ESKOM HOLDINGS (PTY) SOC LIMITED

Weskusfleur Substation

Surface Water Scoping Report

Date:
June 2013

Lidwala EPS Ref:
12026 K-N-K

Lidwala Consulting Engineers (SA) (Pty) Ltd

Randburg Office:
11th Church Avenue, Ruiterhof, Randburg, 2194,
PO Box 4221, Northcliff, 2115.
Tel: 0861 543 9252

Pretoria Office:
1121 Hertzog Street, Waverley, Pretoria, 0186,
PO Box 32497, Waverley, Pretoria, 0135,
Tel: 0861 543 9252

Nelspruit Office:
Lidwala House, 39 Ehmke Street, Nelspruit, 1200
P.O. box 2930, Nelspruit, 1200
Tel: 0861 543 9252

Kimberley Office:
11 Kekewitchl Road, Kimberley, 8301,
PO Box 3585,Diamond, 8305.
Tel: 0861 543 9252

1 EXECUTIVE SUMMARY

Due to the age and reliability of the existing Koeberg on-site Substation, a new 400/132kV substation (Weskusfleur Substation) is proposed in the vicinity of the existing Koeberg Substation to:

- Improve the existing 400kV reliability
- Cater for load growth on the 132 kV network for the 20-year horizon.
- Prevent overloading of existing 400kV busbar
- Replace 30 year old technology/equipment

Five Alternatives were developed for the Scoping Phase and consist of the following proposed sites:

- **Alternative 1** – Located at the north-east corner of the KNPS for the 400kV yard and the southern part of the parking area south of the incoming 400kVlines for the 132kV yard.
- **Alternative 2** – The area at the south eastern corner of the KNPS where part of the PBMR was planned.
- **Alternative 3** – The area on the corner of the main access road just east of the road to the conservation offices and north of the main access road south of the incoming 400 kV lines.
- **Alternative 4** – Offsite option to the east of the R27 on the farm Brakke Fontein 32.
- **Alternative 5** – Offsite option, just east of the R304 next to the existing Sterrekus (Omega) Substation.
- **Alternative 6 –** The no-go option, in which the substation is not constructed and the status quo is maintained in terms of infrastructure.

The Sout River is approximately 5 km from alternatives 1-4 and 2 km from alternative 5. No river channels drain the sites of the different alternatives, except for a small tributary of the Sout River which run through the western corner of the proposed Alternative 5 north of the Sterrekus Substation. Initial indication is that floodlines and flood levels will not play a significant role in terms of the current identified alternatives for the proposed type of development. The preliminary indication is that peak flows will be higher at alternative 4 and 5. Surface water impacts of the all the proposed alternatives will largely be related in the way local stormwater is managed and an integrated approach is encouraged.

Eskom SOC Limited

Weskusfleur Substation, Western Cape Province, South Africa

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Prepared by:

Marinus Boon (BSc. Hons. Env. Man.)

Reviewed by:

Frank van der Kooy Pr.Sci.Nat

Alf Raspi Pr Tech Eng

Lidwala Consulting Engineers (SA) (Pty) Ltd

2 INTRODUCTION

Lidwala Consulting Engineers (SA) (Pty) Ltd has been appointed by Eskom Holdings SOC Limited to conduct a Surface Water study for their Weskusfleur Substation project. The proposed sites are located at the Koeberg Nuclear Power Station (Koeberg) near Melkbosstrand, 30 km north of Cape Town on the West Coast.

Eskom Holdings SOC Limited initiated a study to investigate possible alternatives and solutions to address the long term reliability and improvement of the existing 400kV Gas Insulated System substation (GIS) at Koeberg Nuclear Power Station in the Western Grid. The study also included the future long term 400/132kV transformation requirements at Koeberg substation.

Eskom Holdings SOC Limited's (Eskom) core business is the generation, transmission and distribution of electricity throughout South Africa. Electricity by its nature cannot be stored and must be used as it is generated. Therefore electricity is generated according to supply-demand requirements. Being a nuclear power station, it is vital that the reliability of the electrical infrastructure associated with this power station is never compromised. The station is also critical for grid stability in the Western Cape.

The current 400kV GIS substation was in operation for almost 30 years and there is concerns regarding its reliability as it is difficult to repair as a result of discontinued technology. There is also no space for additional 132 kV feeder bays at Koeberg Substation to accommodate future requirements for new lines.

It is for the aforementioned reasons that a new 400/132kV substation (Weskusfleur Substation) will be required in the vicinity of the Koeberg Power Station to:

- Improve the existing 400kV reliability
- Cater for load growth on the 132 kV network for the 20-year horizon.
- Prevent overloading of existing 400kV busbar
- Replace 30 year old technology/equipment

2.1 Terms of reference

A desktop investigation will conducted using spatial instruments (i.e. aerial photography, land use maps and topographical maps) to identify possible impacts related to the development. A literature survey will further be undertaken to assess the immediate catchment. The following activities are proposed:

- Description of the affected drainage area and water resources;
- Identify any sources or possible sources or impacts on the water course (point sources or diffuse sources);

- Assessing the environment in terms of the proposed development and impacts it will have on the surface water systems;
- Compilation of a detailed report describing possible impacts on the surface water and impacts the proposed development will have on the surface water; and
- Providing recommendations and mitigation measures to remediate and minimise these identified impacts.

2.2 Study Approach, Limitations and Assumptions

For the purpose of the study, a study area of 10 km radius around the site has been defined to adequately cover quaternary catchments.

The scoping phase is defined as a procedure for determining the extent and approach to the EIA phase. The scoping study should provide a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.

The current study is based on a desk study, although all of the proposed sites were visited briefly. Detailed surface water studies have been carried out at the surrounding sites and area.

3 DESCRIPTION OF THE PROPOSED PROJECT

3.1 Location and Description

Five alternatives have been identified for assessment during the scoping phase for the new substation (**Figure 1**). Three of the options are within close proximity to the power station itself, while the other two options are off-site and lie to the east of the R27.

Alternative 1 – Located at the north-east corner of the KNPS for the 400kV yard and the southern part of the parking area south of the incoming 400kVlines for the 132kV yard.

Alternative 2 – The area at the south eastern corner of the KNPS where part of the PBMR was planned.

Alternative 3 – The area on the corner of the main access road just east of the road to the conservation offices and north of the main access road south of the incoming 400 kV lines.

Alternative 4 – Offsite option to the east of the R27 on the farm Brakke Fontein 32.

Alternative 5 – Offsite option, just east of the R304 next to the existing Sterrekus (Omega) Substation.

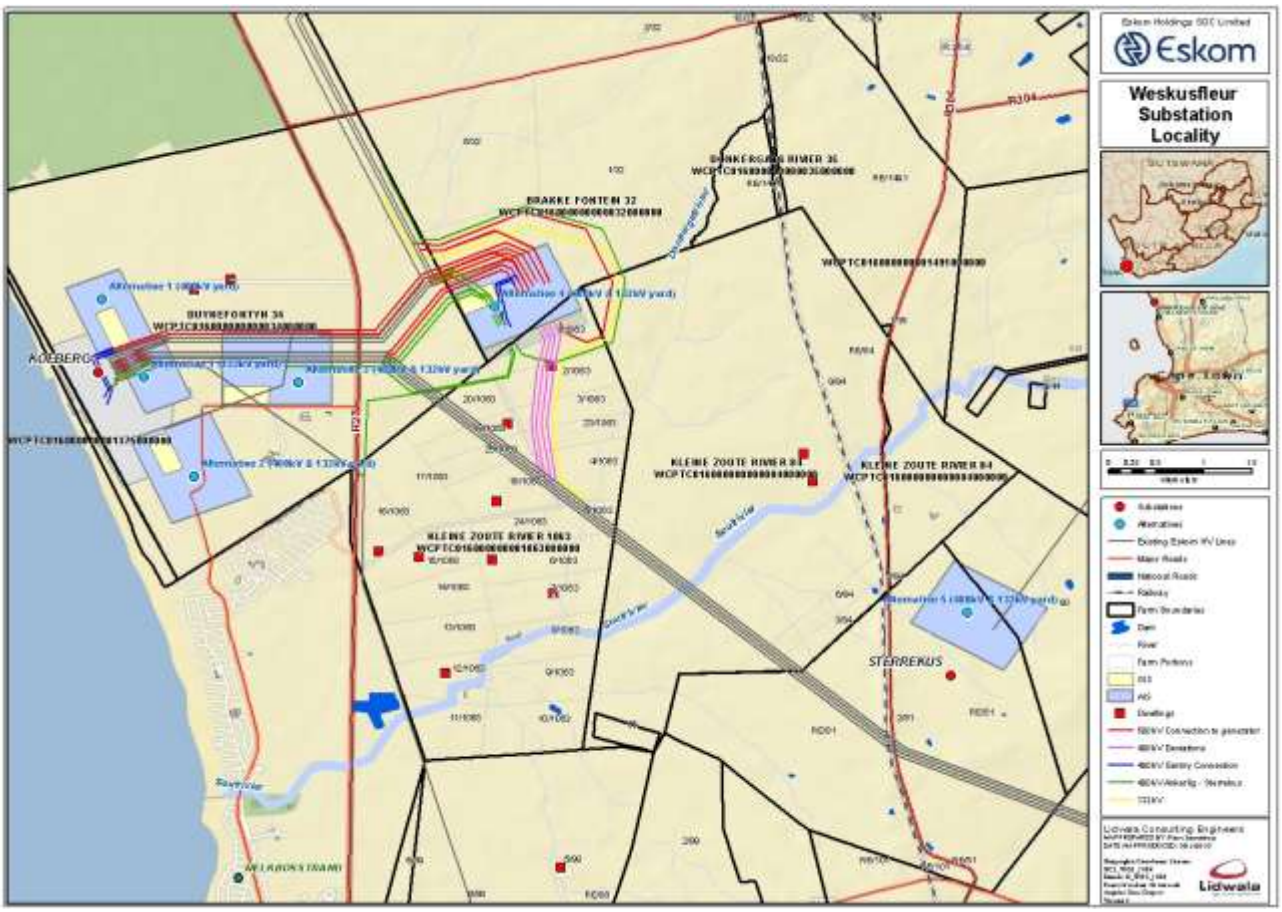


Figure 1: Illustrates the 5 alternative sites identified for the new substation

3.2 Climate

The area has a temperate, Mediterranean-type climate with about 75% of the annual rainfall occurring in the winter months between April and September. Rainfall is cyclonic due to cold fronts moving in from the South Atlantic Ocean. The cold Benguela current inhibits cloud development. The average annual rainfall measured at the Koeberg Nuclear Power Station is 375 mm/a.

Summers are hot and dry with an average temperature of 28°C between January and March. Winter months are cold and wet with an average temperature of 17°C during July. Wind which is a characteristic feature of the West Coast, can often be very strong.

Fog is a regular occurrence along the West Coast during the summer months and can drift as far as 3 km inland. The moisture supplied by the fog compensates for the relatively poor rainfall during the summer months.

The long-term averages and extremes measured from 1980 to 2012 at the Koeberg Meteorological Station is shown in **Table 1**.

Table 1: The longterm averages and extremes measured from 1980 to 2012 (*Source: Koeberg Meteorological Station)*.

Koeberg Meteorological Station

Long-Term Averages and Extremes @ 10m agl. - Average period = 1980 to 2012

Month	Temperatures (°C)					Rainfall (mm) @ 1.2m							Wind				
	Avg.	Extreme Max.	Year	Extreme Min.	Year	Avg.	Highest	Year	Lowest	Year	Highest 24hrs	Year	Avg. m/s	Gust Dir.	Max. Gust m/s	Max Gust km/hr	Year
January	19.6	38.1	2004	10.5	1982	9.4	67.6	1981	0.0	1999	57.4	1981	5.0	NNW	27.7	99.7	2008
February	19.8	38.0	2005	9.0	1980	7.8	42.0	1996	0.0	2000	26.4	1996	4.7	NNW	24.3	87.5	2008
March	18.8	36.6	2004	9.0	1989	11.9	51.0	1989	0.0	2001	33.8	1988	4.3	NNW	23.4	84.2	1993
April	16.9	36.6	2012	5.5	1995	32.9	105.4	1990	2.8	2000	62.0	1993	3.7	S	37.1	133.6	1993
May	15.1	33.6	1986	5.7	1995	46.6	98.2	1987	1.3	2004	49.3	1993	3.5	WSW	38.8	139.7	1987
June	13.5	31.4	1985	4.1	1988	67.3	157.4	1994	25.8	1984	58.2	1996	3.7	E	34.4	123.8	1994
July	13.0	29.0	1980	2.8	1995	64.8	162.4	2001	22.8	2005	59.4	1985	3.9	WSW	30.6	110.2	2000
August	13.2	32.0	1985	2.2	1981	54.1	134.4	1987	13.8	1991	57.6	1987	4.0	WSW	31.2	112.3	2008
September	14.3	38.2	2005	2.3	1989	33.9	75.0	1984	2.5	1993	34.6	1999	4.2	WSW	30.6	110.2	1991
October	15.8	37.2	1985	5.4	1990	18.8	114.8	2004	0.6	1993	50.4	2004	4.5	NNW	26.5	95.4	1992
November	17.2	36.3	1988	6.3	1998	16.3	67.8	2009	0.4	2003	35.7	2008	4.8	SSE	27.8	100.1	1991
December	18.8	37.4	2002	9.6	1988	12.2	32.8	1984	0.3	2005	17.0	1984	4.8	ESE	36.9	132.8	2002

3.3 Geology and Soil

The underlying bedrock consists of the Tygerberg formation and belongs to the Malmesbury Group, which is the oldest rock in the Boland. The soils consist of unconsolidated sand, which are underlain by calcrete and limestone. A large area of the Koeberg Nature Reserve is covered by driftsand that does not support vegetation. The area at Groot Oliphantskop (Alternative 5) consists of acid sands of the Springfontein formation, with significant patches of also Tygerberg formation shales and a small patch of silcrete. Geotechnical characteristics indicate that subsurface rock underlies the site.

3.4 Topography

The topography is relatively flat with a gentle slope towards the coast.

The Groot Oliphantskop farm at alternative 5 is also located on gently sloping land although the high point elevation of the farm is 139 (1:50 000 topographical map) which coincides with the Oliphantskop Homestead.

4 SURFACE WATER

4.1 Description of Aquatic Environment

4.1.1 Quaternary Catchment

The alternatives all falls within the quaternary catchment G21B and in the Berg Water Management Area (WMA). Other catchments in the radius of the alternatives include G21A and G21F.

The water resources within the vicinity of the project alternatives include:

- Sout River; and
- Donkergat River; and
- Diep River

All these rivers are perennial. The Donkergat River is a tributary of the Sout River. The Sout and Diep River flow in a south-westerly direction towards the coast. No river channels drain the sites of the different alternatives, except for a small tributary of the Sout River which run through the western corner of the proposed Alternative 5 north of the Sterrekus Substation. No dams or reservoirs are present in the study area. **Figure 2** indicates the location of water resources in proximity to the proposed alternatives for the Weskusfleur Substation. **Figure 2** also indicates the proximity in relation to the identified National Freshwater Ecosystem Priority Areas (NFEPA) rivers and wetlands (Nel et al. 2011). Refer to section 3.8 for information on the location of wetlands in the Koeberg Nuclear Power site.

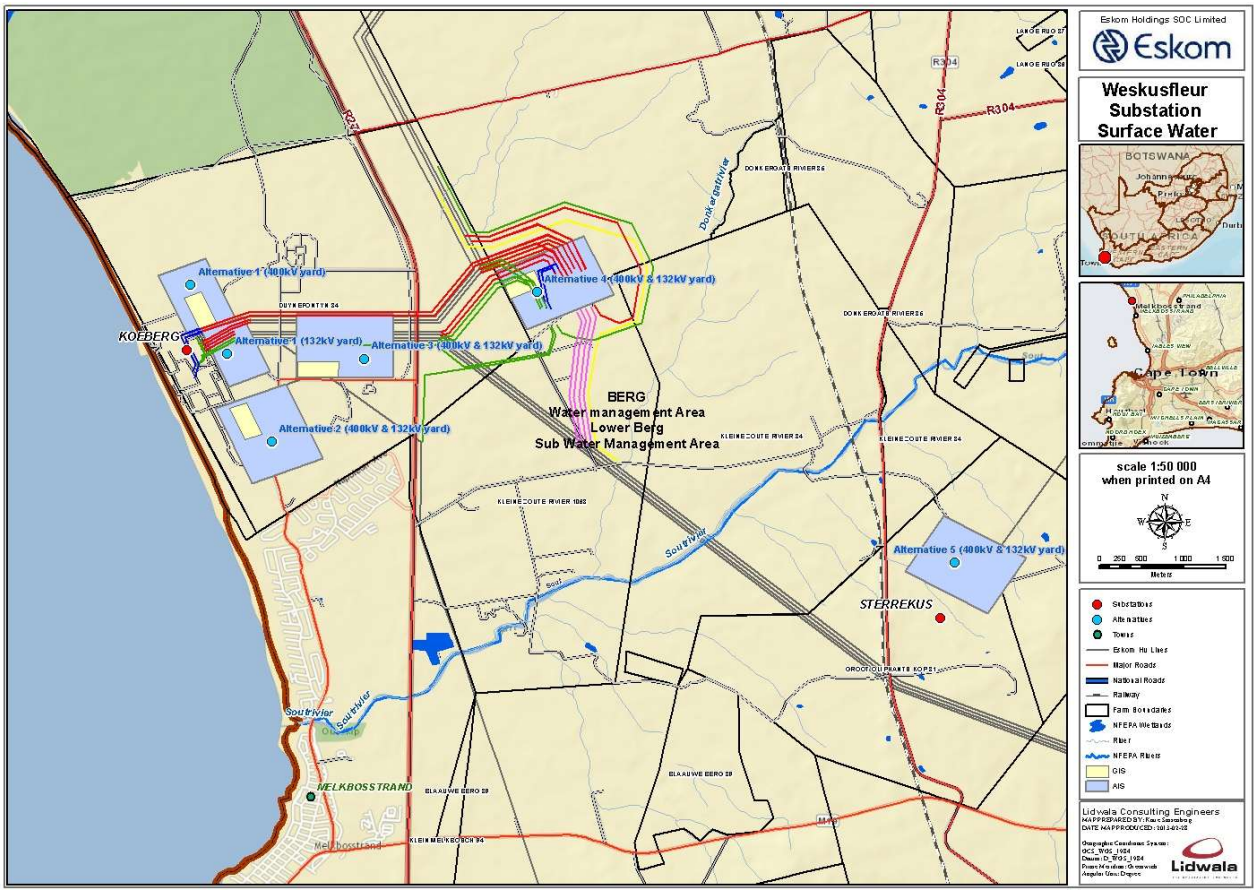


Figure 2: The location of water resources in proximity to the proposed alternatives for the Weskusfleur Substation.

Table 2 below provides a summary of the quaternary catchment characteristics. The high 'coefficient of variation' (CV) indicates that the river channels in these catchments are generally non-perennial (SRK, 2008).

Table 2 Summary of the quaternary catchment characteristics (*Source: SRK Consulting 2008*)

Quat. Catch.	Gross Area (km^2)	Forest Area (km^2)	Irrig. Area (km^2)	Evap. Zone	MAE (mm/a)	Rain Zone	MAP (mm/a)	MAR (mm/a)	MAP-MAR RESP.	NET MAR (Mm^3/a)	GROSS MAR (Mm^3/a)	CV
G21A	523	252	0.0	23C	1 450	G1D	408	32	4	8.0	16.6	1.372
G21B	304	154	3.8	23C	1 445	G2A	424	32	4	4.9	9.6	1.267
G21F	242	221	5.4	23C	1 430	G2A	488	54	4	12.0	13.1	0.823

4.2 Surface Water Quality

4.2.1 Background Water Quality

From the numerous studies, investigations and monitoring information that is available on the subject, the following water quality issues are summarised for the Berg WMA:

- A significant water quality problem in the Berg River catchment is salinization in the middle and lower reaches. This is caused by leaching from the natural geology, which extends from the north of Paarl to the Berg River mouth, consists of Malmesbury shale, as well as agricultural practices and the wash-off of salts from irrigated and dryland agricultural lands.
- Borcherds Quarry and Athlone WWTWs discharge into the Black/Salt River and the Potsdam WWTW discharges into the Diep River, which feeds into the ecologically sensitive Rietvlei wetland system.
- These Salt River no longer display seasonal flow patterns, and have become severely modified. High residual nutrients can lead to eutrophication related problems such as nuisance algal growth and excessive growth of aquatic weeds (Western Cape IWRM Action Plan: Status Quo Report Final Draft).

4.3 Surface Water Quantity

4.3.1 Mean Annual Runoff

The mean annual precipitation (MAP) in the area is 200-400mm (UPD). The National Water Resource Management Strategy (200) indicated that the MAR is 207mm for the Lower Berg Sub Area (**Table 2**). The quaternary catchment G21B MAP is 424mm.

The Mean Annual Runoff (MAR) for the primary watercourses draining the nearby catchments is 32 mm/a.

Table 3: The natural MAR for the Berg River WMA (*Source: DWA 2004*)

Component/ Sub-area	Natural MAR[1]	Ecological Reserve[1,2]
Greater Cape Town	373	61
Upper Berg	849	124
Lower Berg	207	32
Total for WMA	**1 429**	**217**

1) Quantities are incremental and refer to the sub-area under consideration only.
2) The total volume is based on preliminary estimates, with impact on yield being a portion of this.

Looking at the information of associated catchment and the watercourses within the catchment it can be concluded that the local site catchments of the alternatives should be assessed to determine if significant impacts are expected on the sites. From these local site catchments the peak flows can then be determined for each alternative proposed.

Information from the previous studies (based on proximity to alternatives for this study) indicates the following calculated peak flows (m^3/s):

Table 4: Peak flows (m^3/s) adapted from previous assessments

Return Period	Alternative 1 & 2	Alternative 3	Alternative 4	Alternative 5
1:50	3.45	Not available	5.06	6.39
1:100	3.91	Not available	5.74	Not available
1:200	4.41	Not available	6.46	Not available

(Adapted from SRK Consulting 2008 & Eyethu Engineers 2004)

These peak flows have been calculated using the Rational Method and are indicative of the expected runoff downstream.

4.3.2 Flood Volumes

The Sout River is approximately 5 km from alternatives 1-4 and 2 km from alternative 5. Initial indication is that floodlines and flood levels will not play a significant role in terms of the current identified alternatives for the proposed type of development.

It should be indicated that a detention facility have been constructed below the Sterrekus Substation at alternative 5 to prevent flooding below the substation, erosion of sand and silting of a tributary of the Salt River. A high runoff has been experienced from the hard surfaces and increased flow volumes from the substation drainage leaving the substation. Design rainfall data has been used to determine the capacity of the detention facility.

4.4 Water Authority

The Department of Water Affairs act as the Regional Water Authority through their office that is located in Bellville. The City of Cape Town is the appointed Water Service Provider who has the responsibility to supply potable water to the area.

4.5 Wetlands

The location of wetlands on the sites and the extent thereof and their significance as well as their biological diversity has been determined in previous studies (PBMR and Nuclear 1) for example. A separate specialist study will confirm and determine these in the EIA phase

and will be integrated in further surface water studies. **Figure 3** indicates the location of wetlands on the Koeberg Nuclear Power site.

Figure 3: The location of wetlands on the Koeberg Nuclear Power site (*Source The Fresh Water Consulting Group)*.

None of these wetlands are located on one of the proposed alternatives although wetlands are in the proximity of Alternative 2 and 3.

5 IDENTIFIED IMPACTS

5.1 Construction Phase

The primary drainage paths is located a distance from the sites although a small tributary of the Sout River run through the western corner of the proposed Alternative 5 north of the Sterrekus Substation. The area of all the proposed alternatives consists mainly of minor drainage paths over a flat sandy terrain. Impacts as a result of flooding linked to watercourses are therefore absent. Although flooding below the Sterrekus Substation (Alternative 5) which is located in the proximity of a tributary of the Salt River has taken place. This impact is linked to stormwater management and adequate stormwater measures.

A large area will be cleared for construction activities and flat surfaces will be created for heavy electrical equipment. These activities will affect the stormwater runoff characteristics of the land. The flat surfaces will result in more point specific discharge

points which in turn concentrate flow and increase the erosion potential. The absence of vegetation and the associated reduced infiltration result in a higher runoff coefficient (higher percentage of water runoff from the site). Watercourses and man-made drainage structures will carry more water which may result into flooding.

The following potentially negative impacts on the surface water associated with the construction phase have been identified:

- Clearance of the site to prepare for construction;
- Storage of hazardous chemical substances;
- Storage of fuel and oil;
- Cement and concrete batching;
- Transportation of material to site and the storage of material on site; and
- Dust as a result of construction activities.

The abovementioned impacts associated with the construction phase are generic and can be adequately managed through the implementation of a construction Environmental Management Plan.

5.2 Operational Phase

The following potentially negative impacts on the surface water associated with the operational phase have been identified:

- Blocked surface water management systems as result of build-up of dust and silt;
- The cut of the supply of surface water to wetlands as a result of the diversion of site storm water into stormwater infrastructure.

The mitigation of the above mentioned impacts is achieved via a comprehensive operational plan that specifies the maintenance of civil infrastructure and the natural flow of surface water into the wetlands by confining plant areas from those areas which drain into the wetlands.

5.3 Decommissioning Phase

The scope of the decommissioning will determine which impacts may be expected during decommissioning. The current Koeberg Substation is proposed to be decommissioned when the Weskusfleur substation is in operation. This area is within the security fence of the Koeberg Nuclear Power station site and will most likely not be fully rehabilitated to its natural state and therefore will the impacts of decommissioning be only localised.

5.4 No-Go Alternative

The no-go option will result in no impacts to surface water as there will be no construction, operational or decommissioning.

6 OVERVIEW OF IMPACT ASSESSMENT METHODOLOGY

In accordance with Regulation 31 of Government Notice R.543, promulgated in terms of section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), Lidwala is required to assess the significance of potential impacts in terms of the following criteria:

- Cumulative impacts;
- Nature of the impact;
- Extent and duration of the impact;
- Probability of the impact occurring;
- The degree to which the impact can be reversed;
- The degree to which the impact may cause irreplaceable loss of resources; and
- The degree to which the impact can be mitigated.

Issues will be assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;
- The physical **extent**, wherein it is indicated whether:
  - 1 - the impact will be limited to the site;
  - 2 - the impact will be limited to the local area;
  - 3 - the impact will be limited to the region;
  - 4 - the impact will be national; or
  - 5 - the impact will be international;
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
  - 1 - of a very short duration (0–1 years);
  - 2 - of a short duration (2-5 years);
  - 3 - medium-term (5–15 years);
  - 4 - long term (> 15 years); or
  - 5 - permanent;
- The **magnitude of impact on ecological processes**, quantified on a scale from 0-10, where a score is assigned:
  - 0 - small and will have no effect on the environment;
  - 2 - minor and will not result in an impact on processes;
  - 4 - low and will cause a slight impact on processes;
  - 6 - moderate and will result in processes continuing but in a modified way;
  - 8 - high (processes are altered to the extent that they temporarily cease); or
  - 10 - very high and results in complete destruction of patterns and permanent cessation of processes;

- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale where:
  - 1 - very improbable (probably will not happen;
  - 2 - improbable (some possibility, but low likelihood);
  - 3 - probable (distinct possibility);
  - 4 - highly probable (most likely); or
  - 5 - definite (impact will occur regardless of any prevention measures);
- the **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- the **status**, which is described as either positive, negative or neutral;
- the degree to which the impact can be reversed;
- the degree to which the impact may cause irreplaceable loss of resources; and
- the degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M)*P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- **30 - 60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

This EIA Report will assess the significance of impacts for all phases of the project i.e. construction, operation and decommissioning. The results of the above will be summarised in a tabular format. An example is provided below.

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance		Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
CONSTRUCTION PHASE									
BIODIVERSITY									
Impact 1: Loss or degradation of natural/ pristine habitat Koeberg Nature Reserve.	**nature of impact:**	Adverse Impact due to loss or degradation of natural habitat							
	with mitigation	1	4	2	3	**21**	**Low**	-	high
	without mitigation	2	5	2	4	**36**	**Medium**	-	high
	degree to which impact can be reversed:	None							high
	degree of impact on irreplaceable resources:	Low							high

6.1 Proposed activities for EIA phase

Although a brief site visit was conducted as part of the assessment, the current study is largely restricted to a desktop assessment and fieldwork during the EIA phase will be an important activity required to validate and refine the findings of this report. This will include the following studies and activities:

- Local site catchments of all the alternatives should be assessed and peak flows should be calculated to determine if significant impacts are expected on the sites;
- Storm water management plan;
- Clarify the power line arrangement for each Alternative so that the potential impacts can be properly evaluated for each Alternative that is taken through to the EIA stage;
- Although there do not appear to be any wetlands within the affected areas, the preliminary site visit was carried out during the dry season and the lack of such features within the affected areas should be confirmed with a site visit during the wet season (a separate specialist study will confirm and determine these in the EIA phase and will be integrated in further surface water studies);
- Impacts on any watercourses/drainage lines depending on the alternative selected should be investigated;
- Assess the impacts identified in above in light of the site-specific findings and the final layout to be provided by the developer.

7 CONCLUSIONS AND RECOMMENDATIONS

General mitigation measures and recommendations include:

1. Initial indication is that floodlines and flood levels will not play a significant role in terms of the current identified alternatives for the proposed type of development. It is also important to remember that storm water after it leaves the substation terrain might influence land beyond the substation area (cumulative impact).
2. The preliminary indication is that peak flows will be higher at alternative 4 and 5.
3. Surface water impacts of the all the proposed alternatives will largely be related in the way local stormwater is managed and an integrated approach is encouraged.
4. No development should be allowed within any areas demarcated as sensitive and preferably leave as much areas of medium sensitivity surrounding wetlands and rivers intact.
5. Plan construction to avoid any impact on the natural drainage of the site and wetland functionality.
6. Not leaving soil surfaces open to erosion for lengthy time periods.
7. Implement sound storm water management measures.
8. No surface water generated as a result of the activities may be discharged directly into any natural drainage system or wetland.

REFERENCES

Arcus GIBB (Pty) Ltd (2011) Revised Draft Environmental Impact Assessment Report for the Eskom Nuclear Power Station and Associated Infrastructure (Nuclear-1) DEA&DP 12/12/20/944

Department of Water Affairs and Forestry. (1998). National Water Act, Act 36 of 1998. South Africa.

Department of Water Affairs and Forestry (2004) National Water Resource Strategy (First Edition). Department of Water affairs and Forestry. Pretoria. South Africa.

Eyethu Engineers (2004) Hydraulic Assessment Report for the Omega Substation.

Day, L (2008). Assessment of impacts to (surface) freshwater ecosystems for the Proposed Pebble Bed Modular Reactor emonstration Power Plant, at the Koeberg Nuclear Power Station Site. The Freshwater Consulting Group

Koeberg Meteorological Station.The longterm averages and extremes measured from 1980 to 2012

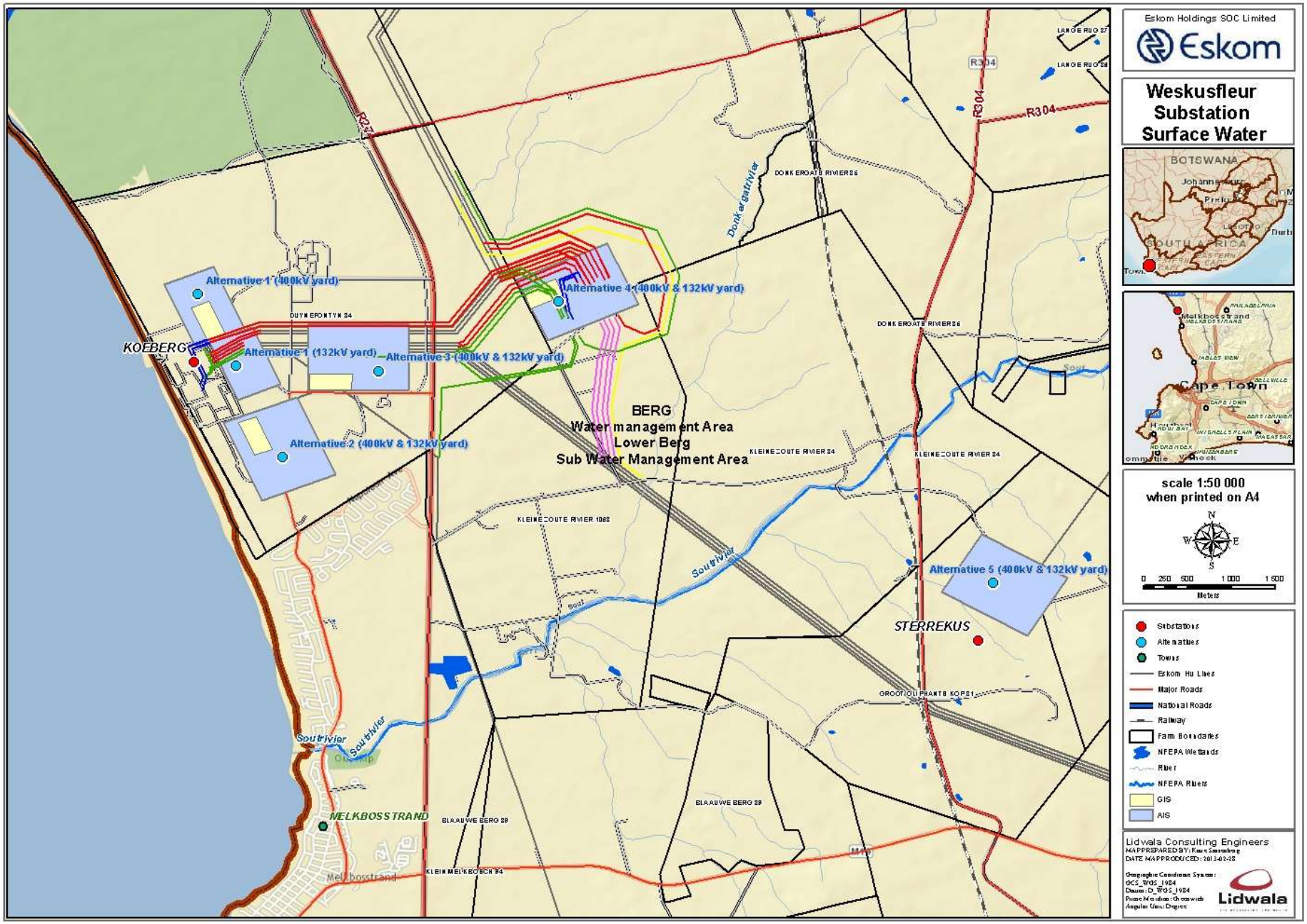
Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., Van Deventer, H., Funke, N., Swartz, E.R., Smith-Adao, L.B., Mbona, N., Downsborough, L. and Nienaber, S. (2011). Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

SRK Consulting (2007) Hydrology Scoping Report for the Eskom Nuclear Power Station and Associated Infrastructure (Nuclear-1)

SRK Consulting (2008) Surface and Groundwater Specialist Assessment for the Proposed Pebble Bed Modular Reactor Demonstration Power Plant, at the Koeberg Nuclear Power Station Site

SRK Consulting (2011) Hydrology Environmental Impact Report for the Eskom Nuclear Power Station and Associated Infrastructure (Nuclear-1)

Utility Program for Drainage (UPD) Version 1.1. Sinotech


Eskom Holdings SOC Limited
Eskom
Weskusfleur Substation Surface Water
Alternative 1 (400kV yard)
Alternative 1 (132kV yard)
Alternative 2 (400kV & 132kV yard)
Alternative 3 (400kV & 132kV yard)
Alternative 4 (400kV & 132kV yard)
Alternative 5 (400kV & 132kV yard)
KOEBERG
STERREKUS
MELKBOSSTRAND
BERG
Water management Area
Lower Berg
Sub Water Management Area
Donkergatrivier
Southrivier
R304
R27
DONKERGAT RIVIER 26
KLEINEZOUTE RIVIER 24
KLEINEZOUTE RIVIER 1062
BLAAUWE BERG 28
KLEIN MELKBOSCH 94
DUYNEFONTYN 24
GROOTOLIPHANTS KOPS 1
BOTSWANA
SOUTH AFRICA
Cape Town
scale 1:50 000
when printed on A4
N
W
E
S
0 250 500 1 000 1 500
Meters
Substations
Alternatives
Towns
Eskom Hv Lines
Major Roads
National Roads
Railway
Farm Boundaries
NFEPA Wetlands
River
NFEPA Rivers
GIS
AIS
Lidwala Consulting Engineers
MAP PREPARED BY: Kruc Sassenberg
DATE MAP PRODUCED: 2013-02-28
Geographic Coordinate System: GCS_WGS_1984
Datum: D_WGS_1984
Prime Meridian: Greenwich
Angular Unit: Degree
Lidwala

(Source: The Fresh Water Consulting Group, 2008)

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/
NEAS Reference Number:	DEAT/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

PROJECT TITLE

Environmental Impact Assessment for the Proposed Weskusfleur Substation, Western Cape Province

Specialist:	**Marinus Boon**		
Contact person:	**Marinus Boon**		
Postal address:	**1121 Hertzog Street, Waverley**		
Postal code:	**0186**	Cell:	**074 76123 27**
Telephone:	**0861 543 9252**	Fax:	**086 557 3141**
E-mail:	**mboon@lidwala.com**		
Professional affiliation(s) (if any)	**See attached CV**		

Project Consultant:	**Lidwala Consulting Engineers (SA) (Pty) Ltd**		
Contact person:	**Frank van der Kooy**		
Postal address:	**1121 Hertzog Street, Waverley**		
Postal code:	**0186**	Cell:	**082 890 1918**
Telephone:	**0861 543 9252**	Fax:	**086 764 9166**
E-mail:	**environmental@lidwala.com**		

4.2 The specialist appointed in terms of the Regulations_

I, Marinus Boon , declare that --

General declaration:

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

MBoon

Signature of the specialist:

Liduala Consulting Engineers (SA)

Name of company (if applicable):

15/07/2015

Date: