thunbergii*	5
Trees	*Phoenix reclinata, Ficus ingens, Colophospermum mopane*	25

6 SUMMARY OF THE IMPACT SCORES

The impacts that were observed on site largely informed the hydrological, geomorphological and vegetation impact scores. In this summary of impact scores, the wetlands were explained individually due to their geographic location and vegetation cover. The impact scores are summarised on the table below for each HGM unit assessed. The two assessed wetlands were largely modified with a PES score of D.

Table 6-1 Summary of impact scores for Floodplain 1 wetland

	Hydrology	Geomorphology	Vegetation
	Impact Score	Impact Score	Impact Score
Area weighted impact scores	7.5	2.8	2.7
PES Category	E	C	C
OVERALL IMPACT SCORES	4.7		
PES SCORE	D (Largely Modified)		

Table 6-2 Summary of impact scores for Floodplain 2 wetland

	Hydrology	Geomorphology	Vegetation
	Impact Score	Impact Score	Impact Score
Area weighted impact scores	6.5	1.0	3.6
PES Category	E	B	C
OVERALL IMPACT SCORES	4.1		
PES SCORE	D (Largely Modified)		

7 WETLAND ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS)

According to Kotze, et al, (2008), wetlands perform certain functions based on their HGM unit type and the importance of a wetland unit is linked to its ecosystem services. According to Davies and Day, (1998), some of the wetland functions include the following:

- streamflow regulation;
- flood attenuation;
- groundwater recharge;
- water purification;
- sediment trapping;
- harvesting of natural resources;
- tourism and recreation;
- Livestock, and crop farming.

Some of the functions in addition to Davies and Day (2008) include: Provision of water for human use, cultural significance, erosion control, and biodiversity maintenance.

7.1 ECOLOGICAL IMPORTANCE

The wetlands were assessed to have Moderate ecological importance and sensitivity. The tables below give a summary (Table 7-1 and Table 7-2) of the EIS Scores for the wetlands and an explanation of the EIS scores (Table 7-3).

FLOODPLAIN 1 WETLAND ECOLOGICAL IMPORTANCE AND SENSITIVITY

This floodplain wetland was considered to be of moderate sensitivity. The wetland is not considered as a RAMSAR site and it is not located within a protected area. The wetland furthermore did not house any distinct biodiversity.

FLOODPLAIN 2 WETLAND ECOLOGICAL IMPORTANCE AND SENSITIVITY

The floodplain 2 wetland was considered of moderate ecological and sensitivity importance. The wetland is not considered as a RAMSAR site. The wetland furthermore did not house any distinct biodiversity.

Table 7-1 Summary of EIS Scores for Floodplain 1 wetland

SUMMARY	Score (0-4)	Confidence (1-5)
Ecological Importance and Sensitivity	**1.7**	**2.1**
Hydro-Functional Importance	**1.5**	**2.5**
Direct Human Benefits	**1.0**	**1.5**
Overall EIS Category	**1.4**	**2.0**

Table 7-2 Summary of EIS Scores for Floodplain 2 Wetland

SUMMARY	Score (0-4)	Confidence (1-5)
Ecological Importance and Sensitivity	**1.7**	**2.6**
Hydro-Functional Importance	**1.5**	**2.5**
Direct Human Benefits	**1.0**	**1.9**
Overall EIS Category	**1.4**	**2.3**

Table 7-3 Explanation of EIS scores for floodplain 1 and Floodplain 2 Wetlands

ECOLOGICAL IMPORTANCE & SENSITIVITY-FLOODPLAIN 1	**1.4**
ECOLOGICAL IMPORTANCE & SENSITIVITY-FLOODPLAIN 2	**1.4**
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	>1 and <=2

7.2 SENSITIVITY MAPPING & ASSESSMENT

An ecological sensitivity map (figure 6.1 below) of the site was produced by integrating the information collected on-site with the available ecological and biodiversity information available in the literature and various spatial databases. This includes delineating the different habitat units identified in the field and assigning sensitivity values to the units based on their ecological properties, conservation value and the observed presence of species of conservation concern. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

Low – Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. Most types of development can proceed within these areas with little ecological impact.

Medium- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.

High – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. These areas may contain or be important habitat for faunal species or provide important ecological services such as water flow regulation or forage provision. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.

Very High – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.

In some situations, areas were also classified between the above categories, such as Medium-High, where it was deemed that an area did not fit well into a certain category but rather fell most appropriately between two sensitivity categories.

Flood plain 1 and 2 and the recommended 32 m buffers are considered to be of high sensitivity. This area is considered to be a no go area, no development should take place within the more sensitive wetland areas and the recommended buffers.

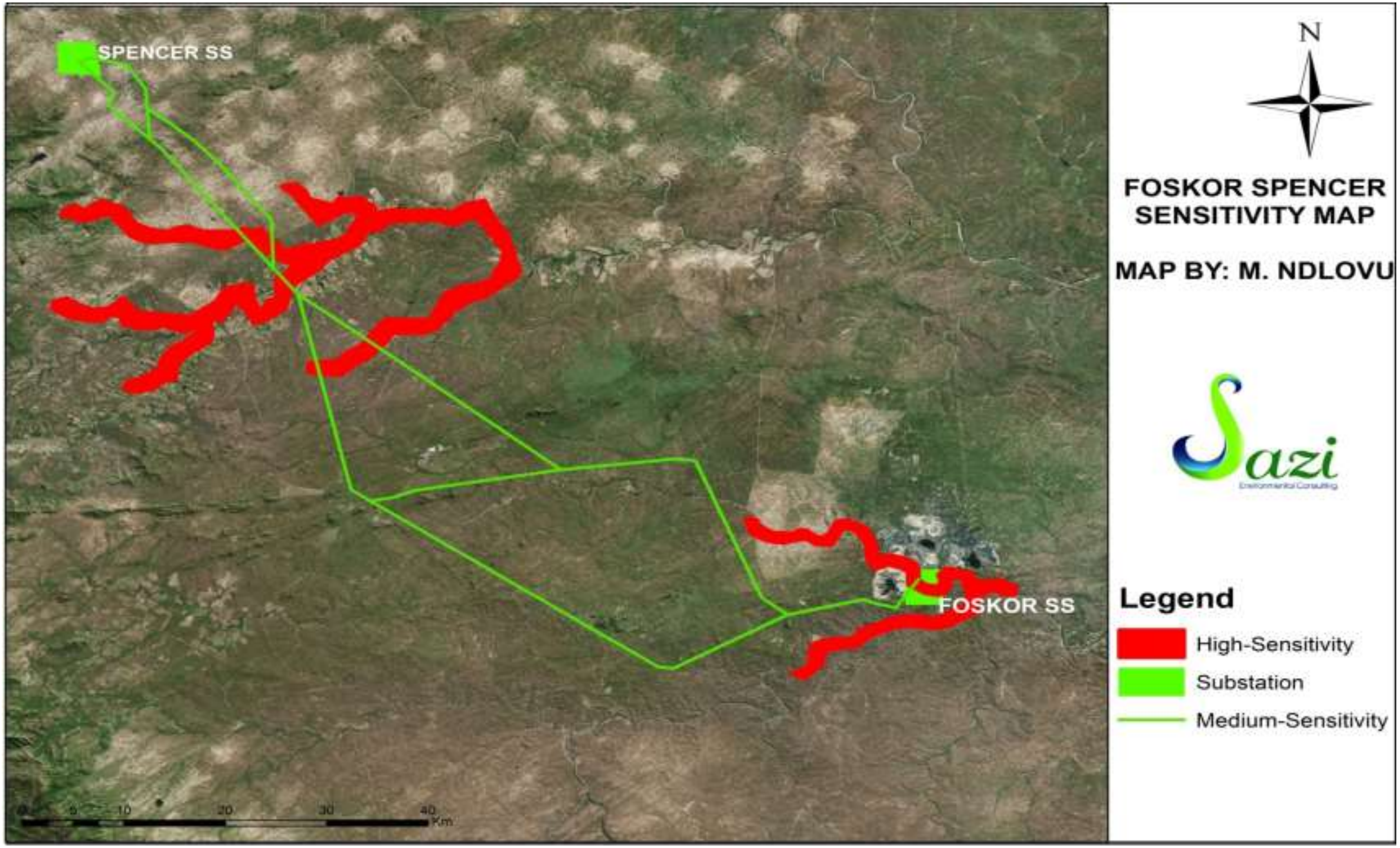

Figure 6-1: Foskor-Spencer Sensitivity Map

7.3 DIRECT HUMAN BENEFITS

Direct human benefits of the wetlands were experienced at the Floodplain 1 wetland that was located near homesteads. It was observed that local residents use the wetland sand to make building blocks. Another benefit observed was that of cow grazing within the wetland.

No direct human benefits were observed for the floodplain 2 wetland.

8 ASSESSMENT OF POTENTIAL IMPACT

An impact assessment was undertaken and mitigation measures prescribed for the proposed Foskor-Spencer power line and all other alternatives. However, linear projects are regarded to have less impacts when it comes to wetland degradation.

The expected impacts associated with the wetlands due to the proposed power line and its alternatives are summarised as follows:

8.1 CONSTRUCTION PHASE

8.1.1 HABITAT DESTRUCTION (due to land clearing, pollution; creation access roads)

Mitigation:

- Existing roads must be used as far as possible for access during construction;
- Where traces of water bodies are identified care should be taken in the vicinity of those water bodies found within the study area;
- Pollution and littering must be managed in order not to further disrupt habitat;
- The smallest possible footprint should be utilized and positioned far from the boundary of the affected watercourse; and
- Excavated watercourses should be re-sloped to a stable gradient (e.g. at least a slope of 1:3), re-vegetated with naturally occurring indigenous species or annual grass species such as *Eragrostis curvula*.

Recommendations:

- An on-site ECO must be responsible for ensuring compliance and minimising environmental impacts.
- Implementation of bins on site during construction for the management of waste.

8.1.2 SOIL EROSION (caused by land clearing)

Mitigation:

- Reduce clearing to a minimum to maintain vegetation cover;
- Construct low level water deflection berms;
- Control runoff before it develops into an erosive force;
- Create a channel for runoff to avoid numerous runoff channels that erode the soil; and
- Re-vegetate cleared soil after construction, for the control of soil erosion and water capacity.

Recommendations:

- Existing roads and paths should be used for access.

8.1.3 ALIEN INVASION OF NATIVE SPECIES HABITAT (caused by seed or sapling dispersal by construction vehicles and construction workers)

Mitigation:

- Removal of alien invasive species to allow native vegetation to grow to its potential;
- Re-vegetation of native species;
- Removal of alien invasive species and monitoring of the environment to keep invasive species to a minimum should they occur; and
- Eradication of invasive species and weeds during the construction phase.

- Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance of the power line and take immediate corrective action where invasive species are observed to establish.

Recommendations:

- Removal of alien invasive species through the use of mechanical methods is the recommended method of alien invasive control.

8.1.4 ALTERATION OF WATER QUALITY (caused by toxic contaminants and hydrocarbons from construction vehicles e.g. oil, brake fluid)

Mitigation:

- After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use;
- Maintenance of construction vehicles;
- Ensure that maintenance work does not take place haphazardly, but, according to a fixed plan, from one area to the other; and
- No re-fuelling of construction vehicles should occur within 32m of demarcated watercourses. Hydrocarbons should not be stored within 32m of watercourses.

Recommendations:

- Use of guidelines for implementing Clean Technologies (e.g. Biological treatments i.e. trickling filtration, membrane bioreactors, fixed film reactors)

8.1.5 ALTERATION OF WATER QUALITY (caused by domestic waste deposits into water)

Mitigation:

- No littering on riparian zones of drainage lines/water courses; and
- All daily activities that could involve the generation of waste should be restricted to the construction site and away from any watercourse.

Recommendations:

- An ECO should be appointed on site for the daily compliance of all activities.

8.2 OPERATIONAL PHASE

8.2.1 LOSS OF WETLAND HABITAT AND ECOLOGICAL STRUCTURE

Mitigation:

- Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction of the power lines; and
- No dumping of waste material should be allowed.

Recommendations:

- Wetland systems and their buffer zones should be regarded as no-go areas during the project life-cycle.

8.2.2 SOIL EROSION (caused by land clearing)

Mitigation:

- Reduce clearing to a minimum to maintain vegetation cover;
- Construct low level water deflection berms;
- Control runoff before it develops into an erosive force;

- Create a channel for runoff to avoid numerous runoff channels that erode the soil; and
- Re-vegetate cleared soil after construction, for the control of soil erosion and water capacity.

Recommendations:

- **Existing roads and paths should be used for access.**

8.3 DECOMMISSIONING PHASE

8.3.1 DEGRADATION OF WETLANDS DUE TO THE DECOMMISSIONING OF THE EXISTING POWER LINE

Mitigation:

• Existing roads and paths should be used for access;

• Upon completion of each pylon one should ensure that site is left clean and free from (debris, hydrocarbons and waste. Moreover, all excavations should be filled appropriately; and

• Re-vegetate cleared soil after construction with local and indigenous grass species, for the control of soil erosion and water capacity.

Recommendations:

• Decommissioning activities should take place during dry seasons.

8.4 POSITIVE IMPACTS FOR CONSTRUCTION, OPERATIONAL AND DECOMMISSIONING PHASES

- There is likely to be a positive impact on employment especially during the construction phase;

- The project has the potential to positively impact upon household incomes during the construction phase;
- Improved national power supply services; and
- There is a possibility of skills-based training programmes on site, where unskilled workers from surrounding community could be taught a skill and achieve a certificate to support the skill. This would be an advantage for the community members post the construction as they will be to apply for other employment elsewhere.

Table 8-2 Summary of wetland impact assessment

ASPECT	IMPACT	POSITIVE/NEGATIVE IMPACT	PROBABILITY	DURATION	SCALE	MAGNITUDE	SIGNIFICANCE/ RISK	MITIGATION REQUIRED	SCALE
Construction trenches and excavations on wetland and associated river	Water quality deterioration (Pollution from suspended material)	Negative	3	2	1	4	21	Yes	LOW
Construction for site establishment and laydown areas for the upgrading of the MTG at spencer	Negative impact on flora and fauna from human interference on site	Negative	3	2	1	6	27	Yes	LOW
Land clearing	Biodiversity loss	Negative	4	3	2	6	44	Yes	MODERATE
Land clearing	Soil loss	Negative	4	2	2	4	32	Yes	MODERATE
Oil spillages	Water quality contamination	Negative	3	1	1	4	18	Yes	LOW
Human dispersal of alien seeds/sapling by construction vehicles, shoes, clothes	Alien invasion of native species habitat	Negative	2	1	1	4	12	Yes	LOW

9 CONCLUSION

The proposed power line from Foskor and Spencer and its associated substation crossed a number of watercourses (rivers, wetlands). Based on the PES and EIS and site assessment undertaken for the identified wetlands, the proposed activity will not pose detrimental impacts on wetlands. The wetlands have already experienced natural impacts that have degraded the wetlands integrity. Furthermore, none of the wetlands were regarded as those of natural importance. In light of the above, proposed power line activities should be conducted with all mitigation measures put in place. Construction of the power line should be undertaken during dry seasons.

The current study approves the proposed construction of the Foskor-Spencer power line. All alternatives cross watercourses, however alternative 2 cuts through less watercourses and wetlands, therefore, is the recommended alternative.

This is based on the following reasons:

- The proposed construction activities will have a low impact on the natural environment and no long term detrimental effects are anticipated or associated with the proposed activities;
- The assessed area is considered of low ecological significance;
- The assessed wetlands are already largely modified;
- Construction activities will be limited to local scale, and no operational impacts are anticipated for the power line;
- The power line construction activities will be localised and limited to one area where the construction will be taking place thereby not affecting the environment on a large scale.

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Appendix 1: Appendix 6 : Specialist Reports
National Environmental Management Act of 1998 (Act of No 107 of 1998),

Amendments to the Environmental Impacts Assessment Regulation 2014

Requirements	Section
Details of specialist	Please see appendix 2
Expertise of specialist	Please see appendix 2
CV of the specialist	Please see appendix 3
Declaration that the specialist is independent in a form as maybe specified by competent authority	Please see appendix 2
Scope of and purpose for which the report was prepared; indicate the quality and age of base data used for specialist report	See section 1, 1.1-1.2, 2.1, 2.2
Description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	See section 5
Duration, date and season of the site Investigation	Executive summary& introduction
Relevance of the season to the outcome of the assessment	See section 5.1& 5.3
Description of methodology (including equipment & model used)	See section 2
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	See section 7
Identification no go areas/sensitive areas and buffers	See Section 4
Map including associated structures, infrastructure and environmental sensitivities of the site include no go areas/areas to be avoided and their buffers	See Section 4
Description of any assumptions made or uncertainties/gap in knowledge	See Section 1.2
Description of the findings & potential implications of such findings on the impact of the proposed activitiy/activities, including alternatives on the environment	See section 6
Mitigation measures for inclusion in the EMPr	See Section 8
Any conditions for inclusion in the environmental authorisation	Not applicable
Any monitoring requirements for inclusion in the EMPr /environmental authorisation	Not applicable
Reasoned opinion as to whether the proposed activity/activities or portions should be authorised	Section 9
Reasoned opinion regarding the acceptability of the proposed activity or activities	Section 9
If the opinion is that the proposed activity, activities or portions thereof should be authorized, any avoidance, management and	Section 8

mitigation measures that should be included in the EMPr, and where applicable, the closure plan	
Description of any consultation process that was undertaken during the course of preparing the specialist report	Not applicable
Summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not applicable
Any other information requested by the competent authority	Not applicable

Appendix 2: Professional Experience

Nonkanyiso Zungu

Nonkanyiso Zungu is a Professional Natural Scientist (Pr.Sci.Nat) with 13 years' experience in the environmental field, including GIS. She is currently a PhD candidate at the University of Cape Town doing research on climate change effects on freshwater ecology. She obtained her Masters Degree in Environmental Management from the University of Pretoria with a specialty in Water Resource Management. She has extensive experience in water resource management, waste management, and obtaining environmental authorisations (air, water, waste) across sectors that include: Power generation, infrastructure (Construction), transportation (rail), waste disposal, water purification & sewage works. The projects she has undertaken include: Environmental Impact Assessments, Basic Assessments, Environmental Feasibility Studies, Environmental scoping studies,

Environmental legal compliance audits, Waste management licences, Water use licences, and Baseline risk assessments. Nonkanyiso Zungu is a Health & Safety and Environmental (SHE) auditor and is knowledgeable on internal integrated SHEQ auditing. She has experience on development and implementation of ISO 14001: 2004 management system and undertaking internal audits.

Nonkanyiso is also a wetland specialist with experience in wetland delineation, determination of present ecological status, ecological importance and sensitivity evaluations, and wetland rehabilitation planning using packages that include Wet-Health, Wet-EcoServices, and Wet-RehabEvaluate.

DECLARATION OF INDEPENDENCE

I, Nonkanyiso Zungu as duly authorised representative of Sazi Environmental Consulting, (SACNASP Ecological Science Registration number 400194/10) as stipulated by the Natural Scientific Professions Act 27 of 2003, hereby confirm my independence (as well as that of Sazi Environmental Consulting) as a specialist and declare that neither I nor Sazi Environmental Consulting have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which DIGES was appointed as environmental assessment practitioner in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for worked performed, specifically in connection with the Environmental Impact Assessment for the proposed Foskor - Spencer 400kV power line and associated infrastructure.

Appendix 3: Details of Specialist and declaration of interest

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014; and

(2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and
Government Notice 921, 2013

PROJECT TITLE

400KV TRANSMISSION POWER LINE FROM FOSKOR SUBSTATION TO SPENCER SUBSTATION AND SPENCER MAIN TRANSMISSION SUBSTATION UPGRADING, WETLAND DELINEATION AND ASSESSMENT

Specialist:	Sazi Environmental Consulting		
Contact person:	Nonkanyiso Zungu		
Postal address:	P.O. Box 201, Carlswald		
Postal code:	1684	Cell:	0848000187
Telephone:	011 312 2806	Fax:	011 312 7208
E-mail:	NZungu@sazienvironmental.co.z		
Professional affiliation(s) (if	South African Council for Natural Scientific Professions (SACNASP, Pr. Nat. Sci. (Practice no. 400194/10): Ecological Science		

any)

Project Consultant:	DIGES GROUP		
Contact person:	Brenda Makanza		
Postal address:	Suite No. 2, 546, 16th Road, Midrand		
Postal code:	1685	Cell:	
Telephone:	011 312 2878	Fax:	011 312 7824
E-mail:	brendam@diges.co.za		

4.2 The specialist appointed in terms of the Regulations_

I,Nonkanyiso Zungu ____________________, declare that -- General

declaration:

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 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Sazi Environmental Consulting
Name of company (if applicable):

17 October 2017
Date:

Appendix 4: CV of Specialist

Profile Summary

Nonkanyiso Zungu is a Professional Natural Scientist (Pr.Sci.Nat) with 13 years' experience in the environmental field, including GIS. She is currently a PhD candidate at the University of Cape Town doing research on climate change effects on freshwater ecology. She obtained her Masters Degree in Environmental Management from the University of Pretoria with a specialty in Water Resource Management. She has extensive experience in water resource management, waste management, and obtaining environmental authorisations (air, water, waste) across sectors that include: Power generation, infrastructure (Construction), transportation (rail), waste disposal, water purification & sewage works. The projects she has undertaken include: Environmental Impact Assessments, Basic Assessments, Environmental Feasibility Studies, Environmental scoping studies,

Environmental legal compliance audits, Waste management licences, Water use licences, and Baseline risk assessments.

Nonkanyiso Zungu is a Health & Safety and Environmental (SHE) auditor and is knowledgeable on internal integrated SHEQ auditing. She has experience on development and implementation of ISO 14001: 2004 management system and undertaking internal audits.

Nonkanyiso is also a wetland specialist with experience in wetland delineation, determination of present ecological status, ecological importance and sensitivity evaluations, and wetland rehabilitation planning using packages that include Wet-Health, Wet-EcoServices, and Wet-RehabEvaluate.

Education

Institution	Year	Degree Obtained
University of Cape Town	2017 -	Current
University of Pretoria	2011	MSc. Environmental Management
University of KwaZulu-Natal	2005	BSc. Honours, Ecology
University of KwaZulu-Natal	2003	BSc. Biological Sciences

Professional Registrations

- South African Council for Natural Scientific Professions (SACNASP, Pr. Nat. Sci. (Practice no. 400194/10): Ecological Science
- Member of the Gauteng Wetland Task Group
- Member of WISA (Gauteng Region)

Short Courses

- ISO 14001 IMPLEMENTATION AND INTERNAL AUDITING
- ISO 18001 IMPLEMENTATION AND INTERNAL AUDITING
- ISO 9001 IMPLEMENTATION AND INTERNAL AUDITING
- LEAD AUDITING (SAATCA)
- INCIDENT AND ACCIDENT INVESTIGATIONS
- QUALIFIED WETLAND ASSESSMENT PACTITIONER (WET-HEALTH; WET IHI)

Key Skills

- ESRI GIS MAPPING, ARCMAP 10
- ISO 14001: 2004 internal auditing
- Legal compliance auditing
- Wetland delineation and assessment
- Environmental Impact Assessment
- Waste Management Licence Applications
- Water Use Licence Applications
- Basic Assessments
- Feasibility Studies (Fatal flaw analysis)

Employment History

2014 – Current	SAZI Environmental Consulting cc
2011 - 2014	Sebata Group of Companies
2009 - 2011	Department of Water Affairs
2007 - 2009	Wetland Consulting Services
2005 - 2006	University of KwaZulu-Natal (Maluti Transfontier Conservation Program)
2004 – 2005	University of KwaZulu-Natal (Welgevonden Elephant Program)

Appendix 5: Qualifications of Specialist

27236031

University of Pretoria

The Council and Senate hereby declare that
at a congregation of the University the degree

Master of Agricultural Management
in
Environmental Management

with all the associated rights and privileges
was conferred on

Nonkanyiso Maphumulo

in terms of the Higher Education Act, 1997 and the Statute of the University

On behalf of the Council and Senate

C. de la Rey

Vice-Chancellor and Principal

On behalf of the Faculty of
Natural and Agricultural Sciences

Dean

Registrar

2011-09-09

UNIVERSITY OF KWAZULU-NATAL

The Universities of Durban-Westville and Natal merged
to become the University of KwaZulu-Natal on 1 January 2004

This is to certify that

Nonkanyiso Maphumulo

was admitted this day
at a congregation of the University
to the degree of

Bachelor of Science Honours
(Biological Sciences)

having satisfied the conditions prescribed for the degree.

M W Makgoba
Vice-Chancellor

E Mneney
Registrar

J A Cooke
Dean

8 May 2006

UV PROTECTED

University of Natal

We, the Vice-Chancellor, the Registrar,
and the Dean of the Faculty,
hereby certify
that

Nonkanyiso Maphumulo

has this day been admitted to
the degree of

Bachelor of Science
Biological Sciences

M W Makgoba
Vice-Chancellor

G J Trotter
Acting Registrar

John A Cooke

J A Cooke
Dean

18 December 2003

UV PROTECTED – TAMPER EVIDENT UV

I certify that this document is a true copy of the original which was examined by me and that, from my observations, the original has not been altered in any manner

SIGNATURE

Commissioner of Oaths – Philani Sifiso Khumalo

Designation: Certified Financial Accountant (ICBA) (S...292

Date: 16/10/2017

1071 Chicago Street, Cosmo City, North Riding, 2188

THE SOUTH AFRICAN COUNCIL FOR NATURAL SCIENTIFIC PROFESSIONS

herewith certifies that

Nonkanyiso Zungu

Registration number: 400194/10

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice
(Schedule I of the Act)

Ecological Science **20 October 2010**

20 October 2010
Pretoria

President

Chief Executive Officer

Sazi
Environmental Consulting

m: 084 800 0187

e: nzungu@sazienvironmental.co.za

a: B16 Lone Creek, Waterfall Park, Vorna Valley, Midrand, 1684