



15 April 2019
533767

Eskom Holdings SOC Ltd: Western Cape Operating Unit
Eskom Ring Road
Brackenfell
7561

Attention: Madré Delpont

Dear Madré

Stormwater Management Plan for the proposed Eskom Grid-Scale Battery Storage at the Skaapvlei Substation

1 Introduction

SRK Consulting (South Africa) (Pty) Ltd (SRK) was appointed by Eskom Holdings SOC Limited (Eskom) to compile a Stormwater Management Plan (SWMP) as part of an environmental assessment process for the installment of grid-scale battery storage units at Skaapvlei substation (the site).

1.1 Objectives

The SWMP will include design criteria and commitments that will adhere to internal Eskom objectives and local and national guidelines, which may, amongst others, include the following:

- Protect all life and property from flood damage;
- Protect water resources in the catchment areas from pollution and siltation;
- Protect and enhance the watercourses locally and downstream;
- Conserve the natural flora and fauna in the environment;

Partners R Armstrong, AH Bracken, N Brien, JM Brown, CD Dalglish, BM Engelsman, R Gardiner, M Hinsch, GC Howell, WC Joughin, DA Kilian, S Kisten, JA Lake, V Maharaj, DJ Mahlangu, I Mahomed, HAC Meintjes, MJ Morris, GP Nel, VS Reddy, PE Schmidt, PJ Shepherd, MJ Sim, VM Simposya, HFJ Theart, KM Uderstadt, AT van Zyl, MD Wanless, ML Wertz, A Wood

Directors AJ Barrett, GC Howell, WC Joughin, V Maharaj, VS Reddy, PE Schmidt, PJ Shepherd

Associate Partners PJ Aucamp, LSE Coetser, E Goossens, SG Jones, W Jordaan, F Lake, MJ Meiring, L Nedeljkovic, RD O'Brien, T Shepherd, JJ Slabbert, JS Stiff, M van Huyssteen, D Visser

Consultants JAC Cowan, *PrSci Nat, BSc(Hons)*; JH de Beer, *PrSci Nat, MSc*; JR Dixon, *PrEng*; T Hart, *MA, TTHD*; GA Jones, *PrEng, PhD*; PR Labrum, *PrEng*; RRW McNeill, *PrTech Eng*; PN Rosewarne, *PrSci Nat*; AA Smithen, *PrEng*; TR Stacey, *PrEng, DSc*; OKH Steffen, *PrEng, PhD*; WI Stewart, *PrSci Nat, MSc*, PJ Terbrugge, *PrSci Nat, MSc*, DJ Venter; *PrTech Eng*

SRK Consulting (South Africa) (Pty) Ltd

Reg No 1995.012890.07

African Offices:

Cape Town	+ 27 (0) 21 659 3060
Durban	+ 27 (0) 31 279 1200
East London	+ 27 (0) 43 748 6292
Johannesburg	+ 27 (0) 11 441 1111
Kimberley	+ 27 (0) 53 861 5798
Pietermaritzburg	+ 27 (0) 33 347 5069
Port Elizabeth	+ 27 (0) 41 509 4800
Pretoria	+ 27 (0) 12 361 9821
Rustenburg	+ 27 (0) 14 594 1280
Accra	+ 23 (3) 24 485 0928
Lubumbashi	+ 243 (0) 81 999 9775

Group Offices:

Africa
Asia
Australia
Europe
North America
South America



- Prevent soil erosion;
- Ensure sustainable stormwater management systems; and
- Contain all dirty stormwater on site for treatment or proper disposal.

1.2 Project Background

Eskom proposes installing grid-scale battery storage units at existing distribution substations in the Western Cape to strengthen the electricity distribution network and address capacity and/or voltage constraints. The two types of technology alternatives being considered by Eskom for battery storage at the substations are:

- Self-contained (solid state) batteries; and
- Flow batteries.

A single battery technology, or a combination of the technology alternatives, may be implemented. The chemical composition of all the batteries is considered hazardous, and the batteries will therefore be stored in containers and banded.

2 Site Information

The site is located approximately 25 km West of Lutzville, off the R363 within the West Coast District Municipality (see Figure 2-1 below).

The project is situated within Quaternary Catchment F60E, which is a winter rainfall region and receives a Mean Annual Precipitation (MAP) of between 100 and 200 mm, according to the Water Resources (2012) data. At times, large rainfall events might occur in succession that result in the catchment being saturated and generating notable surface flows.

The site area is characterised by relatively flat slopes ranging between 1° and 3°. All surface flow will drain in the direction of the low-lying area (or pan), which is located approximately 3 km towards the East of the site.

The areas immediately around the site consist predominantly of brush vegetation (as shown in Photo 2-1 and Photo 2-2). The site is located within a windfarm. The soil at the near surface consists of sand. Infiltration in the sandy soils will be high and thus the site will not be prone to ponding or dominant surface flows.



Photo 2-1: Sandy soils with revegetated areas around the site. Shallow sloping and predominantly brush vegetation



Photo 2-2: Proposed new battery storage area with wind turbines in the background

The proposed location of the battery containers (as shown in Photo 2-3) is clear of any water course and shows no ponding after a rain event. The current drainage channels and stormwater systems (trenches) appear to be efficient on this site (as can be seen on Photo 2-3). However, clearing/maintenance of stormwater systems is required.



Photo 2-3: The Skaapvlei substation



Photo 2-4: Excavated trench around the boundary of the site

Stormwater originating from the substation surface drains via the existing stormwater drainage systems, which channel clean stormwater away from the facility. The elevated platform barrier and trench around the site should prevent stormwater or surface (sheet) flow from flowing across the site.

The proposed battery storage units are considered to contain hazardous substances (as discussed in section 1.1) and will be stored in containers and banded.

The two power transformers at the existing substation are banded and connected to an oil/water separator dam. The oil/water separator dam collects and stores oil leaked and spilled into the banded transformer area by faulty equipment. The dam is designed in such a way that water and oil is separated, and the water escapes to the environment while the oil remains inside. The oil/water separator dam is inspected regularly and if oil is inside it is pumped out and disposed of as hazardous waste.

The new substation extension will add additional two or three banded power transformers to the site. If the existing oil/water separator dam is insufficient to hold the new storage capacity, then an additional oil dam will be constructed.

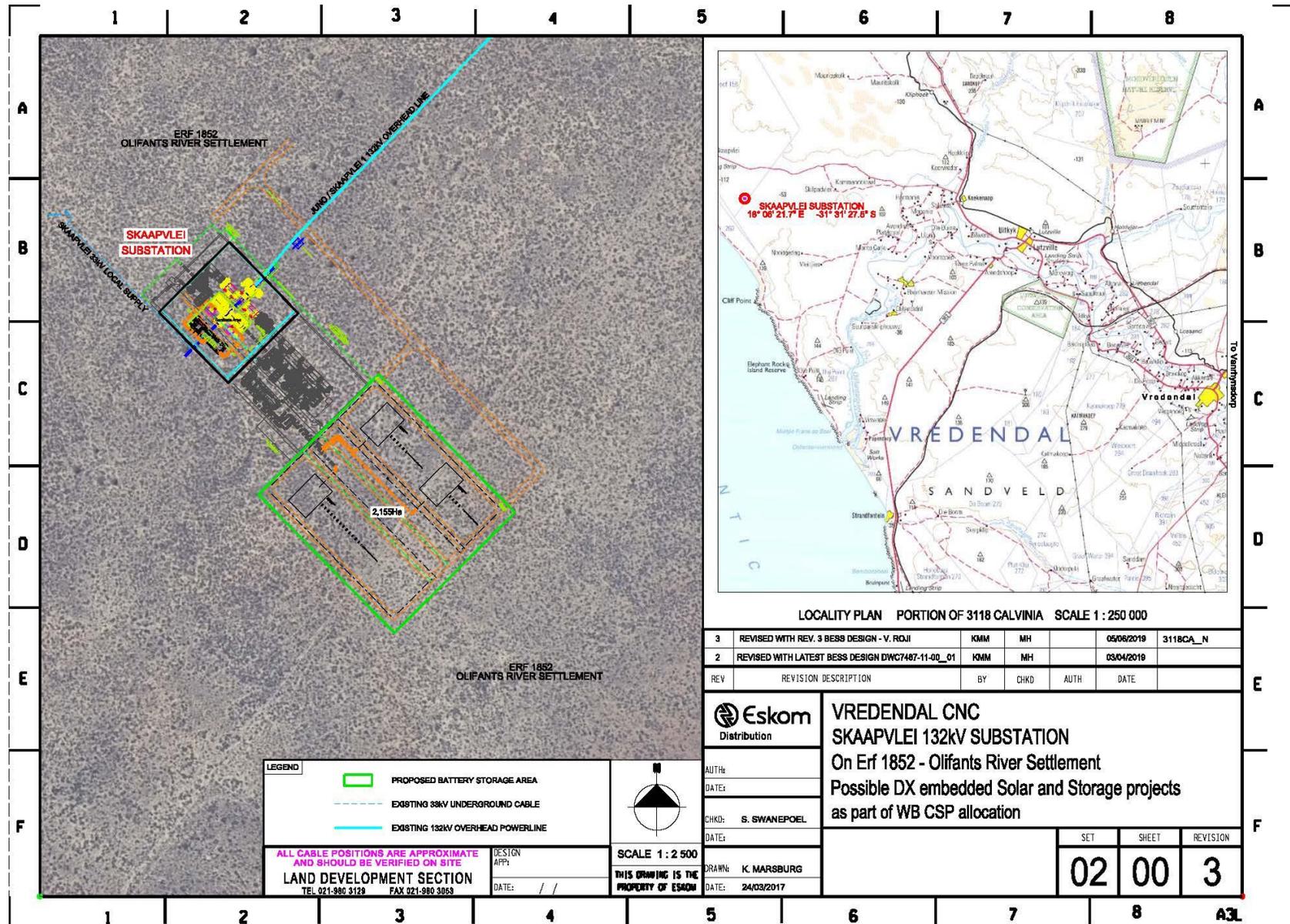


Figure 2-1: Locality map of the existing Eskom Skaapvlei substation (provided by Eskom).

3 Stormwater Management Plan

3.1 Design Phase

During detailed engineering design and planning of the civil and BESS infrastructure, the Engineer shall:

- Present designs for the expanded substation and BESS platforms, as well as any new roads.
- Ensure that storm water originating from upgradient (stormwater that could flow across the site from external areas) is diverted around the site.
- Present designs for maintaining the internal stormwater drains.
- Present designs for keeping stormwater separate from contaminated water and bunded areas to prevent water pollution.
- Design the drainage systems (of stormwater infrastructure, trenches, drains and outlets) to encourage dissipation of water, decreasing velocity of water and prevent erosion, ponding and flooding of the site and surrounding environment.
- Consider secondary and tertiary containment measures due to the hazardous nature of the battery electrolytes.

3.2 Construction Phase

The following stormwater management measures should be implemented during construction:

- Construct all drainage channels and stormwater drainage systems according to the engineer's design.
- Install temporary diversion systems / berms around the construction site or at certain problematic areas (including temporary access roads and parking bays) during construction to prevent ponding, flooding or contamination of stormwater with contaminants.
- Temporary roads should be kept to a minimum to avoid multiple access routes/roads and should only be constructed if absolutely necessary.
- Temporary parking bays/roads should consist of a compacted coarse gravel layer (if necessary).
- Any construction material stockpiles should be protected by berms (or another mechanism) to ensure that material cannot be mobilised by runoff and/or potentially block the stormwater system.
- Place oil traps under stationary machinery, only re-fuel machines at designated fuelling points, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.
- Ensure that spill kits appropriate to the hazardous substance/s are available at all times on the site.
- Draw up and strictly enforce a procedure for the storage, handling and transport of the battery containers, and other hazardous materials on site (including fuel storage areas). This procedure should be informed by hazardous material safety data sheets and discussions with the supplier.
- Ensure vehicles and equipment are in good working order.
- Ensure that good housekeeping and maintenance rules are applied.
- Inspect the site weekly for signs of spills.

- Ensure that onsite sanitation facilities are appropriately designed, are well maintained and serviced regularly.
- Excavations filled with rain water may be pumped out and the water released into the environment.
- Handle and store waste in such a way as to prevent mixing with water.

This stormwater plan is to be communicated to all staff.

3.3 Operational Phase

The following stormwater management measures should be implemented during the operational phase:

- Clearly visible signage and emergency numbers shall be placed indicating who to call if any problem with stormwater or any other environmental issues is noticed.
- All necessary spill kits appropriate to the hazardous substance shall be kept on the site.
- All battery containers (hazardous chemicals) shall be banded in accordance with legal requirements and supplier requirements.
- Signs shall be placed on all battery storage areas indicating as a minimum:
 - The battery type (and chemical name/s).
 - Who to contact (immediately) if a spill or leak is noticed.
 - MSDS sheets shall be displayed clearly where batteries are stored. Alternatively available on site.
- Whenever maintenance staff visit the site the site shall be inspected for:
 - Spills and leaks in/from battery storage areas – if any spills or leaks are found, they will be remediated, and repairs carried out to prevent recurrence.
 - Blockages in stormwater systems.
 - Litter, particularly litter in any stormwater channels, culvert, drains etc. – any litter found shall be removed.
 - New oil or fuel stains from vehicles – if stains are found, the owner of the vehicle with the leak shall be notified and instructed to facilitate remedial measures to the vehicle.
 - Full or faulty bunds and oil/water separators.
- Training courses shall be run annually for all employees that visit the site (or as needed for new employees) to inform them of the contents of this plan and how to inspect the site and who to inform if issues are noted;
- The following records shall be kept:
 - A register of spills
 - Incident Management records with the corrective actions taken after spills
 - Waste disposal records
 - Attendance registers for training courses.
 - An inventory of battery types (and associated chemicals) on the site
 - A record of all inspections.

Please contact the undersigned should you have any queries.

Yours faithfully,

SRK Consulting (South Africa) (Pty) Ltd

Prepared by

SRK Consulting - Certified Electronic Signature


533767/43568/Report
6731-6806-2998-DUPD-15/04/2019
This signature has been printed digitally. The Author has given permission for its use for this document. The details are stored in the SRK Signature Database

Daniell du Preez *B.Sc., M.Eng.*

Engineering Geologist

Project Partner

SRK Consulting - Certified Electronic Signature


533767/43568/Letter Report
6101-3769-6866-ENGE-15/04/2019
This signature has been printed digitally. The Author has given permission for its use for this document. The details are stored in the SRK Signature Database

Bruce Engelsman, *Pr. Eng., Pr. CPM*

Principal Engineer, Partner

Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.

Disclaimer

The opinions expressed in this report have been based on the information supplied to SRK by Eskom. SRK has exercised all due care in reviewing the supplied information, but conclusions from the review are reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional hydrogeological and environmental practices.

4 References

WR (2012). *Water Resources of South Africa*. Water Research Commission. Royal HaskoningDHV. Official WR2012 website launched in 2015. Website: <http://waterresourceswr2012.co.za/>

DWS (2016). *Development of Reconciliation Strategies for All Towns in the Southern Planning Region*. Darling. Swartland LM (WSA), West Coast DM, Western Cape Province.

SRK Report Distribution Record

Report No.

533767

Copy No.

Pdf Version

Name/Title	Company	Copy	Date	Authorised by
Madré Delpont	Eskom	1		
Xanthe Adams	SRK Consulting	2		
SRK Library	SRK Consulting	pdf		

Approval Signature:

This report is protected by copyright vested in SRK (SA) (Pty) Ltd. It may not be reproduced or transmitted in any form or by any means whatsoever to any person without the written permission of the copyright holder, SRK.