SECTION 21(C) AND (I) WATER USE AUTHORISATION APPLICATION

FOR THE

HARRISMITH MUNIC-LETSATSI 11KV POWERLINE PROJECT, SITUATED IN HARRISMITH, FREE STATE PROVINCE

JUNE 2015

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SYNOPSIS :

Water Use License Application for the Harrismith Munic-Letsatsi 11kV Powerline Project, Situated In Harrismith, Free State Province.

KEY WORDS :

Water Use License Application, Eskom

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2008 which has been independently certified by DEKRA Certification under certificate number 90906882

Verification	Capacity	Name	Signature	Date
By Author	Environmental Scientist	Kirthi Peramaul		06/07/2015
Checked by	Snr Environmental Scientist	Sonja van der Merwe		06/07/2015
Authorised by	Technical Director	Cecilia Canahai		06/07/2015

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EXECUTIVE SUMMARY

Jeffares & Green (Pty) Ltd was appointed by Eskom Distributions, Free State Operating Unit to undertake the Water Use Authorisation Process for the proposed construction of the Harrismith – Munic Letsatsi 11kV powerlines. Eskom commenced with the construction of the powerline in early 2014. During construction water logged areas were encountered and all construction activities were stopped to identify if wetlands do occur in the construction area. Eskom then contacted the Department of Water and Sanitation (DWS) to undertake a site visit, and after the site visit DWS instructed Eskom to undertake a Wetland Delineation Assessment, and other applicable studies necessary for the undertaking of a Water Use License Application Process, as the construction of the powerlines within wetlands require a Water Use Authorisation Process.

The study area is located to the west of the Town of Harrismith in the Free State Province at coordinates 28°16' 35.98"S; 29°06' 36.53"E. The main river within the study area is the Wilge River. This section of the Wilge River falls within the Upper Vaal Water Management Area (WMA). The area is easily accessible via the N5, which forms part of the study area. The Wilge River in particular and the associated sub-quaternary catchments has been identified as a River FEPA (Freshwater Ecosystem Priority Area). According to the National Biodiversity Assessment (NBA) the study area also falls within a terrestrial environment which is considered to be endangered.

Several wetland types were identified during the field survey. This included unchannelled valley bottom wetlands, depressions, hillslope seeps and an order one (1) river. In addition, an artificial wetland has formed as a result of continuous stormwater runoff from the N5. This wetland has formed next to the Harrismith-Munic substation. The most important wetland type identified during the study was the large floodplain wetland associated with the Wilge River. Several oxbow lakes and floodplain pans were also noted, which are directly depended on the Wilge River for inundation.

The proposed project will have an impact on the floodplain wetland in the form of a potential change in hydrology, geomorphology and vegetation. Currently, these components of the floodplain have been minimally altered as there has not been large alterations in catchment land use. The risk of any impact occurring is low to very low, as it was evident that the placement of the original powerlines appeared to have very little impact on the floodplain wetland. Mitigation measures have been suggested in the report and should be applied to avoid any negative impacts on the receiving environment.

1 INTRODUCTION

Eskom Distributions, Free State Operating Unit, proposed the construction of two 11kV powerlines for The Letsatsi Family Trust, in the Harrismith area, from the existing Harrismith-Munic substation. Construction of these lines commenced in March 2014, however, during construction, the contractor came across water logged areas, and all construction activities were stopped to allow investigation of these areas.

Eskom contacted the Department of Water and Sanitation (DWS) (*formerly known as the Department of Water Affairs*) to undertake a site visit, and after the site visit DWS instructed Eskom to undertake a Wetland Delineation Assessment, and other applicable studies necessary for the undertaking of a Water Use License Application Process, as the construction of the powerlines across wetlands requires a Water Use Authorisation Process.

Eskom contacted Jeffares & Green (Pty) Ltd on the 6th of February 2015 and requested Jeffares & Green (Pty) Ltd to submit a quotation to undertake the above mentioned work. The quotation was submitted to Eskom and the appointment was received by Jeffares & Green on the 25th of March 2015.

2 DETAILS OF THE APPLICANT

As mentioned in Section 1 above, Eskom Distributions, Free State Operating Unit, proposed the construction of two 11kV lines for The Letsatsi Family Trust in the Harrismith area, from the existing Harrismith-Munic substation which is located in Harrismith, in the Free State Province. The details of the project applicant are provided in the table below:

Project applicant:	Eskom Distributions, Free State Operating Unit		
Contact person:	Mrs Mahlatse Moeng		
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3 PROJECT ENVIRONMENTAL ASSESSMENT PRACTITIONER

Jeffares & Green (Pty) Ltd were appointed by Eskom Distributions, Free State Operating Unit as the Independent Environmental Assessment Practitioner to undertake the Water Use Authorisation process for this project.

Jeffares & Green is a specialist consultancy offering services in the following sectors; environmental impact and environmental management, geotechnical engineering, geohydrology, waste management and various engineering sectors (roads, structures, municipal, etc).

In September 2000, Jeffares & Green obtained the international quality management certification, ISO 9001, for all of its services. Our accreditation company is DEKRA.

The J&G project team included the following parties. CV's of the project team members are attached to Appendix C.

Name	Position in Firm	Qualification	Years' Experience	Role in Project
Mrs Cecilia Canahai	Technical Director	Pr Sci Nat, MSc (Eng Geology), BSc (Eng Geology)	24 Years	Project Manager and Reviewer.
Mrs Sonja van der Merwe	Snr Environmental Scientist	BA (Hons) Geography and Environmental Management	9 Years	Environmental Assessment Practitioner and Project Leader.
Dr Martin Ferreira	Aquatic Scientist	PhD. Aquatic health	6 Years	Aquatic Specialist undertaking the Aquatic Assessment and WULA Technical Report compilation assistance.
Miss Anelile Gibixego	Graduate Aquatic Scientist	BSc Biological Sciences	5 Years	Aquatic Specialist undertaking the Aquatic Assessment.
Mrs Kirthi Peramaul	Environmental Scientist	BSc (Hons) Environmental Science	8 Years	Environmental Scientist, compilation of the WULA Technical Report

4 PROJECT LOCATION

The existing Harrismith-Munic Substation is situated south of the N5 National Route in Harrismith, on the Farm Harrismith 131, at the following coordinates:

Latitude:	28°17'00.27"S
Longitude:	29°07'31.03"E

The Harrismith-Munic – Letsatsi 11kV distribution powerlines will originate at the Harrismith-Munic Substation, and will terminate at the Letsatsi transformer bay.

The distribution lines originate on the Remaining Extent of the Farm Harrismith 131, at the Harrismith-Munic Substation. From here the lines run in a north westerly direction and transverse Portion 190 of the Farm Harrismith 131, on which the National Road N5 and its Road Reserve is situated. From here the lines run in a northerly direction again, traversing the Remaining Extent of the Farm Harrismith 131. The lines then traverse the Transnet Railway line and servitude, situated on Portion 118 of the Farm Harrismith 131. The lines then traverse Portion 186 of the Farm Harrismith 131, and then terminate on Erf 4899 Harrismith at a transformer bay (Letsatsi Transformer bay) to be constructed for The Letsatsi Family Trust. Please refer to Figure 1: Project Locality Map.

Figure 1: Project Locality Map

5 LANDOWNER AND EXISTING LAND USE OF DEVELOPMENT SITES

The proposed powerlines will originate at the Harrismith-Munic Substation which is situated on a property owned by the Maluti a Phofung Local Municipality. The powerlines will traverse the N5 (National Route), the Murray Road Bridge, a railway line, as well as existing telecommunication infrastructure.

Eskom did not register a servitude for the construction of a powerline on these affected properties / servitudes, but they have obtained Way-leaves from the various entities. Way-leaves or easements is the right to use a property of another without possessing it. It entitles the holder only the right to use such land in a specified manner.

The following entities issued Eskom Holdings Limited with Way-Leaves or permission letters for the use of their properties / servitudes for the construction of powerlines:

Property Owner / Or entity maintaining the land	Property Description	21 Digit Surveyor General Code	Infrastructure to be associated / to be associated with these properties
Maluti a Phofung Local Municipality	Remaining Extent of the Farm Harrismith 131	F01500000000013100000	Property on which the Harrismith-Munic Substation is situated, and on which the two powerlines will originate.
The South African National Roads Agency Limited (SANRAL)	Portion 190 of the Farm Harrismith 131	F01500000000013100190	The powerlines will traverse the National Road N5 Servitude
Transnet	Portion 118 of the Farm Harrismith 131	F01500000000013100118	The powerlines will traverse the Transnet Railway Line Servitude
Maluti a Phofung Local Municipality	Portion 186 of the Farm Harrismith 131	F01500000000013100186	The powerlines will traverse this property.
Maluti a Phofung Local Municipality	Erf 4899 Harrismith		Property on which the Letsatsi Transformers will be situated and on which the powerlines will terminate
Free State Department of Police, Roads and Transport	Situated on the Remaining Extent of the Farm Harrismith 131	F01500000000013100000	The powerlines will traverse the Murray Road Bridge.
Telkom	Situated on the Remaining Extent of the Farm Harrismith 131	F01500000000013100000	The powerlines will traverse existing Telkom telecommunication infrastructure.

Wayleaves from the different entities are attached to Appendix H of this Technical Report.

6 LEGISLATIVE REVIEW

6.1 National Water Act

Section 21 of the National Water Act (Act 36 of 1998) defines a list of activities which requires a Water Use Authorisation. Listed activities in terms of Section 21 include the following:

- 21(a) taking water from a water resource;
- 21(b) storing water;
- 21(c) impeding or diverting the flow of water in a watercourse;
- 21(d) engaging in a stream flow reduction activity contemplated in Section 36 of the Act;
- 21(e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- 21(f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- 21(g) disposing of waste in a manner which may detrimentally impact on a water resource;
- 21(h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- 21(i) altering the bed, banks, course or characteristics of a watercourse;
- 21(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
- 21(k) using water for recreational purposes.

The proposed project will require a Water Use Authorization related to activities (c) and (i).

6.2 National Environmental Management Act

New Environmental Impact Assessment (EIA) Regulations were promulgated in December 2014 in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998 consists of the following:

- Regulation 982 provide details on the processes and procedures to be followed when undertaking an Environmental Authorisation process;
- Listing Notice 1 (Regulation 983) define activities which will trigger the need for a Basic Assessment process;
- Listing Notice 2 (Regulation 984) define activities which trigger an Environmental Impact Assessment (EIA) process. If activities from both R 983 and R 984 are triggered, then an EIA process will be required.
- Listing Notice 3 (Regulations 985) define certain additional listed activities for which a Basic Assessment process would be required within identified geographical areas.

The above regulations were reviewed to determine whether the proposed project will trigger any of the above listed activities, and if so, what Environmental Authorisation Process would be required. The following activities which could form part of the proposed project were identified:

Listing Notice	Activity	Description
R983 / Listing Notice 1	12	The development of- xii. infrastructure or structures with a physical footprint of 100 square metres 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 metres 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 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; or (ee) where such development occurs within existing roads or road reserves.
R983 / Listing Notice 1	19	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from- i. 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; or (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.

The proposed construction of the two (2) Harrismith – Munic Letsatsi 11kV lines do not appear to trigger the listed activities in terms of the above regulations, as the threshold will not be met for either Activities 12 or 19, and therefore Environmental Authorisation does not appear to be required for the project. Refer to Appendix H for the written confirmation from Eskom, and below for Eskom's comments.

- Activity 12: Will not be triggered as these lines will not meet those thresholds; and
- Activity 19: Will not be triggered, as these thresholds will not be met.

7 AUTHORISATION AND LICENSING PROCESSES

7.1 Water Use Authorisation Process

Where construction will take place within the areas Regulated by the DWS which include all Riparian Areas, all areas within the 1:100 year Floodline of Rivers and Streams and all areas within a 500m radius of the delineated edge of a wetland, a Water Use Authorisation is

required. Hence, an Application needs to be made to the DWS to obtain a Water Use Authorisation.

Construction of the powerlines commenced in March 2014. During the construction phase of the project, a challenge was encountered with waterlogged areas. As a result construction was halted for input from Eskom's environmental section. Eskom consulted with the DWS and were requested to submit a construction method statement as well as additional information to the DWS. The construction method statement as well as structure technical diagrams were submitted to DWS on the 17th of December 2014. A site visit was undertaken on the 27th of January 2015 by the DWS officials from the Gauteng Regional office and Eskom. Due to the presence of suspected wetland areas and a river system along the powerline route, the DWS recommended that a Water Use License Application (WULA) process be followed as the construction activities are considered a section 21 (c) and (i) water uses. The DWS also advised that specialist studies such as a Wetland Delineation, Floodline study and a geotechnical study should be undertaken. Eskom then appointed Jeffares & Green (Pty) Ltd to undertake the WULA process, the Floodline Assessment and the Wetland Delineation Assessment. The DWS has indicated that for the purposes of this report, the project description and activities undertaken should be explained in future tense even though construction has already commenced. However the Wetland Assessment undertaken by Dr Martin Ferreira makes reference to the poles that have been placed for the construction of the powerlines. All correspondence with the DWS is attached to Appendix E of this Technical Report.

7.2 Specialist Studies

The following specialist studies were undertaken by suitably qualified specialists:

- A Floodline Assessment undertaken by Mr Phillip Hull from Jeffares & Green (Pty) Ltd ; and
- A Wetland Assessment undertaken by Dr Martin Ferreira from Jeffares & Green (Pty) Ltd

All Specialist Reports are attached to Appendix F of this Report.

8 DESCRIPTION OF WATER USE

8.1 Water Resource Description

The study area currently falls within the Upper Vaal Water Management Area (WMA) (DWAF, 2004). It has been proposed in the National Water Resource Strategy version 2 (DWA, 2013) that the current 19 WMAs areas be consolidated into 9 WMAs. The study area will then form part of a larger WMA known as the Vaal WMA. The Vaal River system is within the economic heartland of the country and supplies the water resource needs of 60% of the national economy and serves 20 million people (DWA, 2013). The water resources in this WMA are limited and must be secured (DWA, 2013).

The Upper Vaal WMA is a pivotal WMA in the country and includes the transfer of large quantities of water into and out of the area (DWAF, 2004). The northern part of the WMA is characterised by extensive urbanisation, mining and industrial activity, while the remainder of

the WMA is characterised by livestock farming and rain fed cultivation. Water resources in the area are highly developed and regulated due to the high level of urbanisation in the WMA and its pivotal role as a water transfer point. Only marginal potential for further development remains in the WMA. Climate over the WMA is fairly uniform, and the average rainfall varies between 600 mm and 800 mm per year. Groundwater is mainly used for stock watering and rural domestic needs but a substantial quantity of water is also abstracted from dolomitic aquifers for urban use (DWAF, 2004).

Table 1: Main characteristics of quaternary catchment C81E in which the study area is located.

Quaternary Catchment	C81 E
Catchment size	590.7 km^2
Mean Annual Precipitation	657.56
Mean Annual Surface Runoff	48.8
Vegetation	Moist Cold Highveld Grassland
Desktop Ecological Importance and Sensitive*	Moderate
Desktop Present Ecological State*	C (Moderately Modified)

The study area falls within the Highveld ecoregion and the Highveld geomorphic province (Partridge et al., 2010). The Highveld is an extensive grassland region occupying the eastern interior plateau at elevations ranging from ~1200 to 1800 m. Most of the Province is drained by the tributaries and main stem of the Vaal River. The study area falls within a region north of the Vaal River. The older pre-Karoo landscape to the north of the Vaal River has greater relief as a result of slight incision of the superimposed drainage. For example, near Middelburg and Heidelberg many of the rivers follow pre-Karoo lines (e.g., the Blesbokspruit); a major exception is the Suikerbosrand River that flows across a once buried ridge (King, 1967). Much of the Province is, however, gently undulating and is dominated by the late Cretaceous African erosion surface, which remains intact on many of the broad interfluves (Partridge & Maud, 1987). The dominant drainage direction is westerly, partly because of the influence of the pre-Karoo topography, and partly because of warping along the Griqualand–Transvaal axis, whose activity was largely contemporaneous with uplift of the Ciskei–Swaziland axis (Partridge & Maud, 1987).

8.2 Conservation Status

The study area falls within a freshwater protected area (**Error! Reference source not found.**). he Wilge River in particular and the associated sub-quaternary catchments have been identified as River FEPA's. River FEPA's achieve biodiversity targets for river ecosystems and threatened/near-threatened fish species, and were identified in rivers that are currently in a good condition (A or B ecological category). Their FEPA status indicates that they should remain in a good condition in order to contribute to national biodiversity goals and support sustainable use of water resources.

The National Freshwater Ecosystem Protected Areas (NFEPA) was completed during early 2011 and the goal of the project was to determine strategic spatial priorities for conserving freshwater ecosystems and supporting sustainable use of water resources. This does not mean that the rivers cannot be used for human needs, but that the rivers should be supported by good planning, decision-making and management so that human use does not impact on

the river ecosystem condition. The project outputs are in the form of numerous maps indicating various different categories that each has different management implications. These categories include river FEPA's and associated sub-quaternary catchments, wetland FEPA's, wetland clusters, Fish Support Areas and associated sub-quaternary catchments, fish sanctuaries, phase 2 FEPA's and associated sub-quaternary catchments and Upstream Management Areas (Driver et al., 2011). Although several wetlands have been identified within the study area through the NFEPA project, none of these are considered to be Wetland FEPAs.

According to Free State Department of Economic Development, Tourism and Environmental Affairs (DESTEA) (2012) the study area does fall within a terrestrial environment which is considered to be endangered. This is largely due to the fact that the study area is dominated by the Eastern Free State Sandy Grassland (Figure 3). The conservation target for the vegetation type is 24%. Around 2% is statutorily conserved in the Qwaqwa and Golden Gate Highlands National Parks, as well as in the Sterkfontein Dam Nature Reserve. Almost half of the vegetation type has already been transformed for cultivation (maize), building of dams (e.g. Sterkfontein, Loch Athlone, Saulspoort).

Cirsium vulgare and *Cosmos bipinnatus* are forming spectacular displays along road verges and on old fields, *Hypochaeris radicata, Plantago virginica, Tagetes minuta, Verbena bonariensis, V. brasiliensis, Richardia brasiliensis, Guilleminea densa* and others are frequent alien invaders and diminish the agricultural and biodiversity value of these grasslands.

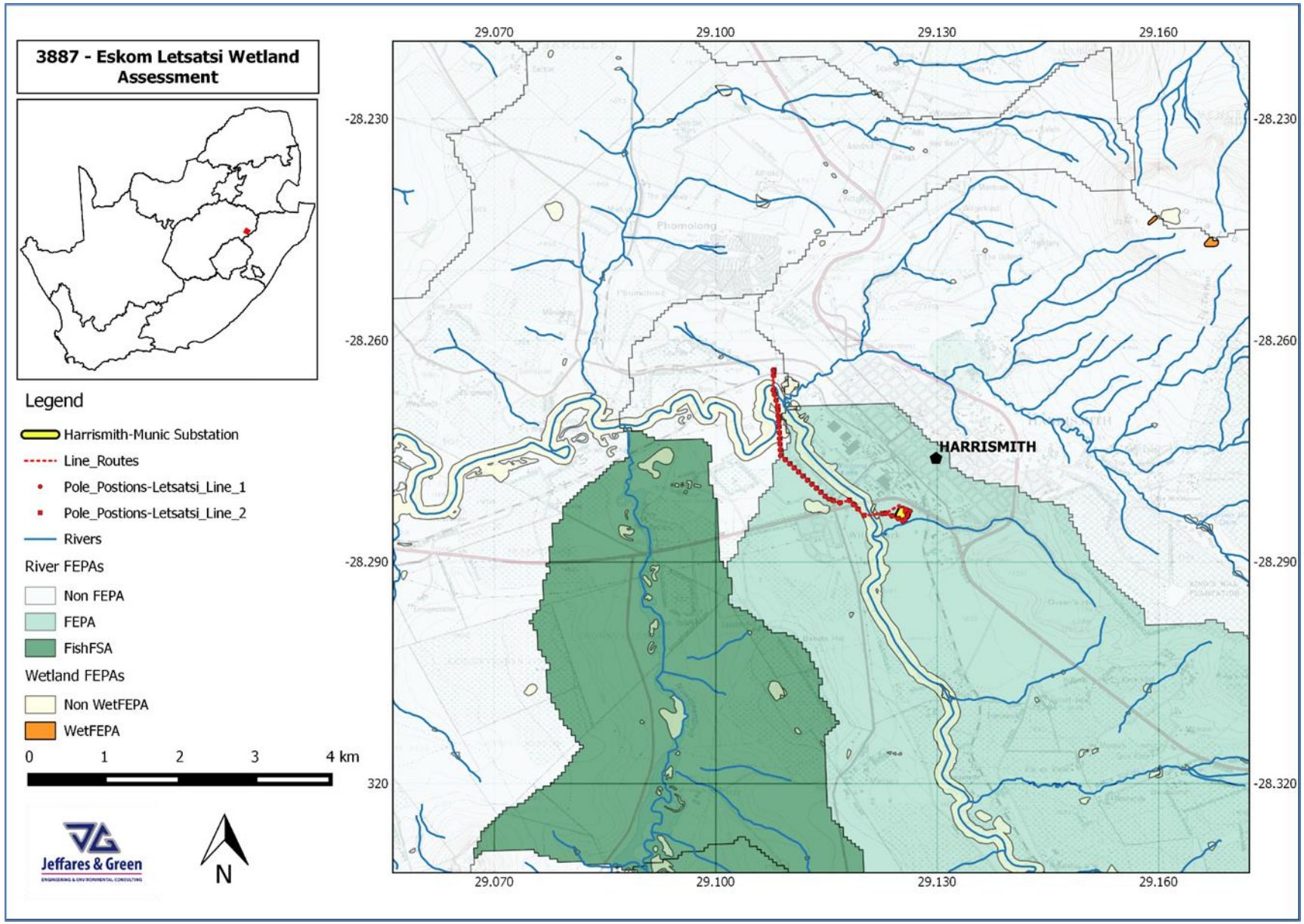

Figure 2: Map of the study area showing the extent of the project and the National Freshwater Protected Areas information

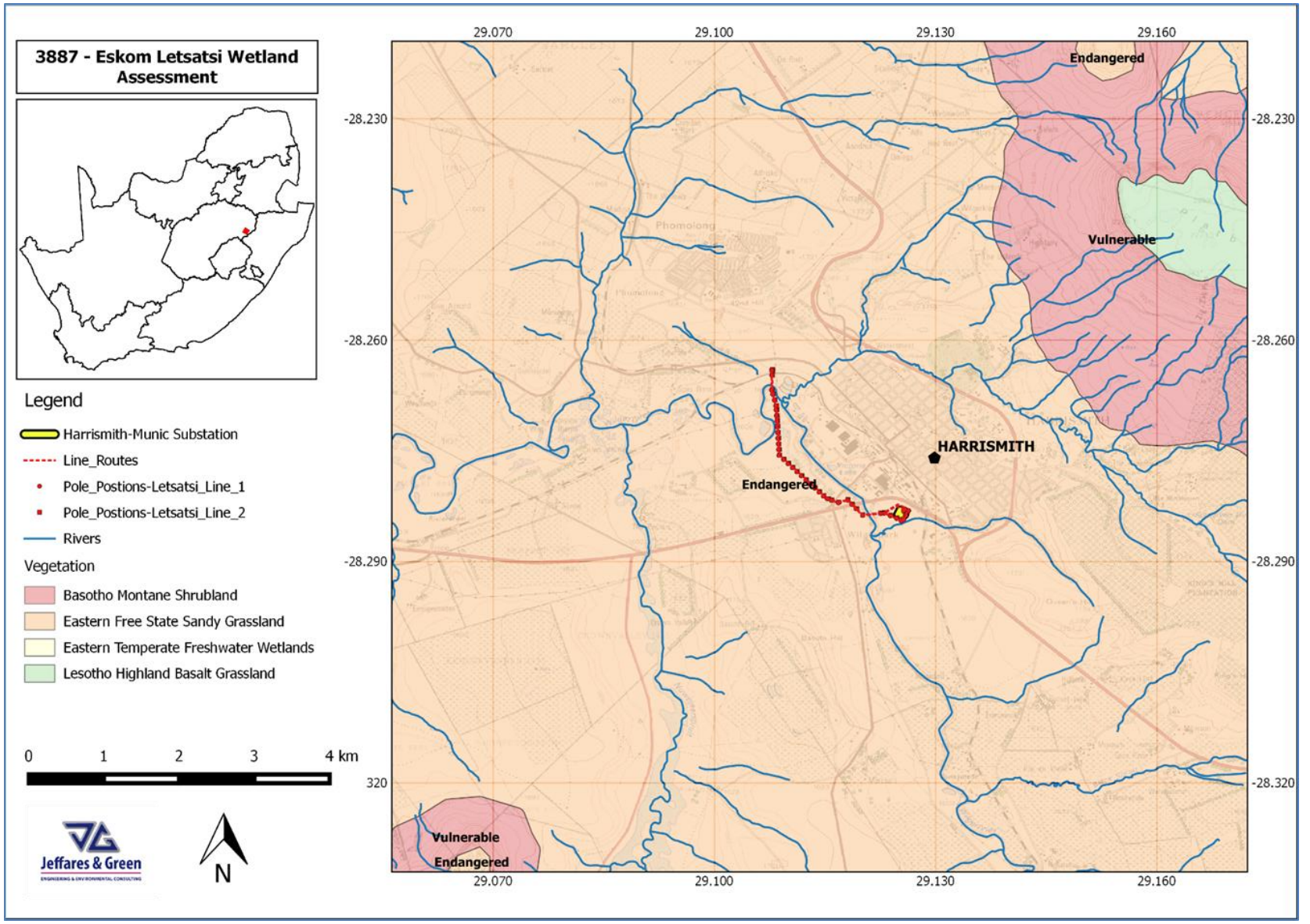

Figure 8 : Map showing the dominant vegetation types within the study area according to Mucina and Rutherford, 2006; and the protection status of the study areas according to the National Biodiversity Assessment of 2011

8.3 Wetlands

According to the Wetland Assessment undertaken by Dr Martin Ferreira, several wetlands types have been identified within the study area. A copy of the Wetland Assessment Report is attached to Appendix F of this Water Use License Technical Report. The following wetland types were identified during the field survey:

- One (1) artificial wetland,
- Three (3) Unchannelled Valley Bottom Wetlands (UCVB),
- One (1) hillslope seep connected to a watercourse,
- One (1) depression,
- One (1) order 1 river, and
- One (1) floodplain wetland.

The floodplain wetland is the largest wetland associated with the proposed activity and apart from possibly one UCVB wetland, the floodplain will be the only hydrogeomorphic unit (HGM) affected by the proposed activity. Please refer to Figures 17 & 18 which shows the various wetland types observed during the field survey, and the extent of the wetlands identified and the extent of the project. Each Wetland type observed during the field survey is explained in detail below.

8.4 Artificial Wetland

An artificial wetland has formed north of the Harrismith - Munic substation. This wetland appears to have formed as a result of the accumulation of stormwater draining from the N5. Several channels were observed draining into the wetland and permanent water was also present. Although artificial, the wetland that has formed appears to play an important role in attenuating stormwater and slowing the movement of water entering the floodplain. Several channels have, however formed downstream of the wetland and the stormwater outlet, channelizing water and causing erosion of the landscape around the substation.

Figure 4: Soils observed within the artificial wetlands showing clear signs of wetness

Figure 5: The channels forming as a result of stormwater from the N5

8.5 Unchannelled Valley Bottom Wetlands (UCVB)

The UCVB wetlands within the study area were all severely eroded. The UCVB wetlands directly east of the substation were of particular concern with large headcuts forming along the wetland. The changes observed were largely related to changes in hydrology with roads and railway lines transecting the UCVB within the study area. Large culverts have been placed where the infrastructure crosses the various UCVB wetlands and these culverts concentrate flow causing the erosion observed. Next to the UCVB, directly east of the substation, a housing development is also under construction. This will potentially cause further hydrological changes to this particular UCVB wetland.

Figure 6: Erosion observed at the UCVB wetland next to the Harrismith-Munic substation

Figure 7: Housing development under construction

8.6 Hillslope Seep

A hill slope seep was observed near the Harrismith-Munic substation. It is unclear whether this seep is a natural feature of the landscape or whether it has been formed through excavation of soils. Regardless of its origin, the Katspruit soil form was found within the wetland indicating permanently wet soils. *Juncus effesus, Cyperus compresus*, *Paspulum dilatatum Eragrostis curvula,* and *Cirsium vulgare* were all present within the wetland. Large bare patches were noted within the wetland indicating some disturbance.

Figure 8: Soils observed within the hillslope seep indicating clear signs of wetness

Figure 9: Bare soils observed

8.7 Depression

A large depression was observed to the east of the crossing of the N5. This depression does not appear to be dependent on the Wilge River as a source of water and appear to be functioning as a separate hydrogeomorphic unit (HGM). The volume of water in relation to the relatively small catchment may indicate that groundwater is an important source of water for the depression. The hydrology has been altered and large channels have been constructed, directing outflow from this depression into the floodplain wetland.

Figure 10: Large depression observed during the field survey

Figure 11: Channel that moves water from the depression into the Wilge River

8.8 Order 1 River

An order 1 river was identified during the field survey. The riparian zone of this river is dominated by *Salix babylonica*. The river originates in the mountains to the east of the town of Harrismith and runs along the west of the town before entering the Wilge River. The river

appears to receive abundant stormwater and surface water runoff from the town, and this will potentially have water quality impacts.

Figure 12: The confluence of the UCVB, the order 1 river and the Wilge River.

8.9 Floodplain

The floodplain wetland is the major wetland of concern with regards to the proposed activity, as the current powerline has been placed within the boundaries of this wetland. The floodplain wetland is characterized by numerous oxbow lakes and floodplain pans that have formed and which are depended on the overspill from the Wilge River as a source of water. It appears that the Wilge River has incised in certain areas, especially downstream of the road crossings. This potentially will cause changes to the frequency and the extent of inundation of the oxbow lakes and pans. During the field survey it was noted that the oxbow lakes where the Harrismith Munic- Letsatsi 11kV line will cross the Wilge River contained a large volume of water.

Figure 13: Wilge River near the crossing point of the Lestatsi line

Figure 14: One of the oxbow lakes

Figure 15: Sample collected in the floodplain wetland with an orthic A topsoil with an E horizon indicating clear signs of wetness.

Figure 16: Soil sample collected in the floodplain wetland with an orthic G Horizon indicating clear signs of wetness.

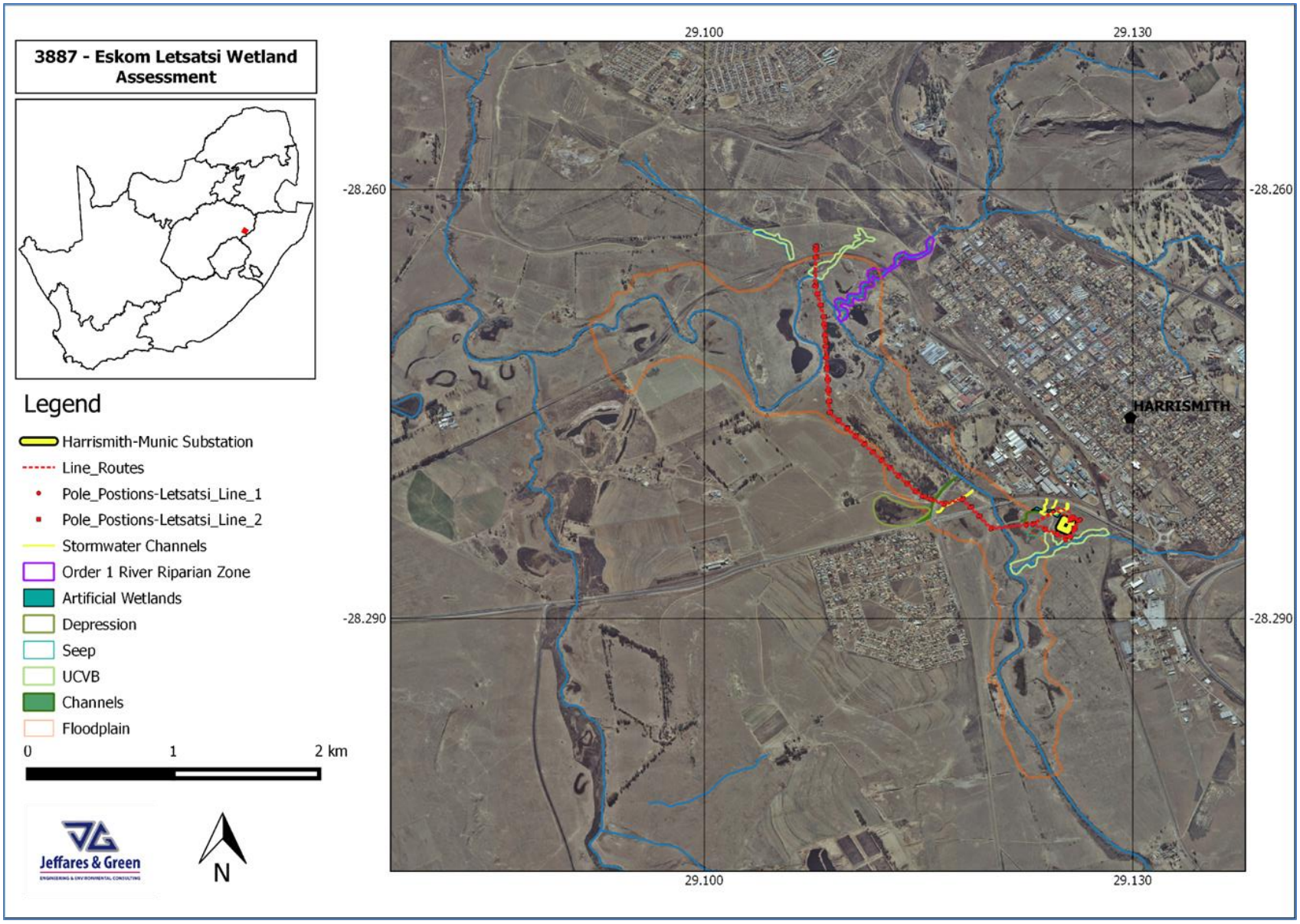

Figure 17: Map indicating the various wetland types observed during the field survey

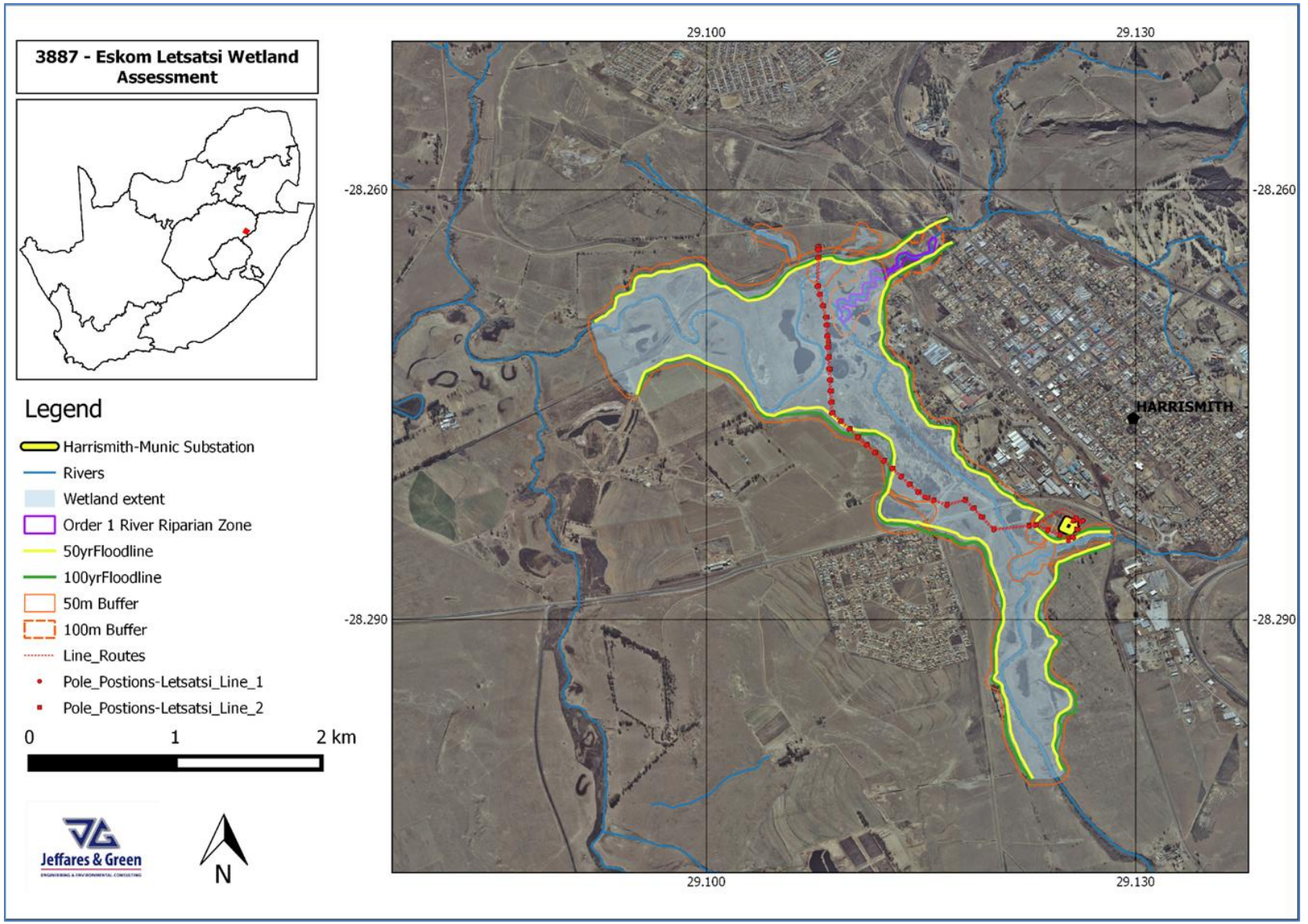

Figure 18: Map showing the extent of the wetlands identified and the extent of the project.

8.10 Water Use Motivation

Eskom proposed the construction of the Harrismith-Munic - Letsatsi 11kV powerlines for a customer, the Letsatsi Family Trust, who intends to construct residential houses within the Intabazwe Corridor. The Intabazwe Corridor is located between the Intabazwe Township and Harrismith. The Intabazwe corridor is a mixed use development which will include, residential units, a shopping complex, office units, industrial stands, a day-care center, a hospital, a college, a multi-purpose community center, a cultural tourism center and public parks. The proposed construction of the Harrismith-Munic-Letsatsi 11kV powerlines is to supply the Intabazwe Corridor specifically the residential component, the FET College and the hospital which require electricity supply.

8.11 Project Description

The project includes the construction of the two (2) Harrismith-Munic-Letsatsi 11kV powerlines which is approximately 3.6 kilometres (km) in length. Maximum span lengths between poles can be 90-100m for an 11kV hare line. Each line will consist of forty four (44) poles. Bird friendly wooden poles will be used. Both lines will exit the Harrismith-Munic substation and travel parallel until the termination point. As per the Wetland Assessment undertaken the Harrismith-Munic - Letsatsi 11kV powerlines will be placed along the Floodplain Wetland which has been identified on site.

8.12 Project Phase Description

8.12.1.1 Construction phase

The route will be accessed via existing roads and tracks where possible. The majority of the new excavations on the new powerlines route will be done by an auger drill. Only where site conditions require new structures and stay excavations this will be done by hand. The wooden poles will be lifted and mounted using a truck mounted crane. As per the recommendation provided in the Wetland Assessment undertaken by Dr Martin Ferreira, It is recommended that powerlines are erected using a pilot cable for stringing purposes. This will avoid additional movement of heavy vehicles. A copy of the construction method statement for the Harrismith–Munic-Letsatsi 11kV lines is attached to Appendix F of this report. A summary of the method statement for the planting and compaction of poles is provide below

The following Eskom Procedures will be followed for the pole planting and pole compaction:

- *Eskom's Procedure for Conventional stay planting and compaction, pole planting and compaction, and Rock Anchor installation and testing DSP 34-1657)*

The excavation depth for a standard wooden pole (11m in height), is 1.8 meters (m) deep. The first 500mm (0.5m) of the excavation will have a diameter of 1.2m (1,200mm). The remaining 1.3m of the excavation will have a diameter of 600mm. A diagram (Figure 19) is provided below to illustrate the excavation dimensions.

The lower portion of the excavation (1.3m deep section) will be back filled with a select soil that is a Type 2 soil (refer to explanation below) or better. This backfilled section will be compacted in 150mm layers with a hand compacter weighing not less than 12kg. The lower portion of the excavation for wooden poles are generally not backfilled with concrete, as poles

easily becomes rotten under such conditions. Where site conditions are poor, a concrete ring will be placed around the lower excavated sections. The upper section of the excavation (500mm deep section) will be backfilled with an import soil that is moistened and thoroughly mixed with two (2) pockets of 50kg Portland cement.

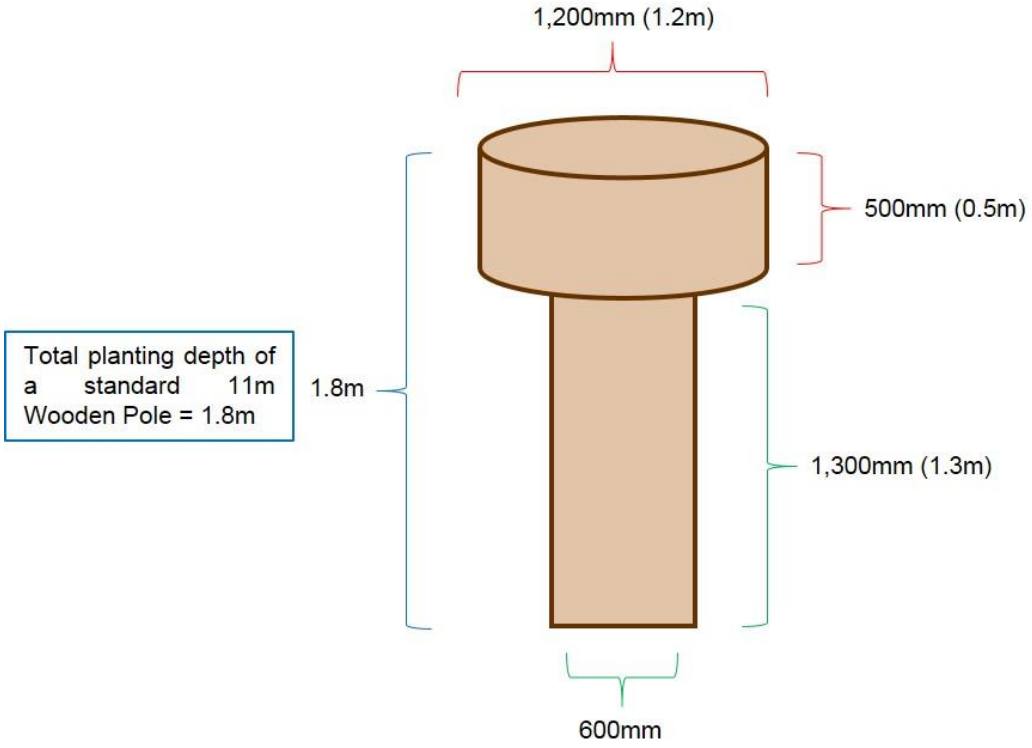

Figure 19: Cross Section View of Planting Wooden Poles

Concrete may also be used instead of the cement sand mix which will be vibrated with a mechanical vibrator. The sand cement mix will be used to backfill the excavation in 150mm layers and will be compacted. Once it has been compacted a further 150mm will be added and compacted. Compaction will continue until no further settlement occurs. The excavation will be backfilled and compacted to 100mm above natural ground level in order to prevent ponding of water around the footings of the poles.

The sand cement mix shall be left to cure for seven (7) days, before loads are applied to the pole.

Pilot cables will be used for stringing purposes, should site conditions allow the cables will be pulled along the line route with a 4x4 tractor or similar suitable vehicle; otherwise it will be pulled by hand. The line is generally strung in sections (from bend to bend). Cable drums are placed at 5 km intervals (depending on the length of the conductor) during the stringing process. In order to minimise any potential negative impacts on the surrounding area, these cable drums should be placed within the servitude. The maximum span lengths between the poles will be approximately 90-100m for an 11kv hare line.

Table 2: Compaction methods for different soil types

Soil Type	Method
1. Type 1 and 2 soils (stiff cohesive soils or medium dense cohesion less soils)	After the poles have been planted to the required depth, the soil used for backfilling will be slightly moistened such that if the soil is held in the hand and squeezed it shall stay compacted after opening the hand. This ensures the moisture content is correct therefore ensuring best possible compaction.
2. Type 3 and 4 soils (non clay)	Excavated non clay soil will be slightly moistened such that if held in the hand and squeezed it stays compact after opening the hand
3. Type 3 and 4 (Clay/Turf Type Soils)	If the soil removed from the hole is clay, an import soil will be used to backfill the hole which will either be a type 2 soil or a G5 road material.
4. Water logged holes (type 3 and 4 soils)	Should the hole be water logged, the water will be removed before the soil is replaced an import soil shall be used to backfill the hole either with type 2 soil or G5 road material.

The following recommendations as provided in the Wetland Assessment undertaken by Dr Martin Ferreira, will be adhered to during the construction phase:

- Cement and other material must be mixed in a demarcated area and not in wetlands or buffer zones. Any mixing of cement must be undertaken on an impervious surface;
- Movement of contractors and vehicles within wetlands and riparian areas should be minimised to avoid compaction of sediment and water pollution. Vehicles should also be serviced on a regular basis to avoid leaks and spills;
- If soil is used that has been brought in from external sources it should not be stockpiled within the wetland area. The use of soil from outside the wetland should be kept to a minimum.

8.12.1.2 Access Roads

Existing roads will be used for access to the construction areas, no other access roads will be made or deviations done across wet areas by any person or vehicle. Vehicle activity and movement will be limited to the existing roads and servitude area. Footprint damage will be kept to a minimum and vegetation clearance will be limited purely to the servitude route and done where necessary. Vegetation will be removed in sections, as construction is taking place, and should not be removed throughout the extent of the construction area.

8.12.1.3 Excavation and stockpiling of soils in water logged areas, riparian habitats and buffer zones:

According to Eskom's Construction Method Statement, all excavated soils that are stockpiled will be adequately bunded by suitable materials around the entire circumference of the stockpile as an erosion control measure from wind, water and animals. Topsoil will be stockpiled separately from the subsoil. When reinstating or backfilling the soil the sub-soil layer will be backfilled first followed by the topsoil layer. Soils from separate areas will be kept separate and where backfilling is necessary the soil will be returned to the area where it was taken. Any construction material e.g. unearthed poles will not be left lying in wetland areas when there is no work being done. Where possible material lying in the wetlands will be kept to a minimum. Storage of materials will be away from wetland areas

8.13 Rehabilitation Phase

The following activities will be undertaken during the rehabilitation of relevant parts of the site after completion of all construction activities, namely:

- All temporary stockpile areas, litter and rubble to be removed on completion of construction.
- Where the removal of alien species may have left soil exposed, appropriate wetland/endemic plants should be established. Vegetation removed during the construction phase will be re-vegetated.

8.14 Operational phase

During the operational phase maintenance on the powerlines and vegetation monitoring and management will be undertaken within the servitude area. Maintenance on the powerlines will be conducted in accordance to Eskom's Guideline for the routine inspection and consequential maintenance of high, medium and low voltage powerlines (DISAGABF5). The guidelines are attached to Appendix H of this report. Mitigation measures as per section 11.11 of this report will be considered when undertaking maintenance activities.

8.15 Decommissioning

The proposed powerlines will be permanent structures and it is not envisioned that these structures will be decommissioned. Should these lines ever be decommissioned, a Wetland Rehabilitation Plan should be compiled by a suitably qualified specialist, and should be submitted to the Department of Water and Sanitation for review and approval.

8.16 Water Use Being Applied For

For the purpose of the current study, the National Water Act (Act36 of 1998) definition for wetlands was used to identify wetland environments. According to this definition, wetlands are “land which is transitional between terrestrial and aquatic systems where the water table is usually at or near 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.

Section 21 of the National Water Act (Act 36 of 1998) defines a list of activities which require a Water Use Authorisation. The proposed project will require a Water Use Authorization related to activities (c) and (i).

Section 21(c) of the National Water Act refers to the impeding or diversion of the flow of water in a watercourse. ‘Impeding the flow' means that there will be either a temporary or permanent obstruction or hindrance to the flow of water in a watercourse, by a structure built either fully or partially in or across a watercourse. 'Diverting the flow' refers to the erection of a temporary or permanent structure, causing the flow of water to be rerouted.

Section 21(i) of the National Water Act refers to altering the bed, banks, course or characteristics of a watercourse. This means any change affecting the resource quality of a watercourse.

8.17 Technique to be used to undertake the water use

Refer to Section 8.12.1.1

8.18 Safety issues in terms of public, livestock and properties

The properties earmarked for the proposed construction of the powerlines is owned by the Maluti a Phofung Local Municipality. However, construction of the powerlines will be undertaken on Eskom’s proclaimed servitude. The area is easily accessible via the N5 which forms part of the study area. The land use in the area predominantly comprises of vacant grassland, livestock farming and formal crop cultivation. The following safety measures would be put in place to protect the safety of the public, livestock and other properties:

- Hazardous material and chemicals would not be kept or handled within wetland and riparian areas. Hazardous substances will be kept in a demarcated area on an impervious surface. Any spillages from hazardous material would be cleaned immediately and transported to a landfill site that accepts hazardous material;
- All potential hazardous or polluting materials will be stored within the fenced off materials area, as far away from oncoming traffic and from drainage inlets;
- Flagmen would be appointed to direct traffic when the N5, Murray Road crossing is being constructed, and proper signage should be displayed to warn road users of the construction activities; and
- Vehicle operators would be suitably licensed and have had appropriate environmental and safety induction, are aware of specific site procedures, and are well rested and cognisant when operating heavy or unsafe vehicles / machinery.

8.19 Timing and duration of the various development phases

Due to the fact that construction has already commenced, the duration of the construction phase of the remainder of the project is expected to be approximately two (2) months..

8.20 Design drawing(s) of any structures to be built

Design drawings and specification of the poles to be used in the proposed construction is attached to Appendix D of this report.

8.21 Proximity of the development to the floodline

A Floodline Delineation study was undertaken by Mr Phillip Hull from Jeffares & Green (Pty) Ltd for a section of the Wilge River, which is located on the outskirts of Harrismith in the Free State Province. The Report compiled by Mr Hull is attached to Appendix F of this Technical Report. The peak discharge values calculated for the Wilge River, Nuwejaarspruit River and two additional unnamed tributaries in the vicinity of the floodline study area, were used to hydraulically simulate the 1:50 and 1:100 year return period floodlines. The hydraulic modelling was undertaken using the HEC-RAS hydraulic model. This model provided flood high water levels and flow velocities associated with the calculated peak discharge values. The resultant floodlines where plotted using the Geographic Information System (GIS) and HEC-geoRAS. The results indicated that the 1:50 and 1:100 year floodlines are extensive, ranging from 400 m wide to 1 250 m wide. Froude Number is a dimensionless value that describes different flow regimes of open channel flow. These flood events are, however, associated with relatively low flow velocities (less than 1 m/s) and low Froude numbers (less than 0.2). This is largely due to the flat nature of the Wilge River in the vicinity of the powerline and substations. The floodlines indicated that large portions of the proposed powerlines fall within the delineated floodlines. Please refer to figure 20, which depicts the 1:50 and 1:100 Year Floodline Delineation Results.

8.22 The effect of the project on the floodlines and flood management

According to the Wetland Assessment conducted by Dr Martin Ferreira the floodplain wetland is the major wetland of concern with regards to the proposed activity, as the current powerline has been placed within the boundaries of this wetland. The floodplain wetland is characterized by numerous oxbow lakes and floodplain pans that have formed and which are depended on the overspill from the Wilge River as a source of water. It appears that the Wilge River has incised in certain areas, especially downstream of road crossings. This potentially will cause changes to the frequency and the extent of inundation of the oxbow lakes and pans. During the field survey it was noted that an oxbow lake where the Letsatsi line will cross the Wilge River contained a large volume of water.

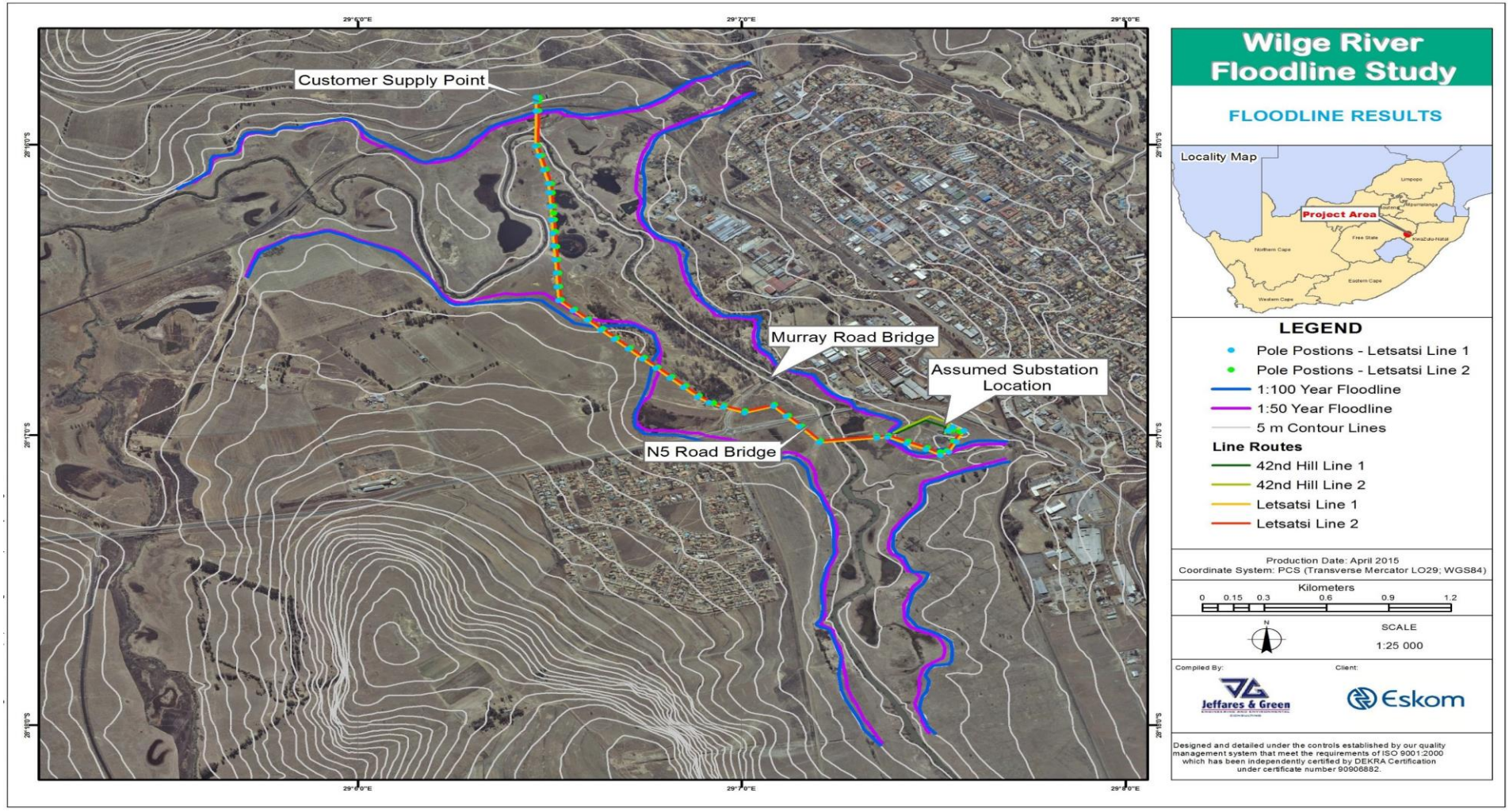

Figure 20: 1:50 and 1:100 Year Floodline Delineation Results

8.23 Stormwater management

The construction of the Harrismith–Munic - Letsatsi 11kV powerline will not have an effect on stormwater as the powerline is elevated and the poles don't have a footprint over the length of the line. The Harrismith–Munic - Letsatsi Substation already exists and therefore no concrete foundations will be constructed.

8.24 Effect on water quality and water flow

According to the Wetland Assessment conducted by Dr Martin Ferreira, changes to the water quality could result in changes to the ecosystem structure and function as well as a potential loss in biodiversity. Water quality pollution often leads to modification of the species composition where sensitive species are lost and organisms tolerant to environmental changes dominate the community structure.

The runoff from the construction may have introduced pollutants into the order 1 river and the groundwater. Any spills of hazardous substances, vehicle oils or grease leakages will flow directly into the river. This will have a negative impact on the river. These pollutants can react with other compounds in the water to form different pollutants, thus changing the quality of aquatic life. These wastes and pollutants will be carried to systems downstream. Inappropriate storage of hazardous substances used during construction can either lead to them being washed into the wetlands or can filter into the groundwater, indirectly affecting the water quality of the wetlands.

The hydrology of these wetlands has been altered due to increased surface water runoff. Flow from hillslope seeps and within unchannelled valley bottom wetlands are generally very slow and diffuse. An increase in flow velocity in these systems will lead to erosion and long term hydrological changes. Many of the wetlands that were observed during the field survey already showed signs of erosion. This is largely due to poor catchment management.

8.25 Effect on migration of biota

The Harrismith–Munic - Letsatsi11kV powerlines will have an impact on the floodplain wetland associated with the Wilge River in the form of a potential change in hydrology, geomorphology and vegetation. Therefore the effect on the migration of biota in the Wilge River is not applicable.

8.26 Erosion protection, stabilisation and rehabilitation measures

Erosion was observed near the Harrismith-Munic substation. The UCVB to the east of the substation is severely eroded and possibly contributing to sediment loads within the Wilge River. The area south of the substation is also severely eroded with large exposed areas. To the west of the Wilge River, large eroded and exposed areas were also observed. Downstream of the N5 crossing, the catchment has also been altered due to recreational use (4x4 trails). This exposed area will also contribute to sediment loads within the Wilge River. Historical imagery shows very little erosion of the areas mentioned above. The imagery does show the existence of croplands on the west of the Wilge River directly opposite the current

Harrismith-Munic substation. This historical land use is largely responsible for the exposed/bare areas observed during the field survey. Many of the wetlands that were observed during the field survey already showed signs of erosion. This is largely due to poor catchment management. Erosion is already evident in the wetland area, therefore the proposed powerline will have a low to very low impact. The following mitigation measures will however be implemented:

- Erosion protection must be used in all areas where erosion may occur. Selected areas may require rehabilitation and stabilisation prior to construction.
- Erosion may be correlated with flow regulation and connectivity therefore must be maintained within these systems.

8.27 Materials to be used to perform the water use

The majority of the new excavations on the new powerline route will be done by an auger drill. Only where site conditions require new structures and stay excavations this will be done by hand. Wooden poles will be lifted and mounted using a truck mounted crane. The new poles will be backfilled with a soil/cement mixture. If poor soil conditions are present import soil will be used. The soil will be compacted with a hand compactor. Hare conductions will be used for the construction of the powerline. However according to recommendations in the Wetland Assessment report, if soil is used that has been brought in from external sources it should not be stockpiled within the wetland area and the use of soil from outside the wetland should be kept at a minimum.

9 ENVIRONMENTAL ATTRIBUTES

9.1 Environmental Description

The catchment of the Wilge River upstream of the floodplain has not been extensively transformed. There is little evidence of irrigation, few hardened surfaces and little urbanisation. Land use appears to be dominated by livestock farming, although some crops are noticeable on the tributary entering the Wilge River, near Swinburne. The construction of a large bridge for the N5 appears to have caused some channel straightening.

9.2 Water quality

In terms of the Overview of Water Resources Availability and Utilisation, Upper Vaal Water Management Area, compiled by the Department of Water Affairs in 2003, the surface water within the Upper Vaal Water Management Area is good of good quality, particularly in streams situated in the north-western parts which receives flow outflow from the dolomitic aquifers in the region. However, the large quantities of urban, mining and industrial effluent, together with urban stormwater, have a major impact on the water quality of some tributaries in the north western part of the water management area (e.g. Waterval, Blesbokspruit, Natalspruit, Klip) and particularly on the Vaal River downstream of the Vaal Dam (DWAF,2003). Changes to the water quality could result in changes to the ecosystem structure and function as well as a potential loss in biodiversity. Water quality pollution often leads to modification of the species composition where sensitive species are lost and organisms tolerant to environmental changes dominate the community structure.

The runoff from the construction sites may have introduced pollutants into the order 1 river and the groundwater. Any spills of hazardous substances, vehicle oils or grease leakages will flow directly into the river. This will have a negative impact on the river. These pollutants can react with other compounds in the water to form different pollutants, thus changing the quality of aquatic life. These wastes and pollutants will be carried to systems downstream. Inappropriate storage of hazardous substances used during construction can either lead to them being washed into the wetlands or can filter into the groundwater, indirectly affecting the water quality of the wetlands.

Due to the increased sedimentation and change in the geomorphology, the water's turbidity will increase therefore increasing the dissolved minerals in the water. The characteristics of the water change and the biota that is tolerant to environmental changes are able to dominate the system. Increased turbidity have a direct impact on the micro-flora and macro-invertebrates that require light to penetrate the water.

9.3 Fauna

The study area is dominated by livestock farming. The following measures to ensure minimal impact as documented in Eskom's construction method statement will be implemented. The construction method statement is attached to Appendix H of this report.

- Any animal in the wetland area will be left undisturbed as much as possible;
- All excavated soils that are stockpiled will be adequately bunded by placing suitable materials around the entire circumference of the stockpile. This will act as an erosion control measure from wind, water and animals; and
- The footprint area of construction should be limited to what is absolutely essential to avoid excessive damage/disturbance.

All mitigation measures indicated in the Wetland Assessment undertaken by Dr Martin Ferriera will be applied to avoid any negative impact on the receiving environment.

9.4 Flora

Wetland vegetation plays an important role in providing various direct and indirect services and thus an important component to consider in wetland health. The vegetation within the study area remains in a largely natural state. Some vegetation has been lost through hardened surfaces and infrastructure, although this is limited to the immediate catchment. The larger catchment remains mostly untransformed with few crops. Dense alien vegetation patches remain the largest concern with regards to the vegetation community. Vegetation will be removed during the construction phase and vegetation loss will also occur as an indirect result of hydrological and geomorphological alterations. This will lead to reduced surface roughness, which will lead to additional geomorphological and hydrological impacts as discussed above. There is a risk of increased abundances of exotic shrubs due to the disturbance of topsoil. The vegetation on the riparian and wetland zones plays an important role in providing direct and indirect services. Vegetation will be removed during the construction phase, and further loss of vegetation could occur as a result of indirect impacts from changes in the hydrology and geomorphological changes.

9.5 Hydrology

The hydrology refers to the movement and the distribution of water within these systems. The hydrology within the riparian and wetland areas has been altered during the construction of the powerline. The powerlines will be situated in the vicinity of an artificial wetland, UCVB wetlands, a hillslope seep and a floodplain wetland. It will also intersect the order one river twice within the study area. Ideally, the powerlines should be placed outside of these wetland boundaries. However, in this case it is not possible to place the poles outside of the wetland and riparian areas, and therefore, this will result in short term (during construction) and long term (operational) hydrological alterations.

Wetlands function to control flow and attenuate floods by storing water; this is accomplished by releasing the water slowly. This flow control plays a vital role in the landscape and downstream sedimentation. The loss of wetlands in a river's catchment result in uncontrollable flooding in the lower river reaches. The hydrology of these wetlands has been altered due to increased surface water runoff.

Flow from hillslope seeps and within unchannelled valley bottom wetlands are generally very slow and diffuse. An increase in flow velocity in these systems will lead to erosion and long term hydrological changes. Many of the wetlands that were observed during the field survey already showed signs of erosion. This is largely due to poor catchment management

9.6 Wetlands

Please refer to section 9.1 of this report, where the wetlands identified during the Wetland Assessment undertaken by Dr Martin Ferreira is explained in detail.

9.7 Geology and Soils

According to Mucina and Rutherford, (2006), the area is characterized by mudstones, sandstones and shale of the Beaufort Group (Tarsastad Formation in the South and Adelaide Formation in the North). Glenrosa, Bonheim,Avalon and Mayo soil forms dominate the outcrops and slightly elevated areas while Sepane, Arcadia and Rensburg soil forms are typical for moist bottomlands. The Wetland Assessment undertaken by Dr Martin Ferreira identified the domination Kroonstad and Katspruit soils in the very wet areas such as the floodplain pans, while the more temporary wet areas were dominated by Avalon and Westleigh soil forms. The geomorphology of the floodplain is still in a largely natural state. Very few hardened surfaces were observed during the field survey. In addition very little infilling, gullies and exposed soil were observed in the vicinity of the powerlines and the study area in general. Due to few changes in land use, the surface roughness also appear to be largely natural. . The geomorphology (soils) will be altered during the construction phase. Soils will be compacted due to the movement of contractors, and will also be excavated for pole construction purposes. If construction takes place during the wet season, the soils will be flushed into the valley bottom wetland. Pilot cables will be used for stringing purposes. However, should site conditions allow, the cables will be pulled along the line route with a 4x4 tractor or similar suitable vehicle. The use of heavy vehicles within the wetland areas could potentially cause further compaction of wetland soils.

Soils excavated during the construction phase should be used for rehabilitation as stockpiles may potentially increase the availability of soils within the wetland area. Once the project is

constructed, the soils in the area will be permanently lost. Imported soils will also be used during the construction process. These soils could potentially alter sediment structures within the wetland and could also be more susceptible to erosion.

9.8 Topography

The study area is characterised by flat to slightly undulating and undulating terrain with streams and rivers that drain the foothills of the Drakensberg. According to the Wetland Assessment undertaken by Dr Martin Ferreira, very few hardened surfaces were observed during the field survey. In addition very little infilling, gullies and exposed soil were observed in the vicinity of the powerlines and the study area in general. Due to few changes in land use, the surface roughness also appear to be largely natural.

9.9 Aesthetics

The catchment of the Wilge River upstream of the floodplain has not been extensively transformed. There is little evidence of irrigation, few hardened surfaces and little urbanisation. Land use appears to be dominated by livestock farming, although some crops are noticeable on the tributary entering the Wilge River, near Swinburne. The construction of a large bridge for the N5 appears to have caused some channel straightening. During construction, the removal of vegetation, construction equipment, stockpiles and activities undertaken during the construction phase may have a negative visual impact on the adjacent land uses. At the end of the construction phase, the trenches will be backfilled, and vegetated, and therefore no visual impact will occur. Visual impact may occur during the operational phase when maintenance activities is undertaken. These impacts will be the same as for the construction phase impacts.

9.10 Land Use and Infrastructure

Land use appears to be dominated by livestock farming, although some crops are noticeable on the tributary entering the Wilge River. To the west of the Wilge River, large eroded and exposed areas were also observed. Downstream of the N5 crossing, the catchment has also been altered due to recreational use (4x4 trails). Directly east of the substation a housing development is under construction. The construction of the powerline will improve the current infrastructure in the area. Infrastructure is an essential part of development of any country. It is about providing basic services that the community need in everyday life. Therefore construction of the powerline will have a positive impact on the land use and infrastructure of the study area.

9.11 Socio-economic components

9.11.1.1 Employment Status of Household Head

The proposed project is located within the Maluti a Phofung Local Municipality. The project will fall within the jurisdiction of Ward 6 and 22 of the Maluti a Phofung Local Municipality. The 2011 Census data as obtained from the Stats SA Website (http://interactive.statssa.gov.za/superweb/login.do) was used to obtain the following

information. According to the 2011 census survey the following population numbers were documented:

Table 3: Population figures

Geographical Area	Total Population
Free State Province	2,745,590
Maluti a Phofung Local Municipality	335,784
Ward 6	12,089
Ward 22	6,551

The Maluti a Phofung Local Municipality had a total population of 335,784 people during the time of the 2011 census survey. A total population of 12,089 people were recorded for Ward 6 and 6,551 people for Ward 22. A total of 34.42% of persons are currently employed and a total of 5.83% are currently unemployed in Ward 6 and Ward 22. A breakdown of the employment status for ward 6 and 22 is provided below. The graph below depicts a comparison between the Free State province, the Maluti a Phofung Local Municipality and the Wards 6 and 22.

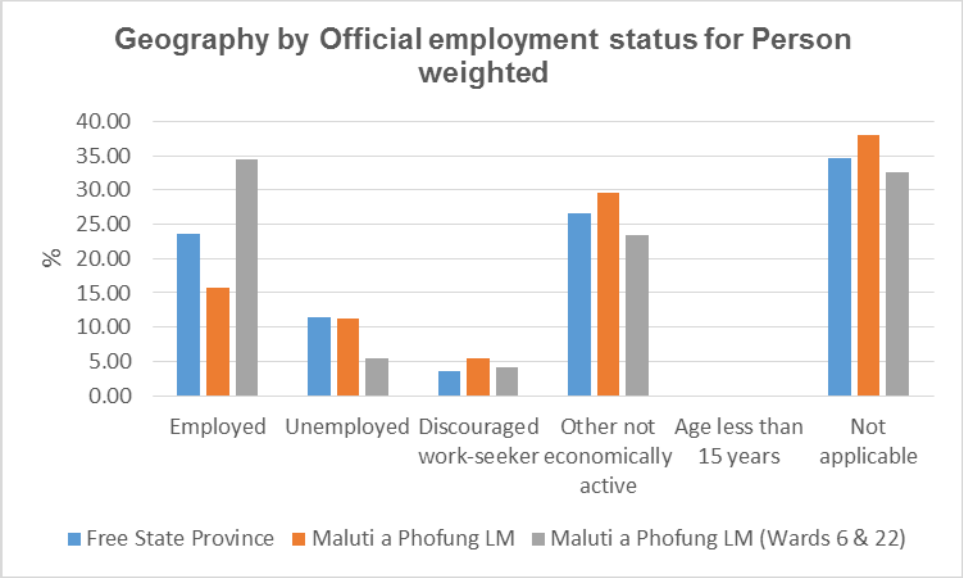

Figure 21: Official Employment status

9.12 Income Status

A breakdown of the individual monthly income for the total population of the, Free State province, the Local Municipality and Wards 6 and 22, as recorded during the 2011 census survey is provided below:

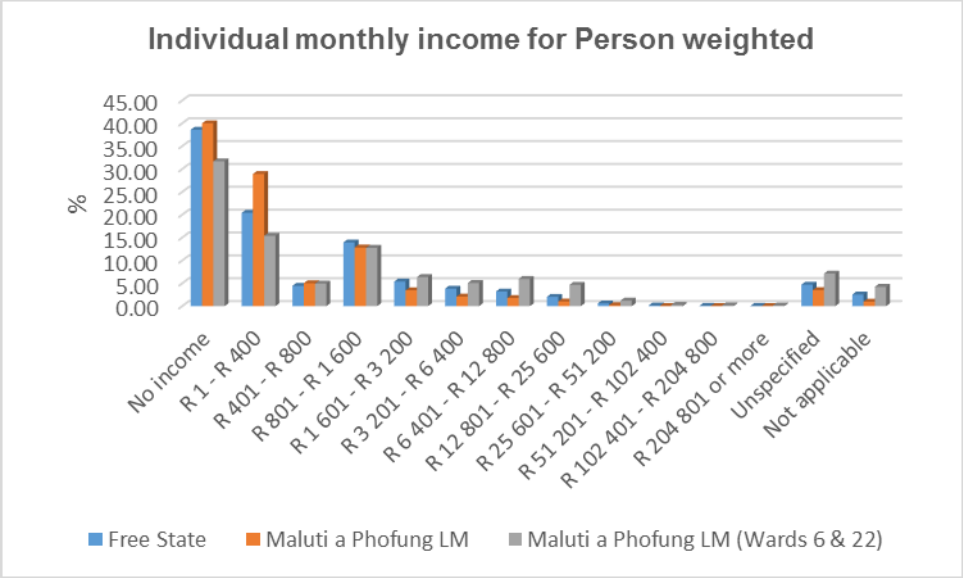

Figure 22 Individual Monthly Income

9.13 Education Level

A breakdown of the education level for the total population of the Free State Province, the Local Municipality, as well as Wards 6 and 22, as recorded during the 2011 census survey is provided below. In Wards 6 and 22 a total of 3557 individuals (3.00%) have completed Grade 12/Std 10, and 919 individuals (1.21%) have no schooling.

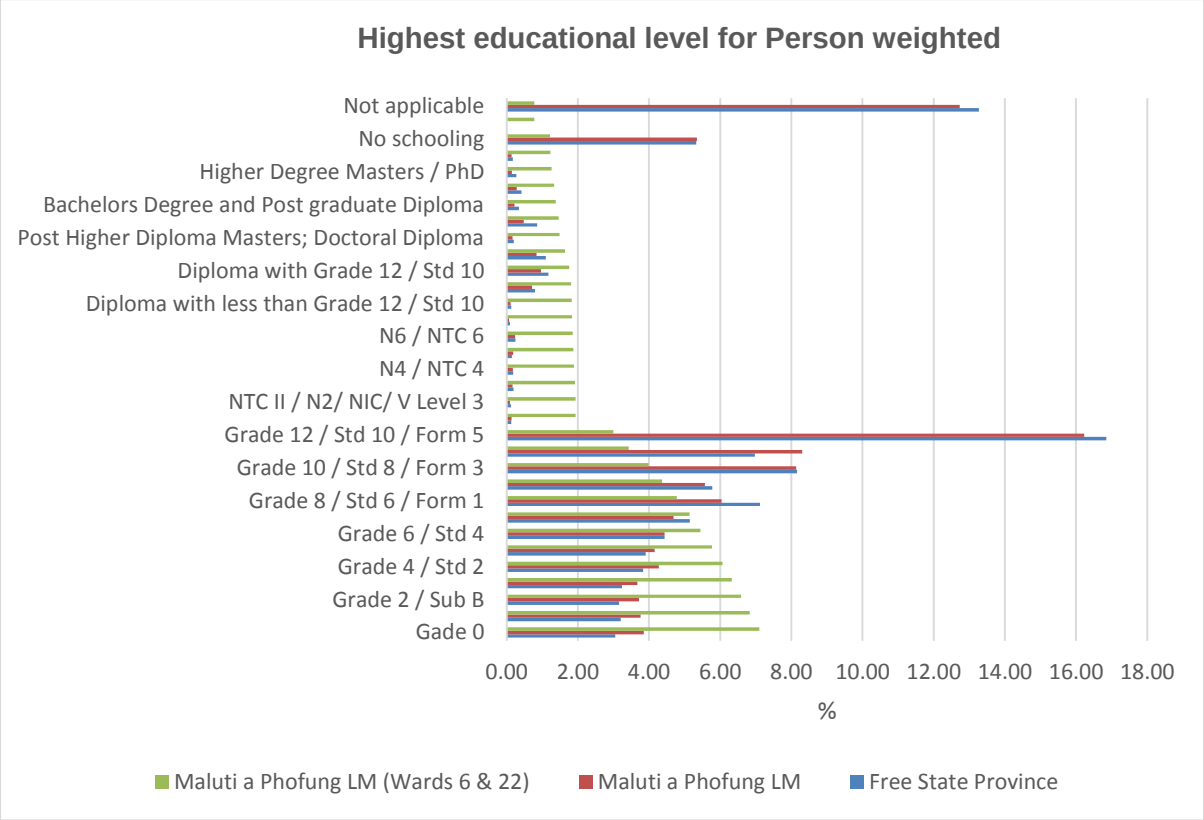

Figure 23: Education Level

9.14 Energy or Fuel for Lighting

In terms of the 2011 Census data, as obtained from the Statistics South Africa Superweb site, only 81.17% of the total population within wards 6 and 22 use electricity for lighting up their households. The table below provides a breakdown of the energy or fuel for lighting as recorded during the 2011 census survey.

Table 4: Energy or fuel for lighting for Household figures

Energy or fuel for lighting for Household weighted			
Energy Source	**Free State Province**	**Maluti a Phofung LM**	**Maluti a Phofung LM (Wards 6 & 22)**
Electricity	98.92%	89.04%	81.17%
Gas	0.02%	0.11%	0.36%
Paraffin	0.23%	1.07%	0.84%
Candles (not a valid option)	0.80%	9.41%	16.37%
Solar	0.02%	0.19%	0.99%
None	0.01%	0.19%	0.27%

9.15 Energy or fuel for cooking

In terms of the 2011 Census data, as obtained from the Statistics South Africa Superwed site, only 70.82% of the total population within Wards 6 and 22 use electricity for cooking. The

table below provides a breakdown of the energy or fuel for cooking as recorded during the 2011 census survey.

Table 5: Energy or fuel for cooking for Household figures

Energy or fuel for cooking for Household weighted			
Energy Source	**Free State Province**	**Maluti a Phofung LM**	**Maluti a Phofung LM (Wards 6 & 22)**
Electricity	84.49%	81.04%	70.82%
Gas	2.90%	3.23%	7.34%
Paraffin	7.63%	8.73%	3.41%
Wood	3.40%	4.41%	14.53%
Coal	0.80%	1.79%	2.92%
Animal dung	0.38%	0.49%	0.70%
Solar	0.14%	0.11%	0.18%
Other	0.08%	0.02%	0.05%
None	0.19%	0.19%	0.05%

9.16 Importance of Environmental Attributes

Table: 6: Importance of environmental attributes related to the Wetlands

Environmental Attribute	**Sensitivity** (resilience, how readily it is affected by a particular stressor)	**Legal importance** (e.g. protected status)	**Public** (i.e. interested and affected parties) importance	**Influence to water resource**	**Professional judgement**
Water Quality	Low sensitivity	No activity should be undertaken on site that affects the wetlands without authorization in terms of Section 21 of the National Water Act, (Act 36 of 1998	There will be no impact on the public as the Water Quality is already impacted on.	Changes in the hydrology during the construction and operational phases may influence the water resource but mitigation measures may reduce the impact	The runoff from the construction activities may have introduced pollutants into the order 1 river and the groundwater. Any spills of hazardous substances, vehicle oils or grease leakages will flow directly into the river. This will have a negative impact on the river. These pollutants can react with other compounds in the water to form different pollutants, thus changing the quality of aquatic life. These wastes and pollutants will be carried to systems downstream. Inappropriate storage of hazardous substances used during construction can either lead to them being washed into the wetlands or can filter into the groundwater, indirectly affecting the water quality of the wetlands. The potential impacts are all of a very low risk to the receiving

Environmental Attribute	**Sensitivity** (resilience, how readily it is affected by a particular stressor)	**Legal importance** (e.g. protected status)	**Public** (i.e. interested and affected parties) importance	**Influence to water resource**	**Professional judgement**
					environment. The potential impacts can be easily mitigated.
Fauna	Low sensitivity	Not applicable	There are no sensitive species of concern in the area that are of public importance.	There are no sensitive species of concern in the area that are of public importance.	The study area is dominated by livestock farming. The following measures to ensure minimal impact as documented in the construction method statement will be implemented. The construction method statement is attached to Appendix H of this report. • Any animal in the wetland area will be left undisturbed as much as possible; • All excavated soils that are stockpiled will be adequately bunded by suitable materials around the entire circumference of the stockpile as an erosion control measure from wind, water and animals; • Footprint area of construction to be limited to what is absolutely essential to avoid excessive damage/disturbance.
Flora	Low sensitivity	Not Applicable.	Not Applicable.	Not Applicable.	Wetland vegetation plays an important role in providing

Environmental Attribute	**Sensitivity** (resilience, how readily it is affected by a particular stressor)	**Legal importance** (e.g. protected status)	**Public** (i.e. interested and affected parties) importance	**Influence to water resource**	**Professional judgement**
					various direct and indirect services and thus an important component to consider in wetland health. Vegetation will be removed during the construction phase and vegetation loss will also occur as an indirect result of hydrological and geomorphological alterations. This will lead to reduced surface roughness, which will lead to additional geomorphological and hydrological impacts as discussed above. There is a risk of increased abundances of exotic shrubs due to the disturbance of topsoil. The vegetation on the riparian and wetland zones plays an important role in providing direct and indirect services. Vegetation will be removed during the construction phase and further loss of vegetation will occur as a result of indirect impacts from changes in the hydrology and geomorphological changes. The potential impacts are all of low to very low risk to the receiving

Environmental Attribute	**Sensitivity** (resilience, how readily it is affected by a particular stressor)	**Legal importance** (e.g. protected status)	**Public** (i.e. interested and affected parties) importance	**Influence to water resource**	**Professional judgement**
					environment. The potential impacts can be easily mitigated.
Hydrology	Low sensitivity	Not applicable.	The hydrology of these wetlands have been altered	The hydrology of these wetlands have been altered	The hydrology of these wetlands has been altered due to increased surface water runoff. Flow from hillslope seeps and within unchannelled valley bottom wetlands are generally very slow and diffuse. An increase in flow velocity in these systems will lead to erosion and long term hydrological changes. Many of the wetlands that were observed during the field survey already showed signs of erosion. This is largely due to poor catchment management
Wetlands	Low sensitivity	No activity should be undertaken on site that affects the wetlands without authorization in terms of Section 21 of the National Water Act, (Act 36 of 1998)	Functional wetlands perform vital functions at very little financial cost so it is in the publics' interest to improve the state of the wetlands.	The alteration of wetland hydrology can impact on wetlands to perform certain ecosystems services such as streamflow regulation, water quality enhancement and sediment trapping.	The project will have an impact on the floodplain wetland in the form of a potential change in hydrology, geomorphology and vegetation. Currently these components of the floodplain have been minimally altered, as there has not been large alterations in catchment land use. The risk of any impact occurring is low to very low, as it was evident that the placement

Environmental Attribute	**Sensitivity** (resilience, how readily it is affected by a particular stressor)	**Legal importance** (e.g. protected status)	**Public** (i.e. interested and affected parties) importance	**Influence to water resource**	**Professional judgement**
					of the powerlines appeared to have very little impact on the floodplain wetland. Mitigation measures have been suggested in the report and should be applied to avoid any negative impact on the receiving environment.
Geology and Soils	The area is characterized by mudstones, sandstones and shale of the Beaufort Group (Tarsastad Formation in the South and Adelaide Formation in the North). Glenrosa, Bonheim,Avalon and Mayo soil forms dominate the outcrops and slightly elevated areas while Sepane, Arcadia and Rensburg soil forms are typical for moist bottomlands. The Wetland Assessment undertaken by Dr Martin Ferreira identified the domination Kroonstad	Not applicable.	Not applicable.	If construction takes place during the wet season, the soils will be flushed into the valley bottom wetland	The geomorphology (soils) will be altered during the construction phase. Soils will be compacted due to the movement of contractors, as well as removed for the placement of the poles. If construction takes place during the wet season, the soils will be flushed into the valley bottom wetland. Mitigation measures as discussed in the Wetland Assessment report undertaken by Dr Martin Ferreira will be applied in order to avoid negative impacts on the receiving environment.

Environmental Attribute	**Sensitivity** (resilience, how readily it is affected by a particular stressor)	**Legal importance** (e.g. protected status)	**Public** (i.e. interested and affected parties) importance	**Influence to water resource**	**Professional judgement**
	and Katspruit soils in the very wet areas such as the floodplain pans ,while the more temporary wet areas were dominated by Avalon and Westleigh soil forms.				
Topography	The study area is characterised by flat to slightly undulating and undulating terrain with streams and rivers that drain the foothills of the drakensburg. According to the Wetland Assessment undertaken by Dr Martin Ferreira, very few hardened surfaces were observed during the field survey. In addition very little infilling, gullies and exposed soil were observed in the vicinity of the powerlines and the study area in general. Due to few changes in land use, the surface roughness also	Not applicable.	Changes in the topography will not impact on the public.	Not applicable.	Not Applicable

Environmental Attribute	**Sensitivity** (resilience, how readily it is affected by a particular stressor)	**Legal importance** (e.g. protected status)	**Public** (i.e. interested and affected parties) importance	**Influence to water resource**	**Professional judgement**
	appear to be largely natural.				
Aesthetic	Low sensitivity	Not applicable	Due to the remote location of the study site, visual impact during the construction phase will be very low.	The aesthetics of the area will not impact the water resource.	Due to the remote location of the study site, visual impact during the construction phase will be very low.
Infrastructure	Low Sensitivity The construction of the proposed powerline will improve the current infrastructure in the area.	Not applicable.	The proposed construction of the Harrismith-Mmunic-Letsatsi11kV powerlines is to supply the Intabazwe Corridor specifically the residential component, the FET college and the hospital which require electricity supply.	The construction of the proposed powerline may have a negative impact on the water resource but the implementation of mitigation measures may reduce the impacts.	The construction of the proposed powerline will improve the current infrastructure in the area.
Socio-economic components	Low Sensitivity Eskom Distributions, Free State Operating Unit, proposed the construction of two 11kV lines for a customer (The Letsatsi Family Trust), who intends to construct residential houses within the Intabazwe Corridor.	Not applicable.	The construction phase of the project could create jobs for people from local communities	Development in the area may improve the socio-economic situation in the area which may indirectly improve the condition of the water resource.	The positive socio-economic impacts that the construction of the powerline will have, outweighs the possible negative impacts on the water resource

Environmental Attribute	**Sensitivity** (resilience, how readily it is affected by a particular stressor)	**Legal importance** (e.g. protected status)	**Public** (i.e. interested and affected parties) importance	**Influence to water resource**	**Professional judgement**
	The proposed powerlines will also supply the FET College and the hospital in the Intabazwe corridor. The housing development, FET College, and the hospital all require electricity supply in order to function efficiently. Therefor the proposed powerlines will have a positive impact on the local community as the supply of electricity to the above mentioned services will promote future growth and expansion of community services.				

10 ASSESSMENT OF ALTERNATIVES

No alternatives have been investigated. Eskom proposed the construction of the Harrismith-Munic - Letsatsi 11kV powerline for a customer, the Letsatsi Family Trust. The customer is planning the development of a housing project in the Intabazwe Corridor. The Harrismith-Munic substation is the only substation that is within a 5km radius of the Intabazwe Corridor. The nature of the client's application required a substation solution (feeder bay and line). The capacity of the Harrismith-Munic substation is 7.8 Mega Volt Ampere (MVA) and will be able to supply the housing development project.

11 IMPACT ASSESSMENT AND MANAGEMENT

The Environmental Impact Assessment Regulations, 2014, promulgated in terms of Section 24(5) of the National Environmental Management Act (Act 107 of 1998) prescribes requirements to be adhered to when undertaking impact assessments. Requirements for undertaking impact assessments for Basic Assessments and full Environmental Impact Assessments are outlined in the regulations R983, R984 and R985 of the above mentioned act.

In terms of these Regulations, the following should be considered when undertaking an impact assessment:

- A description and assessment of the significance of any environmental impacts, including –
  a) Cumulative impacts, that may occur as a result of the undertaking of the activity during project life cycle;
  b) Nature of the impact;
  c) Extent and Duration of Impact;
  d) The Probability of Impact Occurring;
  e) The degree to which the impact can be reversed;
  f) The degree to which the impact may cause irreplaceable loss of resources; and
  g) The degree to which the impact can be mitigated.

In terms of the above legislated requirements a standard impact assessment methodology was compiled. In order to compile the impact assessment methodology a review of existing impact assessment methodologies utilised by consultants in the field was undertaken. Furthermore, the following document as compiled by the former Department of Environmental Affairs and Tourism (DEAT) was utilised during the compilation for the impact assessment methodology:

- *DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria*.

A description of the method for assessing the above criteria as well as the method for determining impact risks are provided in Sections 11.1 to 11.7 below.

11.1 Cumulative Impacts

Cumulative impacts can occur over different temporal and spatial scales by interacting, combining and compounding so that the overall effect often exceeds the simple sum of the previous effects. The spatial scale can be local, regional or global, whilst the frequency or temporal scale includes past, present and future impacts on a specific environment or region.

Cumulative effects can simply be defined as the total impact that a series of developments, either present, past or future, will have on the environment within a specific region over a particular period of time.

Potential cumulative impacts on all elements of the receiving environment are addressed for all project phases (pre-construction, construction, operational and decommissioning), before and after implementation of mitigation measures.

11.2 Significance/Magnitude/Nature of Impacts

The significance or magnitude of an impact refers to the importance of an impact. When rating the extent of an impact, it is important to also rate the significance of an impact in order to determine the actual importance of an impact. For example, the size of an area affected by atmospheric pollution may be extremely large, but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be High or Very High, but if it is dilute it would be Very Low or Low.

The significance of impacts has been grouped into five classes, as outlined in the Table 7 below:

Table 7: Description of the different classes of significance

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	MODERATE	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts:

RATING		DESCRIPTION
		other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	NO IMPACT	There is no impact at all - not even a very low impact on a party or system.

11.3 Extent of Impacts

The extent or spatial scale of an impact refers to whether an impact will occur at a local, regional, or global scale. The extent of impacts has been grouped into five classes, as outlined in the **Table** 8 below.

Table 8: Description of the different classes for the extent of the proposed project/development

RATING		DESCRIPTION
5	Global/National	The impact could/will occur on a national or global scale.
4	Regional/Provincial	The impact could/will occur at a Regional/Provincial Level
3	Local	The impact will affect an area up to 5 km from the proposed site.
2	Study Area	The impact will affect an area not exceeding the Boundary of the study site
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the development footprint.

11.4 Duration of Impacts and Degree to which impacts can be reversed

The duration or temporal scale of an impact refers to actual impact timeframe, i.e. how long will impacts to the environment last. The reversibility of impacts is directly linked to the duration of impacts. For e.g. permanent impacts are irreversible impacts, whereas, incidental impacts are immediately reversible. The duration and reversibility of impacts has been grouped into five classes, as outlined in the **Table** 9 below.

Table 9: Description of the different classes of reversibility of a particular impact

RATING		DESCRIPTION	REVERSIBILITY
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.	Immediately reversible
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.	Quickly reversible
3	Medium term	The environmental impact identified will operate for the duration of life of the project.	Reversible over time
4	Long term	The environmental impact identified will operate beyond the life of the project.	Reversible over the long term
5	Permanent	The environmental impact will be permanent.	Irreversible, impact is permanent

11.5 Probability of Impact Occurring

The probability of an impact refers to the likelihood of an impact occurring. The probability of impacts has been grouped into five classes, as outlined in the **Table** 9 below.

Table 9: Description of the different classes of probability of a given impact

RATING	DESCRIPTION
1	Practically impossible that impact will occur
2	Unlikely that impact will occur
3	Impact could occur
4	Very Likely that impact will occur
5	Impact will occur or has already occurred

11.6 Degree to which the impact may cause irreplaceable loss of resources (Intensity or Severity of an Impact)

The degrees to which an impact may cause irreplaceable loss of resources are determined based on the outcome of the impact risk assessment. High risk impacts in sensitive areas are more likely to result in irreplaceable loss of resources compared to low risk impacts.

Table 10: Description of the different classes of intensity/severity of an impact

RATING	DESCRIPTION
High	Disturbance or pristine areas that have important conservation value. Destruction of rare or endangered species.
Medium	Disturbance of areas that have potential conservation value or rare of use as resources. Complete change in species occurrence or variety.

RATING	DESCRIPTION
Low	Disturbance of degraded areas, which have little conservation value. Minor change is species occurrence or variety.

11.7 The degree to which the impact can be mitigated

The degree to which an impact can be mitigated are determined by comparing the impact risk class prior to implementation of mitigation measures to the impact risk class after implementation of mitigation measures. If for e.g. an impact risk class can be reduced from a high to very low, then it is likely that there is a high potential that an impact can be mitigated.

Table 11: Description of the different degrees to which an impact can be mitigated

RATING	DESCRIPTION
High	High Potential to mitigate negative impacts to the level of insignificant effects.
Medium	Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative effects.
Low	Little or no mechanism to mitigate negative impacts.

11.8 Degree of Certainty

As it is not possible to be 100% certain of all facts, a standard “degree of certainty” has been incorporated into this Impact Assessment Methodology to indicate the degree of the EAP’s certainty regarding impact ratings.

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard “degree of certainty” scale will be used as outlined in the Table below. When very detailed specialist studies are available or have been undertaken as part of a project, impacts can be more accurately determined.

Table 12: Description of the different classes of certainty

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can’t know	The consultant believes an assessment is not possible even with additional research.

RATING	DESCRIPTION
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

11.9 Quantitative Description of Impacts

In order to describe impacts in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 have been used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and duration scale as described below:

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Duration})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown below:

Impact	Significance	Spatial Scale	Duration Scale	Probability	Risk Rating
Impact to air quality - For e.g. construction vehicles travelling on areas where vegetation has been cleared could result in dust impact.	Low	Local	Medium-Term	Could Happen	1.6
	2	3	3	3	

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to 5 classes as described in the table below.

Impact Risk Classes:

Rating	Impact Class	Description
0.1-1.0	1	Very Low

1.1-2.0	2	Low
2.1-3.0	3	Moderate
3.1-4.0	4	High
4.1-5.0	5	Very High

Therefore with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact..

11.10 Impact Assessment Tables

Table 12: Summary of impacts related to the pre-construction and construction of the powerline

	Impact Description	Impact Ratings Before Mitigation					Impact Ratings After Mitigation					Degree of Mitigation
		S	E	D	P	Risk	S	E	D	P	Risk	
Change in hydrology	• Increase in hardened surfaces through soil compaction	2	1	2	3	Very Low	2	1	2	3	Very Low	Medium
	• Decrease in surface roughness	2	1	2	3	Very Low	2	1	1	3	Very Low	Medium
Change in geomorphology	• Increased deposition	2	1	2	4	Low	2	1	2	3	Very Low	Medium
	• Change in soil permeability	2	1	2	4	Low	2	1	2	3	Very Low	Medium
	• Wetland soil removal and compaction	2	1	2	4	Low	2	1	2	3	Very Low	Medium
	• Increase in exposed areas due to vegetation stripping	2	1	2	4	Low	2	1	2	3	Very Low	Medium
	• Formation of erosion gullies	2	1	2	4	Low	2	1	2	3		Medium
Change in vegetation	• Loss of vegetation through removal	2	1	3	4	Low	2	1	1	3	Very Low	High
	• Increase in exotic vegetation	2	1	2	4	Low	2	1	2	3	Very Low	High
	• Loss of vegetation through hydrological and geomorphological changes	2	1	2	4	Low	2	1	2	3	Very Low	High
Change in Water Quality	• Pollution due to spills and leaks	2	1	1	3	Very Low	2	1	2	3	Very Low	Medium

11.11 Mitigation Measures

The potential impact on the wetlands can be alleviated by applying certain mitigation measures. The functioning of any wetland is not depended on a single component, and changes to one aspect (such as hydrology) may ultimately cause changes in another (such as vegetation). As a result, a range of possible mitigation measures are listed below, all of which would minimise the potential impact of the powerline construction. The mitigation measures include the following approaches:

- Hazardous material and chemicals should not be kept or handled within wetland and riparian areas. Hazardous substances must be kept in a demarcated area on an impervious surface. Any spillages from hazardous material should be cleaned immediately and transported to a landfill site that accepts hazardous material.
- Cement and other material must be mixed in a demarcated area and not in wetland or buffer zones. Any mixing of cement must be undertaken on a impervious surface
- Movement of contractors and vehicles within wetland and riparian areas should be minimised to avoid compaction of sediment and water pollution. Vehicles should also be serviced on a regular basis to avoid leaks and spills.
- It is recommended that powerlines are erected using a pilot cable for stringing purposes. This will avoid additional movement of heavy vehicles
- Solid waste should be removed on a regular basis and chemical toilets should be provided and should be serviced on a regular basis.
- Any contractor's camps should not be placed near any wetlands.
- Topsoil and excavated soil must not be placed within the wetland or riparian areas. The soil that is excavated from these wetlands should not be used for construction, but rather for any rehabilitation processes.
- If soil is used that has been brought in from external sources it should not be stockpiled within the wetland area. The use of soil from outside the wetland should be kept t a minimum.
- Road cuttings should be filled as soon as possible in order to prevent and / or minimise any erosion that could be caused and to avoid siltation of the wetlands.
- The removal of vegetation must be kept to a minimum where possible. The time that soil is exposed must be limited and re-vegetation or another covering method must be applied during the construction and post construction phase.
- Vegetation must be removed in sections, as construction is taking place, and should not be removed throughout the extent of the construction area.
- Re-vegetation must be completed using the appropriate wetland/endemic plants. Where possible, the vegetation must be removed intact to ensure that it can be planted again during rehabilitation.
- Where vegetation is removed, the compaction of wetland soils must be minimised to avoid an increase in surface runoff speeds.
- The establishment of exotic plants must be avoided.
- The management (cutting) of vegetation should be kept to a minimum as this could influence the ability of the floodplain to retain floods and remove sediment.
- Where possible, the area where construction will take place should be demarcated. Demarcation of the construction areas will ensure that only the required area is cleared of vegetation.

- Erosion protection must be used in all areas where erosion may occur. Selected areas may require rehabilitation and stabilisation prior to construction.
- Erosion may be correlated with flow regulation and connectivity therefore must be maintained within these systems.
- Suitable indicators must be identified and monitored by a qualified wetlands specialist to ensure that the impacts are minimised and corrected timeously.

11.12 Monitoring

In order to ensure that continuous monitoring is undertaken and the risk of negative impacts on the sensitive areas within the study area is reduced, Eskom will ensure that there is an internal Environmental Control Officer (ECO) on site throughout the construction phase. In addition the following monitoring is proposed for the project:

- The Wetland Monitoring Programme (WMP) which was compiled as part of the Water Use Authorisation process should be updated prior to the commencement of construction activities to include all general and specific recommendations provided in the Water Use License. The WMP is included in section 4.8 of the Supplementary Report which is attached to Appendix G of this Water Use Licence Technical Repot. Copies of the Environmental Control Officer's (ECO) Report will only be submitted to DWS should any non-compliance within the DWS Regulated area occur or should any non-compliance in terms of the Water Use License occur, or if otherwise specified in the Water Use License.
- A photographic record must be kept as follows and submitted with reports:
    - Dated photographs of all the sites to be impacted before construction commences
    - Dated photographs of all the sites during construction on a monthly basis
    - Dated photographs of all the sites after completion of construction and rehabilitation.

12 SECTION 27 OF THE NATIONAL WATER ACT

12.1 (27(a)) Existing Lawful water uses;

The proposed project does not fall under an existing lawful use. The project involves the proposed construction of two (2) new powerlines.

12.2 (27(b)) The need to redress the results of past racial and gender discrimination

The proposed construction of the Harrismith–Munic-Letsatsi 11kV powerlines is to supply the Intabazwe Corridor specifically the residential component, the FET College and the hospital with electricity supply. The provision of electricity supply is imperative inorder for a community and business to operate efficiently. The powerlines will supply new essential projects in the community that will have a positive impact on the local socio economic development of the community. These new essential projects will create job opportunities within the Intabazwe corridor.

12.3 (27(c)) Efficient and beneficial use of water in public interest

The proposed construction of the Harrismith–Munic-Letsatsi 11kV powerlines is to supply the Intabazwe Corridor specifically the residential component, the FET College and the hospital with electricity supply. The water use will be regarded as efficient and beneficial as the powerlines will supply new essential projects in the community that will have a positive impact on the local socio economic development of the community.

12.4 (27(d)i) Socio-economic impact of water use if authorised

As mentioned previously, the proposed powerlines will have a positive impact on the local community as the additional supply of electricity to the Intabazwe Corridor will promote future growth and expansion of this area.

12.5 (27(d) ii) Socio-economic impact of failure to authorise water use

Without the construction of the Harrismith–Munic-Letsatsi 11kV powerlines, additional electricity supply to the Intabazwe Corridor will not be provided. This will have a negative effect on the growth and expansion of services in the Intabazwe Corridor.

12.6 (27(e)) Catchment management strategy

There is no Catchment Management Strategy (CMS) available for this WMA at this stage.

12.7 (27(f))The likely effect of the water use on the water resource and on other water users

Changes to the water quality could result in changes to the ecosystem structure and function as well as a potential loss in biodiversity. Water quality pollution often leads to modification of the species composition where sensitive species are lost and organisms tolerant to them being washed into the wetlands or can filter into the groundwater, indirectly affecting the water quality of the wetlands. According to the Wetland Assessment undertaken by Dr Martin Ferreira, the project will have an impact on the floodplain wetland in the form of a potential change in hydrology, geomorphology and vegetation. Currently these components of the floodplain have been minimally altered, as there has not been large alterations in catchment land use. The risk of any impact occurring is low to very low, as it was evident the placement of the original powerlines appeared to have very little impact on the floodplain wetland. Mitigation measures have been suggested in this Water Use License Technical report as well as the Wetland Assessment Report undertaken by Dr Martin Ferreira should be applied to avoid any negative impact on the receiving environment.

12.8 (27(h)) Investments already made by water user in respect of the proposed water use

Jeffares and Green Engineering and Environmental Consultants (J&G) have been appointed by Eskom Free State Operating Unit to undertake the Water Use Licence Application process and Specialist Studies for the project. The following Specialist Studies were undertaken:

- A Floodline Assessment undertaken by Mr Phillip Hull; and
- A Wetland Assessment undertaken by Dr Martin Ferreira from Jeffares & Green (Pty) Ltd

12.9 (27(i))Strategic importance of the water use to be authorised.

As mentioned in Section 12.3 above it is imperative that the water use be authorised as it will have a positive impact on the local socio economic development of the community.

12.10 (27(k)) Probable duration for which water use is to be authorised

The proposed powerlines will be a permanent structure. The major impacts will occur during the construction phase which is estimated to last for 2 months

13 PUBLIC CONSULTATION PROCESS

Construction of the Harrismith-Munic - Letsatsi 11kV powerlines commenced in March 2014 however, during construction, the Eskom contractors came across water logged soils, and all construction activities were stopped. The proposed Harrismith-Munic - Letsatsi 11kV powerlines will be constructed within a proclaimed Eskom servitude. As construction will take place within an Eskom servitude, the potentially affected landowners were consulted by Eskom prior to the appointment of Jeffares & Green (Pty) Ltd. Jeffares & Green (Pty) Ltd made contact with the DWS Gauteng Regional Office on the 2nd of June 2015 regarding their requirements for the undertaking of a Public Participation Process for projects situated within proclaimed servitude areas. The DWS responded on the 4th of June 2015 indicating that a newspaper advertisement should be placed in a local newspaper for the broader public to be informed of the details of the project. Jeffares & Green (Pty) Ltd placed an advertisement in the Harrismith Free State Express newspaper. The newspaper is distributed every Wednesday to the following towns, Bethlehem, Clarens, Ficksburg, Harrismith, Kestell, Ladybrand, Phuthaditjhaba, Reitz, Senekal and the Lesotho Border Posts. The advertisement appeared in the newspaper on the 17th of June 2015. All Interested and Affected Parties have been given till the 12th of August 2015 to provide their comments on the proposed project. Jeffares & Green (Pty) Ltd will add an addendum to this Technical Report, should any comments be received from Interested and Affected Parties. A copy of the newspaper tear sheet was placed in the newspaper is attached to Appendix H of this report. Key Stakeholders were were identified and informed of the proposed project. All correspondence to the key stakeholders and a stakeholder database is attached to Appendix H of this report.

14 CONCLUSION

Section 21 of the National Water Act (Act 36 of 1998) defines a list of activities which require a Water Use Authorisation. The construction of the two (2) Harrismith- Munic - Letsatsi 11kV powerlines will therefore require a Water Use Authorization related to the activities (c) and (i) water uses. Several wetland types were identified during the field survey. This included unchannelled valley bottom wetlands, depressions, hillslope seeps and an order 1 river. In addition, an artificial wetland has formed as a result of continuous stormwater runoff from the N5. The most important wetland type identified during the study was the large floodplain wetland associated with the Wilge River. Several oxbow lakes and floodplain pans were also noted, which are directly depended on the Wilge River for inundation.

The project will have an impact on the floodplain wetland in the form of a potential change in hydrology, geomorphology and vegetation. Currently these components of the floodplain have been minimally altered, as there has not been large alterations in catchment land use. The risk of any impact occurring is low to very low, as it was evident the placement of the original powerlines appeared to have very little impact on the floodplain wetland. Mitigation measures have been suggested in this Water Use License Technical report as well as the Wetland Assessment Report undertaken by Dr Martin Ferreira should be applied to avoid any negative impact on the receiving environment.

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APPENDIX A: WATER USE LICENSE APPLICATION FORMS

APPENDIX B: MAPS

APPENDIX C: TEAM CV

APPENDIX D: DESIGN DRAWINGS

APPENDIX E: DWA LIAISON

APPENDIX F: SPECIALIST STUDIES

APPENDIX G: SUPPLEMENTARY REPORT

APPENDIX H: OTHER