

## KOMATI POWER STATION SHUTDOWN & DISMANTLING

#### **DRAFT ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT REPORT Part II - APPENDICES**

DRAFT

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## A. TITLE & APPROVAL PAGE

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# B. AMENDMENTS PAGE

Date:	Nature of Amendment	Amendment No.
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- Appendix E: WSP Preliminary Contaminated Land Study Report
- Appendix F: Groundwater Laboratory Results Review

### APPENDIX A

#### TITLE DEED T24999



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has applied for the issue to it of a Certificate of Consolidated Title under the provisions of Section 40 (3) of the Deeds Registry Act, 1937 (No. 47 of 1937);

AND WHEREAS the ELECTRICITY SUPPLY COMMISSION

/is.....

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is the registered owner of -

1. REMAINING EXTENT of PORTION 1 of the farm KOORNFONTEIN NO. 27, Registration Division I. S., Transvaal;

> HELD under Deed of Transfer No. 28399/1957 dated 14th November 1957;

 PORTION 17 (a Portion of Portion 9) of the farm BROODSNEYERSPLAATS NO. 25, Registration . Division I.S., Transvaal; AA

HELD under Deed of Transfer No. 18646/1963 dated 30th July 1963;

3. PORTION 19 (a Portion of Portion 9) of the farm BROODSNEYERSPLAATS NO. 25, Registration Division I.S., Transvaal;

HELD under Deed of Transfer No. T. 24998 /1975 dated this day;

4. FORTION 8 (a Portion of Portion 3) of the farm BROODSNEYERSPLAATS NO. 25, Registration Division I.S., Transvaal:

HELD under Deed of Transfer No. 29075/1957 dated 22nd November 1957;

/which.



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which properties have been consolidated into the land hereinafter described:

3.-

NOW THEREFORE in pursuance of the provisions of the said Act, I, the Registrar of Deeds for Transvaal at Pretoria, do hereby certify that the said -

#### ELECTRICITY SUPPLY COMMISSION (Incorporated under the Act on Electricity)

its Successors-in-Title or assigns, is the registered owner of -

FARM KOMATI POWER STATION NO. 56, A Registration Division I.S., Transvaal;

MEASURING 686,9407 (Six Hundred and Eighty Six comma Nine Four Nil Seven) hectares, as will more fully appear from the annexed diagram S.G. No. A. 1043/72 approved by the Surveyor General on the 24th day of February, 1972.

SUBJECT to the following conditions: - and the second



That portion indicated by the figure ABJKLA excluding the figures abcdef and ghjk on the annexed diagram, is subject to the cession of all rights to coal in favour of KLIPFONTEIN KOOLMYNE EN MINERALE ONTGINNINGSMAATSKAPPY BEPERK by virtue of Deed of Cession No. 353/48 R.M. dated the 17th June 1948 and registered on the 22nd June

HENDRIK ANDRIES KLEYNHANS EX OFFICIO KOMM VAN EDE / COMM OF OATHS MEGAWATTPARK MAXWELLRYLAAN / MAXWELL DRIVE SANDTON REP VAN SUID AFRIKA / REP OF SOUTH AFRIC/ /1948.....

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1948, in respect of the former Remaining Extent of the farm KOORNFONTEIN NO. 27, Registration Division I.S., measuring 432,4030 hectares.

2. That portion indicated by the figure C D E M F G H J C on the annexed Diagram is subject to the following reservation :-

> "Onderworpe aan die Koopakte Nr. 272/1905 S gedateer die 26ste Februarie 1904, waarby alle reg, titel en belang in en tot die minerale, metale en edelgesteentes op die Resterende Gedeelte vam die plaas BROOD-SNEYERSFLAATS NO. 25, I.S., groot 2379,1704 hektaar, verkoop was deur Louis Trichardt aan David Symons."

3. The former Remaining Extent of Portion 9 (a Portion of Portion 3) of the farm BROODSNEYERSPLAATS NO. 25 Registration Division I.S., measuring 120,8711 hectares, of which that portion indicated by the figure I E F I on the annexed Diagram forms a portion, is subject to the following servitudes :-

LDRIVE KLEYNHANS OF OATHS *(ENDRIK)* MIND3 VAN ដ្ឋ

(a) "Kragtens Notariële Akte Nr. 616/1968.S gedateer 3 Februarie 1967 is die eiendom onderhewig aan 'n persoonlike ewigdurende serwituut ten gunste van WITBANK COAL HOLDINGS LIMITED vir die vervoer van water deur middel van pype tesame met bykomende regte binne die serwituutgebied gemerk deur die figuur A B C D E F op Serwituntkaart A.706/66 geheg aan gemelde Notariële Akte

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#### Notariële Akte."

The former Portion 17 (a portion of Portion 9) of the farm BROODSNEYERSPLAATS No. 25, Registration Division I.S., indicated by the figure C.D.I.G.m. on the annexed diagram is subject to Notice of Expropriation No. 174/1972 dated 27th March 1972 whereby a servitude 3 metres wide for the purpose of a water pipeline has been expropriated by the South African Railways and Herbours Administration in terms of Section 11(1)(B) of Act No. 37 of 1955.

AND SUBJECT FURTHER to such conditions as are mentioned or referred to in the aforesaid Deeds.

> AND THAT by virtue of these presents, the said -ELECTRICITY SUPPLY COMMISSION

its Successors in Title or Assigns, now is and henceforth shall be entitled thereto conformably to local custom, the STATE, however, reserving its rights.

IN WITNESS WHEREOF I, the said REGISTRAR have subscribed to these presents and have caused the Seal of Office to be affixed thereto.

THUS DONE AND EXECUTED at the Office of the REGISTRAR OF DEEDS for the Transvaal at PRETORIA on this the 3 + h day of the month of f / f / f in the year of Our Lord ONE THOUSAND NINE HUNDRED AND SEVENTY FIVE (1975).

neba

REGISTRAR OF DEEDS.

Registered in the REGISTER of I.S. FARMS, kept at PRETORIA on the above date.

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### **APPENDIX B**

#### DRAWINGS







# Legende:

	objects to be protected
	objects to be removed
	by ESKOM
Temporary	Buildings
PPDNS	Name in Objectlist
	Roshcon Mobile Home
00UYD01	Canteen
00UYC04	Parkhome Office
00UYC03	Parkhome Office
00UYC02	Parkhome Office
00UYC23	Parkhome Office
00UYC20	Parkhome Office
00UYC19	Parkhome Office
	Boiler Office
00UYC06	Parkhome Office
00UYC08	Parkhome Office
00UYC10	Parkhome Office
00UYC09	Parkhome Office
00UYC28	Parkhome Office
00UYC36	Parkhome Office
00UYB10	Sulzer
00UYB09	PB Power
00UYB08	Storage
00UYC04	Southey Contracting Park Homes
0004036	Alstom Park Homes
	Alstom Park Homes
0001032	Alstom Park Homes
0011020	Stein Muller 17 v Park homes
000023	Stein Muller Engineering
02010-000	Alstom Workshop
00UYH01	unbekannt
00011101	unbekannt
00UYA18	unbekannt
00UYA19/2	Roshcon 1 & 2
00UYH03	PIM
00UYA07	Engineering Building
00UYA10/1	Engineering Building
	P.T.M
00UYB02	Performance Testing
00UYA08	Folowership Board Room
00USU11	CED Store
00USU11	CED Store
A 19.11.21	Schicktanz R.Knoll Specification of the objects
ndex Datum	Erstellt Geprüft Freigabe Art der Änderung
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erfasser:	Project: Dismantling Study - TPP Komati 5 2
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Member of Dornier Group	Benennung: Ma
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### APPENDIX C

#### STAKEHOLDERS' DATABASE

Organisation	Contact Name
NATIONAL	
Mining and Environmental Justice community Network of South Africa (MEJCON-SA)	
Centre for Environmental Rights (CER)	
The National Union of Mineworkers (NUM)	
The National Union of Metalworkers of South Africa (NUMSA) The South African Transport and Allied Workers Union (SATAWU)	
Department of Environmental Affairs (DEA)	
Department of Employment and Labour (DoEL)	
Department of Agriculture, Land Reform and Rural Development (DALRRD)	
Department of Trade, Industry and Competition (DTIC)	
Department of Mineral Resources and Energy (DMRE)	
Mineral Council South Africa	Alexandra Lugagne
Mineral Council South Africa	Carla Hudson
National Energy Regulator of South Africa (NERSA)	
VIINTER University of Cape Town (UCT)	
the Impact Catalyst	
PROVINCIAL Moumalanga Environmental Youth Network	
Mpumalanga Green Cluster Agency	Mr Nkosinathi Nkonyane
Vukani Environmental Justice Movement in Action	Thembisile Mbethe
Mpumalanga Green Economy Cluster	Jack Radmore
groundWork	David Hallowes
groundWork	Euripidou Rico
groundWork	Michelle Cruywagen
groundwork groundWork	Kobby Mokgalaka Thomas Mnguni
Centre for Environmental Rights (CER)	Michell Sithole
CER	Michelle Koyama
	Linda Diamini Nicole Loser
Life After Coal	Victor Munnik
	Eugene Cairncross
Mpumalanga Department of Environmental Forestry and Fisheries	Suprise Zwane
Mpumalanga Economic Growth Agency	
Mpumalanga Tourism and Parks Agency	
Mpumalanga Heritage Resource Authority	
Mpumalanga Department of Community Safety, Security and Liaison	
Mpumalanga Department of Social Development	
Mpumalanga Department of Human Settlements	
Mnumplanga Department of Connerative Governance and Traditional Attairs	
Office of the Premier	
Office of the Premier DISTRICT	
Office of the Premier DISTRICT Nkangala District Municipality	Mc Margaret Skesapa
Office of the Premier     Office of the Premier     DISTRICT     Nkangala District Municipality     Vkangala District Municipality     Vkangala District Municipality	Ms Margaret Skosana Mpho Nembilwi
Office of the Premier     DISTRICT     Nkangala District Municipality     Vkangala District Municipality     Vkangala District Municipality     Vkangala District Municipality     Vkangala District Municipality	Ms Margaret Skosana Mpho Nembilwi Fikile Maseko
The of the Premier  The operative documents of ecoperative documents and individual and an operation of the Premier  DISTRICT  Nkangala District Municipality	Ms Margaret Skosana Mpho Nembilwi Fikile Maseko Vusumuzi Kubheka Jahan Marganai
The of the Premier	Ms Margaret Skosana Mpho Nembilwi Fikile Maseko Vusumuzi Kubheka Johan Mangani
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The office of the Premier  The office of the Premier  DISTRICT  Nkangala District Municipality  Nkangala Distrity  Nkangala D	Ms Margaret Skosana Mpho Nembilwi Fikile Maseko Vusumuzi kubheka Johan Mangani Thokozile Zulu
The office of the Premier  DISTRICT  Nkangala District Municipality  Steve Tshwete Local Municipality  Steve Tshwete Local Municipality  Steve Tshwete Local Municipality  Name Steve Tshwete	Ms Margaret Skosana Mpho Nembilwi Fikile Maseko Vusumuzi Kubheka Johan Mangani Thokozile Zulu Mr L Dolo
Steve Tshwete Local Municipality	Ms Margaret Skosana Mpho Nembilwi Fikile Maseko Vusumuzi Kubheka Johan Mangani Thokozile Zulu Mr L Dolo Mr J Silas
Steve Tshwete Local Municipality	Ms Margaret Skosana Mpho Nembilwi Fikile Maseko Vusumuzi Kubheka Johan Mangani Thokozile Zulu Mr L Dolo Mr J Silas Mr M Nkosi Mr L Lopibi
The of the Premier	Ms Margaret Skosana Mpho Nembilwi Fikle Maseko Vusumuzi Kubheka Johan Mangani Thokozile Zulu Mr L Dolo Mr J Silas Mr M Nkosi Mr S Masia
The of the Premier  The other is a construction of a construction	Ms Margaret Skosana Mpho Nembilwi Fikle Maseko Vusumuzi Kubheka Johan Mangani Thokozile Zulu Mr L Dolo Mr J Silas Mr M Nkosi Mr S A Masia Mr M Nkosi
The office of the Premier  The office of the Premier  DISTRICT  Nkangala District Municipality  Steve Tshwete Local Munic	Ms Margaret Skosana Mpho Nembilwi Fikile Maseko Vusumuzi Kubheka Johan Mangani Thokozile Zulu Mr L Dolo Mr J Silas Mr M Nkosi Mrs L Legabi Ms A Masia Mr M Mahamba Mr M Mahamba
The of the Premier	Ms Margaret Skosana Mpho Nembilwi Fikile Maseko Vusumuzi Kubheka Johan Mangani Thokozile Zulu Mr L Dolo Mr J Silas Mr M Nkosi Mrs L Legabi Mr M Nkosi Mrs L Legabi Mr M Mkabela Mr M Mahamba Mr M Mahamba Ms D Lambrechts Hitshwavo Bafana
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Sizanane	
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Broodsnyersplaas	Ngenangani Sibiya
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### APPENDIX D

WSP METHODOLOGY FOR ASSESSMENT OF LAND CONTAMINATION AT KPS

17 May 2022

CONFIDENTIAL

Eskom Holdings SOC Limited Komati Power Station Mpumalanga Province

Dear Madam/Sir:

## Subject: Proposed Methodology for the Assessment of Land Contamination at Eskom's Komati Power Station

Eskom Holdings SOC Limited (Eskom) requires an independent environmental consultant, WSP Group Africa (Pty) Ltd, to undertake the Environmental & Social Impact Assessment (ESIA) and Water Use Licence Application (WULA) processes for the Solar Photovoltaics (PV) and Battery Energy Storage System (BESS) project at Komati Power Station, located in the Mpumalanga Province of South Africa. The ESIA and WULA require specialist studies to support the applications which includes a contaminated land study to cover the soil and groundwater assessment requirements.

The proposed methodology for the contaminated land assessment is in the context of Part 8 of the National Environmental Management: Waste Act (NEM: WA) and in general accordance with the requirements of the South African Framework for the Management of Contaminated Land (May 2010). The proposed scope comprises the completion of preliminary Phase 1 and Phase 2 Site Assessments which are detailed below:

Phase 1 Site Assessment: A preliminary Phase 1 Site Assessment will include the following:

- A detailed desktop exercise to evaluate the site's environmental setting and sensitivity, as well as to review any information provided by Eskom relating to previous environmental site assessments conducted at the facility.
- A site walkover exercise to evaluate all potential sources of environmental liability brought about by current and historic operations (if applicable) at the facility.
- The site walkover will also seek to identify suitably accessible sampling locations and potential access and safety risks associated with the use of mechanical equipment (i.e., concrete corers, drilling rigs) to inform the planning of subsequent intrusive works more reliably.
- The Phase 1 Site Assessment will allow targeted soil and groundwater sampling to be completed under a preliminary Phase 2 Site Assessment, thereby, limiting the extent of works, timeframes and associated cost required to develop an accurate environmental baseline of the facility.

**Phase 2 Site Assessment**: A preliminary soil and groundwater assessment will include the following:

- The clearance of all intrusive positions which will be carried out by a specialist subcontractor using a Cable Avoidance Tool (CAT) and/or Ground Penetrating Radar (GPR) in consultation with site personnel, available service plans, and under the supervision of WSP.
- The advancement of twenty-five auger holes (to a maximum depth of 2 metres below ground level, ground permitting) which will be undertaken to define any possible shallow soil source zone/s of concern more comprehensively; specifically, in areas where

Building C Knightsbridge, 33 Sloane Street Bryanston, 2191 South Africa

# vsp

substantial contamination may have been brought by historic and/or current site activities. The profile of all auger holes will be logged, and observations of soil conditions will be recorded, and twenty-five soil samples (one per auger hole) will be taken for laboratory testing according to applicable protocols for analysis.

- Based on the information from the Phase 1 Site Assessment and taking cognisance of the soil conditions observed, ten targeted positions will be confirmed for the advancement of boreholes and installation of ten monitoring wells up to a maximum depth of 10 metres below ground level. Furthermore, soil samples will be collected (one per borehole) during the borehole advancement exercise and samples will be selected on the basis of the observed levels of contamination within the soil horizons.
- Upon completion of well installation, a specialist surveyor will be appointed to coordinate each of the well positions to evaluate groundwater flow direction/s and hydraulic gradient/s using the groundwater monitoring data that will be collected alongside any existing information as provided by Eskom.
- Allowing a period of stabilisation of the wells, groundwater monitoring will be carried out at all newly installed wells and a total of eleven groundwater samples (including one sample for verification purposes) will be taken according to applicable protocols for sampling and analysis.
- Groundwater samples will be laboratory tested as per the GN R.331 suite as a minimum, which includes the following parameters for groundwater: arsenic, cadmium, chromium, iron, lead, mercury, nickel, selenium, manganese, zinc, polychlorinated biphenyls, polycyclic aromatic hydrocarbon, BTEX (benzene, toluene, ethyl benzene, xylene), iron, nickel, chromium, and zinc. The laboratory suite for soil samples that will be analysed for will include metals, organics and anions which are in accordance with the applicable soil screening criteria (the South African Soil Screening Values).
- Following completion of fieldwork and upon receipt of laboratory analytical results, WSP will prepare a combined factual and interpretative report describing the works undertaken and presenting the results obtained. A conceptual site model (CSM) will be developed based on the findings of the works, clarifying exposure pathways to the identified on- and off-site receptors via applicable transport mechanisms and particularly associated with geological and hydrogeological conditions, and based on the future land-use for the site. Subsequently, a site-specific human health and environmental risk assessment will be performed based on the potential exposure pathways/pollutant linkages highlighted by the CSM. The outcomes of the report will include identifying whether the identified risks associated with the land contamination are considered significant; outlining the recommendations for further works associated with the delineation of the contamination where required; as well as identifying plausible remedial requirements or corrective actions where necessary.

I trust that the methodology outlined for the contamination assessment aspect of the project is deemed appropriate for the purposes of the project.

Kind regards,

Nomalungelo Nyoka Contaminated Land Specialist, WSP Group Africa (Pty) Ltd

### **APPENDIX E**

#### WSP PRELIMINARY CONTAMINATED LAND STUDY REPORT

ESKOM HOLDINGS SOC LTD

## ESKOM KOMATI POWER STATION ESIA AND WULA PRELIMINARY CONTAMINATED LAND STUDY

21 JULY 2022

CONFIDENTIAL







## ESKOM KOMATI POWER STATION ESIA AND WULA PRELIMINARY CONTAMINATED LAND STUDY

ESKOM HOLDINGS SOC LTD

CONFIDENTIAL

PROJECT NO.: 41103965 DATE: JULY 2022

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**REVIEWED BY** 

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This report was prepared by WSP for the account of Eskom Holdings SOC Ltd, in accordance with the professional services agreement. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP's best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

The original of the technology-based document sent herewith has been authenticated and will be retained by WSP for a minimum of ten years. Since the file transmitted is now out of WSP's control and its integrity can no longer be ensured, no guarantee may be given to by any modifications to be made to this document.

The Eskom Komati Power Station has been designated as a National Key Point. This document, and those referenced during its preparation, are strictly confidential. Further, information contained in this report pertains to a site designated as National Key Point and, therefore, the exchange and storage of information must comply with the National Key Points Act, 1980.



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## 1 INTRODUCTION

## 1.1 AUTHORISATION

WSP Group Africa (Pty) Ltd (WSP) was commissioned by Eskom Holdings SOC Limited (Eskom) to undertake a preliminary contamination assessment for targeted portions of its Komati Power Station (KPS) facility in Mpumalanga Province, South Africa. The contamination assessment forms part of the Environmental & Social Impact Assessment (ESIA) and Water Use License Application (WULA) processes for the Solar Photovoltaics (PV) and Battery Energy Storage System (BESS) Project.

The offer to carry out the works was contained in WSP proposal reference 41103965, Eskom Komati PV ESIA and WULA, dated April 2022 and was commissioned by Eskom under Purchase Order No. 4503194444 for Contract No. 4600062770.

## 1.2 BACKGROUND AND PROPOSED DEVELOPMENT

KPS was initially commissioned in 1961 and originally operated until 1990. The power station was mothballed in 1990 but was returned to full service in December 2008 (VPC, 2021). The station has a total of nine units, five 100 MW units on the east (Units 1 to 5) and four 125 MW units on the west (Units 6 to 9), with a total installed capacity of 1,000 MW (1 GW). KPS will reach its end-of-life expectancy in September 2022 when the remaining unit (Unit 9) will have reached its dead stop date (DSD), with eight units (Unit 1 to 8) having have already reached their DSDs.

Eskom is proposing the establishment of a solar electricity generating facility and associated infrastructure as part of its repurposing programme for KPS. The plan is to install 100 MW of solar PV and 150 MW of BESS. The proposed development is located within the property owned by Eskom termed the study area for reporting purposes. The proposed development includes two sites for the solar PV installation (PV Site A and PV Site B) and four for the BESS (BESS A, B, C and D) located within the KPS as shown in **Appendix A: Figure 1**.

The solar PV modules, which convert solar radiation directly into electricity, will occupy a space of up to approximately 720,000  $\text{m}^2$  over a footprint of around 200 to 250 ha. The modules will be elevated above the ground and will be mounted on either fixed tilt systems or tracking systems (comprised of galvanised steel and aluminium). The modules will be placed in rows in such a way that there is allowance for both perimeter and maintenance access roads.

The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers. The BESS components will arrive on site pre-assembled. The BESS facilities are likely to include lithium battery technologies, such as lithium iron phosphate (LiFePO<sub>4</sub>), lithium nickel manganese cobalt oxides (Li-NMC) or vanadium redox (VRB), however the specific technology will only be determined following Engineering, Procurement and Construction (EPC) procurement. The BESS footprints will range from roughly 2 ha up to 6 ha. Further information on the proposed infrastructure and specifications are provided in the ESIA report.

#### 1.2.1 EXISTING AUTHORISATIONS AND LICENCES

Eskom has two existing Water Use Licences (WUL) with amendments obtained in August 2017 and February 2021 as follows:

- 1 WUL number 04/B11B/BCGI/1970 dated 2 February 2014 authorises the following water uses for the Eskom property located within the farm Komati Power Station No 56 IS:
  - a Abstraction of water from the Komati Government Water Scheme (Section 21 b)
  - b Diversion and impedances of the Koringspruit (Section 21 c and i)
  - c Storage of water in the raw water dams (Section 21 b) and
  - d Storage of waste and wastewater including the coal stockyard (BESS D), ash dams and return water dam associated with the Ashing Area (Section 21 g)

This WUL includes water quality limits for surface water (Appendix III, Table 3) and groundwater reserve (Appendix IV, Table 6). Table 3 was revised in the August 2017 amendment whilst the amendment of February 2021 includes changes to frequency of monitoring.

2 WUL number 04/B11B/CI/2556 dated 11 January 2015 refers to construction of Komati storage facility within 500 m from a boundary of an unchanneled valley bottom wetland and seepage wetland which refers, based on the coordinates provided, to the Komati Spruit (Seep 2 wetland)

In addition to the above WUL, Eskom possesses the following two Waste Management Licences (WML):

- 1 KPS Ash Disposal facility (License #: 12/9/11/L1010/6)
- 2 Decommissioning of the asbestos disposal site within the Old Ash dam (License #12/9/11/L73467/6)

### 1.3 AIMS AND OBJECTIVES

The objective of the preliminary contamination assessment is to provide a review of available existing information and present the findings of the contemporary works. The aim of this report is therefore to:

- Establish the environmental setting/s of the relevant development areas at KPS based on a review of
  existing information in conjunction with site reconnaissance, targeted intrusive investigations and
  laboratory analysis of selected samples
- Prepare a Conceptual Site Model (CSM) utilising the supplementary information to conceptualise the hydrological, geological and hydrogeological conditions in respect to possible contamination concerns
- Interpret the significance of recorded contamination impacts in broad accordance with Part 8 of the NEM: WA to ascertain the requirement for additional works and/or remediation

## 1.4 REFERENCED DOCUMENTS

The chronological list of the documents and data sources which informed the desktop review are provided below and are referenced where appropriate in this report. This information includes reports and databases provided by Eskom with additional input from various published resources.

- Bohlweki Environmental, September 2005, Single page (Figure 10) showing the undermining areas, subsidence and rehabilitation ash dump referenced to the Koornfontein Mines EMPR and originally titled Plan No. 4.5.
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## 1.5 SCOPE OF WORK AND LIMITATIONS

This document comprises factual and interpretative reporting based on the findings of the contemporary ground investigations and incorporating available pertinent existing data. The works reported herein are focused on environmental issues pertaining to the defined aims and objectives, and with respect to the targeted areas at KPS only. The study specifically excludes geotechnical considerations.

The preliminary risk assessment is based on potential source-pathway-receptor linkages (exposure pathways) applicable under specific land-use assumptions. Should the source-pathway-receptor linkages be altered, or the applicable land-use/s change, re-assessment may be necessary as the outcomes of the current assessment may no longer be valid. Moreover, the limitations associated with the finite nature of the intrusive works conducted should be recognised and the presence of other areas of impact that have not been identified during the current scope cannot be discounted. The preliminary quantification exercise has been conducted in targeted areas only and more detailed works will likely be necessary to validate the findings.

Whilst broadly complying with Part 8 of the NEM: WA, the report does not constitute a Site Assessment Report (SAR) as described thereunder. Based on WSP's experience it is almost certain that the Department of Forestry, Fisheries and the Environment (DFFE) would require consideration of the entire KPS under a single SAR.

## 2 SETTING

## 2.1 GEOGRAPHY

While the works related to this document focussed on the proposed development areas only, these form part of the consolidated Eskom property as presented in **Appendix A: Figure 1** and **Figure 2** within the KPS 56 IS farm portion. A summary of the general information is provided in **Table 1** with additional information specific to the proposed development in **Table 2**. The localities of current and historical activities are presented on **Appendix A: Figure 2**.

Table '	1 – Site	Summary	1
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Site Name	Eskom Komati Power Station		
Address	R35, Emalahleni, 1034, South Africa, Witbank, Mpumalanga, 1034		
Province	Mpumalanga		
Municipality	Steve Tshwete Municipality		
Current Owner	Eskom (Title Deed No. T24999/1975)		
Location Summary	KPS is situated about 37 km from Middelburg, 43 km from Bethal and 40 km from Witbank. The proposed PV Solar Sites (A and B) are located to the west of the farm portion in vacant open grasslands whilst the proposed BESS areas are located within the KPS footprint.		
Current Use	KPS is a coal power station which includes eight cooling towers, coal stock yard, fuel depot, oil storage, mechanical and electrical equipment, distribution stations, contractors' yards and a series of ash dams and return water dams (RWD) (termed the Ashing Area). A water treatment plant (WTP) to treat water to potable quality is located within the KPS.		
	Kometi Town is a residential area located between the KPS and DV Site B		
Size	The consolidated land belonging to Eskom covers approximately 686.95 ha (VPC, 2021), with KPS covering about 315 ha.		
Brief History	As previously stated, the KPS was commissioned in 1961 and operated until 1990 before being mothballed until it was returned to full service in 2008. Eskom personnel had limited information on the history of the dams and waste site. An indication has therefore been obtained based on the historical Google <sup>TM</sup> imagery where the earliest image is from 1985 (poor resolution) and subsequently for 2009 to 2022. The old ash dumps are unlined and were larger, including the historical ash dump footprint now rehabilitated within PV Site A. There were no records provided as to when this was rehabilitated but the footprint is shown in 1985 and not in the subsequent image from 2009. The footprint for the new lined ash dams first appears in 2011 with the lining in place from around 2015.		
	Inference is made to a possible domestic waste site in an area adjacent to the historical ash dump footprint but the extent and detail for this site is not known and it is not clear on the historical imagery.		
	An asbestos disposal site (License #12/9/11/L73467/6) was utilised for the disposal of 4,050 kg of asbestos and asbestos containing waste in 2008 and was covered with two layers of ash and fenced. VPC, 2021 notes that Ergosaf Environmental and Occupational Health Services confirmed that there was no environmental risk of the disposed asbestos in 2013. All asbestos material has been removed off site.		
	A rehabilitated ash dump is noted as being present in the north-west corner of PV Site B. This is in evidence in 1985 but not in 1990. This area is also noted by Bohlweki Environmental, 2005 to have been undermined with some subsidence noted as having occurred within this area.		
	Eskom has confirmed that there are no underground storage tanks, but fuel storage areas are present in mobile tanks and at the fuel depot and there is a fuel transfer station located south of the coal stockyard.		
	Potential contaminant areas have been identified at the coal stockyard, bulk chemical store (located in the vicinity of the Water treatment plan), Lake Stoffel, Lake Finn. Hazardous		

	Waste Temporary storage (possibly in the vicinity of BESS C), Ashing Area and the historical asbestos disposal area (VPS, 2021). VPS note that limited soil testing (pH, electrical conductivity, calcium, magnesium, sodium, potassium, chloride, nitrate, aluminium, manganese and iron) was carried out to assess the impact of dust suppression near Ashing area, the coal stockyard and water treatment facilities in October 2020. Manganese was found to be elevated in the samples near the Ashing and coal stock yard area.
Contaminants of Potential Concern (CoPC)	Eskom identified the CoPC to include arsenic, cadmium, chromium, iron, lead, mercury, nickel, selenium, manganese, and zinc from the ash and coal storage areas; polychlorinated biphenyls (PCB), polycyclic aromatic hydrocarbon (PAH), benzene, toluene, ethylbenzene, and xylene (BTEX), and other petroleum hydrocarbons from oil storage and mechanical and electrical equipment; and copper, iron, nickel, chromium and zinc from metal cleaning and cooling tower blowdown wastewaters.

#### Table 2 – Proposed Development Areas

Area	Approximate Centre Point Coordinates	Size (ha)	Locality and Current Use
PV Site A	26° 6' 22.61" S 29° 27' 41.63" E	160.6	Southwest corner of the site with the R542 to the south, Komati town to the north, the Goedehoop Colliery (an underground coal mine) to the northwest, and the Eskom Komati Ashing Area to the east. Much of the area was historically a farm, (maize/corn rotated with bean crops). The historical ash and rehabilitated domestic waste footprints are in the eastern portion of the area.
PV Site B	26° 5' 45.17" S 29° 27' 15.52" E	60.9	Northwest corner of the site with Goedehoop Colliery to the west and north, and Komati town to the east. The Blinkpan police station is located on the south-western boundary. This area is not in use but undermining and a rehabilitated ash dump are noted to have been present in the northwest of this area. A landing strip / road crosses the area upslope of the rehabilitated dump.
BESS A	26° 5' 27.74" S 29° 28' 8.22" E	2.6	Southwest portion of the KPS. Area is currently in use with several buildings and contractor's yards (D.B Thermal, Alstom Howden, Siemens, Clyde Bergeman, Roshcon EL and Roshcon Storage) as well as offices, parking areas and a boiler within the proposed development footprint. According to the site layout plan (Eskom) the distribution station is located to the east, with the KPS cooling towers and various buildings and parking areas to the north.
BESS B	26° 5' 33.34" S 29° 28' 2.59" E	3.2	The site is bounded by the Komati spruit (and wetland area) to the west and KPS (BESS A) to the northeast. Most of the area is not in use except for a church located in the south-eastern corner. There is no evidence of a graveyard, but this should be confirmed with Eskom. The church is located within a bunker which was historically an old shooting range.
BESS C	26° 5' 30.92" S 29° 28' 35.13" E	2	Site is bounded to the west by the KPS cooling towers and the drainage line of the Gelukspruit (and wetland) to the northeast. The Ashing Area is located to the south. Much of the area is currently not in use but there is a scrap yard in the southern portion. Eskom noted in discussion that an unknown fenced off area was leased to an unknown subcontractor. Based on the map provided by VPS, 2021 this may have been the temporary hazardous waste storage area.
BESS D	26° 5' 14.90" S 29° 28' 17.13" E	5.6	Site is the coal stockyard currently in use by KPS.

## 2.2 ENVIRONMENTAL

#### 2.2.1 TOPOGRAPHY

Topographic information was sourced from the 1:50 000 topographic map series, (Eskom, 2021 and Eskom, 2019) and is presented in **Appendix A: Figure 3**. The topography is undulating with the highest point near the junction of the R35 and R542 provincial roads (south-eastern corner) at approximately 1,655 metres above mean sea level (mamsl). The topography slopes in a northerly direction to 1,600 mamsl on the northern boundary (PV Site B and KPS).

#### 2.2.2 HYDROLOGY

KPS is in the upper Olifants River quaternary sub-catchment, B11B. The Koringspruit flows some 700 m to the north. The Koringspruit also passes the Koornfontein and Goedehoop Coal mines (downstream of the KPS), eventually flowing into the Koornfontein River and ultimately joining the Olifants River some 15 km downstream. The Komati spruit is a small drainage line in the centre of the site and drains the area western portion of the Ashing Area to the Koringspruit River via dams located within the municipal sewage plant located external to the site boundary.

The Gelukspruit (a tributary of the Koringspruit River) flows in a north-westerly direction to the east of the KPS. According to Eskom, 2019; this stream was diverted to prevent ingress into power plant areas and remains so due to the location of the current KPS activities. Dirty water from the Ashing Area, KPS and coal stockyard area drain to the Stoffel Dam, (VPS, 2021). Finn Dam is located downstream on the north-eastern corner of the KPS and receives water from the coal stockyard (**Appendix A: Figure 2**).

#### SENSITIVE AQUATIC RECEPTORS

The study area is highly developed and water resources and dams have been altered by the mining and existing activities at the KPS. There are no wetland sites of national importance in the immediate area, but four wetlands were identified during the aquatic ecology study carried out by WSP<sup>1</sup> in June 2022 for the ESIA. These include:

- A channel valley bottom associated with the Gelukspruit located to the east of the KPS.
- Seep 1 is located on the southern boundary. The small dam (termed the Clean Water Dam) is located downstream of the seep and impounds and pools the water in the wetland.
- Seep 2 is associated with the Komati spruit. It originates downstream of the Clean Water Dam and receives water from the Ashing Area. Seep 2 is bordered by the Komati village to the west.
- A shallow depression wetland is located within a crop field south and external to PV Site A. The wetland is approximately 3 ha in extent and is cut off from PV Site A by the tarred R542 road.

These wetlands were considered "Largely Modified" in terms of their Present Ecological State and are of low/marginal ecological importance. The channelled valley bottom wetland was however assessed as being moderate in terms of its Ecological Importance and Sensitivity as well as in terms of ecosystem services on account of biodiversity maintenance. No areas of potentially Critical Habitat, as defined by International Finance Corporation and World Bank standards, have been identified within the study area. The location of the wetlands is provided on **Appendix A: Figure 2**.

<sup>&</sup>lt;sup>1</sup> Golder Associates Africa (Pty) Ltd, a member of WSP (Pty) Limited, June 2022, Draft Aquatic ecology study for the Eskom Komati Power Station, Report No 22521869-352949-22, June 2022

#### 2.2.3 GEOLOGY

#### REGIONAL

Eskom KPS is located within the Highveld (Witbank) Coalfield. The regional geology is described (Eskom, 2021, Kimopax, 2019) as falling within the Carboniferous to early Jurassic aged Karoo Basin. The Karoo Supergroup comprises, from oldest to youngest, the Dwyka, Ecca and Beaufort Groups, with the coal seams generally hosted within the Vryheid Formation of the Middle Ecca Group. The Vryheid Formation includes interbedded sandstone, siltstone, shales and coal seams. The coal seams are mined by the adjacent Goedehoop Colliery. Five coal seams are present within the Vryheid Formation and are numbered (from base up) as the Number 1, 2, 3, 4 and 5 Seams. The zone of undermining (Bohlweki Environmental, 2005) indicated as underlying the PV Site B is noted to associated with the No. 4 and No. 2 coal seams. The No. 2 Seam ranges between 1.5 and 4.0 m in thickness where it is laterally continuous whilst the No. 4 Seam averages 4.0 m, varying from 1.0 - 12 m in thickness at Goedehoop mine (SRK 566657, 2021). The depth below ground level should be confirmed but based on the general stratigraphy is likely to be more than 50 m below surface (SRK 566657, 2021).

The Vryheid Formation overlies the Dwyka formation. A summary of the Lithostratigraphy is provided in **Table 3**. The regional geological map is presented in **Appendix A: Figure 4**.

Age	Supergroup	Subsuite	Lithology
Quaternary		Q	Surficial alluvial deposits to the north associated with the
			Koringspruit River
Jurassic		Jd	Fine-grained dolerite
Permian	Karoo	Pv (Vryheid)	Sandstone, shale and coal beds
Carboniferous		C-pd (Dwyka)	Diamictite and shale

#### Table 3 – Lithostratigraphy

#### LOCAL

The local geology comprises weathering products of the sandstones, siltstones and mudstones of the Vryheid Formation, with isolated dolerite outcrops. The top layer consists of reddish-brown sandy soil, with clayey-sandy subsoil comprising yellowish to brown clays residual of the underlying sandstone formations. Weathering is not, based on the available borehole logs, expected to extend deeper than approximately 10 m. Surficial ash and coal may be present within PV Site A associated with the historical ash dump footprint and in BESS D in the coal stockyard area. A linear structure is indicated on the regional geological map to be orientated northeast to southwest through PV Site B.

#### 2.2.4 HYDROGEOLOGY

#### **AQUIFER DESCRIPTION**

A monitoring program has been established for the KPS with the available boreholes presented on **Appendix A: Figure 2**. The boreholes are distinguished as shallow or deep but there is limited lithological information provided. Groundwater monitoring in the areas proposed for the BESS and PV Sites are limited with monitoring boreholes located in PV Site A (west of Ashing Area) and in BESS D (coal stockyard). There are no pre-existing monitoring boreholes located in or around PV Site B, BESS B, BESS C and BESS A. Whilst borehole logs and depth are not provided for all the boreholes, the available information implies that there are two distinct aquifers present in the Komati area, namely:

— Seasonal shallow, discontinuous perched aquifer within the overlying weathered rock matrix. This zone is conceptualised (Kimopax, 2019) as an upper zone of completely weathered material to a depth of 8 to 10 m with a higher hydraulic conductivity (k of around 1 m/d). Monitoring boreholes which intercept this zone are typically less than 10 m deep. Boreholes drilled as part of this investigation (Section 3) target this aquifer.

Regional weathered and/or fractured rock aquifer within the Vryheid Formation. These aquifers are commonly confined along essentially horizontal bedding interfaces between different lithologies. This aquifer occurs below the unsaturated zone (> 10 mbgl) in slightly weathered or fractured bedrock with monitoring boreholes typically being > 30 m deep. GHT Consulting, 2009 indicate that the aquifer hydraulic conductivity for the regional aquifer ranges from 0.007 m/d at AB07 to 2.4 m/d for AB04 with an average of 0.51 m/d. This aquifer is likely to be highly heterogeneous.

Recharge is estimated as 3 % of annual rainfall (20.6 mm/a based on 687 mm/a) in undisturbed areas, (Eskom, 2021).

#### WATER LEVELS AND FLOW DIRECTIONS

Water levels typically vary from around 1.4 to 12 mbgl with shallow groundwater at surface in AK62 between the Raw Water dams and Ashing Area. Eskom, 2021 indicates that the groundwater flow mimics the topography, and the direction of flow is towards the surface stream, particularly the Koringspruit. A comprehensive numerical groundwater model has been compiled for the KPS area as detailed by Kimopax, 2019 and also indicates that contamination is anticipated to migrate from the pollution sources towards the Koringspruit to the north.

#### **AQUIFER CLASSIFICATION**

The regional aquifer is classified as Minor (Parsons<sup>2</sup>, 1995 and DWAF<sup>3</sup>, 1998) or Poor (DEA<sup>4</sup>, 2010) due to the low exploitation potential (0.1 and 0.5 l/s). It does, however, represent an important source of water for domestic supply to the local communities. The aquifer is vulnerable to groundwater contamination due to the shallow water table. This is evident by the contaminant plume (sulphate) identified as underlying the Ashing Area and coal stockyard. The impact is mitigated by the low conductivity and low recharge. Due to the surrounding use of groundwater by communities, the aquifer is considered to require a medium level of protection<sup>5</sup>.

#### **GROUNDWATER QUALITY**

Water quality data is captured in the Eskom Komati Wish database. Groundwater quality parameters that need to be analysed are specified in the WUL (Appendix IV, Table 6, Clause 3.6) as pH, electrical conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (SS), Total Alkalinity, chloride (as Cl), sodium (as Na), sulphate, nitrate, ammonia, orthophosphate, fluoride, potassium, manganese, copper, iron, zinc, arsenic and chromium. The 95<sup>th</sup> percentile was estimated from the data provided for the upgradient (ambient) boreholes, selected boreholes within the KPS and boreholes located on or near the northern site boundary and is included in **Appendix B** (Table B3) for reference. In summary:

- Ambient groundwater quality (as represented by AB58 and AB59) is generally alkaline with an average pH of 8.3. Electrical conductivity (EC) (average 17 and 32 mS/m for AB58 and AB59 respectively) is below the groundwater reserve of 112 mS/m.
- Water quality is affected by KPS activities particularly from the Ashing Area and coal stockyard (BESS D). This is indicated by an increase in salinity associated with elevated chloride, sulphate, calcium, magnesium, sodium and fluoride in the coal stockyard area. Metal concentrations for iron and manganese are elevated compared to the ambient groundwater quality (<0.1 mg/l for iron and <0.5 mg/l for manganese) at AB07 (downgrade of the Ashing Area) and in CB09 (coal stockyard).</p>
- Boreholes located on and near the northern boundary (CB52, AB47 and CB51) comprise sulphate, fluoride and manganese concentrations which are elevated compared to the ambient water quality and South African drinking water standards.

<sup>&</sup>lt;sup>2</sup> Parsons, R, 1995, A South African Aquifer System Management Classification, WRC Report No. KV77/95

<sup>&</sup>lt;sup>3</sup> Department of Water Affairs and Forestry, Second Edition, 1998. Waste Management Series, Minimum Requirements for Water Monitoring as Waste Management Facilities

<sup>&</sup>lt;sup>4</sup> Department of Environmental Affairs, May 2010, Framework for the Management of Contaminated Land

<sup>&</sup>lt;sup>5</sup> Golder Associates Africa (Pty) Ltd, a member of WSP (Pty) Limited, June 2022, Draft Hydrogeological Investigation for the Eskom Komati Power Station, Report No 22521869-353050-43, June 202

#### PROXIMITY TO DRINKING WATER SUPPLIES

Water is supplied via pipeline by the Komati Government Water Scheme which originates from the Nooitgedacht Dam (c132 km from KPS), (Lidwala, 2015). The water is treated by Eskom at the Water Plant and Eskom subsequently supplies water to the municipality; however, the layout of the distribution network and its potential proximity to the areas of proposed developments has not been provided to WSP.

Groundwater is abstracted from the adjacent Goedehoop Colliery where groundwater is also utilised for supply (SRK 566657, 2021). The locality of the points of abstraction are not indicated in the available information.

A hydrocensus (**Appendix A: Figure 2**) was carried out in 2008 (GHT Consulting, 2009) with selected points (thirteen) resampled in 2019 (Eskom, 2019). These covered an approximate 15 km radius around KPS. The results of the hydrocensus imply that the surrounding farms to the east, southeast and southwest of KPS obtain water from boreholes for domestic use and for irrigation of crops. The closest boreholes are located within 500 m of the Eskom boundary on the farms Goedehoop, Geluk and Broodsnyders with details included in **Table 4**. Boreholes identified on the National Groundwater Archive were confirmed to be beyond 1 km of the farm boundary.

ID	Longitude (°E)	Latitude (°S)	Depth (m bgl)	Use	Water Level (mbcl)	Condition
BB20	29.48213	26.08393	26.1	Domestic Drink	14.10	Good
BB21	29.47954	26.10598	26.8	~	2.20 (2008); 1.76 (2019)	Windmill (2019)
BB22	29.47907	26.10586	~	Domestic Drink	~	Good
BB23	29.47905	26.10632	11.0	Domestic Drink	4.50	Broken (2008) indicated to be in use 2019
BB24	29.47125	26.11574	~	Domestic Drink	15.00	Good
BB25	29.47127	26.11574	26.5	Domestic Drink. Livestock	20.50	Good
BB26	29.47783	26.11699	6.1	~	Dry	Dry hole
BB27	29.47912	26.11710	42.0	Domestic Drink. Livestock	32.00	Good
BB43	29.42195	26.12209	15.0	Domestic Drink	8.00	Good
<b>BB44</b>	29.42193	26.12198	55.0	Domestic Drink. Livestock	5.00	Good
BB45	29.41625	26.11591	~	~	~	Not in use for a long time
BB46	29.42719	26.11853	~	~	~	Not in use for a long time

#### Table 4 – Hydrocensus Boreholes

Water quality analyses was carried out on the hydrocensus boreholes. According to Eskom (2019), concentrations were generally below the South African drinking water standards and therefore deemed suitable for drinking (based on the parameters analysed). No groundwater abstraction is known to take place within the study area.

## **3 CONCEPTUAL SITE MODEL**

A Conceptual Site Model (CSM) has been developed based on the information contained within the preceding sections. The aim of the CSM is to define the source–pathway–receptor linkages which may be applicable under the assumption of an ongoing industrial land-use for the proposed development areas and recognising the existing surroundings and which, based on identification of linkages, could give rise to potential human and/or environmental risks.

The CSM has been developed sequentially on the basis that in the event that no plausible linkages exist then no significant risk is considered to be present. Therefore, the CSM specifically focusses on the linkages between the three aspects (i.e. exposure pathway) based on the specified scenarios and if any of these are not identified

then the risks are considered negligible. It should be acknowledged that the CSM would be expected to evolve as more information becomes available and it must be recognised that if the source–pathway–receptor linkages are altered, the CSM must be reviewed to ensure that the assumptions remain valid.

## 3.1 POSSIBLE SOURCES

While the KPS and the associated Ashing Area along with the neighbouring colliery represent more widespread sources from long term operations, including secondary sources related to existing groundwater impacts, the potential pertinent primary sources specific to the targeted development areas are summarised as follows:

#### **PV SITE A**

- Rehabilitated Domestic Waste Site
- Historical Rehabilitated Ash Dump
- Unconfirmed use of fertilisers and/or pesticides for crop production

#### **PV SITE B**

- Rehabilitated Ash Dump
- Ash and slurry used to backfill undermined areas

#### **BESS A**

- Leakages from mechanical and electrical equipment, chemicals and fabrication activities
- Spillages of chemicals from storage areas and the contractor's yard
- Washing and maintenance of equipment including potential solvents and paints

#### **BESS B**

- Historical shooting range
- Unconfirmed graves associated with church

#### **BESS C**

- Scrap yard
- Possibly hazardous materials within fenced temporary storage area

#### **BESS D**

Coal stockyard

### 3.2 KEY RECEPTORS

The following plausible receptors have been identified assuming the use of the site and surrounds remain consistent with the current land use:

#### HUMAN HEALTH

- Site workers industrial use (current and future)
- Residents in neighbouring communities (i.e. Komati Town)
- Groundwater Users: while there are no confirmed abstractions within the study area, groundwater use is known within 500 m of the Eskom boundary

#### **ENVIRONMENTAL**

- Groundwater: The aquifer beneath the site (> 35m) is classified as Minor/Poor with the overlying shallow weathered zone (<10m) being perched and discontinuous. The overlying shallow aquifer is not considered a viable groundwater resource but may contribute to seepage in the wetland areas as well as vertical migration into the regional deeper weathered/fractured rock aquifer. It is again noted that the underlying groundwater is known to have been impacted by mining and activities at KPS</p>
- Surface water: The closest surface water features are the wetlands associated with the Komatispruit and Gelukspruit drainage lines which originate within or immediately downstream of the Ashing Area. These flow towards the Koringspruit to the north of KPS

#### PROPERTY

- Subsurface water supply pipelines and other infrastructure
- Neighbouring third-party land
- Buried concrete/metal

### 3.3 POTENTIAL PATHWAYS

Taking account of the possible sources, and notwithstanding the potential for ongoing or future direct release/s of contaminants, the hypothetical pathways by which these may affect the identified receptors, thereby potentially completing the exposure pathway/s are discussed within the following subsections.

#### 3.3.1 DIRECT EXPOSURE - DERMAL CONTACT AND INGESTION OF SOILS

Dermal contact and/or ingestion of contaminated soils are possible pathways, especially during the proposed development or other maintenance works, and particularly in areas not covered by hardstanding.

#### 3.3.2 VERTICAL MIGRATION OF CONTAMINATION

Vertical migration of contamination may occur from source zones into the underlying groundwater by leaching and dissolution, or under the influence of gravity (i.e. liquid chemical products and oils). This will be exacerbated in areas where impervious cover is absent or of compromised integrity due to higher effective infiltration, where contaminant loading/s are more substantial, or where other conditions exist that may promote contaminant-specific mobility (i.e. introduction of acids).

While contributory impacts related to activities in the discrete development areas cannot be discounted, the known existing plume originating from the Ashing Area likely represents the principal source of groundwater contamination associated with activities at the KPS.

#### 3.3.3 LATERAL MIGRATION WITHIN GROUNDWATER

The lateral migration of contamination will be highly affected by the geological structure, the hydraulic gradient of the underlying groundwater, the permeability of the aquifer unit/s, the efficacy of any attenuation, the effects of recharge and the influence of seasonal fluctuations, as well as by local abstractions. Groundwater is expected to flow generally towards the north towards the Koringspruit, and the plume associated with the impacts from the Ashing Area has been shown to already extend beyond the boundaries of Eskom's premises and, therefore, lateral migration is confirmed.

#### 3.3.4 DIRECT EXPOSURE – DERMAL CONTACT AND INGESTION OF GROUNDWATER

The likelihood of direct contact to site personnel and users is likely negligible under normal operating circumstances in the absence of abstractions within Eskom's boundaries. There is, however, evidence of

groundwater uses within the vicinity of KPS, including for potable use and thus this pathway represents a potential cause for concern.

#### 3.3.5 LATERAL MIGRATION OF CONTAMINATION VIA STORMWATER

Surface water runoff from exposed and impacted soils, unconfined waste deposits, and/or impacted hardstanding may result in contaminant impacts to both man-made and natural stormwater channels and subsequent accumulation and/or migration therein. While appraisal of stormwater management is beyond the scope of the current document it should be recognised that any impacts may migrate from the site and may also contribute to subsurface impacts.

#### 3.3.6 LATERAL MIGRATION VIA SUBSURFACE INFRASTRUCTURE CONDUITS

It is plausible that subsurface utility trenches (i.e. sewers, effluent pipelines, water distribution network) may represent preferential flow-paths for the accumulation and migration of any contaminant impacts.

#### 3.3.7 INHALATION OF VAPOURS

Whilst unlikely to affect users of external areas, vapour intrusion into on-site buildings from either soils or shallow groundwater may represent a significant source of risk to human health.

#### 3.3.8 GENERATION OF GROUND GAS

In addition to, but distinct from, the inhalation of vapours is the potential generation of ground gases within impacted unsaturated and saturated zones. The characteristics, mass and degradation of potential contamination may lead to the generation of methane, oxides of carbon, ethane, ethene and hydrogen sulphide, depending on the active processes. If migration of such gases into internal structure occurs, these may lead to asphyxiation (via oxygen displacement) or potential explosion.

#### 3.3.9 INHALATION OF AIRBORNE DUST AND FIBRES

Agitation and disturbance of soils, especially during substantial earthworks and/or construction activities, may contribute to airborne particulate loads, including potential asbestos fibres, that could become inhaled either by site occupiers or by users of neighbouring areas, including residents of Komati. While specifically excluded from the current scope given its footprint outside of the development areas, the presence of the historical asbestos waste site should be acknowledged.

#### 3.3.10 DIRECT CONTACT WITH PROPERTY

Contamination has the potential to permeate water supply pipes used for human consumption or other processes and/or result in aggressive ground conditions which may compromise the structural integrity of buried concrete, as well as metal that may be in direct contact.

## 4 CURRENT INVESTIGATION

## 4.1 FIELDWORK

#### 4.1.1 SITE RECONNAISSANCE

As well as to confirm health and safety arrangements, an initial site visit was conducted on 05 May 2022 to oversee and discuss the placement of intrusive positions within the relevant areas of concern.

#### 4.1.2 SITING AND SERVICE CLEARANCE

Twenty-five soil sample localities and ten shallow borehole locations were identified following the initial site reconnaissance. As well as to define baseline conditions, these primarily focused on areas where substantial contamination may have been brought about by historic and/or current site activities across the proposed solar PV and BESS development portions; however, at the request of Eskom, also included exploratory positions proximal the fuel depot and down-gradient of the Ashing Area. Where possible, positions were sited down-gradient of the activities/operations identified where any soil impact could be expected to be within the shallow soil profile. It should be noted that AH09 & AH10 were however situated to the east of BESS A due to access constraints and, therefore, may not be representative of potential impacts within the footprint of this proposed development area.

Subsurface clearance was undertaken by Hydrometrix Technologies (Pty) Ltd on 08 June 2022 under the supervision of WSP at each of the targeted intrusive locations. A Cable Avoidance Tool (CAT) was used to determine the presence/absence of underground power cables and metal utilities; thereafter, Ground Penetrating Radar (GPR) was adopted to confirm the absence (or otherwise) of other potential services. The clearance report is presented in **Appendix C**.

#### 4.1.3 AUGERING AND SAMPLING

Twenty-five auger holes (AH01–AH25) were manually advanced to depths ranging from 0.3–1.7 mbgl; geotechnical refusal was encountered in the majority of the holes. The positions of the auger holes, digitised using a handheld Global Positioning System (GPS), are illustrated on **Appendix A: Figure 5**.

Headspace testing was undertaken to determine the potential presence of volatile contaminants within the profiles. Soil samples were obtained at approximate 0.5 m intervals (where possible) and placed in a receptacle such that headspace remained. After a period of exposure to ambient atmospheric conditions the concentration of volatile vapours within the closed headspace was measured using a Photo-Ionisation Detector (PID) calibrated using 100 ppm isobutylene. The recorded concentrations including the depth, descriptions of strata encountered and other pertinent comments on the conditions observed during the intrusive works are presented on the exploratory hole logs in **Appendix D**.

#### 4.1.4 BOREHOLE ADVANCEMENT AND WELL INSTALLATION

At the request of Eskom ten permanent monitoring wells (BH01–BH10) were advanced by Soil and Groundwater Remediation Services (SGRS) under supervision of WSP at targeted safely-accessible locations to depths of up to 10m bgl. These were generally positioned in areas where coverage from the existing monitoring network was limited.

Boreholes were initially manually advanced to depths of up to 2 mbgl prior to completion by percussive techniques. Similar to the auger holes, headspace testing was completed at approximate 0.5 m intervals during manual advancement and, thereafter, at roughly 1 m intervals upon commencement of mechanical drilling; although, the inevitable loss of volatile due to the drilling methodology is recognised. The recorded vapour concentrations along with the depth and descriptions of strata encountered as well as other pertinent comments

on conditions observed during the borehole advancement are again presented on the exploratory hole logs in **Appendix D**, alongside the construction details of each of the subsequently installed monitoring wells.

The positions of the wells, determined via specialist surveyor subsequent to their installation, are illustrated on **Appendix A: Figure 5**.

#### 4.1.5 GROUNDWATER MONITORING AND SAMPLING

Due to the short timeframes associated with the project, a maximum period of one week (depending on drilling progression) was allowed following installation for the newly installed wells to stabilise.

Measurements of static groundwater levels and the base of each position was first carried out using a dual phase interface meter that allowed the simultaneous measurement of the thickness of any potential Non-Aqueous Phase Liquid (NAPL). Thereafter, prior to sampling, accessible wells were purged of a maximum of three well volumes (where possible) using dedicated single-use bailers. Samples were then collected in laboratory prepared containers which were stored in a temperature-controlled environment for delivery to an accredited laboratory for subsequent analysis. All samples were taken according to internationally accepted protocols, ensuring the potential for cross contamination was minimised. A blind duplicate sample (BH10-01) was obtained from BH03 for quality control purposes. The monitoring data is summarised in **Table 5**.

Locality	Well	Water level (m bgl)	Water level (mamsl)	Observation
Ashing Area (Up-gradient)	BH05	1.55	1,617.05	Light brown, no odour
PV Site A	BH07	1.52	1,629.28	Light brown, no odour
	BH08	1.25	1,649.55	Light brown, no odour
	BH06	1.3	1,624.1	Clear translucent, no odour
PV Site B	BH09	0.86	1,601.54	Clear translucent, no odour
	BH10	0.95	1,610.05	Clear translucent, no odour
	BH04	0.88	1,604.42	Clear translucent, no odour
BESS C	BH03	1.52	1,605.58	Light brown, no odour
BESS D	BH02	1.55	1,600.35	Brown, no odour
BESS D (Down-gradient)	BH01	1.97	1,596.73	Light brown, no odour

#### Table 5 – Groundwater Monitoring Data (06 June 2022)

## 4.2 LABORATORY ANALYSIS

The soil and groundwater samples were submitted to Element Materials Technology (Element), a SANAS accredited laboratory (Facility No T0729) for analyses broadly consistent with the priority contaminants listed in the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN R.331 of 2014); however, supplemented with other selected determinants at the request of Eskom, as follows:

#### SOILS

- Metals/metalloids: antimony, arsenic, cadmium, chromium (total and hexavalent), cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, vanadium and zinc
- Inorganics: ammoniacal nitrogen, chloride, cyanide, fluoride, nitrate, nitrite and sulphate
- Aliphatic petroleum hydrocarbons (C<sub>7</sub>-C<sub>9</sub>, C<sub>10</sub>-C<sub>14</sub> and C<sub>15</sub>-C<sub>36</sub>)
- Volatile Organic Compounds (VOC) including benzene, toluene, ethylbenzene and xylenes (BTEX)
- Semi-Volatile Organic Compounds (SVOC) including Polycyclic Aromatic Hydrocarbons (PAH)
- Polychlorinated Biphenyls (PCB)
- Physiochemical: pH and electrical conductivity

**NB:** asbestos has been specifically excluded from the current assessment given the outcomes of VPC, 2021 as summarised in Table 1 in relation to the historical asbestos disposal site.

#### GROUNDWATER

- Metals/metalloids: antimony, arsenic, cadmium, calcium, chromium (total and hexavalent), cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silicon, sodium, vanadium and zinc
- Inorganics: ammoniacal nitrogen, chloride, fluoride, nitrate, ortho-phosphate and sulphate
- Aliphatic petroleum hydrocarbons (C<sub>7</sub>-C<sub>9</sub>, C<sub>10</sub>-C<sub>14</sub> and C<sub>15</sub>-C<sub>36</sub>)
- VOC including BTEX and Tentatively Identified Compounds (TIC)
- SVOC including PAH and TIC
- PCB
- Physiochemical: alkalinity (total), electrical conductivity, pH, Total Dissolved solids (TDS) and Total Organic Carbon (TOC)

Laboratory certificates of analysis are provided in Appendix E.

## 5 GROUND AND GROUNDWATER CONDITIONS

#### 5.1 SOILS

The deepest soil profile that could be achieved was at PV Site A within the area previously used for crops. The soil profile comprised darker brown clayey sand which become lighter brown with depth. No crops were evident at the time of the investigation.

The "natural" soil horizon (weathered bedrock) comprises a moist, orange, brown to red-brown sandy clay or clayey sand (residual Vryheid formation) with occasional mottled clayey sand with ferricrete nodules in most of the areas inferring a seasonally fluctuating water table.

Fill/made ground was encountered in several samples including:

- Coal was observed to 1.5 mbgl (BH02) in the coal stockyard; auger holes (AH01–AH03) refused at 1 mbgl and only coal samples could be obtained
- Ash was observed downgrade of the Ashing Area at AH14 and in BH05 and BH06. While ash was not
  identified in AH13, the soil was darker in colour than elsewhere on the site implying that this area is
  affected by runoff from the ash dams. By contrast, there was no ash indicated in the rehabilitated ash dump
  footprint sample (AH15) within PV Site A.
- A shallow horizon of around 0.5m was noted for the exploratory holes (AH23, AH24, AH25, BH9 and BH10) located in the area of the rehabilitated dump in the vicinity of PV Site B. A seepage zone was noted as perched on mottled sandy clay under this layer in the auger holes (AH23, AH24 and AH25). There was no evidence of ash in the vicinity of this rehabilitated dump, but the gravel horizon could be backfilled weathered material sourced from the surrounding area.
- A soil stockpile of unknown origin (possibly from road building or topsoil) was observed in PV Site A. Samples were obtained near the soils (AH16 and AH17).

### 5.2 GROUNDWATER

#### 5.2.1 DEPTH

Seepage was encountered in the boreholes with BH7 and BH8 (located in PV Site A), but the remaining boreholes were moist with no discrete groundwater strikes observed during drilling. Groundwater depths

following stabilisation were recorded in all the boreholes with depths varying from 0.86 to 1.97 mbgl which is broadly consistent with the existing dataset (Komati WISH database).

#### 5.2.2 FLOW DIRECTION AND HYDRAULIC GRADIENT

Comparing topographic and groundwater elevations an  $\mathbb{R}^2$  value of 0.99 is calculable (**Figure A**) resulting in a very strong correlation coefficient and consistent with previous works. The interpolated groundwater flow is illustrated on **Appendix A: Figure 6** and confirms an overall flow direction to the north.

Very broadly, an average hydraulic gradient is calculated with reference to groundwater elevations (**Table 5**) at BH08 in the south and BH01 in the north. This represents a difference of ~52.82 m over a lateral distance of approximately 2,866 m, equating to a hydraulic gradient of ~0.018. It should be stressed that hydrogeological conditions are unlikely to be homogenous especially recognising that the shallow aquifer is discontinuous and, therefore, local variability should be expected that may differ markedly from this calculated average.



Figure A – Correlation: Topography versus Groundwater Elevation

### 5.3 CONTAMINATION OBSERVATIONS

The results of headspace testing indicated that volatile vapours were below the PID's level of detection (<0.1 ppm) within all soil samples. Nonetheless, visual evidence of soil contamination was noted as follows:

- Coal was noted to a depth of 1.5 mbgl in the coal stockyard
- Ash was noted within the proximity of the Ashing Area
- Discolouration (staining) was observed on the brick paving at the fuel depot (AH05 and AH06)
- Denudation was seen in the vicinity of BESS Area A adjacent to the contractor's yard.

Groundwater samples varied from brown to clear with no obvious visual or olfactory evidence of contamination.

## 6 SOIL RESULTS

The South African Framework for the Management of Contaminated Land (Framework, May 2010) developed by the then Department of Environmental Affairs (DEA)<sup>6</sup> in line with Part 8 of the NEM: WA, outlines the methodology for the screening of potentially contaminated sites to provide a risk-based decision support protocol for their assessment. Further, the then DEA gazetted GN R.331 in May 2014, with these being promulgated under Section 7(2)(d) of the NEM: WA by the then Minister of Water and Environmental Affairs. GN R.331 provides Soil Screening Values (SSVs), a tiered system of priority soil contaminants, to facilitate the determination of sensitivity of the relevant receptor which may be subject to exposure. These are defined as follows:

- SSV1 represents the lowest value calculated for each parameter from both the human health and water resource protection pathways. SSV1 values are not land-use specific
- SSV2 represents the land-use specific soil concentration and are appropriate for screening level site
  assessment in cases where protection of water resources is not an applicable pathway for consideration

Separately, GN R.331 provides Soil Screening Levels (SSLs) for a number of anions; however, it is notable that these are not related to potential risks to human health via direct exposure. These are specifically investigation values that are relevant only to provide guidance on potentially excessive levels of salts, which can represent a major cause of deterioration of soil or water quality from an ecological perspective.

### 6.1 INITIAL SCREENING

Recognising the general approach prescribed by the Framework, the analytical results for the analysed contaminants of concern have first been compared to the SSV1s published in GN R.331. Where SSV1s are not available reference has been made to the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) for Residential Soil (May 2022) as a reasonable alternative while recognising the different paradigm behind their derivation. Whilst conservative under many potential exposure scenarios, such screening allows justified rationalisation of potential contaminants that may require further assessment and/or management, and discounts those potential exposure pathways that do not pose a significant risk.

Cadmium, hexavalent chromium, cyanide and PCBs as well as the majority of the VOCs and SVOCs were recorded below their respective laboratory detection limits and, therefore, are not seen as contaminants of concern for further consideration. Otherwise, the following is noted:

- Arsenic, lead, and manganese were above their respective SSV1s within shallow soils across most of the proposed development areas with the exception of BESS A and BESS B. Similar is noted for vanadium although this was also below its SSV1 at BESS D and the fuel depot, as well as down-gradient
- Excluding samples from BH02, BH06 and AH10 copper was ubiquitously above its SSV1
- Iron was above its USEPA RSL within various samples, and largely within ferruginised soils
- Sulphate was above its SSL within those samples retrieved from AH01 (coal stockyard) and AH15 (historical ash dump at PV Site A)
- Pyrene and benzo(a)pyrene were above their respective SSV1s within the sample collected from AH06 at the fuel depot

The pH of the samples collected ranged widely from 4.58–7.92. Although there are no SSVs published for the protection of human health under the NEM: WA, the South African National Standard (SANS) Globally Harmonised System of Classification and Labelling of Chemicals (GHS), SANS 10234:2019 recognises materials with a pH within a range of 2–11.5 as not being hazardous

<sup>&</sup>lt;sup>6</sup> In June 2019, the DEA was renamed the Department of Environment, Forestry and Fisheries (DEFF) and, in April 2021, was renamed the Department of Forestry, Fisheries and the Environment (DFFE)

## 6.2 FURTHER SCREENING

Where contaminants have been recorded in excess of their respective initial assessment criteria and following the stepwise methodology described in the Framework, further screening has been separately carried out to ascertain whether these could plausibly represent risks to either human health or aquatic systems based on site-specific considerations.

As indicated, the SSLs for anions (i.e. sulphate) are only relevant to provide guidance on potentially excessive levels of salts and, therefore, have not been carried forwards into the further screening exercise. Nonetheless, with the exception of localised instances of elevated sulphate within samples containing coal and ash these were consistently below their respective SSLs and so no concern is raised.

#### 6.2.1 RISK TO HUMAN HEALTH

Potential risks to human health are based on land-use specific considerations and refer to the applicable SSV2s for the following land uses:

- Informal residential
- Formal residential
- Commercial/industrial

Recognising that the town of Komati lies central to the overall proposed development areas, SSV2s relevant for formal residential use have been conservatively adopted to ascertain whether soil contamination may represent a potential health risk. The following is noted:

- With the exception of manganese AH20 (PV Site A), BH10 (PV Site B) and BH04 (BESS B) as well as vanadium at AH21 (PV Site A), metals were below their respective SSV2s. While these localised anomalies are noted, overall average concentrations of both manganese (~754 mg/kg) and vanadium (~124 mg/kg) were below their SSV2s for a formal residential setting. Therefore, in the wider context these are considered unlikely to represent a significant source of risk with respect to human health, especially when recognising that all were below their SSV2s relevant for the commercial/industrial land-use of the proposed development areas
- Benzo(a)pyrene was above both its formal residential and commercial/industrial SSV2s within AH06 at the fuel depot. This falls outside of the proposed development areas covered under this report; however, is indicative of potential risks to human health from ongoing operations and possibly symptomatic of more extensive impacts local to the fuel depot that will require consideration by Eskom during decommissioning

### 6.2.2 RISK TO AQUATIC SYSTEMS

With respect to soil-based contamination, potential risks to aquatic systems are defined based on the sensitivity of the surface water and groundwater resources. The Framework methodology recognises the adoption of SSV1 as generic criteria in the event that there is a current or potential future groundwater use on or within 1 km of a site, or there is a permanent surface watercourse on or adjacent the site. Recognising the proximal surface water courses, including wetlands, as well as the abstractions within 500 m of the premises boundary, these criteria are considered to be satisfied and therefore, with the exception of iron (USEPA RSL for human health only), the commentary in **Section 6.1** is relevant.

It must, however, be acknowledged that the published SSV1s do not distinguish between the protection of drinking water and freshwater aquatic ecosystems, nor do they differentiate from where direct human health risks may represent the critical exposure pathway. In this regard the following is noted in respect of the published SSV1s:

- Arsenic and lead are based on the protection of drinking water. While lead was noted in the shallow groundwater samples (Section 7), arsenic was consistently below its laboratory detection limit
- Manganese, vanadium and benzo(a)pyrene are based on the direct human health risk under an informal residential land-use (as noted by their SSV1s being equivalent to their corresponding SSV2s)
- Copper and pyrene are based on the protection of the freshwater aquatic environment

## 7 GROUNDWATER RESULTS

## 7.1 QUALITY CONTROL – DUPLICATE SAMPLE

To determine the accuracy of the field sampling methodology and the laboratory analysis, a blind field duplicate sample BH10-01 was collected from monitoring well BH03 and submitted for the full suite of analysis described. Data quality was evaluated based on the relative percentage difference (RPD) in the concentration of detected contaminants between the original and duplicate sample and assessed for a RPD target of 20%. Acknowledging that results from either the original or duplicate sample may be equally valid and that either one may be more, or less, representative of groundwater conditions, the following formula has been utilised to calculate the percentage difference:

Relative Percentage Difference (RPD) =  $\begin{pmatrix} (Original Concentration-Duplicate Concentration) \\ \hline (Original Concentration+Duplicate Concentration) \\ 2 \end{pmatrix}$ 

Excluding pH that is logarithmic, where determinants have been detected, the comparison of the original and duplicate sample results is presented in **Table 6** whereby if two values have an RDP greater than 20%, the values are highlighted.

		Concer	~RPD (%)	
Determinant	Units	BH03 (Original) BH10-01 (Duplicate)		
Electrical conductivity	mS/m	184.9	185	-0.05
Cobalt	μg/l	11.1	11	0.9
Iron	μg/l	164.4	163.7	0.4
Lead	μg/l	4.6	4.6	0
Manganese	μg/l	1,718.3	1,639.4	4.7
Nickel	μg/l	12.8	12.6	1.6
Vanadium	μg/l	1	1	0
Zinc	μg/l	37.9	37	2.4
Calcium	mg/l	141	141.5	-0.4
Magnesium	mg/l	125.4	116.5	7.4
Potassium	mg/l	6.2	6	3.28
Sodium	mg/l	136.4	137.1	-0.5
Silicon	µg/l	19,617	20,135	-2.6
Fluoride	mg/l	0.3	0.4	-28.6
Chloride	mg/l	73.9	69.9	5.6
Sulphate	mg/l	983.1	837.9	16
Orthophosphate	mg/l	0.055	0.042	26.8
Ammoniacal nitrogen	mg/l	0.75	0.36	70
Alkalinity	mg/l	260	256	1.6
Total Solids	mg/l	1,537	1,533	0.3

Table 6 –	Relative	Percentage	Differences BH03	(Original)	versus BH10-01	(Dunlicate)
	1 Coluci V C	1 of oontago		(Original)		(Dupliouto)

While both fluoride and orthophosphate show RPDs greater than 20% this is in relation to low concentrations whereby the percentage difference is magnified. In real terms the recorded concentrations are of similar magnitudes and on this basis, it is considered that the laboratory analytical data obtained can be relied upon with a satisfactory degree of confidence, especially when noting that all other RPDs are well within the 20% target.
### 7.2 DISCUSSION

As per **Section 5.2**, the groundwater flow direction is from south to north. On this basis background groundwater quality is likely best represented by two boreholes located up-gradient of the KPS boundary (AB58 and AB59). The background water quality has been defined by the 95<sup>th</sup> percentile concentrations of determinants as sourced from the existing Komati Wish database supplied by Eskom.

The groundwater reserve is provided in the WUL, 2014 (Appendix IV, Table 7, Clause 4.1) where it is noted that concentrations of 0 mg/l are presented for sodium and sulphate. It is expected that these will be naturally present in the regional aquifer as is evidenced for the ambient water quality at AB58 and AB59 where ranges of 17–22 mg/l and 8–21 mg/l are noted for sodium and sulphate, respectively. Although the reserve limits specified within the WUL have been adopted as the primary source of reference for those determinants included the zero values for sodium and sulphate are omitted from further consideration – Eskom should, however, liaise with the Department of Water and Sanitation (DWS) in this regard.

In terms of pH and although lower than background (8.8–9.1) the shallow groundwater is generally near neutral (6.62–7.54) and satisfies the lower pH limit (6.6) specified within the WUL. The other determinants provided for within the WUL are also seen as being broadly compliant; however, exceptions are noted as follows:

- A high salt content is recorded at BH03 (BESS C) where, together with elevated concentrations of sodium and sulphate, electrical conductivity, calcium, magnesium and chloride were above their respective reserve limits. This is expected due to the known groundwater plume extending from the up-gradient Ashing Area and concentrations decrease further down-gradient of the KPS (BH02, BESS D) to below the reserve limits. However, increases in the concentrations of a number of determinants are noted at the further downgradient position (BH01), with magnesium and chloride again above the reserve criteria, albeit at far lower concentrations than BH03.
- Electrical conductivity and magnesium are above their reserve limits at BH08. This is located up-gradient of KPS activities on the southern boundary of PV Site A but slightly down-gradient of the background borehole (AB58).
- Chloride was above its reserve limit at both BH05 (northeast of the Ashing Area and north of Raw Water Dams) and BH04 (BESS B).

The underlying shallow aquifer targeted as part of this investigation is considered a non-aquifer due to the low yield and discontinuous nature. Nonetheless, the possibility of vertical migration of contaminant impacts from this to the regional deeper weathered/fractured rock aquifer is recognised. While appraisal of the quality of water within the deeper aquifer is outside the scope of the current assessment, in recognition of groundwater use within 1 km together with the proximal freshwater aquatic surface water environs, analytical data has also been considered alongside the following:

- South African National Standard (SANS) for Drinking Water, SANS 241-1:2015 Edition 2, or Edition 1 (2011) for determinants omitted from the second version
- South African Water Quality Guidelines (SAWQG) Volume 1, Domestic Use, Second Edition, 1996
- SAWQG Volume 7, Aquatic Ecosystems, Second Edition, 1996

In this context the known plume associated with the Ashing Area expectedly dominates the signature of downgradient groundwater quality with manganese at a concentration  $(1,718.3 \ \mu g/l)$  above both the drinking water chronic health standard (400  $\mu g/l$ ) and freshwater aquatic guideline (180  $\mu g/l$ ). While this plume has been shown to extend off-site to the north, seemingly additional contributions from the KPS and particularly the coal stockyard (BESS D) are also observed with a doubling in the concentration of manganese recorded at BH01 (3,269.5  $\mu g/l$ ). The likely lateral dispersivity of this plume is also apparent at BH05 to the northeast and BH06 to the west where manganese concentrations of 809.5  $\mu g/l$  and 496.8  $\mu g/l$  were respectively recorded. Manganese was not otherwise recorded above either its freshwater aquatic guideline or chronic health standard for drinking water; although was noted to be above its aesthetic drinking water standard at BH04 (BESS B).

Compared to the background range  $(6.2-10 \mu g/l)$  concentrations of zinc appear elevated within the shallow groundwater across the entire property (16.2–59  $\mu g/l$ ). While far below the drinking water standard of 2 000  $\mu g/l$ , these are above both the Target Water Quality Range (TWQR) and Chronic Effect Value (CEV) of 2  $\mu g/l$  and 3.6  $\mu g/l$ , respectively for aquatic ecosystems, and also above the Acute Effect Value (AEV) of 36  $\mu g/l$  in four of ten boreholes (40%) sampled under the current scope. This includes positions both up- and down-gradient and therefore the source of zinc remains uncertain.

While absent in the background, lead has been detected within all shallow groundwater samples obtained. Notably, however, this is an approximate order of magnitude greater, and above the drinking water standard, within the west of the property (BH06, BH07 and BH08 [PV Site A] and BH09 [PV Site B]). While the combustion of fossil fuels (i.e. coal) is a recognised source of environmental lead, the reason for the noted distribution is uncertain and therefore remains unconfirmed; however, appears to correlate with typically higher concentrations of lead in soils in the west of the premises (**Section 6.2.2**).

Exceedances of the adopted standards/guidelines does not necessarily confirm the presence of an unacceptable risk but provides a conservative indication of where the shallow groundwater may represent a source of impact for the identified receptors. It is understood (VPC, 2021) that rehabilitation and management is planned for the plume associated with the Ashing Area and, as such, long term improvements in the quality of shallow groundwater would be expected once this process is implemented. While the sources of lead and zinc cannot be categorically confirmed these are almost certainly related to the activities at both KPS and the neighbouring colliery, and more detailed assessment/s would be recommended to ensure appropriate protection of any potential receptors. Otherwise, the demonstrated impacts to shallow groundwater are not considered to represent substantial constraints to the proposed development specific to the two PV and four BESS sites.

### 8 CONCLUSIONS

Based on the outcomes of the targeted investigatory works, a number of contaminants largely consisting of metals and nutrients/salts together with localised PAHs have been identified within both soils and/or shallow groundwater that are indicative of impacts related to activities at KPS, and particularly associated with the Ashing Area that lies outside of the proposed development areas that are the focus of this document.

However, when considering the approach to assessment as defined by the Framework for the Management of Contaminated Land and taking cognisance of the CSM, the magnitude of impact is largely not considered to represent a significant source of risk with respect to human health and/or aquatic systems when specifically considering the end-use of the areas of concern. There will, however, be a requirement to ensure appropriate management of excavations, and especially where these are required within areas proximal to residential dwellings of Komati. Further, although contributory impacts to groundwater contamination is evident at the Coal Stockyard (BESS D), this source will be removed during the decommissioning of this facility.

Outside of the two PV and four BESS sites covered by this document, a potentially significant contamination has been highlighted proximal the fuel depot to the north of KPS in relation to the concentration of benzo(a)pyrene in shallow soils and Eskom should ensure that appropriate assessment is undertaken to inform relevant corrective actions.

The NEM: WA provides the following definition of 'contaminated':

"the presence in or under any land, site, buildings or structures of a substance or micro-organism above the concentration that is normally present in or under that land, which substance or microorganism directly or indirectly affects or may affect the quality of soil or the environment adversely"

Therefore, and taking cognisance of Section 37(2) of the NEM: WA, it is WSP's opinion that the proposed development areas would likely be regarded as 'contaminated' based on definition, with certain determinants clearly being above a 'normal' level. However, recognising the outcomes of the risk assessment, in terms of Section 38(1)(c) of the NEM: WA it is also considered likely that the demonstrated contamination specific to these areas "does not present an immediate risk, but that measures are required to address the monitoring and management of that risk".

The preliminary nature of this report is again stressed. Additional and more comprehensive intrusive works will almost certainly be necessary to validate the findings herein as well as to prepare a Site Assessment Report (SAR) for authority submission. This may need to be a consolidated submission to the DFFE covering the entirety of the Eskom premises and, as such, liaison with the authorities at the earliest opportunity is recommended. In this regard attention is also drawn to the implications of existing environmental authorisations (i.e. WUL and WML) within the areas of proposed development that will likely require separate management to the process applicable to Part 8 of the NEM: WA (i.e. provision for a Remediation Order).

















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		0	200	400	600	
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NOTE(S	5)	0 1:15,000	200	400 METE	600 RS	
NOTE(S	S)	0 1:15,000	200	400 METE	600 	
NOTE(S REFER COORE SERVIC	S) ENCE(S) JINATE SY E LAYER	0 1:15,000 'STEM: GCS W/ CREDITS:	200 0 GS 1984	400 METE	600 ERS	
NOTE(S REFER COORE SERVIC	8) ENCE(S) DINATE SY E LAYER	0 1:15,000 7STEM: GCS W0 CREDITS:	200 0 GS 1984	400 METE	600 	
NOTE(S REFER COORE SERVIC	S) DINATE SY E LAYER	0 1:15,000 YSTEM: GCS W CREDITS:	200 0 GS 1984	400 METE	600 	
REFER COORE SERVIC	ence(s) Dinate sy Die Layer DM	0 1:15,000 'STEM: GCS W CREDITS:	200 0 GS 1984	400 METE	600 ERS	
REFER COORE SERVIC	B) DINATE SY DE LAYER DM CT	0 1:15,000 VSTEM: GCS WO CREDITS:	200 0 GS 1984	400 	600 	
NOTE(S COORE SERVIC CLIENT ESKO	ence(s) Dinate sy de layer DM CT DM KO	0 1:15,000 STEM: GCS W CREDITS: MATI PV E	200 0 GS 1984	400 	600 RS	
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REFER COORE SERVIC CLIENT ESKC PROJE FIGU CONSU	ENCE(S) DINATE SY ELAYER DM CT DM KO IRE 5: ILTANT	0 T:15,000 TSTEM: GCS WO CREDITS: MATI PV E FIELD INV GOL CONTR	200 0 GS 1984 ESIA ESIA ESTIGATI	400 METE IONS IONS IPREPARED REVIEWED APPROVED REVIEWED APPROVED	600 RS 7/21/2022 MB MB SS SS V.	FIGURE

New boreholes

• Auger boreholes

Contours (5m)

• Site monitoring boreholes

D Municipality sewerage works

Proposed Infrastructure



LEGI	END
$\bigcirc$	Groundwater level (mamsl)
-	Groundwater flow direction
	Groundwater piezometric contour (mamsl)
	Komati Power Station 56 IS
	PV Sites
	BESS
	Dam
	Pan
	Rivers
	Rivers - Non perennial





REFERENCE(S) COORDINATE SYSTEM: WGS LO29 SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT ESKOM

ESKOM KOMATI PV ESIA

CONSULTANT

PROJECT

TITLE FIGURE 6: PIEZOMETRIC MAP

YYYY-MM-DD 7/13/2022 DESIGNED MB SOLDER PREPARED MB REVIEWED SS APPROVED SS FIGURE 0 PROJECT NO. 41103965 CONTROL REV. 0



### B BACKGROUND GROUNDWATER QUALITY

Determinant	Unit	ater Quality	
		AB58 95 <sup>th</sup> Percentile	AB59 95 <sup>th</sup> Percentile
		(October 2011-January 2022)	(October 2011-January 2022)
рН	units	9.1	8.8
EC	mS/m	44	29
Arsenic	µg/l	<10	<10
Total Chromium	µg/l	2	2
Hexavalent Chromium	mg/l	-	<2
Copper	µg/l	11	2
Total Iron	µg/l	10	124
Lead	μg/l	<4	<4
Manganese	μg/l	490	111
Mercury	μg/l	-	<4
Zinc	µg/l	10	6.2
Calcium	mg/l	25	12
Magnesium	mg/l	41	14
Potassium	mg/l	15	11
Sodium	mg/l	22	17
Silicon	μg/l	-	316.8
Fluoride	mg/l	0.4	0.3
Chloride	mg/l	11	10
Sulphate	mg/l	21	8
Nitrate as N	mg/l	1.1	1.4
Ortho Phosphate as P	mg/l	0.02	0.02
Ammoniacal Nitrogen as N	mg/l	1.57	1.09
Total Alkalinity as CaCO <sub>3</sub>	mg/l	253	122
TDS	mg/l	-	148



# C SERVICE CLEARANCE REPORT



Unit 20 30 Surprise Road Maxmead, 3610 South Africa Tel: +27 21 556 6680 Cell: +27 61 190 0644 Email: info@hydrometrix.co.za

10 June 2022

### UTILITIES SURVEY REPORT

### ESKOM – KOMATI POWER STATION

### **INTRODUCTION**

Hydrometrix Technologies was appointed by WSP Group PTY Ltd to clear borehole and auger positions as well as survey borehole positions at the Eskom Komati power station in Mpumalanga. The purpose of the survey was to identify buried utilities and depths around proposed drill positions.

Site work was completed on 08 June 2022. The survey area as per image 1 below.



**ESKOM KOMATI POWER STATION** 

### SERVICES DETECTION METHODLOGY

Detection of various underground services within the target area is conducted in the following manner:

- Electrical and Telkom cables, steel pipes and other conductive utilities: A combination of an electromagnetic transmitter and receiver is used, inducing a signal onto the utility by means of:
  - Direct Connection at valves, lamp post etc.;
  - Clamping inside Telkom chambers, electrical substations etc. if accessible;
  - $\circ$   $\;$  Induction scan where no contact points on services are available.
- **Storm Water and Sewer lines:** These types of services are located by gaining access at points such as manholes, kerb inlets etc. A self-containing sonde is propelled down the pipe using a fibre flex rod. The sonde transmits a signal, which enables the operator to locate the exact position and depth of the sonde from above ground by using a receiver.
- Non-metallic pipes and other non-conductive services: Non-metallic utilities, such as AC water mains and fibre optic cables, are located by means of Ground Penetrating radar (GPR). By scanning the servitude with GPR, changes in ground conductivity are detected. The alignment of several positions of this nature usually indicates the existence of non-metallic services. GPR will only be used to locate services that could not be located by means of electromagnetic methods.

**Note:** Positive ground penetrating radar results are dependent on good soil conditions. If soil conditions are not favourable to good results, this will be noted by the contractor in the survey report.

Type of Utility	Colour Coding
Electrical Cables	RED
Water Pipes	BLUE
Telkom and Fibre Optic Cables	ORANGE
Storm Water Pipes	PURPLE
Sewer Pipes	GREEN
Product Lines	Yellow
Unknown Utilities	PINK

Utility line are drawn on the survey report with colour coding unique to each utility type:

### SURVEY RESULTS

### UTILITY LAYOUTS



Image 1: Auger Hole 01



Image 2: Auger Hole 02



Image 3: Auger Hole 03



Image 4: Auger Hole 04



Image 5: Auger Hole 05



Image 6: Auger Hole 06



Image 7: Auger Hole 07



Image 8: Auger Hole 08



Image 9: Auger Hole 11



Image 10: Auger Hole 12



Image 11: Auger Hole 14



Image 12: Auger Hole 15



Image 13: Auger Hole 16



Image 14: Auger Hole 17



Image 15: Auger Hole 18



Image 16: Auger Hole 19



Image 17: Auger Hole 20



Image 18: Auger Hole 21





Image 20: Auger Hole 24



Image 21: Borehole 01



Image 22: Borehole 02



Image 23: Borehole 03



Image 24: Borehole 04



Image 25: Borehole 05



Image 26: Borehole 06



Image 27: Borehole 07



Image 28: Borehole 08



Image 29: Borehole 09



Image 30: Borehole 10



## D EXPLORATORY HOLE LOGS



### KEY TO SYMBOLS ON EXPLORATORY HOLE RECORDS

### SAMPLES, FIELD TESTS, MEASUREMENTS & RESULTS

TYPE	DESCRIPTION
В	Bulk sample (disturbed)
BLK	Block sample
CORE	Core sample
CBR	California Bearing Ratio mould sample
D	Small tub sample (disturbed)
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
SPT	Standard Penetration Test
(C)	Standard Penetration Test - solid 60° cone
(S)	Standard Penetration Test - Split Spoon
N='x'	'x' blows required to drive 0.3m after seating
N='x'/'y'	'x' blows for 'y' metres within the SPT
U ' <i>x</i> '	Undisturbed sample of specified diameter 'x'
ʻx' blows	'x' blows required to drive 'U' tube 0.45m
HSV	Hand Shear Vane test in kN/m <sup>2</sup>
P( <i>F</i> ),( <i>P</i> )	Piston sample, <i>F</i> - not recovered, <i>P</i> - partially recovered
P.Pen	Hand Pocket Penetrometer test in kN/m <sup>2</sup>
PID	Photo-Ionisation Detector test in ppm
NVT	No Valid Test

### CORE RECOVERY & ROCK QUALITY

IDENTIFIER	DESCRIPTION
TCR	Total Core Recovery (%)
SCR	Solid Core Recovery (%)
RQD	Rock Quality Designation (%)
UCS	Unconfined Compressive Strengths (kN/m <sup>2</sup> )
FI	Fracture Index (discontinuities per metre): NI - non intact, NR - no recovery, NA - non applicable.

### **GROUNDWATER OBSERVATIONS**

SYMBOL	DESCRIPTION
Ţ	Groundwater strike
$\bar{\bar{\mathbf{r}}}$	Groundwater level after defined standing period

### SOIL AND ROCK SYMBOLS

(COMBINED AS NECESSARY)

PATTERN	DESCRIPTION
	Ash
	Boulders and Cobbles
	Breccia
	Chalk
	Clay
	Coal
	Concrete / Brick
000	Conglomerate
0 ° 0 ° 0 ° 0	Gravel
$\sim \sim \sim \sim$	Calcrete / Gypsum







Metamorphic (massive)

Limestone

Made Ground

Metamorphic (schistose)

Igneous (coarse grained)

Igneous (medium grained)

Igneous (fine grained)

Metamorphic (banded)



14 34 3

Peat

Sand

Shale

Silt

Mudstone

Sandstone

x x x \* x x x x

\*\*\*\*

Tarmac

Topsoil

Siltstone

### INSTALLATION, INSTRUMENTATION & BACKFILL DETAILS (COMBINED AS NECESSARY)

### PATTERN DESCRIPTION



Plain pipe with concrete surround



Plain pipe with bentonite seal



Slotted pipe with inert surround and filter sock (where necessary)



Vibrating Wire Piezometer Cable with bentonite seal

Vibrating Wire Piezometer Tip with sand surround

Arisings

### NOTES AND GENERAL REMARKS FOR INTERPRETATION OF EXPLORATORY HOLE RECORDS

1 Soil and rock descriptions are primarily based on observable materials recovered only

2 Lithostratigraphic classifications (groups, formations etc.) are assigned based on a combination of the available geological map/s, visual observations and the descriptions reported alongside professional judgement

Building C, Knightsbridge. 33 Sloare Street, Bryanston, 2191     Project     Sheet       1 of     At 103965     Client     1 of       Job No     Client     Date     02-06-       Contractor / Driller     Method/Plant Used     Logged By     Co-Ordinates (DEC)     Ground Level       Soil & Groundwater Remediation Services     Hand Auger     R. Netshirembe     E 29.471     Ground Level       SAMPLES & TESTS     Elev. (mAOD)     MADE GROUND: Slightly moist black GRAVEL of subangular to subrounded fine to coarse coal.     Mape GROUND: Slightly moist black GRAVEL of subangular to     Legend	)1			
Job No     Client     Date       41103965     Client     Eskom Holdings SOC Limited     Date       Contractor / Driller     Method/Plant Used     Logged By     Co-Ordinates (DEC)     E 29.471       Soli & Groundwater Remediation Services     Hand Auger     R. Netshirembe     STRATA       SAMPLES & TESTS     Elev. (mAOD) (Thick (mAOD)     Depth     Description     Legend       Depth     Type     Test Result     Description     Legend       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       - <td< td=""><td>1</td><td></td></td<>	1			
Contractor / Driller     Method/Plant Used     Logged By     Co-Ordinates (DEC)     Ground Level       Soil & Groundwater Remediation Services     Hand Auger     Logged By     Co-Ordinates (DEC)     E 29.471     Ground Level       SAMPLES & TESTS     Image: Co-Ordinates (DEC)     E 29.471     N -26.087     Image: Co-Ordinates (DEC)     E 29.471     Image: Co-Ordinates (DEC)     E 29.471     N -26.087     Image: Co-Ordinates (DEC)     E 29.471     Image: Co-Ordinates (DEC)     Image:	Date 02-06-22			
Soil & Groundwater Remediation Services     Hand Auger     R. Netshirembe     E 29.471 N -26.087       SAMPLES & TESTS     STRATA       Depth     Type     Test Result     Q L R R R R R R R R R R R R R R R R R R	(m AOE	D)		
SAMPLES & TESTS       Depth     Type     Test Result     Q (a) (b) (b) (b) (b) (b) (b) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c				
Depth       Type       Test Result       Q (u)		Install Backfil		
ADE GROUND: Slightly moist black GRAVEL of subangular to subrounded fine to coarse coal.	Geology	Dia. mm		
-     - <th>END</th> <th></th>	END			
Boring Progress Water Strikes Under Strike Date Time Depth Casing Dat Dia (mm) Water Date Time Strike Minutes Standing		asing		
Date     Time     Depth     Casing Upt     Dia. (mm)     Water Upt     Date     Time     Strike     Minutes     Standing       Chiselling     Water Added     Water Added     Vater Added		asing		
From       To       Hours       Tool       From       To       General Remarks         1. Elevation not surveyed; position digitised by eye only.       2. Groundwater not encountered.       2. Groundwater not encountered.         Scale 1:12.5       Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on vision	sual and	ł		

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Soil Reme	& Grou diation	Indwater			Han	d Auger			R. Netsł	irembe		E 29.471 N -26.088									
S	AMPL	ES & TES	STS									STRAT	Ą					Install / Backfill			
Depth	Туре	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Des	scription				Legend	Geology	Dia.			
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S	AMPLI	ES & TE	STS									STRAT	A					Install / Backfill	
Depth	Туре	Test Result	DID (Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	scription				Legend	Geology	Dia. mm	
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s	SAMPL	ES & TES	STS									STRAT	A		I			Install /
Depth	Туре	Test Result	DID (Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Des	scription				Legend	Geology	Dia.
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	I.50 ES <0.1 < 1.50 End of Exploratory Hole													END				
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Build 33 Sloar Telepl Fa	ding C, I ne Stree hone: + ax: +27	Knightsbrid t, Bryanstor 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		Koi	mati Solar P	/ & BESS	ESIA		She	et	1 of	1	
Job No	411(	)3965			Clier	nt		Es	skom Holding	Is SOC Lim	iited		Dat	e (	02-06-	22	
Contracto Soil a	or / Dri & Grou	ller Indwater	6	Met	hod/F	Plant Hano	Used d Auger		Logged By R. Netsł	nirembe	Co-Ordina	ates (DEC) E 29.476 N -26.091		Groun	d Level	(m AOI	D)
s		ES & TES	з 878								STRAT	Δ					Install /
Depth	Туре	Test Result		HSV kN/m2)	P.Pen kN/m2)	Water	Elev. (mAOD)	Depth (Thick		De	scription	<u> </u>			Legend	Geology	Backfill Dia. mm
	ES		<0.1					-(0.30) - 0.30 - E 	WADE GROUND: subangular fine to	Slightly moist i coarse weather	brown gravel ered shale.	ly SAND. Grave	el is ang	ular to		MG	
		Tim		Bori	ng Pr	ogree	ss	Di- (	) )A/-t- D (	Deta	T	Water S	trikes		Dtax -li	-	ala -
Signature       Boring Progress       Water Strikes         Date       Time       Depth       Casing Dpt       Dia. (mm)       Water Dpt       Date       Time       Strike       Minutes         Signation       Chiselling       Water Added       Water Added       General Remarks       1. Elevation not surveyed; position digitised by eye only.       2. Groundwater not encountered.													5	Standing	Ca	ISING	
Sca	ale 1:12	2.5	Not mar	es: A nual i	ll dim dentit	iensio ficatio	ons in m on.	etres. Log	s should be read	in accordance	with the prov	ided Key. Desc	riptions	are base	ed on vis	ual and	

AH08	8	
1 of 1	1	
03-06-2	22	
nd Level (n	m AO	D)
		Install / Backfill
Legend G	Geology	Dia.
	MG	
	VF	
Standing	С	asing
sed on visu		
	Standing sed on visi	Standing C Standing C

WSP G	Group /	Africa (Pi	ty) Lt	d				E	BC	OREHO	DLE LO	G		Ho	ole No.	AH0	9	
Build 33 Sloan Teleph Fa	ding C, F ne Street none: + x: +27	Knightsbrid t, Bryansto 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		Ko	oma	ati Solar P	V & BESS I	ESIA		Sh	neet	1 of	1	
Job No	4110	)3965			Clier	nt		E	sko	om Holding	js SOC Lim	ited		Da	ate	04-06-	22	
Contracto	or / Dril	ler		Met	hod/l	Plant	Used		Lo	ogged By		Co-Ordina	ates (DEC)		Grour	nd Level	(m AOI	D)
Soil &	& Grou diation	Indwater	s			Han	d Auger			R. Netsł	nirembe		E 29.470 N -26.092					
S	AMPLI	ES & TE	STS									STRAT	Ą					Install /
Depth	Туре	Test Result	PID (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			Des	scription				Legend	Geology	Dia. mm
	ES		<0.1					- (0.50) - - - -(0.80) - - - - 1.30	MoissFOF	st (firm) red-bi RMATION]. st red mottled RMATIONJ.	rown sandy CL/ brown clayey S y Hole	AY [Probable	Weathered Vi	IVRYHEI	EID		VF	
	<u> </u>	I	<u> </u>	Bori	l ng Pi	ogre	ss						Water	Strikes				<u> </u>
Date		Time		Depth	_	Casi	ng Dpt	Dia. (mi	m)	Water Dpt	Date	Time	Strike	Minut	tes	Standing	Ca	asing
Date     Time     Depth     Casing Dpt     Dia. (mm)     Water Dpt     Date     Time     Strike     Minutes       Chiselling     Water Added     Water Added     Water Added     Image: Chiselling     Water Tool     From     Tool     From     Tool     General Remarks       1. Elevation not surveyed; position digitised by eye only.     2. Groundwater not encountered.     Strike     Strike     Strike													y.					
Sca	ale 1:12	2.5	mai	es: A nual i	denti	ficatio	ons in m on.	eues. Lo	ıys sl	nould be read	in accordance	wiui trie prov	nueu ney. Des	cription	s are bas	sea on vis	ual and	

WSP (	Group /	Africa (Pl	ty) Lt	d .	Droid	oot			BC	OREHO	DLE LO	G		Ho	le No.	AH1	0	
33 Sloar Telepl Fa	hone: + hone: +	t, Bryanstoi 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		K	oma	ati Solar P\	/ & BESS I	ESIA			001	1 of	1	
Job No	4110	)3965			Clier	nt		E	Esko	om Holding	ıs SOC Lim	ited		Da	ate	04-06-	22	
Contracto	or / Dril	ler		Met	hod/l	Plant	Used		Lo	ogged By		Co-Ordina	tes (DEC)		Grour	nd Level	(m AOI	D)
Soil a Reme	& Grou diation	Indwater Services	s			Han	d Auger			R. Netsł	nirembe		E 29.470 N -26.092					
S	AMPLI	ES & TES	STS	1				Donth				STRAT	٩			1		Install / Backfill
Depth	Туре	Test Result	DID (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	(Thick -ness)			Des	scription				Legend	Geology	Dia. mm
- - - - - - - - - - - - - - - - - - -	ES		<0.1					- (0.50) - - -(0.60) - - - - - - - - - - -	Mois	st (firm) red-br RMATION].	andy CL/	Weathered	VRYHEID FOR		) DN].		VF	
Data		Time		Bori	ng Pr	ogre	SS	Dia /	nm)	Watar Dat	Data	Timo	Water S	trikes	00	Standing		eina
From		Chis	elling	J Hours		T	ool	Via. (M	Vater	Added To	General Rema 1. Elevation not 2. Groundwater	arks t surveyed; pos r not encounter	ition digitised by	eye only	5 <b>3</b>	Stariuling		xəll IQ
Sca	ale 1:12	2.5	Not mar	es: A nual i	ll dim denti	iensio ficatio	ons in m on.	etres. Lo	ogs sl	hould be read	in accordance	with the prov	ided Key. Desc	riptions	s are bas	sed on vis	ual and	

WSP G	Group /	Africa (Pt	y) Lt	d				E	BOREHO	DLE LO	G		Ho	ble No.	AH1	1	
Build 33 Sloar Telepł Fa	ding C, I ne Stree hone: + x: +27	Knightsbrid t, Bryanstor 27 11 361 11 361 130	ge, 1, 219 1380 1	1	Proje	ect		Ko	mati Solar P	V & BESS I	ESIA		Sł	neet	1 of	1	
Job No	411(	)3965			Clier	nt		E	skom Holding	gs SOC Lim	ited		D	ate	02-06-	22	
Contracto Soil &	or / Dri & Grou	ler Indwater		Met	hod/F	Plant Hano	Used d Auger		Logged By R. Nets	nirembe	Co-Ordina	ttes (DEC) E 29.467 N -26.092		Grour	nd Level	(m AOI	D)
S		=S & TES	sts								STRAT	Δ					Install /
Depth	Туре	Test Result	DId (Amdd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick		Des	scription	<u> </u>			Legend	Geology	Backfill Dia. mm
-								- (0.50)	Moist (firm) red-b FORMATION].	rown sandy CLA	Y [Probable	Weathered V	RYHEI	כ		VF	
-			<0.1					- (0.50)	Moist red clayey S	SAND [Probable	Weathered	VRYHEID FOI	RMATIO	DN].		VF	
1.50	ES		<0.1						End of Explorator	y Hole						END	
Boring Progress												Water S	Strikes				
From	Boring Progress     Water       Date     Time     Depth     Casing Dpt     Dia. (mm)     Water Dpt     Date     Time     Strike													y.	Standing	Ca	asing
Sca	ale 1:12	2.5	Not mar	es: A nual i	 II dim dentii	ensio icatio	ons in m on.	etres. Loç	gs should be read	in accordance	with the prov	ided Key. Des	cription	s are bas	sed on vis	ual and	

WSP G	Group /	Africa (Pt	y) Lt	d				E	BOREH	OLE LC	G		Ho	ole No.	AH1	2	
Build 33 Sloar Teleph Fa	ding C, I ne Stree none: + x: +27	Knightsbrid t, Bryanstor 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		Ko	mati Solar I	PV & BESS I	ESIA		Sł	neet	1 of	1	
Job No	411(	)3965			Clier	nt		E	skom Holdii	ngs SOC Lim	iited		D	ate	02-06-	22	
Contracto Soil &	or / Dri & Grou	ler Indwater		Met	hod/F	Plant Hano	Used d Auger		Logged By R. Net	shirembe	Co-Ordina	ates (DEC) E 29.467 N -26.093		Grour	nd Level	(m AOI	D)
S		=S & TES	, I								STRAT	Δ					Install /
Depth	Туре	Test Result	DId (Amdd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick		De	scription				Legend	Geology	Backfill Dia. mm
-								- (0.50)	Moist (firm) red FORMATION].	-brown sandy CL/	AY [Probable	Weathered Vi	RYHEI	כ		VF	
										y SAND [Probable	⊌ Weathered	VRYHEID FOI	RMATIO	ON].		VF	
										ory Hole						END	
	Boring Progress Wat												Strikes				
Date From	Boring Progress     Wate       Date     Time     Depth     Casing Dpt     Dia. (mm)     Water Dpt     Date     Time     Strike       Date     Time     Depth     Casing Dpt     Dia. (mm)     Water Dpt     Date     Time     Strike       Chiselling     Water Added     Water Added     General Remarks     1. Elevation not surveyed; position digitised       From     To     Hours     Tool     From     To     1. Elevation not surveyed; position digitised												Minu r eye onl	y.	Standing	Ca	asing
Sca	ale 1:12	2.5	Note mar	es: A nual i	II dim dentit	ensio ficatio	ons in m on.	etres. Loç	gs should be rea	ad in accordance	with the prov	vided Key. Des	cription	s are bas	sed on vis	ual and	

Data Building C. Knallissing 201     Project     Komati Solar PV & BESS ESIA       33 Sloame Street, Bryanston, 2191     Fax +27 11 361 1300       Fax +27 11 361 1301     Client       Job No     Client       41103965     Client       Contractor / Driller     Method/Plant Used       Soil & Groundwater     Hand Auger       Remediation Services     Hand Auger       SAMPLES & TESTS     STRATA       Depth     Type       Test     Q (a) (b) (b) (b) (c) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	1 o Date 04-0€ Ground Leve	f 1 5-22 el (m AO	D)
Job No     Client     Eskom Holdings SOC Limited       Contractor / Driller Soil & Groundwater Remediation Services     Method/Plant Used Hand Auger     Logged By R. Netshirembe     Co-Ordinates (DEC) E 29,474 N -26.095       SAMPLES & TESTS     Elev. (mAOD)     Depth (Thick ness)     Depth Depth     Type     Test Result     Q (E E E E E E E E E E E E E E E E E E E	Date 04-0f Ground Leve	6-22	D)
Contractor / Driller     Method/Plant Used     Logged By     Co-Ordinates (DEC)       Soil & Groundwater Remediation Services     Hand Auger     R. Netshirembe     E 29.474       N - 26.095     SAMPLES & TESTS     STRATA       Depth     Type     Test Result     Order of the second Second Second	ed Cround Leve	d Geology	D)
Soil & Groundwater Remediation Services     Hand Auger     R. Netshirembe     E 29.474 N - 26.095       SAMPLES & TESTS     STRATA       Depth     Type     Test Result     a 2 b 2 b 2 b 2 c 2 b 2 c 2 b 2 b 2 c 2 b 2 c 2 b 2 c 2 b 2 c 2 c	ed		Install / Backfill Dia. mm
SAMPLES & TESTS         Depth       Type       Test Result       Oracle of the test of	ed	d Geology	Install / Backfill Dia. / mm
Depth     Type     Test Result     Provide Stress Provide Stress     Provide Stress     Depth (Thick ness)     Description       -     -     -     -     -     -     -     -       -     -     -     -     -     -     -       -     -     -     -     -     -       -     -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -     -       -     -     -     -       -     -     -     -       -     -     -     -       -     -     -     -       -     -     -     -	ed	d Geology	Dia. mm
- Moist (firm) dark brown to black sandy CLAY [Probable Weathered VRYHEID FORMATION].	ed		
		· · · · · · · · · · · · · · · · · · ·	
0.60       ES       Exploratory Hole Terminated due to Refusal         -       -		END	
Boring Progress         Water Strikes           Date         Time         Depth         Casing Dpt         Dia. (mm)         Water Dpt         Date         Time         Strike         Minu	Sinutes Standing	g C	asing
Chiselling     Water Added       From     To       Hours     Tool       From     To       General Remarks       1. Elevation not surveyed; position digitised by eye onl       2. Groundwater not encountered.	one are besident.		

WSP	Group	Africa (Pt	tv) Lt	d				В	OREHO	DLE LC	)G		Hole	e No.	AH1	4	
Buil 33 Sloa Telep Fa	Iding C, F ne Street hone: + ax: +27	Knightsbrid t, Bryanstor 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proj	ect		Kor	nati Solar P'	V & BESS	ESIA		She	eet	1 of	1	
Job No	4110	3965			Clie	nt		Es	kom Holding	gs SOC Lim	nited		Dat	te (	04-06-	22	
Contracto Soil Reme	or / Dril & Grou ediation	ler Indwater Services	s	Met	hod/	Plant Han	Used d Auger		Logged By R. Netsl	nirembe	Co-Ordina	ates (DEC) E 29.478 N -26.097		Ground	d Level	(m AOI	))
S	AMPLI	ES & TES	STS								STRAT	A					Install /
Depth	Туре	Test Result	DID (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)		De	escription				Legend	Geology	Dia. mm
-			-0.4					(0.50) - 0.50	IADE GROUND:	Moist grey AS	н.					MG	
-	<ul> <li>-       <li>-       <li>-      </li> <li>-       <li>-      </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li> <li>-       </li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></ul>										′ [Probable W€	eathered			VF		
1.10 - - - -	ES							- - - -	ind of Explorator	y Hole						END	
				Bor	ing P	rogre	ss					Water	Strikes				
Image: Second													asing				
Sc	ale 1:12	2.5	Not ma	tes: A nual	ll din	nensio	ons in m on.	etres. Log	s should be read	2. Groundwate	with the prov	red. vided Key. Des	criptions	are base	ed on vis	sual and	

WSP	Group	Africa (P	tv) I t	h				E	BO	REHC	DLE LC	)G		Hole	e No.	AH1	5	
Bui 33 Sloa Telej F	ilding C, I ane Stree phone: + ax: +27	Knightsbrid t, Bryansto 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		Ko	omat	ti Solar P\	/ & BESS	ESIA		She	eet	1 of	1	
Job No	411(	)3965			Clier	nt		E	Eskor	m Holding	is SOC Lin	nited		Dat	te (	04-06-	22	
Contract Soil Rem	or / Dri & Grou ediatior	ller undwater Service	s	Meth	nod/F	Plant Han	Used d Auger		Lo	gged By R. Netsh	irembe	Co-Ordina	ates (DEC) E 29.471 N -26.108		Ground	d Level	(m AOI	D)
5	SAMPL	ES & TE	STS									STRAT	Ą		I			Install /
Depth	Туре	Test Result	DID (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick			De	escription				Legend	Geology	Dia.
	ES		<0.1					- (0.60) 	Moist FOR	t light brown MATION].	clayey SAND [ clayey SAND [ / Hole	Probable We	athered VRYH	EID			VF VF END	
				Bori	ng Pr	ogre	ss				Water	Strikes						
Date		Time	[	Depth		Casi	ng Dpt	Dia. (mi	m)	Water Dpt	Date	Time	Strike	Minute	es S	Standing	Ca	asing
From	Boring Progress     W       ite     Time     Depth     Casing Dpt     Dia. (mm)     Water Dpt     Date     Time     Strike       Image: Chiselling     Image: Chiselli													eye only.				
So	cale 1:12	2.5	Note	es: A	II dim dentif	ensie	ons in m on.	etres. Lo	ogs sh	ould be read	2. Groundwate	er not encounte	red. rided Key. Des	criptions	are base	ed on vis	ual and	

WSP 0	Group /	Africa (Pf	ty) Lt	d				B	BOF	REHC	DLE LO	G		Но	le No.	AH1	6	
Build 33 Sloar Telepl Fa	ding C, I ne Stree hone: + ax: +27	Knightsbrid t, Bryanstor 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		Koi	mati	Solar P\	/ & BESS E	ESIA		Sh	eet	1 of	1	
Job No	411(	)3965			Clier	nt		Es	skom	Holding	Is SOC Lim	ited		Da	ate	04-06-	22	
Contracto Soil a	or / Dri & Grou	ler Indwater		Met	hod/F	Plant Hano	Used d Auger		Log	ged By R. Netsh	nirembe	Co-Ordina	ates (DEC) E 29.463 N -26 102		Groun	d Level	(m AOI	D)
Reifie			s стс				-					STDAT	A					Install /
Depth	Туре	Test Result		HSV kN/m2)	P.Pen kN/m2)	Water	Elev. (mAOD)	Depth (Thick			Des	scription	<u> </u>			Legend	Geology	Backfill Dia.
0.30	ES		<0.1					-ness) 5 - (0.30) - 0.30 E -	Slightly ferricre Explora	y moist orar ete nodules atory Hole 1	nge to red claye [Probable Wea	y SAND with thered VRYI	n occasional we HEID FORMAT	eathered ION].	1		VF	
Date		Time	1	Bori Depth	ng Pr	ogres Casii	ss ng Dpt	Dia. (mm	n) V	Water Dpt	Date	Time	Water S Strike	Strikes Minut	es s	Standing	Ca	asing
Boring Progress       Water Strikes         Date       Time       Depth       Casing Dpt       Dia. (mm)       Water Dpt       Date       Time       Strike       Minutes       Standing         000000000000000000000000000000000000																		
Sca	ale 1:12	2.5	Not mar	es: A nual i	ll dim dentit	ensio ficatio	ons in m on.	etres. Log	gs shou	uld be read	in accordance	with the prov	ided Key. Desc	criptions	are bas	ed on vis	ual and	

WSP	Group	Africa (P	ty) Lt	d					BC	OREHC	DLE LC	G		Ho	ole No.	AH1	7	
Bui 33 Sloa Telej F	ilding C, I ane Stree phone: + ax: +27	Knightsbrid t, Bryansto 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		K	oma	ati Solar P\	/ & BESS	ESIA		Sr	ieel	1 of	1	
Job No	411(	)3965			Clier	nt		E	Esko	om Holding	s SOC Lim	iited		D	ate	04-06-	22	
Contract	or / Dri	ller		Met	hod/F	Plant	Used		L	ogged By		Co-Ordina	tes (DEC)		Groun	d Level	(m AOI	D)
Soil Rem	& Grou ediatior	Indwater Service	s			Han	d Auger			R. Netsh	iirembe		E 29.463 N -26.103					
5	SAMPL	ES & TE	STS									STRAT	4					Install / Backfill
Depth	Туре	Test Result	DID (Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	scription				Legend	Geology	Dia. mm
-								-(0.40)	Moi FO	st dark brown ( RMATION].	clayey SAND [i	Probable We	athered VRYH	EID			VF	
-			<0.1					-(0.40)	Moi FO	st light brown i RMATION].	nottled red cla	yey SAND [P	robable Weath	nered V	RYHEID		VF	
	ES		<0.1	Bori	na Pr	ogree	55	-	Exp	loratory Hole T	erminated due	e to Refusal	Water S	Strikes			END	
Date		Time	[	Depth		Casi	ng Dpt	Dia. (m	ım)	Water Dpt	Date	Time	Strike	Minu	ites	Standing	Ca	asing
From		Chis	elling	l Hours		T	ool	V	Vater	· Added	General Rem	arks						
So	Scale 1:12.5       Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Desc												eye only	y. Is are bas	ed on vis	sual and		

WSP (	Group /	Africa (P	ty) Lt	d					BC	OREHO	DLE LC	)G		Ho	le No.	AH1	8	
Buil 33 Sloar Telep Fa	ding C, I ne Stree hone: + ix: +27	Knightsbrid t, Bryansto 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		K	oma	ati Solar P\	/ & BESS	ESIA		Sh	eet	1 of	1	
Job No	411(	)3965			Clier	nt		E	Esko	om Holding	s SOC Lin	nited		Da	ate	04-06-	22	
Contracto	or / Dri	ler		Met	hod/I	Plant	Used		L	ogged By		Co-Ordina	ates (DEC)		Groun	d Level	(m AOI	D)
Reme	& Grou diation	Service	s			Han	d Auger	-		R. Netsh	irembe		N -26.106					
S	AMPLI	ES & TE	STS					Depth				STRAT	A			1		Install / Backfill
Depth	Туре	Test Result	UI9 Un√	HSV (kN/m2	P.Pen (kN/m2	Water	Elev. (mAOD)	(Thick			De	escription				Legend	Geology	Dia. mm
1.70	ES		<0.1					- (0.50) - - - - - -(1.20) - - - - - - - - - - - - - - - - - - -	Moi FO	ist light brown i RMATION].	nottled red cla	iyey SAND [P	robable Weat	hered VF	RYHEID		VF	
								-										
		Time		Bori	ng Pr	ogre	SS	Dia (~	um)	Water Dot	Date	Time	Water	Strikes		Standing		sing
		Time     Depth     Casing Dpt     Dia. (mm)     Water Dpt     Date     Time     Strike     M       Chiselling     Water Added     Water Added     Water Added     Water Added     Water Added     Water Added														Jianding		asing
From				, Hours		T	ool	Fron	<u>n</u>	To	General Rem 1. Elevation no 2. Groundwate	arks ot surveyed; pos er not encounte	ition digitised b red.	y eye only				
Sca	ale 1:12	2.5	Not mai	es: A nual i	ll dim denti	iensio ficatio	ons in m on.	etres. Lo	ogs s	should be read	in accordance	with the prov	ided Key. Des	scriptions	s are bas	ed on vis	sual and	

WSP (	Group	Africa (Pi	ty) Lt	d				E	30	REHC	DLE LO	DG		Ho	le No.	AH1	9	
Buil 33 Sloar Telep Fa	lding C, I ne Stree hone: + ax: +27	Knightsbrid t, Bryansto 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		Ko	oma	ti Solar P\	/ & BESS	ESIA		Sh	eet	1 of	1	
Job No	411(	)3965			Clier	nt		E	sko	m Holding	s SOC Lin	nited		Da	ate	04-06-	22	
Contracto	or / Dri	ler		Met	hod/l	Plant	Used		Lo	ogged By		Co-Ordina	tes (DEC)	I	Groun	d Level	(m AOI	D)
Reme	& Grou ediation	Service	s			Han	d Augei	-		R. Netsh	iirembe		E 29.471 N -26.095					
S	AMPL	ES & TE	STS			_		Dopth				STRAT	٩			1		Install / Backfill
Depth	Туре	Test Result	(Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD	(Thick			De	escription				Legend	Geology	Dia. mm
	ES		<0.1					- (0.50) - - - - (0.70) - - - - - - - - - - - - - - - - - - -	Mois VRYI End	t orange to re HEID FORMA	d mottled grey TION].	ID [Probable \	Veathered VR	RYHEID	1 		VF	
			·	Bori	ng P	rogre	ss	<u> </u>					Water	Strikes				<u> </u>
From		Time Chis To	elling	Depth I Hours		Casi	ng Dpt	Dia. (mr Wa From	n) ater /	Water Dpt Added To	Date General Rem 1. Elevation no 2. Groundwate	Time harks of surveyed; pos er not encounted	Strike	Minut	es i	Standing	Cá	asing
Sca	ale 1:12	2.5	Not mar	es: A nual i	ll din denti	nensi ficati	ons in m on.	etres. Lo	gs sh	nould be read	in accordance	e with the prov	ided Key. Des	criptions	s are bas	ed on vis	ual and	

WSP	Group	Africa (P	tv) I te	4					BC	OREHO	DLE LC	DG		Hole	e No. AH	20	
Bui 33 Sloa Telep Fi	Iding C, I ine Stree phone: + ax: +27	Knightsbrid t, Bryansto 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		K	oma	ati Solar P\	/ & BESS	ESIA		She	et 1 o	<sup>-</sup> 1	
Job No	411(	)3965			Clier	nt		E	Esko	om Holding	Is SOC Lin	nited		Date	e 03-06	6-22	
Contract	or / Dri	ller		Met	hod/F	Plant	Used		L	ogged By		Co-Ordina	ates (DEC)		Ground Leve	el (m AO	D)
Soil Reme	& Grou ediatior	undwater Service	s			Han	d Auger	•		R. Netsł	nirembe		E 29.453 N -26.105				
S	SAMPL	ES & TE	STS		1			Danth				STRAT	A			1	Install / Backfill
Depth	Туре	Test Result	(Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Deptn (Thick -ness)			De	escription			Legen	d Geolog	Dia. / mm
	ES		<0.1					- - - - - - - - - - - - - - - - - - -	Moi FOI	st light brown RMATION].	clayey SAND [	Probable We	athered VRYI-	IEID		· · · · · · · · · · · · · · · · · · ·	
Date		Time		Bori	ng Pr	rogrea	ss ng Dpt	s Standin	3 C	asing							
			olling	lling Water Added													
From		To	Iling     Water Added       Hours     Tool       From     Tool       General Remarks       1. Elevation not surveyed; position digitised by eye only       2. Groundwater not encountered.														4
Sc	ale 1:12	2.5	mar	es: A nual i	u dim denti	fication	ons in m on.	etres. Lo	ogs s	nould be read	in accordance	e with the prov	ndea Key. Des	scriptions	are based on v	isual and	נ 

WSP	Group	Africa (Pt	tv) Lt	td				E	BC	OREHO	DLE LC	G		Hole	e No.	AH2	1	
Buil 33 Sloa Telep Fa	ding C, I ne Stree hone: + ax: +27	Knightsbridg t, Bryanstor 27 11 361 11 361 130	ge, n, 219 1380 1	91	Proje	ect		Ko	oma	ati Solar P	V & BESS I	ESIA		She	et	1 of	1	
Job No	411(	)3965			Clier	nt		E	Esko	om Holding	js SOC Lim	iited		Dat	te (	)4-06-	22	
Contracto Soil Reme	or / Dri & Grou ediation	ler Indwater	s	Met	hod/l	Plant Han	Used d Auger		Lo	ogged By R. Netsł	nirembe	Co-Ordina	ates (DEC) E 29.463 N -26.110		Ground	l Level	(m AOI	כ)
s	AMPL	ES & TES	STS									STRAT	Ą					Install /
Depth	Туре	Test Result	DID (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	scription				Legend	Geology	Dia. mm
- - - - - - - - - - - - - - - - - - -	ES		<0.1					- (0.50) - - - - - - - - - - - - - - - - - - -	Moiss FOF	st dark brown RMATION].	d SAND with oc red VRYHEID	Probable We	athered VRYHE athered ferricred	EID te nodul	es		VF	
-				Bori	ing Pi	rogre	ss	-					Water S	trikes				
Date		Time	elline	Depth		Casi	ng Dpt	Dia. (m	m) /ater	Water Dpt	Date	Time	Strike	Minute		tanding	Ca	asing
From		То		Hours		Τ		From	1	To	General Rema 1. Elevation no 2. Groundwate	arks t surveyed; pos r not encounte	sition digitised by	eye only.		od c		
Sc	ale 1:12	2.5	ma	ies: A nual	identi	fication	ons in m on.	etres. Lo	ogs sl	nould be read	III accordance	with the prov	naea Key. Desc	inplions	are base	ea on vis	sual and	

Building C, Knightsondge, 33 Sloane Street, Bryanston, 2191 Teleforer 120 A DECO ECIA	ľ				
Fax: +27 11 301 1300 Fax: +27 11 301 1301		Sheel	1 of	1	
Job No 41103965 Client Eskom Holdings SOC Limited		Date	04-06-2	22	
Contractor / Driller Method/Plant Used Logged By Co-Ordinate	es (DEC)	Groun	nd Level (	(m AOI	D)
Soil & Groundwater Remediation ServicesHand AugerR. NetshirembeE N	E 29.452 N-26.101				
SAMPLES & TESTS STRATA					Install / Backfill
Depth         Type         Test Result         Current Curent Current Curent Current Current Curent Current Current Curent C			Legend	Geology	Dia. mm
Image: Solution of the system of the syst	thered VRYHEID			VF	
Boring Progress Date Time Depth Casing Dot Dia. (mm) Water Dot Date Time	Water Strike	nutes	Standing	Ca	asina
Chiselling Water Added					Y
From       To       Hours       Tool       From       To       General Remarks         1. Elevation not surveyed; positi       2. Groundwater not encountered       2. Groundwater not encountered         Scale 1:12.5       Notes: All dimensions in metres. Logs should be read in accordance with the provid	ion digitised by eye o d. ded Key. Descriptio	only. ons are bas	sed on vis	ual and	

WSP G	Group /	Africa (Pi	ty) Lt	:d					BC	DREHC	DLE LC	G		Hol	le No.	AH2	3	
Build 33 Sloar Teleph Fa	ling C, F e Street none: + x: +27	Knightsbrid t, Bryansto 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		K	oma	ati Solar P\	/ & BESS	ESIA		She	eet	1 of	1	
Job No	4110	)3965			Clier	nt		E	Esko	om Holding	s SOC Lim	iited		Da	ate	03-06-	22	
Contracto	r / Dril	ler		Met	hod/l	Plant	Used		L	ogged By		Co-Ordina	tes (DEC)		Groun	d Level	(m AOI	D)
Soil & Reme	& Grou diation	Indwater	s			Han	d Auger			R. Netsh	iirembe		E 29.450 N -26.094					
S	AMPLI	ES & TE	STS	1					I			STRAT	۹					Install / Backfill
Depth	Туре	Test Result	DID (DmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	scription				Legend	Geology	Dia. mm
-						ł		- (0.50)	MAI ang Rev	DE GROUND: lular to subang vorked/Transp	Moist (firm to s ular fine to coa orted Natural N	stiff) dark bro Irse weathere /aterial].	wn gravelly CL d shale [Suspe	AY. Gra	ivel is		MG	
	ES		<0.1			O.50     Moist (firm) orange to brown sandy CLAY with occasional weat ferricrete nodules [Probable Weathered VRYHEID FORMATIO     O.60)     O.60     O.											VF	
								-										
2 Date		Time		Bori Depth	ng Pi	ogre: Casi	ss ng Dpt	Dia. (m	ım)	Water Dpt	Date	Time	Water S Strike	Strikes Minute	es	Standing	Ca	ising
From		Chis To	elling	) Hours		T	ool	V Fron	Vater	0.50	eye only.							
Sca	ale 1:12	2.5	Not ma	Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descri manual identification.												ed on vis	ual and	

WSP (	Group /	Africa (Pi	y) Lt	d.					BC	OREHO	DLE LC	)G		Hol	le No.	AH2	4	
Build 33 Sloar Telepl Fa	ding C, F ne Street none: + x: +27	Knightsbrid t, Bryansto 27 11 361 11 361 130	ge, n, 219 1380 1	1	Proje	ect		K	oma	ati Solar P\	/ & BESS	ESIA		Sh	eet	1 of	1	
Job No	4110	)3965			Clier	nt		E	Esko	om Holding	is SOC Lim	nited		Da	ate	03-06-	22	
Contracto	or / Dril	ler		Met	hod/l	Plant	Used		Lo	ogged By		Co-Ordina	tes (DEC)		Groun	d Level	(m AOI	D)
Soil a Reme	& Grou diation	Indwater	5			Han	d Auger			R. Netsh	nirembe		E 29.459 N -26.091					
S	AMPLI	ES & TE	STS	1								STRAT	٩					Install / Backfill
Depth	Туре	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	scription				Legend	Geology	Dia. mm
-						¥		- (0.50)	MAI suba Rew	DE GROUND: angular mediu vorked/Transp	Moist dark bro m to coarse w orted Natural N	wn gravelly S eathered san <i>I</i> aterial].	AND. Gravel is	angula	ar to		MG	
	ES		<0.1			÷		- -(0.60) - 1.10	Mois ferri End	st (firm) orang icrete nodules	athered ION].	d		VF				
								-										
2 Date		Time		Bori Depth	ng Pi	ogre: Casi	ss na Dot	Dia (m	י ושו	Water Dot	Date	Time	Water S Strike	trikes Minute	es	Standing	C=	asina
From		Chis To	elling	) Hours		T	<u>ool</u>	W	0.50	eye only								
Sca	ale 1:12	2.5	Not ma	Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Des manual identification.											s are bas	ed on vis	ual and	

WSP (	Group	Africa (Pi	ty) Li	td					BC	OREHO	DLE LC	G		Ho	ole No.	AH2	25	
Buil 33 Sloar Telep Fa	ding C, I ne Stree hone: + ax: +27	Knightsbrid t, Bryansto 27 11 361 11 361 130	ge, n, 219 1380 1	91	Proje	ect		K	oma	ati Solar P\	/ & BESS	ESIA		SI	heet	1 of	1	
Job No	411(	)3965			Clier	nt		E	Esko	om Holding	s SOC Lim	iited		D	ate	03-06-	22	
Contracto	or / Dri	ller		Met	hod/l	Plant	Used		L	ogged By		Co-Ordina	ates (DEC)		Grour	nd Level	(m AOI	D)
Soil Reme	& Grou ediation	Indwater	s			Han	d Auger			R. Netsh	nirembe		E 29.452 N -26.093					
S	AMPL	ES & TE	STS						I			STRAT	Ą					Install / Backfill
Depth	Туре	Test Result	DID (DmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	scription				Legend	Geology	Dia. mm
-						¥		- (0.50) - 0.50	MAI sub Rev	DE GROUND: angular mediu vorked/Transp	Moist dark bro m to coarse we orted Natural N	wn gravelly S eathered san /aterial].	AND. Gravel is	s angul cted	lar to		MG	
-			<0.1			-		- (0.80)	Mois ferri	st (firm) orang icrete nodules	e to brown san [Probable Wea	dy CLAY with thered VRY	n occasional w HEID FORMAT	eathere	əd		VF	
	ES		<0.1					-	End	l of Exploratory	/ Hole						END	
		Time		Bori	ng Pi	rogre	SS	Dia /	) (	Weter D-1	Data	Time	Water States	Strikes	itee	Stord		oin ~
From		Chis To	Depth     Casing Upt     Dia. (mm)     Water Upt     Date     Time     Strike     M       selling     Water Added     0.50     0.50     0.50     0.50     0.50       Hours     Tool     From     To     General Remarks     1. Elevation not surveyed; position digitised by eye       2. Seepage at 0.5m bgl.     2. Seepage at 0.5m bgl.												ly.	Juanaing		15111 <u>G</u>
Sca	ale 1:12	2.5	Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Description manual identification.											ns are bas	sed on vis	sual and		

ws	SP Gr	roup A	sfrica (P	ty) Lt	d					BC	OREHO	DLE LO	DG		Hole	e No. BH	01	
33 S T	Buildin Sloane elepho Fax:	ng C, K Street, one: +2 +27 1	nightsbrid Bryansto 7 11 361 1 361 130	ge, n, 219 1380 1	1	Proje	ect		K	oma	ati Solar P\	/ & BESS	ESIA		She	et 1 of	1	
Job N	10 2	4110	3965			Clier	nt		E	Esko	om Holding	Is SOC Lin	nited		Dat	e 02-06	-22	
Contr	actor	/ Drill	er		Met	hod/F	Plant	Used		L	ogged By		Co-Ordina	tes (DEC)		Ground Leve	l (m AO	D)
S Re	Soil & emed	Groui iation	ndwater Service	s		A	Nir Pe	ercussio	n		R. Netsł	nirembe		E 29.471 N -26.085		159	8.742	
	SA	MPLE	ES & TE	STS	1	1	-		Donth				STRAT	4			1	Install / Backfil
Dep	oth	Туре	Test Result	(Judd)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	(Thick -ness)			De	escription			Legend	Geolog	y 50 mm
				<0.1					(1.00)	Moi FOi	st orange-brov RMATION].	vn clayey SAN	D [Probable V	Veathered VRYH	EID		VF	
				<0.1				1597.74	- 1.00 -	We	t black slightly	gravelly claye	y SAND. Gra Probable We	vel is subangular	to	· · · · · ·		
1.50		ES		<0.1						FO	RMATION].				_			
																· ·		
			<0.1															
				<0.1					(6.00)								• • VF •	
				<0.1													· ·	
				<0.1													· 	
Ē				<0.1			Ţ	1591.74	- - 7.00	14/								
-				-0.1					-	VR	t pale brown m YHEID FORM4	ATION].	layey SAND [F	Probable vveatne	rea	· · · · · · · · · · · · · · · · · · ·	· ·	
				<0.1					(3.00)								VF	
72//0/12									-								-	
								1588.74	- 10.00									
										End	l of Exploratory	/ Hole					END	
					Bori	ng Pr	rogre	ss	Ł					Water Stri	ikes			
	ate		Time	]	Depth	-	Casi	ng Dpt	Dia. (m	ım)	Water Dpt	Date	Time	Strike 7.00	Minute	s Standing	С	asing
5-0000001117 500	om		Chis To	elling	J Hours		T	ool	V Fron	Vater	Added To	General Rem 1. Seepage at	narks 7m bgl.					
	Scale	9 1:68.	75	Not mar	es: A nual i	II dim dentif	iensi	ons in me	etres. Lo	ogs s	hould be read	in accordance	with the prov	ided Key. Descrij	ptions	are based on v	sual and	ł

WSP G	iroup A	Africa (P	ty) Lt	d	Proic	oct			BC	OREHO	DLE LO	)G		Hol	e No.	BH0	2	
33 Sloan Teleph Fax	e Street ione: +2 k: +27 1	, Bryansto 27 11 361 1 361 130	n, 219 1380 1	1	FTOJE	501		K	oma	ati Solar P\	/ & BESS	ESIA				1 of	1	
Job No	4110	3965			Clier	nt		E	Esko	om Holding	Is SOC Lin	nited		Da	te	02-06-	22	
Contracto	r / Drill	ler		Meth	nod/F	Plant	Used		L	ogged By		Co-Ordina	ates (DEC)		Grour	nd Level	(m AOE	D)
Soil 8 Reme	k Grou diation	ndwater Service	S		А	vir Pe	ercussio	n		R. Netsh	nirembe		E 29.471 N -26.087			1601	.869	
SA	AMPLE	ES & TE	STS									STRAT	A					Install Backfil
Depth	Туре	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	escription				Legend	Geology	Dia. 50 mm
- - - - -			<0.1						MA to c	DE GROUND: coarse coal.	Moist black G	RAVEL of su	bangular to subr	oundeo	d fine			
-			-0.1					E(1.50)									MG	
-1.00 	ES		<0.1				1600.37	- - 1.50										
			<0.1					-	Moi VR`	st orange-brov YHEID FORMA	vn mottled bla ATION].	ck clayey SAN	ND [Probable We	eathere	ed			
			<0.1				4500.07	+(1.00)									VF	
			<0.1				1599.37	- 2.50	Moi FOI	st orange-brov RMATION].	vn clayey SAN	D [Probable \	Weathered VRYI	HEID				
			<0.1					(2.50)									VF	
			<0.1				1596.87	- - - - 5.00	Moi	st pale brown	silty SAND [Pr	obable Weat	hered VRYHEID			· · · · · · · · · · · · · · · · · · ·		
			<0.1						FOI	RMATION].						× · · · · · · · · · · · · · · · · · · ·		
			<0.1			1		(4.00)									VF	
			<0.1			Ţ		-								× · · · · · · · · · · · · · · · · · · ·		
			<0.1				1592.87	9.00 	Moi FOI	st grey to blacl RMATION].	k silty SAND [F	<sup>D</sup> robable Wea	athered VRYHEI	D		× · · · ·	VF	
			<0.1				1591.87	- <u>10.00</u>	Enc	l of Exploratory	/ Hole					* . * .× . * . * . * . * . * . * .	END	
Date		Time		Borii Depth	ng Pr	ogre: Casi	ss ng Dpt	Dia. (m	ım)	Water Dpt	Date	Time	Water St Strike	rikes Minute	es	Standing	Ca	sing
		01							/	Added			8.00					-
From		To		) Hours		Т	ool	V Fron	v ater 1	To	General Rem	narks						
											i. Seepage at	. om dgi.						
Scal	e 1:68.	75	Not ma	es: Al nual i	ll dim dentif	iensio ficatio	ons in m on.	etres. Lo	ogs s	should be read	in accordance	e with the prov	vided Key. Descr	iptions	are bas	sed on vis	ual and	

WSP G Build 33 Sloan		Africa (P	<b>ty) Lt</b> Ige, n. 219	d l	Proje	ect		l	BC	OREHO	DLE LO	DG		Hole	e No. E	3H0	3	
Teleph Fa	none: +2 x: +27 1	27 11 361 1 361 130	1380 11					K	oma	ati Solar P\	/ & BESS	ESIA			1	1 of	1	
Job No	4110	3965			Clier	nt		E	Esko	om Holding	Is SOC Lin	nited		Dat	te 02	2-06-	22	
Contracto	or / Dril	ler		Meth	nod/I	Plant	Used		L	ogged By		Co-Ordin	ates (DEC)		Ground	Level	(m AOE	D)
Soil & Reme	& Grou diation	ndwater Service	S		Α	vir Pe	ercussio	n		R. Netsh	nirembe		E 29.477 N -26.092			1607	.060	
S/	AMPLE	ES & TE	STS		1			Donth				STRAT	A					Install Backfil
Depth	Туре	Test Result	(Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	(Thick -ness)			De	escription			L	egend	Geology	Dia. 50 mm
-							1606.56	- 0.50	MA	DE GROUND:	Moist brown S	SAND.				$\bigotimes$	MG	
-			<0.1					-	Moi FO	st orange-brov RMATION].	vn clayey SAN	ID [Probable	Weathered VRYH	IEID		· · · · · ·		
-			<0.1					 _(1.50)								· · · · · · · · · · · · · · · · · · ·	VF	
1.50	ES		<0.1													· · · · · · · · · · · · · · · · · · ·		
			<0.1				1605.06	- 2.00 -	Moi	st pale orange	silty SAND [F	robable Wea	thered VRYHEID		×	· · · · ·		
-									10	i divit nong.					×	< ' . ' . . ' .× .		
-			<0.1					-							×	<`.`. .`.×		
-								(3.00)							×	< × .	VF	
-			<0.1					-								· × .		
-															×	, ×.		
-			<0.1				1602.06	- 5.00	Moi	st light brown	silty SAND (Pr	ohable Weat	hered V/RYHEID		· · · · · · · · · · · · · · · · · · ·	· · × ·		
-									FO	RMATION].					×	, × .		
-			<0.1					-							×	× . <		
-															×	· · · · · · · · · · · · · · · · · · ·		
-			-0.1												×	<ul> <li>.</li> <li>.</li> <li>.</li> <li>.</li> <li>.</li> </ul>		
			<0.1					-							×	< ' . ' . . ' .× .	VE	
-						↓		-							×	<pre>&lt;</pre>	VI	
-			<0.1			÷									,^ `×	· × .		
-															×	. <sup>.</sup> .× . 		
-			<0.1					-							×	× . <		
-															×	· · ·× · · · · ·		
-			<0.1				1597.06	- 10.00 - -	Enc	d of Exploratory	/ Hole						END	
-				Borir	ng Pr	ogre	ss	t					Water Str	ikes				
Date		Time		Depth		Casi	ng Dpt	Dia. (m	nm)	Water Dpt	Date	Time	Strike 8.00	Minute	es Sta	anding	Ca	ising
		Chis	elling	l				M	Vater	Added								
From		То		lours		Т	ool	From	n	То	General Rem	narks						
Sca	es: Al	ll dim	iensio	ons in me	etres. Lo	ogs s	hould be read	in accordance	e with the pro	vided Key. Descri	ptions	are based	l on vis	ual and				
			Inal	iual (	uenti	nuali	JII.											

WSP G	Group A	Africa (P	ty) Lt	d	Droig				BC	OREHO	DLE LO	DG		Hol	le No.	BH0	4	
33 Sloan Telepł Fa	ning C, r le Street none: +2 x: +27 1	, Bryansto 27 11 361 1 361 130	ige, in, 219 1380 )1	1	Proje	ect		K	oma	ati Solar P\	/ & BESS	ESIA			661	1 of	1	
Job No	4110	3965			Clier	nt		E	Esko	om Holding	Is SOC Lin	nited		Da	ate	01-06-	22	
Contracto	r / Dril	ler		Meth	nod/F	Plant	Used		L	ogged By		Co-Ordina	ates (DEC)		Groun	d Level	(m AOE	D)
Soil & Reme	& Grou diation	ndwater Service	s		A	vir Pe	ercussio	n		R. Netsh	irembe		E 29.467 N -26.092			1605	.338	
S/	AMPLE	ES & TE	STS									STRAT	A					Install Backfi
Depth	Туре	Test Result	DID (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick -ness)			De	escription				Legend	Geology	Dia. 50 mm
-			<0.1				1604.84	- 0.50	Moi FOI	st (firm) red-br RMATION].	rown sandy CL	AY [Probable	Weathered VI		othered		VF	
	50		<0.1						VR	YHEID FORMA	TION].	i biowii ciayey		Die Wea	linered			
	ES		-0.1			<b>1</b>												
			-0.1															
			<0.1															
			<0.1															
								E (5.50)									VF	
			-0.1															
			<0.1															
			<0.1															
			<0.1				1599.34	- 6.00 -	Enc	d of Exploratory	/ Hole						END	<u>       </u>
77																		
1																		
				Borir	ng Pr	ogre	ss	t					Water S	Strikes				
Date		Time		Depth		Casi	ng Dpt	Dia. (m	ım)	Water Dpt	Date	Time	Strike	Minute	es	Standing	Ca	asing
													1.00					
		01	20/11					1.4	let-	Added								
From		To		) Hours		Т	ool	From	vater 1	To	General Rem	harks						
								-		h and all the second								
s Sca	le 1:68.	75	mai	es: Al nual io	dentif	ficatio	ons in m on.	etres. Lo	ugs s	mould be read	in accordance	e with the prov	videa Key. Desi	criptions	are das	ea on vis	iual and	

WSP G Build 33 Sloan Teleph	Group A ling C, K e Street	Africa (P Africa (P Gnightsbrid Bryansto 27 11 361	<b>ty) Lt</b> lge, n, 219 1380	d	Proje	ect		K	BC	<b>DREHC</b>	DLE LC	<b>)G</b> Esia		Hole	e No. eet	<b>BH0</b> 1 of	9 <b>5</b>	
Fai Job No	x: +27 1 4110	03965	1		Clier	nt		E	Esko	om Holding	s SOC Lin	nited		Dat	te	31-05-	22	
Contracto	r / Dril	ler		Meth	hod/F	Plant	Used			oaaed Bv		Co-Ordina	tes (DEC)		Groun	d I evel	(m AOI	וכ
Soil 8	Grou	ndwater			A	vir Pe	ercussio	n		R. Netsk	irembe		E 29.480			1618	.645	-)
Reme		Service	s STS									STRAT	A					Install
Depth	Туре	Test Result	DIA (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick			De	escription				Legend	Geology	Backfi Dia. 50 mm
			-0.1				1618.15	<u>-ness)</u> - - 0.50	MAI	DE GROUND:	Moist grey AS	iH.					MG	
			<0.1					(1.00)	MAI sub	DE GROUND: rounded fine to	Red brown an coarse brick	nd grey sandy and concrete	GRAVEL of ang	gular to		$\left \right\rangle$	MG	
	ES		<0.1				1617.15	- 1.50	Moi	st rad to brown		with froquent	weathered for	icroto n	odulos			
			<0.1						[Pro	bable Weathe	red VRYHEID	FORMATION	].		JUUICS			
			<0.1			<b>↓</b> 1614.65 4.00											VF	
			<0.1			<b>T</b>	1614.65	- 4.00	We	t brown clayey	SAND [Proba	ble Weathere	d VRYHEID FO	RMATIO	ON].			
			<0.1					(6.00)									VF	
			<0.1				1608 65											
			<0.1				100000	-	End	l of Exploratory	/ Hole						END	<u>er kn</u>
-  -								-										
Date		Time		Borii Depth	ng Pr	ogre: Casi	ss ng Dpt	Dia. (m	ım)	Water Dpt	Date	Time	Water S Strike	trikes Minute	es i	Standing	Ca	asing
From		Chis To	selling	) Hours		T	ool	M From	/ater	Added To	General Rem 1. Hole collaps	narks sed from 6 - 10	4.00 m bgl.					
Scal	e 1:68.	.75	Not ma	es: Al nual i	II dim dentif	iensio ficatio	ons in mo	etres. Lo	ogs s	hould be read	in accordance	with the prov	ided Key. Desc	riptions	are bas	ed on vis	sual and	

WS B 33 S Te	P Gro Buildin loane	oup A g C, K Street, ne: +2	frica (P nightsbrid Bryansto 7 11 361	ty) Lt <sup>Ige,</sup> n, 219 1380	d _	Proje	ect		K	BC	<b>DREHC</b>	DLE LO	DG		Hol	le No. eet	BH0	<b>)6</b>	
Job No	Fax: 0	+27 1	3965	1		Clier	nt		E	Esko	om Holding	Is SOC Lir	nited		Da	ite	31-05-	-22	
Contra	actor	/ Drill	or		Moth	hod/[	Diant	Licod		1			Co-Ordina	ates (DEC)		Grour		(m AOI	<u>ור</u>
S	oil & (	Grou	ndwater		weu	Δ	ir Pe	ercussio	n		R Netsh	irembe		E 29.465			1625	(III AOI	)
Re	media SAN	ation /IPI F	Service	s STS									STRAT	Δ				-	Install
Dept	th -	Туре	Test Result		HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick			D	escription	<u> </u>			Legend	Geology	Backfil Dia. 50 mm
-1.50		ES		<0.1 <0.1 <0.1				1624.96 1623.46	- 0.50	MA Moi VR	DE GROUND: st (firm to stiff) YHEID FORM	Moist grey AS orange-brow ATION].	SH. n sandy CLAY	′ [Probable Wea	thered			MG VF	-
				<0.1			Image: Moist red-brown clayey SAND with occasional ferricrete nodu         Weathered VRYHEID FORMATION].         Image: Comparison of the second seco								les [Pr	obable		VF	
				<0.1						vve	a pare brown si					ATIONJ.			
				<0.1					(6.00)									VF	
				<0.1				1615 46											
				<0.1				1015.46		Enc	d of Exploratory	/ Hole						END	
	te		Time		Borii	ng Pr	ogre:	ss ng Dnt	Dia (m	m)	Water Dot	Date	Time	Water St	rikes Minut	es	Standing	C.	asing
	- pm		Chis	selling	J			<u>ool</u>	W	/ater	Added	General Ren 1. Seepage a	narks t 4m bgl.	4.00		_			
	Scale	1:68.	75	Not mai	es: Al nual io	 II dim dentii	iensio ficatio	ons in m on.	etres. Lo	ogs s	hould be read	in accordance	e with the prov	ided Key. Descr	iptions	are bas	ed on vis	sual and	

WSP ( Buil 33 Sloar Telep	Group A ding C, K ne Street hone: +2	Africa (P Africa frightsbrid , Bryansto 27 11 361	ty) Lt ge, n, 219 1380	d _	Proje	ect		K	BC	<b>DREHC</b>	<b>)LE L(</b> / & BESS	D <b>G</b> ESIA		Hole N	No. BH0 t 1 of	<b>7</b>	
Fa Job No	4110	1 361 130 3965	1		Clier	nt		E	Esko	om Holding	s SOC Lir	nited		Date	01-06-	22	
Contracto	or / Drill	ler		Metl	hod/F	Plant	Used		L	ogged By		Co-Ordina	ates (DEC)	0	Ground Level	(m AOI	D)
Soil	& Grou	ndwater			А	ir Pe	ercussio	n		R. Netsh	irembe		E 29.457 N -26 102		1630	.761	
S		ES & TE	STS									STRAT	Α				Install
Depth	Туре	Test Result	DID (Junv)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick			D	escription			Legend	Geology	Dia. 50 mm
			<0.1					-(1.00)	Moi FO	ist dark brown o RMATION].	clayey SAND	[Probable We	athered VRYHEID	)		VF	
Ē			<0.1				1629.76	- 1.00 -	Moi		layey SAND	[Probable We	athered VRYHEID	)			
			<0.1					(1.00)		NIVIA ( IUN].						VF	
2.00	ES		<0.1				1628.76	2.00	Moi FO	ist light brown s RMATION].	ilty SAND [Pr	obable Weath	nered VRYHEID		× · · · · · · · · · · · · · · · · · · ·		
			<0.1														
			<0.1					-									
			<0.1					-									
			<0.1					(8.00)								VF	
			<0.1					-							×     		
			<0.1					-									
			<0.1					-									
			<0.1				1620.76	- 10.00	Enc	d of Exploratory	Hole					END	
			I	Bori	ng Pr	ogre	ss .						Water Stri	kes			I
Date		Time	[	Depth		Casi	ng Dpt	Dia. (m	ım)	Water Dpt	Date	Time	Strike	Minutes	Standing	Ca	asing
		Chis	elling	1			_	V	Vater	Added							
From		То	I	Hours		Water Added     General Remarks       Tool     From     To       General Remarks     1. Groundwater not encountered.											
Sca	ale 1:68.	75	Not mar	Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. manual identification.									ided Key. Descrip	otions ar	e based on vis	ual and	

WSP G Build	Froup A	Africa (P	ty) Lt	d _	Proje	ect			BC	OREHC	DLE LO	DG		Hole	e No. E	3H0	8	
33 Sloan Teleph Fax	e Street ione: +2 k: +27 1	, Bryansto 27 11 361 1 361 130	on, 219 1380 )1	1	,			K	oma	ati Solar P\	/ & BESS	ESIA			1	l of	1	
Job No	4110	3965			Clier	nt		E	Esko	om Holding	s SOC Lir	nited		Date	e 0′	1-06-	22	
Contracto	r / Drill	ler		Meth	hod/F	Plant	Used		L	ogged By		Co-Ordina	ates (DEC)		Ground	Level	(m AOI	D)
Soil 8 Reme	k Grou diation	ndwater Service	IS		A	vir Pe	ercussio	n		R. Netsh	irembe		E 29.470 N -26.111			1650	.798	
SA		ES & TE	STS		-			Donth				STRAT	A					Install Backfi
Depth	Туре	Test Result	DID (Vmqq)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	(Thick			D	escription			L	.egend	Geology	Dia. 50 mm
-			<0.1					-(1.00)	Moi FOI	st dark brown o RMATION].	clayey SAND	[Probable We	athered VRYHEI	D	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	VF	
1.00	ES		<0.1				1649.80	- 1.00	Moi	st light brown o	lavev SAND	[Probable We	athered VRYHEI	ר ר		· · · · · · · · · · · · · · · · · · ·		
	20		<0.1					(1.00)	FOI	RMATION].						· · · · · · · · · · · · · · · · · · ·	VF	
			<0.1				1648.80	2.00	Moi FOI	st light brown s RMATION].	silty SAND [Pi	robable Weath	nered VRYHEID		×	×.		
			<0.1													· · ·× ·		
- - - - - - - -			<0.1					-								· · · · · · · · · · · · · · · · · · ·		
- - - - - - - -			<0.1					-								· · × ·		
- - - - - - - -			<0.1					(8.00)							×.	× . × .	VF	
-			<0.1					-								× . × .		
- - - - - - - -			<0.1												×			
- - - - -			<0.1					-							×.	· · · · · · · · · · · · · · · · · · ·		
- - - - -			<0.1				1640.80	- <u>10.00</u>	Enc	l of Exploratory	Hole				×	· · · · · ·	END	
	·!	Tim		Borir	ng Pr ∣	ogre	ss					-	Water Str	ikes				•
Date		IIme		Depth		Casi	ng Upt	Dia. (n	יm)	vvater Dpt	Date	lime	Strike	winutes	s Sta	anding	Ca	asing
		Chie	elling	1				W	Vator	Added								
From		Chiselling     Water Added       To     Hours     Tool     From     To       General Remarks     1. Groundwater not encountered.										red.		1		1		
Scal	e 1:68.	75	Not ma	es: Al nual io	 II dim dentit	iensio ficatio	ons in m	etres. L	ogs s	should be read	in accordance	e with the prov	<i>i</i> ided Key. Descri	ptions a	are based	l on vis	sual and	

WSP G	Group A	Africa (P	ty) Lt	d					BC	OREHO	DLE LO	DG		Hole	e No.	BH0	9	
Build 33 Sloan Teleph Fay	ling C, k e Street tone: +2 x: +27 1	Knightsbrid , Bryansto 27 11 361 1 361 130	lge, n, 219 1380 1	1	Proje	ect		К	oma	ati Solar P\	/ & BESS	ESIA		She	eet	1 of	1	
Job No	4110	3965			Clier	nt		E	Esko	om Holding	s SOC Lir	nited		Dat	te	31-05-	22	
Contracto	r / Dril	ler		Meth	nod/F	Plant	Used		L	ogged By		Co-Ordina	tes (DEC)		Groun	d Level	(m AOI	D)
Reme	& Grou diation	ndwater Service	s		A	vir Pe	ercussio	n		R. Netsh	irembe		N -26.095			1611	.041	
SA	AMPLE	ES & TE	STS					Denth				STRAT	٩					Install Backfi
Depth	Туре	Test Result	DIP (Vmqq)	HSV kN/m2	P.Pen kN/m2	Water	Elev. (mAOD)	(Thick			D	escription				Legend	Geology	Dia. 50 mm
			<0.1				1610.54	-ness) - - 0.50	MAI to s Rev	DE GROUND: ubangular fine vorked/Transp	Moist (firm) d to coarse we orted Natural	ark brown gra athered shale Material].	velly CLAY. Gra [Suspected	avel is a	angular		MG	
			-0.1						Moi	st (firm) light o ules [Probable	range to brow Weathered \	n sandy CLA` /RYHEID FOF	/ with occasiona RMATION].	l ferricr	rete			
Ē			-0.1					[(1.50)									VF	
- 1.50 	ES		<0.1				1609.04	2.00										
			<0.1					-	Moi FO	st (firm) light o RMATION].	range sandy (	CLAY [Probab	le Weathered VF	RYHEI	5			
			<0.1					(2.00)							VF			
			<0.1			1607.04 4.00 Moist becoming wet light brown clayey SAND [Probable W												
								-	VR		TION].							
			<0.1															
			<0.1															
			<0.1			<b>1</b> <u>−</u>		- 									VF	
			<0.1					-										
			<0.1					-										
			<0.1				1601.04	- 10.00	5								END	
									⊢nd	I OF Exploratory	TOIE							
: <u>-</u>			<u> </u>	Borii	ng Pr		ss	-			Water St	rikes						
Date		Time	1	Depth	Casing Dpt         Dia. (mm)         Water Dpt         Date         Time         Strik           0         0         0         0         7.00         0									Minute	s	Standing	Ca	asing
					Water Added													
From		Chis To		l Hours		Т	ool	V Fron	Vater n	Added To								
Scal	e 1:68.	.75	Not ma	es: Al nual i	ll dim denti	iensio ficatio	ons in m on.	etres. L	ogs s	hould be read	in accordance	e with the prov	ided Key. Descr	iptions	are bas	ed on vis	ual and	

WSP (	Group A	Africa (Pl	y) Lto	4 L	Proie	ect			BC	OREHO	DLE LO	DG		Ho	le No.	BH1	0	
33 Sloa Telep Fa	ne Štree hone: + ax: +27	t, Bryanstoi 27 11 361 11 361 130	ň, 2191 1380 1					K	oma	ati Solar P\	/ & BESS	ESIA				1 of	1	
Job No	4110	)3965		ľ	Clier	nt		E	Esko	om Holding	s SOC Lin	nited		Da	ate	30-05-	22	
Contracto	or / Dri	ller		Meth	nod/F	Plant	Used		L	ogged By		Co-Ordina	ates (DEC)		Grour	nd Level	(m AOI	D)
Soil Reme	& Grou ediatior	Indwater	5		A	vir Pe	ercussio	n		R. Netsh	irembe		E 29.456 N -26.092			1602	.403	
s	AMPL	ES & TES	STS									STRAT	A					Install / Backfill
Depth	Туре	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick			De	escription				Legend	Geology	Dia. 50 mm
-			<0.1				1601.90	- 0.50	MA to s Rev	DE GROUND: ubangular fine worked/Transp	Moist (firm) da to coarse wea orted Natural I	ark brown gra athered shale Material].	velly CLAY. G [Suspected	Gravel is a	angular		MG	
			<0.1					-	Moi nod	st (firm) light o lules [Probable	range to brow Weathered V	n sandy CLA` RYHEID FOF	Y with occasic RMATION].	onal ferric	crete			
-			-0.1					[(1.50)									VF	
1.50 	ES		<b>-</b> 0.1			₹	1600.40	- <u>2.</u> 00										
-			<0.1			-		-	Moi FOI	st (firm) light o RMATION].	range sandy (	CLAY [Probab	le Weathered	VRYHEI	ID			
			<0.1					(2.00)									VF	
			<0.1		1598.40 - 4.00 Moist light brown clayey SAND [Probable Weathered VRY FORMATION].								HEID					
								-	101	Nika nonj.								
-			<0.1					-										
								-										
			<0.1															
-								-										
			<0.1					- (6.00)									VF	
								-										
			<0.1															
Ē								-										
-			<0.1															
			-0.1					-										
							1592.40	- 10.00										
			<0.1						Enc	d of Exploratory	Hole						END	
Ē																		
		1	l	Boring Progress Water St Death Coasing Dat Dia (ann) Water Data Time Strike								Strikes	1			1		
Date		Time		Depth         Casing Dpt         Dia. (mm)         Water Dpt         Date         Time         Strike           2.00<								Strike 2.00	Minut	ies	Standing	Ca	asing	
		Chis	elling					W	Vater	Added								
From		То	Н	Hours         Tool         From         To         General Remarks           1. Seepage at 2m bgl.														
				1. Seepage at 2111 by:														
Sca	ale 1:68	.75	Note man	Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Desc manual identification.								scriptions	s are bas	sed on vis	ual and			



## CERTIFICATES OF ANALYSIS



Issue :

Element Materials Technology Unit D2 & D5 9 Quantum Road Firgrove Business Park Somerset West 7130 South Africa

W: www.element.com

WSP G Building 33 Sloai Bryanste Johanne Gauteng South A 2191	roup Africa C, Knightsbridge ne Street on ssburg frica	Hac-MIXA Verifing Laboratory T0739
Attentio	on :	Noma Nyoka
Date :		17th June, 2022
Your re	ference :	
Our refe	erence :	Test Report 22/528 Batch 1
Locatio	n :	Eskom Komati Project
Date sa	mples received :	7th June, 2022
Status		Final report

Thirty five samples were received for analysis on 7th June, 2022 of which thirty five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Analysis was undertaken at either Element Materials Technology UK, which is ISO 17025 accredited under UKAS (4225) or Element Materials Technology (SA) which is ISO 17025 accredited under SANAS (T0729) or a subcontract laboratory where specified.

1

NOTE: Under International Laboratory Accreditation Cooperation (ILAC), ISO 17025 (UKAS) accreditation is recognised as equivalent to SANAS (South Africa) accreditation.

Authorised By:

Debbie van Wyk

**Organics Laboratory:** 

Greg Ondrejkovic Technical Supervisor

**Inorganics Laboratory:** 

Greg Ondrejkovic Technical Supervisor

Please include all sections of this report if it is reproduced

## **Element Materials Technology**

Client Name:	WSP Gro	up Africa					Report :	Solid					
Location:	Eskom Ko	omati Proje	ct				Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Noma Nyo	oka						0 ,					
EMT Job No:	22/528												
EMT Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	AH 1	AH 2	AH 3	AH 4	AH 5	AH 6	AH 7	AH 8	AH 9	AH 10 (8)			
Depth	1M	1M	1M	1.1M	0.8M	1.5M	0.3M	1.1M	1.3M	1.1M	Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and a	cronyms
Containers	в	в	в	в	в	в	в	в	в	в			
Sample Date	02/06/2022	02/06/2022	02/06/2022	03/06/2022	03/06/2022	03/06/2022	02/06/2022	03/06/2022	04/06/2022	04/06/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			Method
Date of Receipt	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	LOD/LOR	Units	No.
Antimony*	5	2	2	3	5	2	3	2	4	2	<1	mg/kg	UK_TM30/UK_PM15
Arsenic*	10.0	5.9	4.6	6.8	6.0	4.1	6.1	3.0	5.1	1.6	<0.5	mg/kg	UK_TM30/UK_PM15
Cadmium*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	UK_TM30/UK_PM15
Chromium*	192.9	88.4	81.2	171.8	197.4	81.8	169.6	110.7	190.4	78.8	<0.5	mg/kg	UK_TM30/UK_PM15
Cobalt*	25.0	16.5	10.8	32.0	25.2	14.5	25.0	18.5	10.3	7.6	<0.5	mg/kg	UK_TM30/UK_PM15
Copper"	33	24	521AB	37	21	19	29	30	29	13	<1	mg/kg	UK_IM30/UK_PM15
lead*	24	15	28	35000 <b>AB</b>	43690	11	20	7	49310	19340	<20	mg/kg	UK TM30/UK PM15
Manganese*	754	663	543	1003	1006	275	1076	445	166	132	<1	ma/ka	UK TM30/UK PM15
Mercurv*	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ma/ka	UK TM30/UK PM15
Nickel*	28.2	33.9	44.4	35.0	25.2	30.3	26.2	39.1	23.1	12.3	<0.7	ma/ka	UK_TM30/UK_PM15
Selenium*	2	2	2	3	2	2	2	1	2	<1	<1	mg/kg	UK_TM30/UK_PM15
Vanadium*	130	62	54	123	81	70	91	77	115	45	<1	mg/kg	UK_TM30/UK_PM15
Zinc*	42	67	361	33	31	27	33	32	21	12	<5	mg/kg	UK_TM30/UK_PM15
VOC MS													
Methyl Tertiary Butyl Ether	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/kg	SA_TM15/SA_PM10
Vinyl Chloride	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/kg	SA_TM15/SA_PM10
1,1-Dichloroethene (1,1 DCE) SA	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	ug/kg	SA_TM15/SA_PM10
trans-1-2-Dichloroethene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
cis-1-2-Dichloroethene sA	<3	<3	17	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Chloroform SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Carbon tetrachloride SA	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/kg	SA_TM15/SA_PM10
1,2-Dichloroethane sa	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/kg	SA_TM15/SA_PM10
Benzene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Toluene **	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Ethylbenzene	3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Aylenes (sum of isomers)	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	ug/kg	SA_IM15/SA_PM10
1.3.5 Trimothylbonzono <sup>SA</sup>	<3	-3	<3	-3	-3	<3	<3	<3	<3	-3	-3	ug/kg	SA TM15/SA PM10
1.2.4 Trimethylbonzono <sup>SA</sup>	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	ug/kg	SA TM15/SA PM10
1,2,4- Minethylbenzene	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	ug/kg	SA TM15/SA PM10
1,4-Dichlorobenzene <sup>SA</sup>	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/kg	SA TM15/SA PM10
1,2,4-Trichlorobenzene	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	ug/ka	SA_TM15/SA_PM10
1,2,3-Trichlorobenzene	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	ug/ka	SA_TM15/SA_PM10
1,2-Dichloroethene (cis & trans)	<6	<6	17	<6	<6	<6	<6	<6	<6	<6	<6	ug/ka	SA_TM15/SA_PM10
Trichlorobenzenes (1,2,3 & 1,2.4)	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	ug/kg	SA_TM15/SA_PM10
1,2,3-Trimethylbenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM15/SA_PM10

## **Element Materials Technology**

Client Name:	WSP Gro	up Africa					Report :	Solid					
Location:	Eskom Ko	omati Proie	ct				Solids: V=	60a VOC ia	.l=250a al	ass iar T=n	lastic tub		
Contact:	Noma Nvo	oka	-				30/103. V-1	ssa voo ja	, u 2009 yi				
EMT Job No:	22/528												
					-		-			10			
EMT Sample No.	1	2	3	4	5	6	7	8	9	10			
Sample ID	AH 1	AH 2	AH 3	AH 4	AH 5	AH 6	AH 7	AH 8	AH 9	AH 10 (8)			
Depth	1M	1M	1M	1.1M	0.8M	1.5M	0.3M	1.1M	1.3M	1.1M	5		
000 No (miss									-		Please se abbrevi	e attached n ations and ac	otes for all cronyms
COC No / misc													
Containers	В	В	В	В	В	В	В	В	В	В			
Sample Date	02/06/2022	02/06/2022	02/06/2022	03/06/2022	03/06/2022	03/06/2022	02/06/2022	03/06/2022	04/06/2022	04/06/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Baton Hamber											LOD/LOR	Units	Method No.
Date of Receipt	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022			
SVOC MS													
Phenois													
2-Chlorophenol <sup>SA</sup>	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
2,4,6-Trichlorophenol SA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
PAHs													
Naphthalene SA	549	<10	<10	<10	<10	47	237	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
Pyrene SA	127	<10	<10	<10	13	78070 <sub>AC</sub>	124	14	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
Benzo(a)pyrene	49	<10	<10	<10	<10	26723 <sub>AC</sub>	162	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
Other SVOCs													
Nitrobenzene 34	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
7711 01110													
TPH CWG													
Aliphatics													
07-09	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	SA_TM36/SA_PM12
C10-C14	<4	<4	<4	<4	<4	55	<4	<4	<4	<4	<4	mg/kg	SA_TM5/SA_PM8/PM16
C 15-C30	</th <th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th>1278</th><th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th>mg/kg</th><th>SA_IMDISA_PM8/PM16</th></th></th></th></th></th></th></th></th></th>	</th <th><!--</th--><th><!--</th--><th><!--</th--><th>1278</th><th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th>mg/kg</th><th>SA_IMDISA_PM8/PM16</th></th></th></th></th></th></th></th></th>	</th <th><!--</th--><th><!--</th--><th>1278</th><th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th>mg/kg</th><th>SA_IMDISA_PM8/PM16</th></th></th></th></th></th></th></th>	</th <th><!--</th--><th>1278</th><th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th>mg/kg</th><th>SA_IMDISA_PM8/PM16</th></th></th></th></th></th></th>	</th <th>1278</th> <th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th>mg/kg</th><th>SA_IMDISA_PM8/PM16</th></th></th></th></th></th>	1278	</th <th><!--</th--><th><!--</th--><th><!--</th--><th><!--</th--><th>mg/kg</th><th>SA_IMDISA_PM8/PM16</th></th></th></th></th>	</th <th><!--</th--><th><!--</th--><th><!--</th--><th>mg/kg</th><th>SA_IMDISA_PM8/PM16</th></th></th></th>	</th <th><!--</th--><th><!--</th--><th>mg/kg</th><th>SA_IMDISA_PM8/PM16</th></th></th>	</th <th><!--</th--><th>mg/kg</th><th>SA_IMDISA_PM8/PM16</th></th>	</th <th>mg/kg</th> <th>SA_IMDISA_PM8/PM16</th>	mg/kg	SA_IMDISA_PM8/PM16
	<12	<12	<12	<12	\$12	1333	\$12	\$12	\$12	\$12	\$12	mg/kg	
PCBs (Total vs Aroclor 1254)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM17/SA_PM8
Natural Moisture Content	11.1	15.6	58.9	13.1	13.9	16.5	11.9	20.3	24.3	17.7	<0.1	%	SA_PM4/SA_PM0
Fluoride	0.8	0.7	1.0	1.0	2.8	2.4	2.0	0.9	<0.3	<0.3	<0.3	mg/kg	SA_TM27/SA_PM20
Chloride <sup>SA</sup>	7	8	21	3	6	5	5	9	3	<2	<2	mg/kg	SA_TM27/SA_PM20
Nitrite as NO2 SA	1.8	<0.5	1.9	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	mg/kg	SA_TM27/SA_PM20
Nitrate as NO3 <sup>sa</sup>	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	mg/kg	SA_TM27/SA_PM20
Sulphate as SO4 (2:1 Ext) <sup>SA</sup>	4173 <sub>AD</sub>	286	675 <sub>AA</sub>	1228 <sub>AC</sub>	61	116	512 <sub>AA</sub>	248	217	117	<3	mg/kg	SA_TM27/SA_PM20
Nitrite as N <sup>SA</sup>	0.5	<0.2	0.6	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	SA_TM27/SA_PM20
Nitrate as N <sup>SA</sup>	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	mg/kg	SA_TM27/SA_PM20
Hexavalent Chromium*	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	UK_TM38/UK_PM20
Chromium III*	192.9	88.4	81.2	171.8	197.4	81.8	169.6	110.7	190.4	78.8	<0.5	mg/kg	UK_TILDO/TILDOUK_PM/IS/PM20
Ammoniacal Nitrogen as N	1.4	<0.6	<0.6	<0.6	<0.6	1.5	<0.6	<0.6	<0.6	<0.6	<0.6	mg/kg	SA_TM27/SA_PM20
Ammoniacal Nitrogen as NH4	1.8	<0.6	<0.6	<0.6	<0.6	1.9	<0.6	<0.6	<0.6	<0.6	<0.6	mg/kg	SA_TM27/SA_PM20
Total Cyanide*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	UK_TM89/UK_PM45
Electrical Conductivity @25C (5:1 ext)	1224	140	589	374	117	163	300	192	187	<100	<100	uS/cm	SA_TM28/SA_PM58
pH <sup>sa</sup>	7.13	7.29	7.56	7.54	7.92	7.83	7.78	7.76	6.34	5.45	<2.00	pH units	SA_TM19/SA_PM11

## **Element Materials Technology**

Client Name:	WSP Gro	up Africa					Report :	Solid					
Reference:	Eskom Kr	omati Proje	ct				Solido: \/-		r 1-250a al	acciar T-n	lactic tub		
Contact:	Noma Nv	oka	01				Solius: v-	oog voc ja	r, J–250g gi	ass jar, 1-p			
EMT Job No:	22/528	ond											
											1		
EMT Sample No.	11	12	13	14	15	16	17	18	19	20			
Sample ID	AH 11	AH 12	AH 13	AH 14	AH 15	AH 16	AH 17	AH 18	AH 19	AH 20			
Depth	1.5M	1.5M	0.6M	1.1M	1M	0.3M	0.8M	1.7M		1.6M	Diagon on	a attached r	atoo for all
COC No / misc											abbrevi	ations and a	cronyms
Containers	в	в	в	в	в	в	в	в	в	в			
Sample Date	03/06/2022	03/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022	03/06/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt		07/06/2022		07/06/2022	07/06/2022					07/06/2022	LOD/LOR	Units	Method No.
	5	01100/2022	01/00/2022	01100/2022	01100/2022	01100/2022	01100/2022	01100/2022	01100/2022	01100/2022	- 1		
Antimony"	5	4	3	5	12.0	5	5	3	3	4	<1	mg/kg	UK_IM30/UK_PM15
Arsenic Codmium*	3.7	3.0 <0.1	0.4 <0.1	0.9 <0.1	13.8	9.2	10.4	5.4 <0.1	3.9 <0.1	5.5	<0.5	mg/kg	
Caumium*	109.9	142.0	169.4	208.5	77.5	226.9	105.9	134.2	114.1	160.6	<0.1	mg/kg	
Cobalt*	35.5	0.8	31.7	200.J	53	250.0	0.4	9.5	24.2	140.5	<0.5	mg/kg	
Coppor*	21	20	42	43.0	246	23.3	5.4	27	24.5	30	<0.5	mg/kg	
	21	40300	52820	70590	40030	69320	101500	56300	30520	54470	<20	mg/kg	
lead*	10	40390	24	/9300AB	20	28	101300 <b>AB</b>	15	17	100	<5	mg/kg	
Manganese*	13	240	1209	93	121	850	45	66	831	1804	<1	mg/kg	
Moreun/*		<0.1	<0.1	0.2	0.0	0.1	40	<0.1	0.1	<0.1	<0.1	mg/kg	
Nickol*	20.2	16.2	49.3	30.0	10.3	20.1	36.7	30.0	22.6	42.5	<0.7	mg/kg	
Selenium*	20.2	10.5	3	2	2	23.1	1	2	22.0	1	<1	mg/kg	UK TM30/UK PM15
Vanadium*	85	87	128	169	47	159	177	122	76	02	<1	mg/kg	
Zinc*	10	19	120	24	47	30	25	21	24	92	<5	mg/kg	UK TM30/UK PM15
ZIIIC	19	10	50	24	13		25	21	24	10	-5	iiig/kg	
VOC MS													
Methyl Tertiary Butyl Ether	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ua/ka	SA TM15/SA PM10
Vinvl Chloride	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ua/ka	SA_TM15/SA_PM10
1 1-Dichloroethene (1 1 DCF) SA	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	ua/ka	SA_TM15/SA_PM10
trans-1-2-Dichloroethene <sup>SA</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ua/ka	SA_TM15/SA_PM10
cis=1-2-Dichloroethene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ua/ka	SA TM15/SA PM10
Chloroform <sup>SA</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ua/ka	SA TM15/SA PM10
Carbon tetrachloride SA	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ua/ka	SA TM15/SA PM10
1.2-Dichloroethane SA	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ua/ka	SA TM15/SA PM10
Renzene <sup>SA</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ua/ka	SA TM15/SA PM10
Toluene <sup>SA</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ua/ka	SA TM15/SA PM10
Chlorobenzene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA TM15/SA PM10
Ethylhenzene <sup>SA</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ua/ka	SA TM15/SA PM10
Xvlenes (sum of isomers)	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	ug/kg	SA TM15/SA PM10
1 1 2 2-Tetrachloroethane	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA TM15/SA PM10
1 3 5-Trimethylbenzene <sup>SA</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ua/ka	SA TM15/SA PM10
1.2.4-Trimethylbenzene <sup>SA</sup>	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	ug/kg	SA TM15/SA PM10
1.4-Dichlorobenzene <sup>SA</sup>	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/kg	SA TM15/SA PM10
1,4-Dichlorobenzene SA	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/kg	SA TM15/SA PM10
	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	ug/kg	SA TM15/SA PM10
1,2,4-Trichlorobenzene	<7	<7	<7	<7	<7	<7	<7	-7	<7	<7	<7	ug/kg	SA TM15/SA PM10
1.2. Disblarasthana (sia 8 trana)	~6	-6	-1			-1		-1	-1	-1	-1	ug/kg	
	~0	-14	~0	-14	-14	~0	~0	~0	~0	~0	~0	ug/kg	SA THALEIGA PALIC
monorobenzenes (1,2,3 & 1,2,4)	×14	×14	×14	×14	×14	×14	×14	×14	×14	~14	~14	ид/кд	3A_1M15/SA_PM10
1,2,3-Trimethylbenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM15/SA_PM10
	1	1	1	1	1	1						1	1
Client Name:	WSP Gro	up Africa					Report :	Solid					
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Reference:	Eskom Ko	omati Proie	ct				Solids: V=	60g VOC ia	r .l=250a.al	ass iar T=r	plastic tub		
Contact:	Noma Ny	oka					Conus. v-	009 100 ja	i, 0–2009 gi	ass jai, 1–p			
EMT Job No:	22/528												
		10	10		15	10	17	10	10		1		
EMT Sample No.	11	12	13	14	15	16	17	18	19	20			
Sample ID	AH 11	AH 12	AH 13	AH 14	AH 15	AH 16	AH 17	AH 18	AH 19	AH 20			
Depth	1.5M	1.5M	0.6M	1.1M	1M	0.3M	0.8M	1.7M		1.6M	Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and a	cronyms
Containers	в	в	в	в	в	в	в	в	в	в	1		
Sample Date	03/06/2022	03/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022	04/06/2022	03/06/2022	1		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	1		
Datab Number		001	001		4	4	4	4	4	4	ļ		
Batch Number		1			1	1	1	1	1		LOD/LOR	Units	Method No.
Date of Receipt	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022			
SVOC MS													
Phenois													
2-Chlorophenol <sup>sa</sup>	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
2,4,6-Trichlorophenol SA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
PAHs													
Naphthalene SA	<10	<10	<10	<10	337	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
Pyrene sa	<10	<10	<10	<10	72	19	<10	<10	18	<10	<10	ug/kg	SA_TM16/SA_PM8
Benzo(a)pyrene <sup>sa</sup>	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
Other SVOCs													
Nitrobenzene SA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
TPH CWG													
Aliphatics													
C7-C9	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	SA_TM36/SA_PM1:
C10-C14	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	SA_TM5/SA_PM8/PM1
C15-C36	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	SA_TM5/SA_PM8/PM1
Total aliphatics C7-C36	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	mg/kg	SA, THISTMOUSA, PHILPHY2PHY
PCBs (Total vs Aroclor 1254)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM17/SA_PM8
Natural Moisture Content	21.7	23.6	14.6	14.7	19.6	8.0	17.1	22.4	14.7	22.7	<0.1	%	SA_PM4/SA_PM
Fluoride	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	mg/kg	SA_TM27/SA_PM2
Chloride <sup>sa</sup>	6	10	33	6	32	6	<2	5	19	7	<2	mg/kg	SA_TM27/SA_PM2
Nitrite as NO2 <sup>SA</sup>	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	SA_TM27/SA_PM2
Nitrate as NO3 <sup>SA</sup>	<2.5	<2.5	<2.5	<2.5	6.8	<2.5	<2.5	<2.5	10.0	<2.5	<2.5	mg/kg	SA_TM27/SA_PM2
Sulphate as SO4 (2:1 Ext) <sup>SA</sup>	311	185	534 <sub>AA</sub>	338	4302 <sub>AD</sub>	412	54	172	2723 <sub>AD</sub>	51	<3	mg/kg	SA_TM27/SA_PM2
Nitrite as N <sup>SA</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	SA_TM27/SA_PM2
Nitrate as N <sup>SA</sup>	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	mg/kg	SA_TM27/SA_PM2
Hexavalent Chromium*	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	UK_TM38/UK_PM2
Chromium III*	198.8	142.0	168.4	208.5	77.5	236.8	195.8	134.2	114.1	169.6	<0.5	mg/kg	UK,TILDETTABLIK, PMSPNA
Ammoniacal Nitrogen as N	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	mg/kg	SA_TM27/SA_PM2
Ammoniacal Nitrogen as NH4	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	mg/kg	SA_TM27/SA_PM2
Total Cyanide*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	UK_TM89/UK_PM4
Electrical Conductivity @25C (5:1 ext)	158	109	287	194	2640	222	<100	103	1047	<100	<100	uS/cm	SA_TM28/SA_PM5
pH 🛰	5.48	5.33	6.31	6.60	6.76	6.96	6.59	6.13	7.00	6.92	<2.00	pH units	SA_TM19/SA_PM1
	1	1	1	1	1						1		1

Client Name: Reference:	WSP Gro	up Africa					Report :	Solid					
Location:	Eskom Ko	omati Proie	ct				Solids: V=	60a VOC ia	r .l=250a al	lass iar T=r	lastic tub		
Contact:	Noma Nv	oka					Condo. V	009 100 ju	r, oʻzoog gi	labo jai, i p			
EMT Job No:	22/528												
EMT Sample No.	21	22	23	24	25	26	27	28	29	30			
Sample ID	AH 21	AH 22	AH 23	AH 24	AH 25	BH 1	BH 2	BH 3	BH 4	BH 5			
Donth	1.0M	114	1.1M	1.1M	1.2M	1 EM	114	1 EM	114	1 EM			
Deptil	1.211	TIVI	1.11VI	1.11VI	1.3101	1.5101	T IVI	1.5101	TIVI	1.5101	Please se	e attached n	notes for all
COC No / misc											abbievi	allons and a	cionyms
Containers	в	В	в	в	в	в	в	в	в	в			
Sample Date	04/06/2022	04/06/2022	03/06/2022	03/06/2022	03/06/2022	02/06/2022	02/06/2022	02/06/2022	01/06/2022	31/05/2022			
	0 1100/2022	0 11 001 2022	00,00,2022	00,00,2022	00,00,2022	02/00/2022	02/00/2022	02/00/2022	0110012022	0 11 001 2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			1
Batch Number	1	1	1	1	1	1	1	1	1	1	100/100	11.24	Method
Date of Receipt	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	LOD/LOR	Units	No.
Antimony*	<5	<5	<5	2	3	2	<1	<5	3	<5	<1	ma/ka	UK TM30/UK PM1
Arsenic*	~9 <b>AB</b>	14.0	1/1.8	26	4.5	3.2	3.5	~3AB	3.0	~~AB	<0.5	mg/kg	UK TM30/UK PM1
Codmium*	20.0	<0.1	<0.1	2.0	4.5	-0.1	-0.1	7.0	-0.1	5.5	<0.5	mg/kg	
Chromium*	~0.1	244.0	200.0	~0.1	10.1	~0.1 96 E	11.0	242.4	156.5	201.2	<0.1	mg/kg	
	010.3AB	341.0AB	388.9AB	03.0	133.0	00.5	F 2	313.1AB	74.0	301.3AB	<0.5	mg/kg	
Cobait"	103.7	28.2	0.0	00.7	3.9	0.0	0.3	10.5	74.2	38.8	<0.5	mg/kg	
Copper"	99	03	48	20	19	21	14	40	28	47	<1 100	mg/kg	
iron"	176900AB	127300AB	77500AB	31800	24840	29140	3903	77050AB	36030	88420AB	<20	mg/kg	
Lead	64	25	11	23	<5	<5	16	12	93	24	<5	mg/kg	UK_TM30/UK_PM1
Manganese*	885	397	55	1104	21	104	70	238	2680 <sub>AB</sub>	926	<1	mg/kg	UK_TM30/UK_PM1
Mercury*	0.3	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.1	<0.1	<0.1	mg/kg	UK_TM30/UK_PM1
Nickel*	57.7	43.8	24.5	39.6	12.6	24.8	10.4	40.2	20.0	36.2	<0.7	mg/kg	UK_TM30/UK_PM1
Selenium*	3	2	2	1	<1	1	<1	1	1	2	<1	mg/kg	UK_TM30/UK_PM1
Vanadium*	371 <sub>AB</sub>	247 <sub>AB</sub>	293 <sub>AB</sub>	76	140	71	22	175	97	202	<1	mg/kg	UK_TM30/UK_PM1
Zinc*	28	22	13	21	9	24	16	21	18	26	<5	mg/kg	UK_TM30/UK_PM1
VOC MS													
Methyl Tertiary Butyl Ether	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/kg	SA_TM15/SA_PM1
Vinyl Chloride	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/kg	SA_TM15/SA_PM1
1,1-Dichloroethene (1,1 DCE) SA	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	ug/kg	SA_TM15/SA_PM1
trans-1-2-Dichloroethene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM1
cis-1-2-Dichloroethene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM1
Chloroform SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM1
Carbon tetrachloride <sup>SA</sup>	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/kg	SA_TM15/SA_PM1
1,2-Dichloroethane <sup>sa</sup>	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/kg	SA_TM15/SA_PM1
Benzene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM1
Toluene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM1
Chlorobenzene <sup>SA</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM1
Ethylbenzene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	4	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM1
Xylenes (sum of isomers)	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	ug/kg	SA_TM15/SA_PM1
1,1,2,2-Tetrachloroethane	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM1
1,3,5-Trimethylbenzene sa	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM1
1,2,4-Trimethylbenzene SA	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	ug/kg	SA_TM15/SA_PM1
1,4-Dichlorobenzene SA	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/kg	SA_TM15/SA_PM1
1,2-Dichlorobenzene SA	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/kg	SA_TM15/SA_PM1
1,2,4-Trichlorobenzene	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	ug/kg	SA_TM15/SA_PM1
1,2,3-Trichlorobenzene	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	ug/kg	SA_TM15/SA_PM1
1,2-Dichloroethene (cis & trans)	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	ug/ka	SA_TM15/SA_PM1
Trichlorobenzenes (1,2,3 & 1,2,4)	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	ug/kg	SA_TM15/SA_PM1
( <i>, , , , , , , , , , , , , , , , , , ,</i>													
1,2,3-Trimethylbenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/ka	SA_TM15/SA_PM1
,												33	
	1	1		1									1

Client Name:	WSP Gro	up Africa					Report :	Solid					
Reference: Location: Contact:	Eskom Ko Noma Nyo	omati Proje oka	ct				Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	astic tub		
EMT Job No:	22/528												
EMT Sample No.	21	22	23	24	25	26	27	28	29	30			
Sample ID	AH 21	AH 22	AH 23	AH 24	AH 25	BH 1	BH 2	BH 3	BH 4	BH 5			
Depth	1.2M	1M	1.1M	1.1M	1.3M	1.5M	1M	1.5M	1M	1.5M			
COC No / miss											abbrevi	e attached n ations and a	cronyms
	_	_	_	_	_	_	_	_	_	_			
Containers	В	В	В	В	В	В	В	В	В	В			
Sample Date	04/06/2022	04/06/2022	03/06/2022	03/06/2022	03/06/2022	02/06/2022	02/06/2022	02/06/2022	01/06/2022	31/05/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			Method
Date of Receipt	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	LOD/LOR	Units	No.
SVOC MS													
Phenois													
2-Chlorophenol SA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM
2,4,6-Trichlorophenol SA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM
PAHs													
Naphthalene <sup>sa</sup>	<10	<10	<10	<10	<10	<10	934	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM
Pyrene <sup>sa</sup>	<10	<10	<10	<10	<10	<10	540	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM
Benzo(a)pyrene <sup>sa</sup>	<10	<10	<10	<10	<10	<10	321	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM
Other SVOCs													
Nitrobenzene <sup>SA</sup>	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM
TPH CWG													
Aliphatics													
C7-C9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	SA_TM36/SA_PM1
C10-C14	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	SA_TM5/SA_PM8/PM1
C15-C36	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	SA_TM5/SA_PM8/PM1
Total aliphatics C7-C36	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	mg/kg	SA_THSTM06SA_PH8PMt2PMt
PCBs (Total vs Aroclor 1254)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/kg	SA_TM17/SA_PM
Natural Moisture Content	10.2	18.4	14.1	16.9	18.7	13.2	7.7	14.6	24.7	15.2	<0.1	%	SA_PM4/SA_PM
Fluoride	<0.3	<0.3	<0.3	<0.3	<0.3	1.3	0.4	0.4	<0.3	0.3	<0.3	mg/kg	SA_TM27/SA_PM2
Chloride SA	<2	3	4	6	2	3	2	9	17	74	<2	mg/kg	SA_TM27/SA_PM2
Nitrite as NO2 SA	<0.5	<0.5	<0.5	<0.5	0.9	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	SA_TM27/SA_PM2
Sulphata as SO4 (2:1 Ext) SA	<2.5 448	×2.5 85	<2.5 88	216	~2.5 67	~2.5 56	1007	2.5	×2.5 34	584	~2.5	mg/kg	SA_TM27/SA_PM2
Nitrite as N SA	<0.2	<0.2	<0.2	<0.2	0.3	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	ma/ka	SA TM27/SA PM2
Nitrate as N <sup>SA</sup>	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ma/ka	SA_TM27/SA_PM2
Hexavalent Chromium*	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	UK_TM38/UK_PM2
Chromium III*	610.3 <sub>AB</sub>	341.6 <sub>AB</sub>	388.9 <sub>AB</sub>	83.6	133.6	86.5	11.0	313.1 <sub>AB</sub>	156.5	301.3 <sub>AB</sub>	<0.5	mg/kg	UK,TADOTRODUK,PMISIPAZ
Ammoniacal Nitrogen as N	10	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	ma/ka	SA TM27/SA PM2
Ammoniacal Nitrogen as NH4	1.3	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	mg/ka	SA_TM27/SA_PM2
												33	_
Total Cyanide*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	UK_TM89/UK_PM4
Electrical Conductivity @25C (5:1 ext)	172	<100	<100	127	<100	<100	729	187	<100	228	<100	uS/cm	SA_TM28/SA_PM5
рН <sup>sa</sup>	4.58	5.44	6.31	6.24	6.04	6.96	6.91	6.99	6.32	6.55	<2.00	pH units	SA_TM19/SA_PM1

Client Name:	WSP Gro	up Africa				Report :	Solid					
Location:	Eskom Ko	omati Proje	ct			Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Noma Nyo	oka										
EMT Job No:	22/528					 						
EMT Sample No.	31	32	33	34	35							
Sample ID	BH 6	BH 7	BH 8	BH 9	BH 10							
Depth	1.5M	2M	1M	1.5M	1.5M					Please se	e attached n	otes for all
COC No / misc										abbrevi	ations and a	cronyms
Containers	в	в	в	в	в							
Oceanity Dette												
Sample Date	31/05/2022	01/06/2022	01/06/2022	31/05/2022	30/05/2022							
Sample Type	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1						Linita	Method
Date of Receipt	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022					LOD/LOK	Units	No.
Antimony*	1	2	<5 <sub>AB</sub>	6	4					<1	mg/kg	UK_TM30/UK_PM15
Arsenic*	1.6	1.9	23.0	10.1	8.0					<0.5	mg/kg	UK_TM30/UK_PM15
Cadmium*	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	UK_TM30/UK_PM15
Chromium*	75.3	68.9	279.0 <sub>AB</sub>	244.7	190.7					<0.5	mg/kg	UK_TM30/UK_PM15
Cobalt*	3.6	7.4	69.5	58.1	121.2					<0.5	mg/kg	UK_TM30/UK_PM15
Copper"	12	17	39	50	50					<1	mg/kg	UK_IM30/UK_PM15
l ead*	12080	20020	92300AB	20	53					<20	mg/kg	UK_TM30/UK_PM15
Manganese*	43	101	968	967	519645					<1	ma/ka	UK TM30/UK PM15
Mercurv*	<0.1	<0.1	0.2	0.1	0.2					<0.1	ma/ka	UK_TM30/UK_PM15
Nickel*	15.6	18.3	60.6	51.0	59.5					<0.7	mg/kg	UK_TM30/UK_PM15
Selenium*	<1	<1	<1	1	3					<1	mg/kg	UK_TM30/UK_PM15
Vanadium*	33	44	188	201	185					<1	mg/kg	UK_TM30/UK_PM15
Zinc*	16	18	40	19	26					<5	mg/kg	UK_TM30/UK_PM15
VOC MS												
Methyl Tertiary Butyl Ether	<2	<2	<2	<2	<2					<2	ug/kg	SA_TM15/SA_PM10
Vinyl Chloride	<2	<2	<2	<2	<2					<2	ug/kg	SA_TM15/SA_PM10
1,1-Dichloroethene (1,1 DCE) SA	<6	<6	<6	<6	<6					<6	ug/kg	SA_TM15/SA_PM10
trans-1-2-Dichloroethene sa	<3	<3	<3	<3	<3					<3	ug/kg	SA_TM15/SA_PM10
cis-1-2-Dichloroethene	<3	<3	<3	<3	<3					<3	ug/kg	SA_TM15/SA_PM10
Chloroform <sup>SA</sup>	<3	<3	<3	<3	<3					<3	ug/kg	SA_TM15/SA_PM10
Carbon tetrachloride	<4	<4	<4	<4	<4					<4	ug/kg	SA_IM15/SA_PM10
	~4 <3	<	<4 <3	<7	<4					~4 <3	ug/kg	SA TM15/SA PM10
	<3	<3	<3	<3	<3					<3	ug/kg	SA TM15/SA PM10
Chlorobenzene <sup>SA</sup>	<3	<3	<3	<3	<3					<3	ug/kg	SA_TM15/SA_PM10
Ethvibenzene <sup>sa</sup>	<3	<3	<3	<3	<3					<3	ug/kg	SA_TM15/SA_PM10
Xylenes (sum of isomers)	<8	<8	<8	<8	<8					<8	ug/kg	SA_TM15/SA_PM10
1,1,2,2-Tetrachloroethane	<3	<3	<3	<3	<3					<3	ug/kg	SA_TM15/SA_PM10
1,3,5-Trimethylbenzene sa	<3	<3	<3	<3	<3					<3	ug/kg	SA_TM15/SA_PM10
1,2,4-Trimethylbenzene SA	<6	<6	<6	<6	<6					<6	ug/kg	SA_TM15/SA_PM10
1,4-Dichlorobenzene <sup>SA</sup>	<4	<4	<4	<4	<4					<4	ug/kg	SA_TM15/SA_PM10
1,2-Dichlorobenzene SA	<4	<4	<4	<4	<4					<4	ug/kg	SA_TM15/SA_PM10
1,2,4-Trichlorobenzene	<7	<7	<7	<7	<7					<7	ug/kg	SA_TM15/SA_PM10
1,2,3-Trichlorobenzene	<7	<7	<7	<7	<7					<7	ug/kg	SA_TM15/SA_PM10
1,2-Dichloroethene (cis & trans)	<6	<6	<6	<6	<6					<6	ug/kg	SA_TM15/SA_PM10
Trichlorobenzenes (1,2,3 & 1,2,4)	<14	<14	<14	<14	<14					<14	ug/kg	SA_TM15/SA_PM10
1,2,3-Trimethylbenzene	<10	<10	<10	<10	<10					<10	ug/kg	SA_TM15/SA_PM10

Client Name: Reference:	WSP Gro	up Africa				Report :	Solid					
Location:	Eskom Ko	omati Proje	ct			Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
EMT Job No	22/528	UKd										
EMT Sample No.	31	32	33	34	35							
Sample ID	BH 6	BH 7	BH 8	BH 9	BH 10							
Depth	1.5M	2M	1M	1.5M	1.5M					D		
										abbrevi	e attached n ations and a	otes for all cronyms
COC NO / MISC												
Containers	В	В	В	В	В							
Sample Date	31/05/2022	01/06/2022	01/06/2022	31/05/2022	30/05/2022							
Sample Type	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1							
Daten Number										LOD/LOR	Units	Method No.
Date of Receipt	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022							
SVOC MS												
Phenois												
2-Chlorophenol SA	<10	<10	<10	<10	<10					<10	ug/kg	SA_TM16/SA_PM8
2,4,6-Trichlorophenol <sup>SA</sup>	<10	<10	<10	<10	<10					<10	ug/kg	SA_TM16/SA_PM8
PAHs												
Naphthalene 3	<10	<10	<10	<10	<10					<10	ug/kg	SA_TM16/SA_PM8
Pyrene SA	<10	<10	<10	<10	<10					<10	ug/kg	SA_TM16/SA_PM8
Benzo(a)pyrene	<10	<10	<10	<10	<10					<10	ug/kg	SA_TM16/SA_PM8
SA SA	-10	-10	-10	-10	-10					-10		
Nitrobenzene	<10	<10	<10	<10	<10					<10	ug/kg	SA_TM16/SA_PM8
Alizhatian												
Aliphatics	-0.4	-0.1	-0.1	-0.4	-0.1					-0.1		-
C1-C9	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	
C15-C36	<7	<7	<7	<7	<7					<7	ma/ka	SA TM5/SA PM8/PM16
Total aliphatics C7-C36	<12	<12	<12	<12	<12					<12	ma/ka	SA,TISTINISA, PIEPW2PWS
PCBs (Total vs Aroclor 1254)	<10	<10	<10	<10	<10					<10	ug/kg	SA_TM17/SA_PM8
Natural Moisture Content	20.9	19.8	15.8	15.1	18.4					<0.1	%	SA_PM4/SA_PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/kg	SA_TM27/SA_PM20
Chloride SA	3	6	3	<2	4					<2	mg/kg	SA_TM27/SA_PM20
Nitrite as NO2 <sup>sa</sup>	0.9	<0.5	<0.5	<0.5	<0.5					<0.5	mg/kg	SA_TM27/SA_PM20
Nitrate as NO3 <sup>SA</sup>	<2.5	<2.5	<2.5	<2.5	<2.5					<2.5	mg/kg	SA_TM27/SA_PM20
Sulphate as SO4 (2:1 Ext) <sup>SA</sup>	34	51	247	60	27					<3	mg/kg	SA_TM27/SA_PM20
Nitrite as N <sup>SA</sup>	0.3	<0.2	<0.2	<0.2	<0.2					<0.2	mg/kg	SA_TM27/SA_PM20
Nitrate as N <sup>SA</sup>	<2.5	<2.5	<2.5	<2.5	<2.5					<2.5	mg/kg	SA_TM27/SA_PM20
Hexavalent Chromium*	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/kg	UK_TM38/UK_PM20
Chromium III*	75.3	68.9	279.0 <sub>AB</sub>	244.7	190.7					<0.5	mg/kg	UK_TREETROBUK_PMISPM20
Ammoniacal Nitrogen as N	<0.6	<0.6	<0.6	<0.6	<0.6					<0.6	mg/kg	SA_TM27/SA_PM20
Ammoniacal Nitrogen as NH4	<0.6	<0.6	<0.6	<0.6	<0.6					<0.6	mg/kg	SA_TM27/SA_PM20
Total Cyanide*	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	mg/kg	UK_TM89/UK_PM45
Electrical Conductivity @25C (5:1 ext)	<100	<100	126	<100	<100					<100	uS/cm	SA_TM28/SA_PM58
pH <sup>sa</sup>	6.91	6.46	6.73	6.44	7.21					<2.00	pH units	SA_TM19/SA_PM11

Notification of Deviating Samples

Client Name: WSP Group Africa

# Reference:

Location: Eskom Komati Project

Contact: Noma Nyoka

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
					No deviating sample report results for job 22/528	

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

**EMT Job No.:** 22/528

## SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at  $35^{\circ}C \pm 5^{\circ}C$  unless otherwise stated. Moisture content for CEN Leachate tests are dried at  $105^{\circ}C \pm 5^{\circ}C$ . Ash samples are dried at  $37^{\circ}C \pm 5^{\circ}C$ .

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

#### **DEVIATING SAMPLES**

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

# BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation. Laboratory records are kept for a period of no less than 6 years.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

#### **Measurement Uncertainty**

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

#### **Customer Provided Information**

Sample ID and depth is information provided by the customer.

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
w	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
со	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
ос	Outside Calibration Range
AA	x2 Dilution
AB	x5 Dilution
AC	x10 Dilution
AD	x20 Dilution

#### EMT Job No: 22/528

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
SA_PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	SA_PM0	No preparation is required.			AR	
SA_TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds by Headspace GC-MS.	SA_PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
SA_TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds by Headspace GC-MS.	SA_PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
SA_TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	SA_PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
SA_TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	SA_PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
SA_TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	SA_PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
SA_TM19	Determination of pH by bench pH meter	SA_PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
SA_TM27	Major ions by lon Chromatography	SA_PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a orbital shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a orbital shaker.			AD	Yes
SA_TM27	Major ions by lon Chromatography	SA_PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a orbital shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a orbital shaker.	Yes		AD	Yes
SA_TM27	Major ions by lon Chromatography	SA_PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a orbital shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a orbital shaker.			AR	Yes

#### EMT Job No: 22/528

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
SA_TM28	Determination of Electrical Conductivity with hand held manual conductivity probe.	SA_PM58	Dried and ground solid samples are extracted with water in a 5:1 water to solid ratio, the samples are shaken on an orbital shaker.			AD	Yes
SA_TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12, MTBE and BTEX by headspace GC-FID.	SA_PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
SA_TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	SA_PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
SA_TM5/TM36	Hydrocarbons (EPH) including column fractionation in soverin Extractable Februari Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID. Including determination of BTEX and calculation of Aliphatic fractione.	SA_PM8/PM12/PM16	please refer to SA_PM8/PM16 and SA_PM12 for method details			AR	Yes
UK_TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	UK_PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.				Yes
UK_TM30/TM38	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009 / Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	UK_PM15/PM20	Samples containing asbestos are not dried and ground soint samples using Aqua region reluxed at 12.5 C. Samples containing asbestos are not dried and ground. / Extraction of dried and ground or as received samples with deionised water in a 2.1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10.1 ratio of 0.2M sodium hydroxide to soli for hexavalent chromium using a reciprocal shaker.				Yes
UK_TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	UK_PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.				Yes
UK_TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	UK_PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.				Yes



Issue :

Element Materials Technology Unit D2 & D5 9 Quantum Road Firgrove Business Park Somerset West 7130 South Africa

W: www.element.com

WSP Group Africa Building C, Knightsbridge 33 Sloane Street Bryanston Johannesburg Gauteng South Africa 2191	Incertification Sanas Feiting Loboratory T078
Attention :	Sarah Skinner
Date :	29th June, 2022
Your reference :	41103965
Our reference :	Test Report 22/556 Batch 1
Location :	Eskom Komati Power Station (ESIA and WULA
Date samples received :	10th June, 2022
Status :	Final report

Eleven samples were received for analysis on 10th June, 2022 of which eleven were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

1

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Analysis was undertaken at either Element Materials Technology UK, which is ISO 17025 accredited under UKAS (4225) or Element Materials Technology (SA) which is ISO 17025 accredited under SANAS (T0729) or a subcontract laboratory where specified.

NOTE: Under International Laboratory Accreditation Cooperation (ILAC), ISO 17025 (UKAS) accreditation is recognised as equivalent to SANAS (South Africa) accreditation.

Authorised By:

Debbie van Wyk

Organics Laboratory:

Greg Ondrejkovic Technical Supervisor

**Inorganics Laboratory:** 

Greg Ondrejkovic Technical Supervisor

Please include all sections of this report if it is reproduced

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70			
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Denth													
											Please se abbrevi	e attached n ations and a	otes for all cronyms
COC No / misc													
Containers	V HN P G	V P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G			
Sample Date	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Bate of Baselet	10/00/0000	40/00/0000	10/00/0000	40/00/0000	40/00/0000	40/00/0000	10/00/0000	40/00/0000	40/00/0000	40/00/0000	LOD/LOR	Units	Method No.
Date of Receipt	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	-		
Dissolved Antimony*	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	UK_TM170/UK_PM14
Dissolved Arsenic*	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	ug/l	UK_TM170/UK_PM14
Dissolved Cadmium*	<0.03	<0.03	<0.03	<0.03	0.04	0.03	<0.03	0.04	<0.03	<0.03	<0.03	ug/l	UK_TM170/UK_PM14
Total Dissolved Chromium*	<0.2	4.3	<0.2	1.4	0.4	<0.2	<0.2	0.2	0.3	<0.2	<0.2	ug/i	UK_TM170/UK_PM14
Dissolved Cobalt*	12.2	25.6	11.1	4.6	4.6	6.6	0.2	0.5	0.7	<0.1	<0.1	ug/l	UK_TM170/UK_PM14
Dissolved Copper*	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	UK_TM170/UK_PM14
Total Dissolved Iron*	292.0	1692.1 <sub>AB</sub>	164.4	492.9	12.6	25.6	11.2	7.9	43.9	9.9	<4.7	ug/l	UK_TM170/UK_PM14
Dissolved Lead*	1.5	2.1	4.6	1.6	7.8	12.8	38.1	33.0	28.3	2.7	<0.4	ug/l	UK_TM170/UK_PM14
Dissolved Manganese*	3269.5 <sub>AB</sub>	1241.8 <sub>AB</sub>	1/18.3 <sub>AB</sub>	114.8	809.5	496.8	15.7	68.8	18.3	6.8	<1.5	ug/l	UK_TM170/UK_PM14
Dissolved Mercury*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/i	UK_TM170/UK_PM14
Dissolved Nickel*	4.7	8.2	12.8	6.3	5.5	7.0	4.5	23.6	1.7	3.2	<0.2	ug/l	UK_TM170/UK_PM14
Dissolved Selenium*	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	ug/i	UK_IM170/UK_PM14
Dissolved Vanadium*	<0.0	4.8	1.0	1.5	1.1	<0.0	<0.0	<0.0	2.2	1.0	<0.0	ug/i	UK_IM170/UK_PM14
Dissolved Zinc"	16.2	30.7	37.9	29.4	37.8	46.4	34.5	59.0	32.4	24.5	<1.5	ug/i	UK_IM170/UK_PM14
D'	72.1	27.7	141.0	11.0	46.2	42.4	12.6	92.0	17.0	8.0	<0.2	ma/l	
Dissolved Calcium	73.1 50.0	27.7	141.0	11.0	40.3	42.4	0.1	74.2	11.0	6.0 E.0	<0.3	mg/l	5A_TM27/5A_PM0
Dissolved Magnesium	30.0	22.5	120.4 <b>AB</b>	2.6	20.4	54.0	9.1	19.5	2.2	3.0	<0.2	mg/l	SA_TM27/SA_PM0
Dissolved Polassium	4.2	95.9	136.4	15.0	92.6	0.9	7.9	10.5	3.2	2.3	<0.1	mg/l	SA_TM27/SA_PM0
Dissolved Solicon*	21300	29901	10617	10607	8002	9916	6005	40.4	22415	23.0	<100	111g/1	
	2100048	2000 148	ISOLIAB	10007 AB	0302	3010	0000	3300	2041048	3330	100	ugn	

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70							
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10							
Denth																	
Depth											Please se	e attached n	otes for all				
COC No / misc											abbievi		Jonyma				
Containers	V HN P G	V P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G							
Sample Date	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022							
Sample Type	Ground Water																
Batch Number	1	1	1	1	1	1	1	1	1	1			Martina				
Date of Receipt	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	LOD/LOR	Units	No.				
	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022							
	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2		SA TMIE/SA DMID				
Methyl Tertian/ Butyl Ether	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	SA TM15/SA PM10				
Chlanamathana SA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/i	SA_TM15/SA_PM10				
Vinvl Chlorido	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/i	SA TM15/SA PM10				
Recomposition de	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/i	SA TM15/SA PM10				
Chloroothana <sup>SA</sup>	<3	<3	<3	<3	<1	<1	<1	-1	<3	<3	<3	ug/l	SA TM15/SA PM10				
Trichlorofluoromothone SA	<3	-3	<3	-3	-3	-3	-3	-3	-3	-3	-3	ug/i	SA TM15/SA PM10				
1 1-Dichloroethene (1 1 DCE) SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA TM15/SA PM10				
Dichloromethane (DCM) SA	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	SA TM15/SA PM10				
trans-1-2-Dichloroethene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA TM15/SA PM10				
1 1-Dichloroethane SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA TM15/SA PM10				
cis-1-2-Dichloroethene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ua/l	SA_TM15/SA_PM10				
2.2-Dichloropropane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ua/l	SA_TM15/SA_PM10				
Bromochloromethane <sup>SA</sup>	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ua/l	SA_TM15/SA_PM10				
Chloroform <sup>SA</sup>	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
1.1.1-Trichloroethane SA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
1,1-Dichloropropene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10				
Carbon tetrachloride SA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
1,2-Dichloroethane sa	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM15/SA_PM10				
Trichloroethene (TCE) SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10				
1,2-Dichloropropane <sup>sa</sup>	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
Dibromomethane <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10				
Bromodichloromethane <sup>sa</sup>	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
cis-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
Toluene <sup>sa</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	SA_TM15/SA_PM10				
trans-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
1,1,2-Trichloroethane sa	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
Tetrachloroethene (PCE) <sup>SA</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10				
1,3-Dichloropropane <sup>sa</sup>	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
Dibromochloromethane <sup>SA</sup>	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
1,2-Dibromoethane <sup>sa</sup>	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
Chlorobenzene <sup>SA</sup>	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
1,1,1,2-Tetrachloroethane sa	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
Ethylbenzene sa	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM15/SA_PM10				
p/m-Xylene sa	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
o-Xylene <sup>sa</sup>	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM15/SA_PM10				
Styrene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
Bromoform SA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
Isopropylbenzene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10				
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/l	SA_TM15/SA_PM10				
	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10				
1,2,3-Trichloropropane	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10				

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70			
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Donth													
Depui											Please se abbrevi	e attached n ations and a	otes for all cronvms
COC No / misc													2
Containers	V HN P G	VPG	V HN P G	V HN P G									
Sample Date	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022			
Sample Type	Ground Water	Ground Water											
Batch Number	1	1	1	1	1	1	1	1	1	1			Method
Date of Receipt	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	LOD/LOR	Units	No.
VOC MS Continued													
Propylbenzene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
2-Chlorotoluene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,3,5-Trimethylbenzene sa	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
4-Chlorotoluene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
tert-Butylbenzene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,2,4-Trimethylbenzene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
sec-Butylbenzene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
4-Isopropyltoluene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,3-Dichlorobenzene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,4-Dichlorobenzene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
n-Butylbenzene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,2-Dichlorobenzene <sup>sa</sup>	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
Hexachlorobutadiene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
Naphthalene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
VOC TICs	ND	ND		None	SA_TM15/SA_PM10								
SVOC MS													
Phenols													
2-Chlorophenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
2-Methylphenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
2-Nitrophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
2,4-Dichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
2,4-Dimethylphenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
2,4,5-Trichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
2,4,6-Trichlorophenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
4-Chioro-3-methylphenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/i	SA_TM16/SA_PM30
4-weinyiphenoi	<1	<1	<1	<1	<1	<1	<1	<1	<i </i 	<i </i 	<1	ug/i	5A_1M16/5A_PM30
4-mitrophenoi	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/i	5A_1M16/5A_PM30
Phonol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/i	SA_TM16/SA_FM30
	~1	~1	~1	~1		~1	~1	~1	~1	~1		ugn	54_1W10/54_PM30

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

## Report : Liquid

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70			
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Donth													
Deptil											Please se abbrevi	e attached n ations and a	otes for all cronyms
COC No / misc													<b>,</b>
Containers	V HN P G	V P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G			
Sample Date	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022			
Sample Type	Ground Water												
Betek Number	4	4	4	4	1	4	4	4	4	4			
Batch Number	I	1	1	1	1	1	1	I	I		LOD/LOR	Units	Method No.
Date of Receipt	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022			
SVOC MS													
PAHs													
2-Chloronaphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
2-Methylnaphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Naphthalene SA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Acenaphthylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
Acenaphthene SA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Fluorene **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
Phenanthrene **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
Anthracene SA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
Pyrene **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/i	SA_TM16/SA_PM30
Benzo(a)anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/i	SA_TM16/SA_PM30
Chrysene SA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/i	SA_IM16/SA_PM30
Benzo(b)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/i	SA_IM16/SA_PM30
	<1	~1	~1	~1	~1	~1	~1	<1	<1	~1	~1	ug/i	5A_1M16/5A_PM30
Benzo(a)pyrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/i	SA TM16/SA PM30
Dibonzo(ab)onthracono <sup>SA</sup>	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/i	SA TM16/SA PM30
Bonzo(ghi)pon/ono <sup>SA</sup>	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA TM16/SA PM30
Phthalates	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	ug/i	
Bis(2-ethylbexyl) phthalate SA	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ua/l	SA TM16/SA PM30
Butvibenzvi phthalate	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ua/l	SA_TM16/SA_PM30
Di-n-butyl phthalate <sup>SA</sup>	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	ua/l	SA_TM16/SA_PM30
Di-n-Octyl phthalate	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Diethyl phthalate SA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Dimethyl phthalate <sup>SA</sup>	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
											1		

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70			
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Denth													
Depth											Please se abbrevi	e attached n	otes for all
COC No / misc											abbrott		
Containers	V HN P G	V P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G			
Sample Date	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			Method
Date of Receipt	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	LOD/LOR	Units	No.
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene <sup>sa</sup>	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
1,2,4-Trichlorobenzene sa	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
1,3-Dichlorobenzene <sup>sa</sup>	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
1,4-Dichlorobenzene <sup>sa</sup>	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
2-Nitroaniline	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
2,4-Dinitrotoluene <sup>SA</sup>	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
2,6-Dinitrotoluene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
3-Nitroaniline	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
4-Bromophenylphenylether <sup>sa</sup>	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
4-Chloroaniline	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
4-Chlorophenylphenylether SA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
4-Nitroaniline	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
Azobenzene <sup>sa</sup>	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
Bis(2-chloroethoxy)methane <sup>SA</sup>	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
Bis(2-chloroethyl)ether sA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Carbazole SA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
Dibenzofuran <sup>sa</sup>	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	SA_TM16/SA_PM30
Hexachlorobenzene SA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Hexachlorobutadiene 34	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Hexachlorocyclopentadiene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/i	SA_TM16/SA_PM30
	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/i	SA_IM16/SA_PM30
Isophorone	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/i	SA_1M10/SA_PM30
N-nitrosodi-n-propylamine	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/i	SA_1M10/SA_PM30
Nitrobenzene						~1		~1	~1	~1	~1	ugn	34_11110/34_11100
SVOC TICs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		None	SA_TM16/SA_PM30
TPH CWG													
Aliphatics													
C7-C9	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	SA_TM36/SA_PM12
C10-C14	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	SA_TM5/SA_PM16/PM30
C15-C36	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	SA_TM5/SA_PM16/PM30
Total aliphatics C7-C36	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	SA, TASITADISA, PAT2PANAPADO
PCBs (Total vs Aroclor 1254)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ua/l	SA TM17/SA PM30
- 023 (10tal 13 Al0001 1234)	~U.Z	~0.2	~U.Z	~U.Z	~0.2	~U.Z	~U.Z	~U.Z	~U.Z	~U.Z	~U.Z	ug/i	
Fluoride <sup>sa</sup>	0.4	<0.3	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.3	<0.3	<0.3	mg/l	SA_TM27/SA_PM0
Chloride <sup>SA</sup>	32.1	22.1	73.9	53.0	67.6	19.0	29.7	25.6	3.4	11.7	<0.3	mg/l	SA_TM27/SA_PM0
Sulphate <sup>sa</sup>	133.1	183.6 <sub>AA</sub>	983.1 <sub>AB</sub>	5.4	213.0 <sub>AA</sub>	234.8 <sub>AA</sub>	67.3	446.0 <sub>AB</sub>	51.1	55.4	<0.5	mg/l	SA_TM27/SA_PM0
Nitrate as N <sup>SA</sup>	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	0.36	<0.05	1.27	<0.05	<0.05	mg/l	SA_TM27/SA_PM0

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70			
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Depth											Disease		
COC No / misc											abbrevi	e attached ho ations and ac	otes for all cronyms
Containers		VPG			VHNPG								
Oceanda Dete		V F G	VTINF G	VTINF G	VIINF G	VTINF G	VIIII F G		VTINF G				
Sample Date	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022			
Sample Type	Ground Water			1									
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method
Date of Receipt	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022			INO.
Ortho Phosphate as P	0.046	0.039	0.055	0.033	0.029	0.023	0.036	0.046	0.039	0.026	<0.015	mg/l	SA_TM191/SA_PM31
	2.60	0.47	0.75	-0.02	0.47	0.40	10.02	0.05	-0.02	-0.02	-0.02		
Ammoniacal Nitrogen as N	<0.006	<0.006	<0.06	<0.03	<0.006	<0.006	<0.03	<0.05	<0.03	<0.03	<0.03	mg/l	UK TM38/UK PM0
	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	ing/i	
Total Alkalinity as CaCO3 <sup>sa</sup>	396	132	260	18	92	64	23	116	124	20	<3	mg/l	SA_TM32/SA_PM0
Electrical Conductivity @25C SA	981	684	1849	248	835	679	304	1133	370	125	<2	uS/cm	SA_TM28/SA_PM0
pH <sup>sa</sup>	7.44	7.44	7.25	7.10	7.54	6.67	7.00	7.42	7.54	6.62	<2.00	pH units	SA_TM19/SA_PM0
Total Dissolved Solids <sup>sa</sup>	616	541	1537	205	563	486	187	894	250	136	<35	mg/l	SA_TM20/SA_PM31
Total Organic Carbon*	<2	<2	<2	<2	<2	<2	<2	2	<2	<2	<2	mg/l	UK_TM60/UK_PM0
					1						1	1	

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	71-77							
Sample ID	BH 10-01							
Depth						Please se	e attached n	otes for all
COC No / misc					 	 abbrevi	ations and ac	cronyms
Containors								
Containers	VHNPG							
Sample Date	07/06/2022							
Sample Type	Ground Water							
Batch Number	1							Method
Date of Receipt	10/06/2022					 LOD/LOR	Units	No.
Dissolved Antimony*	<2					<2	ug/l	UK_TM170/UK_PM14
Dissolved Arsenic*	<0.9					<0.9	ug/l	UK_TM170/UK_PM14
Dissolved Cadmium*	<0.03					<0.03	ug/l	UK_TM170/UK_PM14
Total Dissolved Chromium*	<0.2					<0.2	ug/l	UK_TM170/UK_PM14
Dissolved Cobalt*	11.0					<0.1	ug/l	UK_TM170/UK_PM14
Dissolved Copper*	<1					<1	ug/l	UK_TM170/UK_PM14
Total Dissolved Iron*	163.7					<4.7	ug/l	UK_TM170/UK_PM14
Dissolved Lead*	4.6					<0.4	ug/l	UK_TM170/UK_PM14
Dissolved Manganese*	1639.4 <sub>AB</sub>					<1.5	ug/l	UK_TM170/UK_PM14
Dissolved Mercury*	<0.5					<0.5	ug/l	UK_TM170/UK_PM14
Dissolved Nickel*	12.6					<0.2	ug/l	UK_TM170/UK_PM14
Dissolved Selenium*	<1.2					<1.2	ug/l	UK_TM170/UK_PM14
Dissolved Vanadium*	1.0					<0.6	ug/l	UK_TM170/UK_PM14
Dissolved Zinc*	37.0					<1.5	ug/l	UK_TM170/UK_PM14
Dissolved Calcium <sup>SA</sup>	141.5					<0.3	mg/l	SA_TM27/SA_PM0
Dissolved Magnesium <sup>SA</sup>	116.5 <sub>AB</sub>					<0.2	mg/l	SA_TM27/SA_PM0
Dissolved Potassium <sup>sa</sup>	6.0					<0.1	mg/l	SA_TM27/SA_PM0
Dissolved Sodium <sup>sa</sup>	137.1					<0.1	mg/l	SA_TM27/SA_PM0
Dissolved Silicon*	20135 <sub>AB</sub>	 			 	 <100	ug/l	UK_TM30/UK_PM14

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

## Report : Liquid

EMT Sample No.	71-77										1	
Sample ID	BH 10-01											
Depth											Plassass	
COC No / misc											abbrevi	
Containers	V HN P G										1	
Sample Date	07/06/2022										1	
Sample Tune	Cround Water										1	
Sample Type	Ground water										<u> </u>	
Batch Number	1										LOD/LOR	
Date of Receipt	10/06/2022											
	<2										-2	
hyl Tertiany Butyl Ether	<0.1										<0.1	-
romothano SA	-0.1										-0.1	
Chloride	<0.1										<0.1	
emothano	<0.1										<0.1	-
	~1										~1	
broetnane SA	5										~3	
	- 3										2	
	<3										< 3	
Ioromethane (DCM)	<0										<0	
S-1-2-Dichloroethene	< 3										< 3	
	< 3										< 3	
2-Dichloroethene	<3										<3	
chloropropane	<1										<1	
ochloromethane	<2										<2	
form SA	<2										<2	
Trichloroethane	<2										<2	
ichloropropene SA	<3										<3	-
on tetrachloride	<2										<2	-
ichloroethane of	<2										<2	-
ene	<0.5										<0.5	-
proethene (TCE)	<3										<3	-
ichloropropane **	<2										<2	-
	<3										<3	
odichloromethane	<2										<2	-
	<2										<2	_
ene	<5										<5	
s-1-3-Dichloropropene	<2										<2	
2- I richloroethane	<2										<2	
rachloroethene (PCE)	<3										<3	-
Dichloropropane **	<2										<2	_
omochloromethane	<2										<2	-
Dibromoethane	<2										<2	-
	<2										<2	
2- I etrachloroethane	<2										<2	
benzene SA	<1										<1	
Xylene ***	<2										<2	1
ene 🐃	<1										<1	
ne sa	<2										<2	
form SA	<2										<2	
pylbenzene SA	<3										<3	
-Tetrachloroethane	<4										<4	
benzene SA	<2										<2	
Trichloropropane SA	<3	1	1	1	1	1	1				<3	

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	71-77							
Sample ID	BH 10-01							
Depth						Disease		
COC No / misc						 abbrevi	ations and a	cronyms
Containers	V HN P G	 						
Sample Date	07/06/2022							
Sample Type	Ground Water							
Batch Number	1							Method
Date of Receipt	10/06/2022					 LOD/LOR	Units	No.
VOC MS Continued								
Propylbenzene <sup>SA</sup>	<3					<3	ua/l	SA_TM15/SA_PM10
2-Chlorotoluene <sup>SA</sup>	<3					<3	ug/l	SA_TM15/SA_PM10
1.3.5-Trimethylbenzene <sup>sa</sup>	<3					 <3	ug/l	SA_TM15/SA_PM10
4-Chlorotoluene <sup>SA</sup>	<3					 <3	ug/l	SA_TM15/SA_PM10
tert-Butylbenzene <sup>sa</sup>	<3					<3	ug/l	SA_TM15/SA_PM10
1,2,4-Trimethylbenzene <sup>sa</sup>	<3					<3	ug/l	SA_TM15/SA_PM10
sec-Butylbenzene sA	<3					<3	ug/l	SA_TM15/SA_PM10
4-Isopropyltoluene sa	<3					<3	ug/l	SA_TM15/SA_PM10
1,3-Dichlorobenzene <sup>sa</sup>	<3					<3	ug/l	SA_TM15/SA_PM10
1,4-Dichlorobenzene <sup>sa</sup>	<3					<3	ug/l	SA_TM15/SA_PM10
n-Butylbenzene <sup>sa</sup>	<3					<3	ug/l	SA_TM15/SA_PM10
1,2-Dichlorobenzene <sup>sa</sup>	<3					<3	ug/l	SA_TM15/SA_PM10
1,2-Dibromo-3-chloropropane	<2					<2	ug/l	SA_TM15/SA_PM10
1,2,4-Trichlorobenzene	<3					<3	ug/l	SA_TM15/SA_PM10
Hexachlorobutadiene	<3					<3	ug/l	SA_TM15/SA_PM10
Naphthalene	<2					<2	ug/l	SA_TM15/SA_PM10
1,2,3-Trichlorobenzene	<3					<3	ug/l	SA_TM15/SA_PM10
VOC TICs	ND						None	SA_TM15/SA_PM10
SVOC MS								
Phenois	- 11					1		
2-Chlorophenol	<0.5					 <0.5	ug/i	SA_TM16/SA_PM30
	<0.5					<0.5	ug/l	SA TM16/SA PM30
	<0.5					<0.5	ug/l	SA TM16/SA PM30
2 4-Dimethylphenol	<1					 <1	ug/l	SA TM16/SA PM30
2.4.5-Trichlorophenol	<0.5					<0.5	ug/l	SA_TM16/SA_PM30
2,4,6-Trichlorophenol	<1					<1	ug/l	SA_TM16/SA_PM30
4-Chloro-3-methylphenol	<0.5					 <0.5	ug/l	SA_TM16/SA_PM30
4-Methylphenol	<1					<1	ug/l	SA_TM16/SA_PM30
4-Nitrophenol	<10					<10	ug/l	SA_TM16/SA_PM30
Pentachlorophenol	<1					<1	ug/l	SA_TM16/SA_PM30
Phenol	<1					<1	ug/l	SA_TM16/SA_PM30

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	71-77											
Sample ID	BH 10-01											
Depth										Please se	o attached n	otos for all
COC No / misc										abbrevi	ations and a	cronyms
Our trian												
Containers	V HN P G											
Sample Date	07/06/2022											
Sample Type	Ground Water											
Batch Number	1										Units	Method
Date of Receipt	10/06/2022									LODIEOIT	onno	No.
SVOC MS												
PAHs												
2-Chloronaphthalene <sup>sa</sup>	<1									<1	ug/l	SA_TM16/SA_PM30
2-Methylnaphthalene <sup>sa</sup>	<1									<1	ug/l	SA_TM16/SA_PM30
Naphthalene <sup>sa</sup>	<1									<1	ug/l	SA_TM16/SA_PM30
Acenaphthylene <sup>sa</sup>	<0.5									<0.5	ug/l	SA_TM16/SA_PM30
Acenaphthene <sup>sa</sup>	<1									<1	ug/l	SA_TM16/SA_PM30
Fluorene <sup>sa</sup>	<0.5									<0.5	ug/l	SA_TM16/SA_PM30
Phenanthrene <sup>sa</sup>	<0.5									<0.5	ug/l	SA_TM16/SA_PM30
Anthracene sa	<0.5									<0.5	ug/l	SA_TM16/SA_PM30
Fluoranthene sA	<0.5									<0.5	ug/l	SA_TM16/SA_PM30
Pyrene sa	<0.5									<0.5	ug/l	SA_TM16/SA_PM30
Benzo(a)anthracene	<0.5									<0.5	ug/l	SA_TM16/SA_PM30
Chrysene SA	<0.5									<0.5	ug/l	SA_TM16/SA_PM30
Benzo(b)fluoranthene	<1									<1	ug/l	SA_TM16/SA_PM30
Benzo(k)fluoranthene	<1									<1	ug/l	SA_TM16/SA_PM30
Benzo(a)pyrene	<1									<1	ug/i	SA_TM16/SA_PM30
Dihana (ab)anthraana SA	<0.5									<0.5	ug/i	SA_1M10/SA_PM30
Bopzo(ghi)porviono <sup>SA</sup>	<0.5									<0.5	ug/l	SA TM16/SA PM30
Phthalates	-0.0									-0.5	ugn	1
Bis(2-ethylhexyl) phthalate SA	<5									<5	ua/l	SA_TM16/SA_PM30
Butylbenzyl phthalate	<1									<1	ug/l	SA_TM16/SA_PM30
Di-n-butyl phthalate <sup>sa</sup>	<1.5									<1.5	ug/l	SA_TM16/SA_PM30
Di-n-Octyl phthalate	<1									<1	ug/l	SA_TM16/SA_PM30
Diethyl phthalate <sup>sa</sup>	<1									<1	ug/l	SA_TM16/SA_PM30
Dimethyl phthalate <sup>sa</sup>	<1									<1	ug/l	SA_TM16/SA_PM30
	1	1	1	1	1	1	1	1	1	1		1

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	71-77							
Sample ID	BH 10-01							
Depth								
600 No / mino						 Please se abbrevi	e attached n ations and ac	otes for all cronyms
COC NO / MISC								
Containers	V HN P G	 						
Sample Date	07/06/2022							
Sample Type	Ground Water							
Batch Number	1							
Baton Hamber						 LOD/LOR	Units	Method No.
Date of Receipt	10/06/2022							
SVOC MS								
Other SVOCs		 				 		
1,2-Dichlorobenzene	<1					<1	ug/i	SA_TM16/SA_PM30
1,2,4-Trichlorobenzene	<1					<1	ug/i	SA_TM16/SA_PM30
1,3-Dichlorobenzene	<1					<1	ug/i	SA_IM16/SA_PM30
	<1					<1 	ug/i	SA_INII6/SA_PM30
	<1					<1	ug/I	SA_IM16/SA_PM30
2,4-Dinitrotoluene	<0.5					<0.5	ug/i	SA_IM16/SA_PM30
2,6-Dinitroloiuene	<1					 <1	ug/i	SA_IM16/SA_PM30
	~1					 ~1	ug/i	SA TM16/SA DM20
4-Bromophenyiphenyiether	<1					<1	ug/l	SA TM16/SA DM30
4 Chlorophonylphonylothor SA	<1					<1	ug/l	SA TM16/SA PM30
4-Nitroaniline	<0.5					<0.5	ug/l	SA TM16/SA PM30
Azobenzene <sup>SA</sup>	<0.5					 <0.5	ug/l	SA TM16/SA PM30
Bis(2-chloroethoxy)methane SA	<0.5					<0.5	ug/l	SA TM16/SA PM30
Bis(2-chloroethyl)ether SA	<1					<1	ua/l	SA_TM16/SA_PM30
Carbazole <sup>SA</sup>	<0.5					<0.5	ug/l	SA_TM16/SA_PM30
Dibenzofuran <sup>sa</sup>	<0.5					<0.5	ug/l	SA_TM16/SA_PM30
Hexachlorobenzene <sup>sa</sup>	<1					<1	ug/l	SA_TM16/SA_PM30
Hexachlorobutadiene sa	<1					<1	ug/l	SA_TM16/SA_PM30
Hexachlorocyclopentadiene sa	<1					<1	ug/l	SA_TM16/SA_PM30
Hexachloroethane <sup>SA</sup>	<1					<1	ug/l	SA_TM16/SA_PM30
Isophorone <sup>SA</sup>	<0.5					<0.5	ug/l	SA_TM16/SA_PM30
N-nitrosodi-n-propylamine <sup>SA</sup>	<0.5					<0.5	ug/l	SA_TM16/SA_PM30
Nitrobenzene <sup>sa</sup>	<1					<1	ug/l	SA_TM16/SA_PM30
SVOC TICs	ND						None	SA_TM16/SA_PM30
TPH CWG								
Aliphatics								
C7-C9	<10					 <10	ug/l	SA_TM36/SA_PM12
C10-C14	<10	 				 <10	ug/l	SA_TM5/SA_PM16/PM30
C15-C36	<10					<10	ug/l	SA_TM5/SA_PM16/PM30
Total aliphatics C7-C36	<10					 <10	ug/l	SA_TINETINDESA_PHY2PhylePhoto
PCRs (Total vs Araplar 1954)	<0.2					<0.2	110/1	SA TM17/SA D400
FODS (TOTAL VS AFOCIOF 1294)	<u>∼∪.∠</u>					<u>\U.2</u>	ug/i	5A_1W17/5A_PMI30
Fluoride <sup>SA</sup>	0.4					<0.3	mg/l	SA_TM27/SA_PM0
Chloride <sup>sa</sup>	69.9					<0.3	mg/l	SA_TM27/SA_PM0
Sulphate <sup>sa</sup>	837.9 <sub>AB</sub>					 <0.5	mg/l	SA_TM27/SA_PM0
Nitrate as N <sup>SA</sup>	<0.05					<0.05	mg/l	SA_TM27/SA_PM0

Client Name:	WSP Group Africa
Reference:	41103965
Location:	Eskom Komati Power Station (ESIA and WULA project)
Contact:	Sarah Skinner
EMT Job No:	22/556

#### Report : Liquid

EMT Sample No.	71-77										
Sample ID	BH 10-01										
Depth									Please se	e attached n	otes for all
COC No / misc									abbrevi	ations and ad	cronyms
Containers	V HN P G										
Sample Date	07/06/2022										
Sample Type	Ground Water										
Batab Number	1										
Batch Number	1								LOD/LOR	Units	Method No.
Date of Receipt	10/06/2022								10.045		
Onno Phosphate as P	0.042								<0.015	mg/i	24_10191/24_PM31
Ammoniacal Nitrogen as N <sup>sa</sup>	0.36								<0.03	mg/l	SA_TM27/SA_PM0
Hexavalent Chromium*	<0.006								<0.006	mg/l	UK_TM38/UK_PM0
Total Alkalinity as CaCO3 <sup>sa</sup>	256								<3	mg/l	SA_TM32/SA_PM0
Electrical Conductivity @250 SA	1850								<2	uS/cm	SA TM28/SA PM0
pH SA	6.62								<2.00	pH units	SA_TM19/SA_PM0
Total Dissolved Solids <sup>SA</sup>	1533								<35	mg/l	SA_TM20/SA_PM31
Total Organic Carbon*	<2								<2	mg/l	UK_TM60/UK_PM0
	1	1	1	1	1			1			

Client Name:WSP Group AfricaReference:41103965Location:Eskom Komati Power Station (ESIA and WULA project)Contact:Sarah Skinner

Matrix : Liquid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
22/556	1	BH 1		1-9	SVOC	Sample holding time exceeded
22/556	1	BH 2		10-14	svoc	Sample holding time exceeded
22/556	1	BH 3		15-21	SVOC	Sample holding time exceeded
22/556	1	BH 4		22-28	SVOC	Sample holding time exceeded
22/556	1	BH 5		29-35	SVOC	Sample holding time exceeded
22/556	1	BH 6		36-42	SVOC	Sample holding time exceeded
22/556	1	BH 7		43-49	SVOC	Sample holding time exceeded
22/556	1	BH 8		50-56	SVOC	Sample holding time exceeded
22/556	1	BH 9		57-63	SVOC	Sample holding time exceeded
22/556	1	BH 10		64-70	SVOC	Sample holding time exceeded
22/556	1	BH 10-01		71-77	SVOC	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

**EMT Job No.:** 22/556

## SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at  $35^{\circ}C \pm 5^{\circ}C$  unless otherwise stated. Moisture content for CEN Leachate tests are dried at  $105^{\circ}C \pm 5^{\circ}C$ . Ash samples are dried at  $37^{\circ}C \pm 5^{\circ}C$ .

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

#### **DEVIATING SAMPLES**

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

# BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation. Laboratory records are kept for a period of no less than 6 years.

# **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## **Measurement Uncertainty**

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

## **Customer Provided Information**

Sample ID and depth is information provided by the customer.

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
w	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
со	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
ос	Outside Calibration Range
AA	x2 Dilution
AB	x5 Dilution

#### EMT Job No: 22/556

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
SA_TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds by Headspace GC-MS.	SA_PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
SA_TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds by Headspace GC-MS.	SA_PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
SA_TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	SA_PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
SA_TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	SA_PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
SA_TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	SA_PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
SA_TM19	Determination of pH by bench pH meter	SA_PM0	No preparation is required.	Yes			
SA_TM191	Orthophosphate as PO4 by Colorimetric Measurement v1	SA_PM31	Sample is filtered				
SA_TM20	Modified BS 1377-3: 1990 Gravimetric determination of Total Dissolved Solids	SA_PM31	Sample is filtered	Yes			
SA_TM27	Major ions by Ion Chromatography	SA_PM0	No preparation is required.	Yes			
SA_TM28	Determination of Electrical Conductivity with hand held manual conductivity probe.	SA_PM0	No preparation is required.	Yes			

#### EMT Job No: 22/556

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
SA_TM32	Determination of Alkalinity by titration of the sample with a standard solution of acid by visual detection of end points.	SA_PM0	No preparation is required.	Yes			
SA_TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12, MTBE and BTEX by headspace GC-FID.	SA_PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
SA_TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	SA_PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
SA_TM5/TM36	Hydrocarbons (EPH) including column fractionation in sovenit Exactable reuroemin Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID. Including determination of BTEX and calculation of Aliphatic fractione.	SA_PM12/PM16/PM30	please refer to SA_PM16/PM30 and SA_PM12 for method details				
UK_TM170	Determination of Trace Metal elements by ICP-MS (Inductively Coupled Plasma - Mass Spectrometry) modified USEPA 200.8/6020A and BS EN ISO 17294-2 2016	UK_PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				
UK_TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	UK_PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				
UK_TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	UK_PM0	No preparation is required.				
UK_TM60	Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR).	UK_PM0	No preparation is required.				

# APPENDIX F

# GROUNDWATER LABORATORY RESULTS REVIEW



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# Eskom Komati Power Station -Groundwater Laboratory Results Review

Report\_Draft

Version - 1 26 August 2022



Client: NEMAI CONSULTING Project Number: 22-0669



# Eskom Komati Power Station -Groundwater Laboratory Results Review



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APPENDIX A: EXCEEDANCES
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# 1 INTRODUCTION

RSK GCS Environment (PTY) LTD was appointed by NEMAI Consulting to undertake a review of the available groundwater laboratory results obtained from:

- WSP (Report no: 41103965) which included groundwater monitoring results of 10 newly installed WSP groundwater monitoring wells (BH01-BH10). These wells were installed during June 2022 and subsequently sampled and analysed for the following parameters:
  - $\circ$  Characteristics such as total dissolved solids, pH, Total Organic Carbon etc.
  - Major anions & cations, trace metals.
  - Total Petroleum Hydrocarbons (TPH) Aliphatic C7 C46;
  - Volatile Organic Compounds (VOCs)
  - Semi-Volatile Organic Compounds (SVOCs)
    - Phenols
    - Polycyclic Aromatic Hydrocarbons (PAHs)
    - Phthalates
    - Polychlorinated biphenyls (PCBs).
- Aquatico (Laboratory Report no: 133002) which included groundwater monitoring results of 24 Eskom groundwater monitoring wells (Ab#, CB#, PB#, MW6 and KMR07). These wells were sampled during August 2022 and analysed for the following parameters:
  - o Metals
  - BTEX & TPH Aliphatic C7 C46
  - PCBs (lab results not received)

As part of the current review, the available groundwater monitoring chemistry data was summarised and screening against the following adopted screening criteria:

- Eskom Water Use Licences (WUL) number 04/B11B/BCGI/1970 groundwater quality reserve limits.
- South African National Standard (SANS) for Drinking Water, SANS241-1:2015.
- South African Water Quality Guidelines (SAWQG) Volume 1, Domestic Use, Second Edition, 1996.
- SAWQG Volume 7, Aquatic Ecosystems, Second Edition, 1996

The aim of the review was to highlight (a) contaminants of potential concern, (b) groundwater monitoring locations which exceeded the adopted screening criteria; and (c) identify areas where groundwater quality data gaps exist with regards to the existing groundwater monitoring well network and groundwater chemistry data received for review.

The review was undertaken on laboratory data as received and RSK GCS can make no comment on the validity, representativeness, and accuracy of the results as RSK GCS did not collect the samples.

# Background

Eskom Holdings SOC (Ltd) is a South African utility that generates, transmits and distributes electricity. Eskom supplies about 95% of the country's electricity. Eskom's 2035 strategy encompasses the journey that Eskom intends to take in response to the changing energy environment and the impact this has towards a sustainable power utility. This strategy is necessitated by the challenges that Eskom faces as a business as well as the global and local shifts occurring in the energy sector particularly with respect to environmental and climate change challenges, difficulties in accessing financing and changes to the macro industry environment significantly altering the energy supply industry (ESI).

The road to 2035, includes the shutting down of a number of coal-fired power stations by 2035, repurposing and repowering, delivering new clean generation projects, expanding the Transmission grid, and rolling out micro grid solutions. Several power stations are reaching the end of life. These stations will go into extended cold reserve and are most likely to be fully decommissioned in the future. Eskom is considering a shutdown, dismantling and repurposing of some of its fleet as it reaches its end of life. Komati Power Station, situated in Mpumalanga will reach its end-of-life expectancy in September 2022.

Eskom has not yet made a final decision on the decommissioning and repurposing plan. The decommissioning strategy could include complete demolition, selective dismantling and demolition or stripping parts of the plant for various reasons/uses, but each strategy will have its specific impacts, and will have a different roll-out plan. Whatever the decided decommissioning strategy, the objective would be to consider both environment and social aspects.
### 2 GROUNDWATER MONITORING WELL LOCATIONS

During the June and August 2022 respective groundwater monitoring by WSP and Aquatico, a total of 34 groundwater monitoring wells were sampled. These wells include 10 newly installed WSP groundwater monitoring wells and 24 existing Eskom groundwater monitoring wells which were sampled by Aquatico. The location of the groundwater monitoring boreholes in respect to the Komati repurposing development are indicated in Table 2-1 and graphically presented in Figure 4-1.

Komati PV_A	Komati PV_B	BESS_A											
WSP: BH9, BH10	WSP: BH6, BH7, BH8	WSP: None											
Aquatico: AB63	Aquatico: None	Aquatico: None											
BESS_B	BESS_C	BESS_D											
WSP: BH4	WSP: BH3	WSP: BH2											
Aquatico: None	Aquatico: None	Aquatico: None											
	Greater Komati Area												
WSP:													
BH1 – Located north of BESS_D and down-gradient of the Power Station													
BH5 – Located north and down-gradient of the ash dam													
Aquatico:													
AB04 – Located to the south-eas	t and up-gradient BESS_B and dow	n-gradient of the ash dam											
AB06 – Located to the north and	down-gradient of the ash dam												
AB07 – Located to the east of BE	SS_C and down-gradient of the asl	n dam											
AB08 – Could not locate on available	able maps												
AB51 – Could not locate on avail	able maps												
AB52 – Could not locate on available	able maps												
AB53 – Located to the south of Komati Town (residential).	BESS_B and down-gradient of the	ash dam, and upgradient of the											
AB54 – Located to the south of	BESS_B and down-gradient of the	ash dam, and upgradient of the											
Komati Town (residential).													

#### Table 2-1: Groundwater monitoring well locations

### **3 GROUNDWATER LABORATORY RESULTS**

The groundwater laboratory results received from NEMAI Consulting for samples collected by WSP and Aquatico are presented in Table 3-1 and Table 3-2, Table 3-3, respectively. The results have been screened against the following adopted screening criteria:

- WUL groundwater quality reserve limits.
- SANS for Drinking Water, SANS241-1:2015.
- SAWQG Volume 1, Domestic Use, Second Edition, 1996.
- SAWQG Volume 7, Aquatic Ecosystems, Second Edition, 1996

The groundwater samples collected by WSP and Aquatico were analysed for metals, inorganics, VOCs, SVOCs and TPHs. Only compounds that were detected in the collected groundwater samples (i.e above laboratory detection limit) are listed in Table 3-1, Table 3-2 and Table 3-3. The wells which exceeded the adopted screening criteria are presented graphically in Figure 4-2.

See Appendix A for a full list of groundwater monitoring well exceedances in relation to the adopted screening criteria.

#### KOMATI ESA

#### Table 3-1: WSP Groundwater Monitoring Results

Locality		BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8	BH9	BH10	BH 10-01 (DUP)		SANS241:2015	SANS241:2015 SAWQG: 1996			
Sample date Parameters	Unit	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	WUL: 2014	Drinking Water	Domestic (TWQR)	Aquatic (TWQR)	Aquatic (CEV)	Aquatic (AEV)
pH	pH units	7 44	7 44	7.25	7 10	7 54	6.67	7.00	7 42	7 54	6.62	6.62	60-80	50-97	60-90	NV	NV	NV
Electrical Conductivity	uS/cm	981.00	684.00	1.849.00	248.00	835.00	679.00	304.00	1.133.00	370.00	125.00	1.850.00	1.000.00	1.700.00	0 - 700	NV	NV	NV
Total Dissolved Solids	mg/I	616.00	541.00	1,537.00	205.00	563.00	486.00	187.00	894.00	250.00	136.00	1,533.00	NV	1,200.00	0 - 450	NV	NV	NV
Total Organic Carbon	mg/I	<2	<2	<2	<2	<2	<2	<2	2.00	<2	<2	<2	NV	10.00	0 - 5	NV	NV	NV
Total Alkalinity as CaCO3	mg/I	396.00	132.00	260.00	18.00	92.00	64.00	23.00	116.00	124.00	20.00	256.00	150.00	NV	NV	NV	NV	NV
Fluoride	mg/I	0.40	<0.3	0.30	<0.3	<0.3	<0.3	<0.3	<0.3	0.30	<0.3	0.40	1.00	1.50	0-1	0.75	1.50	2.54
Chloride	mg/I	32.10	22.10	73.90	53.00	67.60	19.00	29.70	25.60	3.40	11.70	69.90	25.00	300.00	0 - 100	NV	NV	NV
Sulphate	mg/I	133.10	183.60	983.10	5.40	213.00	234.80	67.30	446.00	51.10	55.40	837.90	380.00	500.00	0 - 200	NV	NV	NV
Nitrate as N	mg/I	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.11	0.36	< 0.05	1.27	< 0.05	< 0.05	1.00	11.00	0 - 6	NV	NV	NV
Ammoniacal Nitrogen as N	mg/I	2.60	0.47	0.75	< 0.03	0.47	0.19	< 0.03	0.05	< 0.03	< 0.03	0.36	0.007	1.50	0 - 1.0	0.007	0.015	0.100
Ortho Phosphate as P	mg/I	0.05	0.04	0.06	0.03	0.03	0.02	0.04	0.05	0.04	0.03	0.04	50.00	NV	NV	NV	NV	NV
Dissolved Calcium	mg/I	73.10	27.70	141.00	11.00	46.30	42.40	13.60	83.00	17.00	8.00	141.50	130.00	NV	0 - 32	NV	NV	NV
Dissolved Magnesium	mg/I	50.00	22.50	125.40	11.20	26.40	34.60	9.10	74.30	11.20	5.00	116.50	50.00	NV	0 - 30	NV	NV	NV
Dissolved Potassium	mg/I	4.20	7.00	6.20	3.60	11.20	6.90	7.90	18.50	3.20	2.30	6.00	25.00	NV	0 - 50	NV	NV	NV
Dissolved Sodium	mg/I	71.60	85.80	136.40	15.20	82.60	44.20	26.30	48.40	46.50	25.60	137.10	70.00	200.00	0 - 100	NV	NV	NV
Dissolved Boron	mg/I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50	2.40	NV	NV	NV	NV
Dissolved Barium	mg/I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NV	0.70	NV	NV	NV	NV
Dissolved Strontium	mg/I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NV	NV	NV	NV	NV	NV
Dissolved Cadmium	ug/I	<0.03	<0.03	<0.03	< 0.03	0.04	0.03	< 0.03	0.04	< 0.03	<0.03	<0.03	NV	3.0	0 - 5	0.2	0.3	3.0
Total Dissolved Chromium	ug/I	<0.2	4.30	<0.2	1.40	0.40	<0.2	<0.2	0.20	0.30	<0.2	<0.2	50.00	50.00	0-50	7.00	14.00	200.00
Dissolved Arsenic	ug/I	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NV	10.00	0-10	10.00	20.00	130.00
Dissolved Cobalt	ug/I	12.20	25.60	11.10	4.60	4.60	6.60	0.20	0.50	0.70	<0.1	11.00	NV	NV	NV	NV	NV	NV
Dissolved Copper	ug/l	<1	2.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	NV	2,000.00	0 - 1000	0.3	0.5	1.6
Total Dissolved Iron	ug/I	292.00	1,692.10	164.40	492.90	12.60	25.60	11.20	7.90	43.90	9.90	163.70	1,000.00	2,000.00	0 - 100	NV	NV	NV
Dissolved Lead	ug/I	1.50	2.10	4.60	1.60	7.80	12.80	38.10	33.00	28.30	2.70	4.60	NV	10.00	0 - 0.01	0.2	0.5	4.0
Dissolved Manganese	ug/I	3,269.50	1,241.80	1,/18.30	114.80	809.50	496.80	15.70	68.80	18.30	6.80	1,639.40	400.00	400.00	0 - 50	180	3/0	1,300
Dissolved Nickel	ug/I	4.70	8.20	12.80	6.30	5.50	7.00	4.50	23.60	1.70	3.20	12.60	NV	70.00	NV	NV	NV	NV
Dissolved Vanadium	ug/I	<0.6	4.80	1.00	1.50	1.10	<u.6< th=""><th><u.6< th=""><th><u.6< th=""><th>2.20</th><th>1.50</th><th>1.00</th><th>NV</th><th>E 000.00</th><th>0 - 100</th><th>NV 2</th><th>NV</th><th>NV</th></u.6<></th></u.6<></th></u.6<>	<u.6< th=""><th><u.6< th=""><th>2.20</th><th>1.50</th><th>1.00</th><th>NV</th><th>E 000.00</th><th>0 - 100</th><th>NV 2</th><th>NV</th><th>NV</th></u.6<></th></u.6<>	<u.6< th=""><th>2.20</th><th>1.50</th><th>1.00</th><th>NV</th><th>E 000.00</th><th>0 - 100</th><th>NV 2</th><th>NV</th><th>NV</th></u.6<>	2.20	1.50	1.00	NV	E 000.00	0 - 100	NV 2	NV	NV
Dissolved Zinc Dissolved Silicon	ug/I	21 200 00	30.70	10 617 00	29.40	37.80	46.40	54.50	0.095.00	32.40	24.50	37.00	NV	5,000.00	U - 3000	2	4	30
	ug/l	21,509.00	28,801.00	19,617.00	10,607.00	8,902.00	9,010.00	6,005.00	9,960.00	25,415.00	9,350.00	20,155.00	100.00	INV NIV	NV	INV NU		INV
TPH C10-C22	μg/1	NA NA	NA NA	NA	NA	NA	NA	NA	NA NA	NA	NA	NA	100.00	INV	INV NIV	INV NU		INV NIV
TPH C20-C40	μg/1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100.00	NIV	NV	NU		NIV
No. of WIII excedances	P6/1	5	A	9	1	A	2	1	A/A	1	0	0	100.00	INV	INV	INV	INV	INV
No. of SANS drinking water exceedances		2	1	4		1	2	1	1	1	0	4						
No. of Aquatic TWQR exceedances		4	5	4	2	4	4	2	3	2	2	4						

Notes:

NA - Not Analysed

< - below detection limit

Bold Black values - Exceed one screening value

Bold Red values - Exceed multiple screening values

#### Table 3-2: Aquatico Groundwater Monitoring Results

Locality		AB04	AB06	AB07	AB08	AB51	AB52	AB53	AB54	AB55	AB56	AB57		SANS241:2015		SAWQG	1996	
Sample date Parameters	Unit	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	WUL: 2014	Drinking Water	Domestic (TWOR)	Aquatic (TWOR)	Aquatic (CEV)	Aquatic (AFV)
pH	pH units	NA	60-80	50-97	60-90	NV	NV	NV										
Electrical Conductivity	uS/cm	NA	1,000.00	1,700.00	0 - 700	NV	NV	NV										
Total Dissolved Solids	mg/I	NA	NV	1,200.00	0 - 450	NV	NV	NV										
Total Organic Carbon	mg/I	NA	NV	10.00	0 - 5	NV	NV	NV										
Total Alkalinity as CaCO3	mg/I	NA	150.00	NV	NV	NV	NV	NV										
Fluoride	mg/I	NA	1.00	1.50	0-1	0.75	1.50	2.54										
Chloride	mg/I	NA	25.00	300.00	0 - 100	NV	NV	NV										
Sulphate	mg/I	NA	380.00	500.00	0 - 200	NV	NV	NV										
Nitrate as N	mg/I	NA	1.00	11.00	0 - 6	NV	NV	NV										
Ammoniacal Nitrogen as N	mg/I	NA	0.007	1.50	0 - 1.0	0.007	0.015	0.100										
Ortho Phosphate as P	mg/I	NA	50.00	NV	NV	NV	NV	NV										
Dissolved Calcium	mg/I	NA	130.00	NV	0 - 32	NV	NV	NV										
Dissolved Magnesium	mg/I	NA	50.00	NV	0 - 30	NV	NV	NV										
Dissolved Potassium	mg/I	NA	25.00	NV	0 - 50	NV	NV	NV										
Dissolved Sodium	mg/I	NA	70.00	200.00	0 - 100	NV	NV	NV										
Dissolved Boron	mg/I	NA	0.50	2.40	NV	NV	NV	NV										
Dissolved Barium	mg/I	NA	NV	0.70	NV	NV	NV	NV										
Dissolved Strontium	mg/I	NA	NV	NV	NV	NV	NV	NV										
Dissolved Cadmium	ug/I	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NV	3.0	0 - 5	0.2	0.3	3.0
Total Dissolved Chromium	ug/I	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	50.00	50.00	0-50	7.00	14.00	200.00
Dissolved Arsenic	ug/I	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NV	10.00	0-10	10.00	20.00	130.00
Dissolved Cobalt	ug/I	NA	NV	NV	NV	NV	NV	NV										
Dissolved Copper	ug/I	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NV	2,000.00	0 - 1000	0.3	0.5	1.6
Total Dissolved Iron	ug/I	<4.0	<4.0	503.00	NA	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	1,000.00	2,000.00	0 - 100	NV	NV	NV
Dissolved Lead	ug/I	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	NV	10.00	0 - 0.01	0.2	0.5	4.0
Dissolved Manganese	ug/I	231.00	371.00	5,350.00	NA	90.00	2,030.00	180.00	<1.0	4.00	495.00	42.00	400.00	400.00	0 - 50	180	370	1,300
Dissolved Nickel	ug/l	<2.0	<2.0	<2.0	NA	<2.0	9.00	<2.0	<2.0	<2.0	<2.0	<2.0	NV	70.00	NV	NV	NV	NV
Dissolved Vanadium	ug/l	NA	NV	NV	0 - 100	NV	NV	NV										
Dissolved Zinc	ug/l	<2.0	<2.0	<2.0	NA	<2.0	9.00	<2.0	<2.0	<2.0	<2.0	<2.0	NV	5,000.00	0 - 3000	2	4	36
Dissolved Silicon	ug/l	NA	NV	NV	NV	NV	NV	NV										
TPH C16-C22	μg/l	<10	<10	41.60	<10	<10	NA	<10	<10	<10	<10	<10	100.00	NV	NV	NV	NV	NV
TPH C22-C30	μg/l	<10	<10	58.80	<10	<10	NA	<10	<10	<10	<10	<10	100.00	NV	NV	NV	NV	NV
TPH C30-C40	μg/1	<10	<10	34.00	<10	<10	NA	<10	<10	<10	<10	<10	100.00	NV	NV	NV	NV	NV
No. of WUL excedances		0	0	1	0	0	1	0	0	0	1	0	1					
No. of SANS drinking water exceedance	5	0	0	1	0	0	1	0	0	0	1	0						
No. of Aquatic TWOR exceedances		1	1	1	0	0	2	0	0	0	1	0						

Notes:

NA - Not Analysed

< - below detection limit

Bold Black values - Exceed one screening value

Bold Red values - Exceed multiple screening values

#### Table 3-3: Aquatico Groundwater Monitoring Results (Continued)

Locality		AB58	AB59	AB61	AB62	AB63	CB08	CB52	CB60	PB47	PB48	CB64 New BH	MW6	KMR07		SANS241:2015		SAWQG:	1996	
Sample date		44/00/0000	44/00/0000	44/00/0000	44/00/0000	44/00/0000	44/00/0000		44/00/0000	44/00/0000		44/22/2022	05/00/0000	05/00/0000	WUL: 2014	Drinking	Domestic	Aquatic	Aquatic	Aquatic
Parameters	Unit	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	05/08/2022	05/08/2022		Water	(TWQR)	(TWQR)	(CEV)	(AEV)
pH	pH units	NA	8.17	8.21	6.0 - 8.0	5.0 -9.7	6.0 - 9.0	NV	NV	NV										
Electrical Conductivity	uS/cm	NA	728.00	1,080.00	1,000.00	1,700.00	0 - 700	NV	NV	NV										
Total Dissolved Solids	mg/I	NA	598.00	724.00	NV	1,200.00	0 - 450	NV	NV	NV										
Total Organic Carbon	mg/I	NA	NA	NA	NV	10.00	0 - 5	NV	NV	NV										
Total Alkalinity as CaCO3	mg/l	NA	395.00	186.00	150.00	NV	NV	NV	NV	NV										
Fluoride	mg/I	NA	<0.263	0.26	1.00	1.50	0-1	0.75	1.50	2.54										
Chloride	mg/I	NA	20.00	64.10	25.00	300.00	0 - 100	NV	NV	NV										
Sulphate	mg/I	NA	9.97	282.00	380.00	500.00	0 - 200	NV	NV	NV										
Nitrate as N	mg/I	NA	0.21	0.61	1.00	11.00	0 - 6	NV	NV	NV										
Ammoniacal Nitrogen as N	mg/I	NA	0.13	0.21	0.007	1.50	0 - 1.0	0.007	0.015	0.100										
Ortho Phosphate as P	mg/I	NA	0.13	0.21	50.00	NV	NV	NV	NV	NV										
Dissolved Calcium	mg/I	NA	98.00	95.20	130.00	NV	0 - 32	NV	NV	NV										
Dissolved Magnesium	mg/I	NA	18.00	40.90	50.00	NV	0 - 30	NV	NV	NV										
Dissolved Potassium	mg/I	NA	22.00	16.30	25.00	NV	0 - 50	NV	NV	NV										
Dissolved Sodium	mg/I	NA	27.10	87.90	70.00	200.00	0 - 100	NV	NV	NV										
Dissolved Boron	mg/I	NA	0.04	0.503	0.50	2.40	NV	NV	NV	NV										
Dissolved Barium	mg/I	NA	0.28	0.07	NV	0.70	NV	NV	NV	NV										
Dissolved Strontium	mg/I	NA	0.38	1.35	NV	NV	NV	NV	NV	NV										
Dissolved Cadmium	ug/I	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	NA	NV	3.0	0 - 5	0.2	0.3	3.0
Total Dissolved Chromium	ug/I	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<2.0	<2.0	50.00	50.00	0-50	7.00	14.00	200.00
Dissolved Arsenic	ug/I	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NV	10.00	0-10	10.00	20.00	130.00
Dissolved Cobalt	ug/I	NA	NA	NA	NV	NV	NV	NV	NV	NV										
Dissolved Copper	ug/I	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NV	2,000.00	0 - 1000	0.3	0.5	1.6
Total Dissolved Iron	ug/I	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	NA	822.00	<4.0	<4.0	171.00	<4.0	<4.0	1,000.00	2,000.00	0 - 100	NV	NV	NV
Dissolved Lead	ug/I	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	NV	10.00	0 - 0.01	0.2	0.5	4.0
Dissolved Manganese	ug/I	158.00	6.00	34.00	14.00	18.00	496.00	NA	97.00	3.00	30.00	117.00	1,220.00	<4.0	400.00	400.00	0 - 50	180	370	1,300
Dissolved Nickel	ug/I	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	NA	NV	70.00	NV	NV	NV	NV
Dissolved Vanadium	ug/I	NA	NA	NA	NV	NV	0 - 100	NV	NV	NV										
Dissolved Zinc	ug/I	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<2.0	8.00	<2.0	<2.0	NV	5,000.00	0 - 3000	2	4	36
Dissolved Silicon	ug/I	NA	3,360.00	<26	NV	NV	NV	NV	NV	NV										
TPH C16-C22	μg/I	<10	<10	<10	<10	<10	NA	<10	<10	<10	<10	887.00	NA	NA	100.00	NV	NV	NV	NV	NV
TPH C22-C30	μg/I	<10	<10	<10	<10	<10	NA	<10	<10	<10	<10	189.00	NA	NA	100.00	NV	NV	NV	NV	NV
TPH C30-C40	μg/I	<10	<10	<10	<10	<10	NA	<10	<10	<10	<10	<10	NA	NA	100.00	NV	NV	NV	NV	NV
No. of WUL exeedances		0	0	0	0	0	1	0	0	0	0	2	4	7						
No. of SANS drinking water exceedance	5	0	0	0	0	0	1	0	0	0	0	0	1	0						
No. of Aquatic TWOR exceedances		0	0	0	0	0	1	0	0	0	0	1	2	1						

Notes:

NA - Not Analysed

< - below detection limit

Bold Black values - Exceed one screening value

Bold Red values - Exceed multiple screening values

#### 3.1 Groundwater laboratory results

#### 3.1.1 Exceedance's overview

From the groundwater laboratory results it can be noted that most of the groundwater samples collected from the WSP wells contained multiple compounds exceeding the adopted WUL, SANS and SAWQG Aquatic TWQR, whereas the groundwater samples collected by Aquatico from the Eskom monitoring wells only exceeded some of the adopted screening criteria.

It should be noted that most of the Aquatico sampled groundwater monitoring wells were only analyzed for a limited number of compounds whereas the WSP wells were analysed for an extensive suite, including inorganics. Inorganic results for only two Aquatico sampled wells were forwarded to RSK GCS namely MW6 and KMR07. This is a significant data gap in the evaluation of the groundwater results.

#### 3.1.2 WUL Exceedances

Of the sampled wells, the wells which contained the most compounds exceeding the WUL limits include BH3 (9 exceedances), KMR07 (7 exceedances), BH1 and BH8 (5 exceedances), BH5 (4 exceedances). BH3 is located within BESS\_C (currently scrap yard) and contained elevated sulphate, magnesium, sodium, and manganese concentrations. KMR07 is located to the north-west of the municipal sewerage works and indicated multiple exceedances but none which were significantly elevated above the WUL limits. BH1 is located to north and down-gradient of BESS\_D (currently coal stockyard) and Lake Finn and near the Gelukspruit stream, this well contained highly elevated dissolved manganese, ammonia, and Total Alkalinity. BH8, is located near the southern border of the PV\_A border close to the rehabilitated domestic waste site and historical ash dam footprint. BH8 also contained multiple compounds exceeding the WUL limits. Monitoring well BH5 is located to the north-east and down-gradient of the old ash dams and to the north and down-gradient of the raw water dams, and like KMR07 and BH8, monitoring well BH5 reported multiple WUL exceedances but none that were significantly elevated above the WUL limits.

#### Manganese

As mentioned above, multiple groundwater monitoring wells contained various compounds exceeding the WUL reserve limits. It is worth mentioning that most of the sampled wells contained dissolved manganese concentrations marginally exceeding the WUL reserve limit.

The wells which contained the highest dissolved manganese concentrations include BH1-BH3, AB07 and AB52. These wells all marginally exceeded the WUL manganese reserve limit and are located to the north and down-gradient of the ash dam, and near the Power Station. Monitoring well AB07 contained the highest manganese concentration followed by BH1. Monitoring well AB07 is located to the east and cross-gradient of the Power Station scrap yard and in close proximity to the Gelukspruit stream. BH1 is located north and down-gradient of BESS\_D (currently coal stockyard) and Lake Finn and is also located near the Gelukspruit stream.

#### Total petroleum hydrocarbons

Of the 34 groundwater monitoring wells sampled all were analysed for total petroleum hydrocarbon concentrations and only two wells contained detectable TPH concentrations namely AB07 and CB64 New. Of the two wells only the TPH concentrations detected at CB64 New exceeded the WUL reserve limits. The location of this well is however not known. Multiple sampled wells also contained elevated ammonia and chloride concentrations compared to the WUL limits.

#### 3.1.3 SANS Exceedances

Of the 34 sampled groundwater monitoring wells, 13 of the wells contained compounds exceeding the SANS241 drinking water standards. Of these 13 wells, the dissolved lead and manganese were the two most prevalent compounds exceeding the SANS screening values. Groundwater monitoring wells BH6, BH7 and BH8 contained the most elevated lead concentrations and are all located near the borders of the PV\_A parcel of land. According to the WSP report (Report ref: 41103965) The PV\_A parcel of land has mostly been used as farmland, with historical ash/slimes dam located near the east of the of the parcel and rehabilitated domestic waste site near the south-eastern border of the parcel. Once more, groundwater monitoring well BH3 was the most impacted with 4 SANS exceedances reported, followed by BH1 and BH6 with 2 exceedances. BH1 is located to the north of BESS\_D (currently coals stock yard); and BH6 is located near the northern border of the PV\_A parcel of land, to the west and cross-gradient of the ash dams.

#### 3.1.4 SAWQG Aquatic TWQR Exceedances

19 of the 34 samples groundwater monitoring wells exceeded the SAWQG Aquatic Target Water Quality Ranges. The aquatic target quality ranges are more conservative compared to the SANS drinking water and WUL values. Of the compounds analysed manganese and zinc followed closely by lead were the three most predominant compounds detected which exceeded the adopted aquatic screening values. The two highest dissolved zinc concentrations were detected at BH8 and BH6. As mentioned previously, both wells are

located on the planned PV\_A parcel. BH5 also contained an elevated zinc concentration with respect to the aquatic screening value and is located to the north-east and down-gradient of the ash dam and raw water dams. Of the sampled wells, the well which contained the most compounds exceeding aquatic screening criteria was BH2 (5 exceedances), followed by BH1, BH3, BH5 and BH6 (4 exceedances each).

#### 3.1.5 Summary/ High Risk Areas

Based on the received groundwater monitoring laboratory results, most of the sampled wells exceeded the adopted screening criteria, however, the most highly impacted locations include the areas in the vicinity of:

- BH3 & AB07 Power Station Scrapyard
- BH2 Power Station Coal Stock Yard
- BH1 Area north of Lake Finn
- KMR07 Area north of the municipal sewerage works
- BH5 Area north of the ash dams
- BH8 Area near the south-east border of PV\_A
- **BH6** Area near the northern border of PV\_A

It should be noted that there would most probably be additional highly impacted areas which aren't currently highlighted due to the lack of inorganic data for the Aquatico sampled wells.

## 4 DATA GAPS

Based on the review of the groundwater monitoring results made available to RSK GCS for review, the following data gaps currently exist:

- 1. The locality of multiple sampled Aquatico wells are not known.
- 2. The two data sets from WSP and Aquatico are not directly comparable as the WSP dataset contains a wider range of analytes and which are not reported under the Aquatico dataset.
- 3. The review was undertaken on data as received and the sampling methodologies, sample preservation, quality assurance and quality control measures employed by the two respective companies while sampling are not known.
- 4. Except for the 24 existing Eskom wells sampled by Aquatico, there are multiple additional groundwater monitoring wells which were not sampled and did not form part of the current review.
- A discrepancy between the detection limits and compounds detected by the Aquatico and WSP datasets have been identified. For example, iron was detected in all WSP sample results whereas only three of the Aquatico sampled contained detectable iron concentrations.
- 6. There is currently a lack of groundwater monitoring data inside the Komati Power Station at the following areas:
  - a. BESS\_A
  - b. Generator area
  - c. Garage area
  - d. Hazardous waste storage area
  - e. Fuel storage area
  - f. Cooling towers

## FIGURE 4-1: SITE LAYOUT MAP



# FIGURE 4-2: GROUNDWATER EXCEEDANCES MAP



### **APPENDIX A: EXCEEDANCES**

# WUL EXCEEDANCES



Locality	BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8	BH9	BH10	BH 10-01	
Date of Receipt	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	WUL: 2014
Parameters	10/00/2022	10,00,2022	10/00/2022	10/00/2022	10,00,2022	10,00,2022	10,00,2022	10,00,2022	10/00/2022	10,00,2022	10,00,2022	
рН	7.44	7.44	7.25	7.10	7.54	6.67	7.00	7.42	7.54	6.62	6.62	8.00
Electrical Conductivity	981.00	684.00	1,849.00	248.00	835.00	679.00	304.00	1,133.00	370.00	125.00	1,850.00	1,000.00
Total Dissolved Solids	616.00	541.00	1,537.00	205.00	563.00	486.00	187.00	894.00	250.00	136.00	1,533.00	NV
Total Organic Carbon	BDL	2.00	BDL	BDL	BDL	NV						
Total Alkalinity as CaCO3	396.00	132.00	260.00	18.00	92.00	64.00	23.00	116.00	124.00	20.00	256.00	150.00
Fluoride	0.40	BDL	0.30	BDL	BDL	BDL	BDL	BDL	0.30	BDL	0.40	1.00
Chloride	32.10	22.10	73.90	53.00	67.60	19.00	29.70	25.60	3.40	11.70	69.90	25.00
Sulphate	133.10	183.60	983.10	5.40	213.00	234.80	67.30	446.00	51.10	55.40	837.90	380.00
Nitrate as N	BDL	BDL	BDL	BDL	BDL	0.11	0.36	BDL	1.27	BDL	BDL	1.00
Ammoniacal Nitrogen as N	2.60	0.47	0.75	BDL	0.47	0.19	BDL	0.05	BDL	BDL	0.36	0.007
Ortho Phosphate as P	0.05	0.04	0.06	0.03	0.03	0.02	0.04	0.05	0.04	0.03	0.04	50.00
Dissolved Calcium	73.10	27.70	141.00	11.00	46.30	42.40	13.60	83.00	17.00	8.00	141.50	130.00
Dissolved Magnesium	50.00	22.50	125.40	11.20	26.40	34.60	9.10	74.30	11.20	5.00	116.50	50.00
Dissolved Potassium	4.20	7.00	6.20	3.60	11.20	6.90	7.90	18.50	3.20	2.30	6.00	25.00
Dissolved Sodium	71.60	85.80	136.40	15.20	82.60	44.20	26.30	48.40	46.50	25.60	137.10	70.00
Dissolved Boron	NA	0.50										
Dissolved Barium	NA	NV										
Dissolved Strontium	NA	NV										
Dissolved Cadmium	BDL	BDL	BDL	BDL	0.04	0.03	BDL	0.04	BDL	BDL	BDL	NV
Total Dissolved Chromium	BDL	4.30	BDL	1.40	0.40	BDL	BDL	0.20	0.30	BDL	BDL	50.00
Dissolved Arsenic	BDL	NV										
Dissolved Cobalt	12.20	25.60	11.10	4.60	4.60	6.60	0.20	0.50	0.70	BDL	11.00	NV
Dissolved Copper	BDL	2.00	BDL	NV								
Total Dissolved Iron	292.00	1,692.10	164.40	492.90	12.60	25.60	11.20	7.90	43.90	9.90	163.70	1,000.00
Dissolved Lead	1.50	2.10	4.60	1.60	7.80	12.80	38.10	33.00	28.30	2.70	4.60	NV
Dissolved Manganese	3,269.50	1,241.80	1,718.30	114.80	809.50	496.80	15.70	68.80	18.30	6.80	1,639.40	400.00
Dissolved Nickel	4.70	8.20	12.80	6.30	5.50	7.00	4.50	23.60	1.70	3.20	12.60	NV
Dissolved Vadium	BDL	4.80	1.00	1.50	1.10	BDL	BDL	BDL	2.20	1.50	1.00	NV
Dissolved Zinc	16.20	30.70	37.90	29.40	37.80	46.40	34.50	59.00	32.40	24.50	37.00	NV
Dissolved Silicon	21,309.00	28,801.00	19,617.00	10,607.00	8,902.00	9,616.00	6,005.00	9,986.00	23,415.00	9,350.00	20,135.00	NV
TPH C16-C22	NA	100.00										
TPH C22-C30	NA	100.00										
TPH C30-C40	NA	100.00										
No. of WUL exeedances	5	4	9	1	4	2	1	5	1	0	9	

NA - Not Analysed

BDL - below detection limit

Exceeds screening value

Locality	AB04	AB06	AB07	AB08	AB51	AB52	AB53	AB54	AB55	AB56	AB57	
Date of Receipt	11/09/2022	11/08/2022	11/02/2022	11/09/2022	11/08/2022	11/08/2022	11/09/2022	11/09/2022	11/09/2022	11/09/2022	11/02/2022	WUL: 2014
Parameters	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	
рН	NA	8.00										
Electrical Conductivity	NA	1,000.00										
Total Dissolved Solids	NA	NV										
Total Organic Carbon	NA	NV										
Total Alkalinity as CaCO3	NA	150.00										
Fluoride	NA	1.00										
Chloride	NA	25.00										
Sulphate	NA	380.00										
Nitrate as N	NA	1.00										
Ammoniacal Nitrogen as N	NA	0.007										
Ortho Phosphate as P	NA	50.00										
Dissolved Calcium	NA	130.00										
Dissolved Magnesium	NA	50.00										
Dissolved Potassium	NA	25.00										
Dissolved Sodium	NA	70.00										
Dissolved Boron	NA	0.50										
Dissolved Barium	NA	NV										
Dissolved Strontium	NA	NV										
Dissolved Cadmium	BDL	NV										
Total Dissolved Chromium	BDL	50.00										
Dissolved Arsenic	BDL	NV										
Dissolved Cobalt	NA	NV										
Dissolved Copper	BDL	NV										
Total Dissolved Iron	BDL	BDL	503.00	NA	BDL	1,000.00						
Dissolved Lead	BDL	NV										
Dissolved Manganese	231.00	371.00	5,350.00	NA	90.00	2,030.00	180.00	BDL	4.00	495.00	42.00	400.00
Dissolved Nickel	BDL	BDL	BDL	NA	BDL	9.00	BDL	BDL	BDL	BDL	BDL	NV
Dissolved Vadium	NA	NV										
Dissolved Zinc	BDL	BDL	BDL	NA	BDL	9.00	BDL	BDL	BDL	BDL	BDL	NV
Dissolved Silicon	NA	NV										
TPH C16-C22	BDL	BDL	41.60	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	100.00
TPH C22-C30	BDL	BDL	58.80	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	100.00
TPH C30-C40	BDL	BDL	34.00	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	100.00
No. of WUL exeedances	0	0	1	0	0	1	0	0	0	1	0	

NA - Not Analysed

BDL - below detection limit

Exceeds screening value

Locality	AB58	AB59	AB61	AB62	AB63	CB08	CB52	CB60	PB47	PB48	CB64 New BH	MW6	KMR07	
Date of Receipt Parameters	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	05/08/2022	05/08/2022	WUL: 2014
рН	NA	8.17	8.21	8.00										
Electrical Conductivity	NA	728.00	1,080.00	1,000.00										
Total Dissolved Solids	NA	598.00	724.00	NV										
Total Organic Carbon	NA	NA	NA	NV										
Total Alkalinity as CaCO3	NA	395.00	186.00	150.00										
Fluoride	NA	BDL63	0.26	1.00										
Chloride	NA	20.00	64.10	25.00										
Sulphate	NA	9.97	282.00	380.00										
Nitrate as N	NA	0.21	0.61	1.00										
Ammoniacal Nitrogen as N	NA	0.13	0.21	0.007										
Ortho Phosphate as P	NA	0.13	0.21	50.00										
Dissolved Calcium	NA	98.00	95.20	130.00										
Dissolved Magnesium	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	18.00	40.90	50.00
Dissolved Potassium	NA	22.00	16.30	25.00										
Dissolved Sodium	NA	27.10	87.90	70.00										
Dissolved Boron	NA	0.04	0.503	0.50										
Dissolved Barium	NA	0.28	0.07	NV										
Dissolved Strontium	NA	0.38	1.35	NV										
Dissolved Cadmium	BDL	NA	NA	NV										
Total Dissolved Chromium	BDL	BDL	BDL	BDL	BDL		BDL	BDL	BDL	BDL	BDL	BDL	BDL	50.00
Dissolved Arsenic	BDL	BDL	BDL	NV										
Dissolved Cobalt	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NV
Dissolved Copper	BDL	BDL	BDL	NV										
Total Dissolved Iron	BDL	BDL	BDL	BDL	BDL	BDL	NA	822.00	BDL	BDL	171.00	BDL	BDL	1,000.00
Dissolved Lead	BDL	BDL	BDL	NV										
Dissolved Manganese	158.00	6.00	34.00	14.00	18.00	496.00	NA	97.00	3.00	30.00	117.00	1,220.00	BDL	400.00
Dissolved Nickel	BDL	NA	NA	NV										
Dissolved Vadium	NA	NA	NA	NV										
Dissolved Zinc	BDL	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	8.00	BDL	BDL	NV
Dissolved Silicon	NA	3,360.00	BDL6	NV										
TPH C16-C22	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	887.00	NA	NA	100.00
TPH C22-C30	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	189.00	NA	NA	100.00
TPH C30-C40	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	NA	NA	100.00
No. of WUL exeedances	0	0	0	0	0	1	0	0	0	0	2	4	7	

NA - Not Analysed

BDL - below detection limit

Exceeds screening value

# SANS EXCEEDANCES



Locality	BH1	BH2	ВНЗ	BH4	BH5	BH6	BH7	BH8	BH9	BH10	BH 10-01	SANS241:2015
Date of Receipt	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	Drinking
Parameters	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	10/00/2022	Water
рН	7.44	7.44	7.25	7.10	7.54	6.67	7.00	7.42	7.54	6.62	6.62	5.0 -9.7
Electrical Conductivity	981.00	684.00	1,849.00	248.00	835.00	679.00	304.00	1,133.00	370.00	125.00	1,850.00	1,700.00
Total Dissolved Solids	616.00	541.00	1,537.00	205.00	563.00	486.00	187.00	894.00	250.00	136.00	1,533.00	1,200.00
Total Organic Carbon	BDL	2.00	BDL	BDL	BDL	10.00						
Total Alkalinity as CaCO3	396.00	132.00	260.00	18.00	92.00	64.00	23.00	116.00	124.00	20.00	256.00	NV
Fluoride	0.40	BDL	0.30	BDL	BDL	BDL	BDL	BDL	0.30	BDL	0.40	1.50
Chloride	32.10	22.10	73.90	53.00	67.60	19.00	29.70	25.60	3.40	11.70	69.90	300.00
Sulphate	133.10	183.60	983.10	5.40	213.00	234.80	67.30	446.00	51.10	55.40	837.90	500.00
Nitrate as N	BDL	BDL	BDL	BDL	BDL	0.11	0.36	BDL	1.27	BDL	BDL	11.00
Ammoniacal Nitrogen as N	2.60	0.47	0.75	BDL	0.47	0.19	BDL	0.05	BDL	BDL	0.36	1.50
Ortho Phosphate as P	0.05	0.04	0.06	0.03	0.03	0.02	0.04	0.05	0.04	0.03	0.04	NV
Dissolved Calcium	73.10	27.70	141.00	11.00	46.30	42.40	13.60	83.00	17.00	8.00	141.50	NV
Dissolved Magnesium	50.00	22.50	125.40	11.20	26.40	34.60	9.10	74.30	11.20	5.00	116.50	NV
Dissolved Potassium	4.20	7.00	6.20	3.60	11.20	6.90	7.90	18.50	3.20	2.30	6.00	NV
Dissolved Sodium	71.60	85.80	136.40	15.20	82.60	44.20	26.30	48.40	46.50	25.60	137.10	200.00
Dissolved Boron	NA	2.40										
Dissolved Barium	NA	0.70										
Dissolved Strontium	NA	NV										
Dissolved Cadmium	BDL	BDL	BDL	BDL	0.04	0.03	BDL	0.04	BDL	BDL	BDL	3.0
Total Dissolved Chromium	BDL	4.30	BDL	1.40	0.40	BDL	BDL	0.20	0.30	BDL	BDL	50.00
Dissolved Arsenic	BDL	10.00										
Dissolved Cobalt	12.20	25.60	11.10	4.60	4.60	6.60	0.20	0.50	0.70	BDL	11.00	NV
Dissolved Copper	BDL	2.00	BDL	2,000.00								
Total Dissolved Iron	292.00	1,692.10	164.40	492.90	12.60	25.60	11.20	7.90	43.90	9.90	163.70	2,000.00
Dissolved Lead	1.50	2.10	4.60	1.60	7.80	12.80	38.10	33.00	28.30	2.70	4.60	10.00
Dissolved Manganese	3,269.50	1,241.80	1,718.30	114.80	809.50	496.80	15.70	68.80	18.30	6.80	1,639.40	400.00
Dissolved Nickel	4.70	8.20	12.80	6.30	5.50	7.00	4.50	23.60	1.70	3.20	12.60	70.00
Dissolved Vadium	BDL	4.80	1.00	1.50	1.10	BDL	BDL	BDL	2.20	1.50	1.00	NV
Dissolved Zinc	16.20	30.70	37.90	29.40	37.80	46.40	34.50	59.00	32.40	24.50	37.00	5,000.00
Dissolved Silicon	21,309.00	28,801.00	19,617.00	10,607.00	8,902.00	9,616.00	6,005.00	9,986.00	23,415.00	9,350.00	20,135.00	NV
TPH C16-C22	NA	NV										
TPH C22-C30	NA	NV										
TPH C30-C40	NA	NV										
No. of SANS drinking water exceedances	2	1	4	0	1	2	1	1	1	0	4	

NA - Not Analysed

BDL - below detection limit

Exceeds screening value

Locality	AB04	AB06	AB07	AB08	AB51	AB52	AB53	AB54	AB55	AB56	AB57	SANS241:2015
Date of Receipt Parameters	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	Drinking Water
pH	NA	5.0 -9.7										
Electrical Conductivity	NA	1,700.00										
Total Dissolved Solids	NA	1,200.00										
Total Organic Carbon	NA	10.00										
Total Alkalinity as CaCO3	NA	NV										
Fluoride	NA	1.50										
Chloride	NA	300.00										
Sulphate	NA	500.00										
Nitrate as N	NA	11.00										
Ammoniacal Nitrogen as N	NA	1.50										
Ortho Phosphate as P	NA	NV										
Dissolved Calcium	NA	NV										
Dissolved Magnesium	NA	NV										
Dissolved Potassium	NA	NV										
Dissolved Sodium	NA	200.00										
Dissolved Boron	NA	2.40										
Dissolved Barium	NA	0.70										
Dissolved Strontium	NA	NV										
Dissolved Cadmium	BDL	3.0										
Total Dissolved Chromium	BDL	50.00										
Dissolved Arsenic	BDL	10.00										
Dissolved Cobalt	NA	NV										
Dissolved Copper	BDL	2,000.00										
Total Dissolved Iron	BDL	BDL	503.00	NA	BDL	2,000.00						
Dissolved Lead	BDL	10.00										
Dissolved Manganese	231.00	371.00	5,350.00	NA	90.00	2,030.00	180.00	BDL	4.00	495.00	42.00	400.00
Dissolved Nickel	BDL	BDL	BDL	NA	BDL	9.00	BDL	BDL	BDL	BDL	BDL	70.00
Dissolved Vadium	NA	NV										
Dissolved Zinc	BDL	BDL	BDL	NA	BDL	9.00	BDL	BDL	BDL	BDL	BDL	5,000.00
Dissolved Silicon	NA	NV										
TPH C16-C22	BDL	BDL	41.60	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	NV
TPH C22-C30	BDL	BDL	58.80	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	NV
TPH C30-C40	BDL	BDL	34.00	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	NV
No. of SANS drinking water exceedances	0	0	1	0	0	1	0	0	0	1	0	

NA - Not Analysed

BDL - below detection limit

Exceeds screening value

Locality	AB58	AB59	AB61	AB62	AB63	CB08	CB52	CB60	PB47	PB48	CB64 New BH	MW6	KMR07	SANS241:201 5
Date of Receipt Parameters	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	05/08/2022	05/08/2022	Drinking Water
рН	NA	8.17	8.21	5.0 - 9.7										
Electrical Conductivity	NA	728.00	1,080.00	1,700.00										
Total Dissolved Solids	NA	598.00	724.00	1,200.00										
Total Organic Carbon	NA	NA	NA	10.00										
Total Alkalinity as CaCO3	NA	395.00	186.00	NV										
Fluoride	NA	BDL63	0.26	1.50										
Chloride	NA	20.00	64.10	300.00										
Sulphate	NA	9.97	282.00	500.00										
Nitrate as N	NA	0.21	0.61	11.00										
Ammoniacal Nitrogen as N	NA	0.13	0.21	1.50										
Ortho Phosphate as P	NA	0.13	0.21	NV										
Dissolved Calcium	NA	98.00	95.20	NV										
Dissolved Magnesium	NA	18.00	40.90	NV										
Dissolved Potassium	NA	22.00	16.30	NV										
Dissolved Sodium	NA	27.10	87.90	200.00										
Dissolved Boron	NA	0.04	0.503	2.40										
Dissolved Barium	NA	0.28	0.07	0.70										
Dissolved Strontium	NA	0.38	1.35	NV										
Dissolved Cadmium	BDL	NA	NA	3.0										
Total Dissolved Chromium	BDL	BDL	BDL	50.00										
Dissolved Arsenic	BDL	BDL	BDL	10.00										
Dissolved Cobalt	NA	NA	NA	NV										
Dissolved Copper	BDL	BDL	BDL	2,000.00										
Total Dissolved Iron	BDL	BDL	BDL	BDL	BDL	BDL	NA	822.00	BDL	BDL	171.00	BDL	BDL	2,000.00
Dissolved Lead	BDL	BDL	BDL	10.00										
Dissolved Manganese	158.00	6.00	34.00	14.00	18.00	496.00	NA	97.00	3.00	30.00	117.00	1,220.00	BDL	400.00
Dissolved Nickel	BDL	NA	NA	70.00										
Dissolved Vadium	NA	NA	NA	NV										
Dissolved Zinc	BDL	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	8.00	BDL	BDL	5,000.00
Dissolved Silicon	NA	3,360.00	BDL6	NV										
TPH C16-C22	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	887.00	NA	NA	NV
TPH C22-C30	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	189.00	NA	NA	NV
TPH C30-C40	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	NA	NA	NV
No. of SANS drinking water exceedances	0	0	0	0	0	1	0	0	0	0	0	1	0	

NA - Not Analysed

BDL - below detection limit

Exceeds screening value

# SAWQG EXCEEDANCES



Locality	BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8	BH9	BH10	BH 10-01	SAWQG: 1996
Date of Receipt Parameters	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	Aquatic (TWQR)
рН	7.44	7.44	7.25	7.10	7.54	6.67	7.00	7.42	7.54	6.62	6.62	NV
Electrical Conductivity	981.00	684.00	1,849.00	248.00	835.00	679.00	304.00	1,133.00	370.00	125.00	1,850.00	NV
Total Dissolved Solids	616.00	541.00	1,537.00	205.00	563.00	486.00	187.00	894.00	250.00	136.00	1,533.00	NV
Total Organic Carbon	BDL	2.00	BDL	BDL	BDL	NV						
Total Alkalinity as CaCO3	396.00	132.00	260.00	18.00	92.00	64.00	23.00	116.00	124.00	20.00	256.00	NV
Fluoride	0.40	BDL	0.30	BDL	BDL	BDL	BDL	BDL	0.30	BDL	0.40	0.75
Chloride	32.10	22.10	73.90	53.00	67.60	19.00	29.70	25.60	3.40	11.70	69.90	NV
Sulphate	133.10	183.60	983.10	5.40	213.00	234.80	67.30	446.00	51.10	55.40	837.90	NV
Nitrate as N	BDL	BDL	BDL	BDL	BDL	0.11	0.36	BDL	1.27	BDL	BDL	NV
Ammoniacal Nitrogen as N	2.60	0.47	0.75	BDL	0.47	0.19	BDL	0.05	BDL	BDL	0.36	0.007
Ortho Phosphate as P	0.05	0.04	0.06	0.03	0.03	0.02	0.04	0.05	0.04	0.03	0.04	NV
Dissolved Calcium	73.10	27.70	141.00	11.00	46.30	42.40	13.60	83.00	17.00	8.00	141.50	NV
Dissolved Magnesium	50.00	22.50	125.40	11.20	26.40	34.60	9.10	74.30	11.20	5.00	116.50	NV
Dissolved Potassium	4.20	7.00	6.20	3.60	11.20	6.90	7.90	18.50	3.20	2.30	6.00	NV
Dissolved Sodium	71.60	85.80	136.40	15.20	82.60	44.20	26.30	48.40	46.50	25.60	137.10	NV
Dissolved Boron	NA	NV										
Dissolved Barium	NA	NV										
Dissolved Strontium	NA	NV										
Dissolved Cadmium	BDL	BDL	BDL	BDL	0.04	0.03	BDL	0.04	BDL	BDL	BDL	0.2
Total Dissolved Chromium	BDL	4.30	BDL	1.40	0.40	BDL	BDL	0.20	0.30	BDL	BDL	7.00
Dissolved Arsenic	BDL	10.00										
Dissolved Cobalt	12.20	25.60	11.10	4.60	4.60	6.60	0.20	0.50	0.70	BDL	11.00	NV
Dissolved Copper	BDL	2.00	BDL	0.3								
Total Dissolved Iron	292.00	1,692.10	164.40	492.90	12.60	25.60	11.20	7.90	43.90	9.90	163.70	NV
Dissolved Lead	1.50	2.10	4.60	1.60	7.80	12.80	38.10	33.00	28.30	2.70	4.60	0.2
Dissolved Manganese	3,269.50	1,241.80	1,718.30	114.80	809.50	496.80	15.70	68.80	18.30	6.80	1,639.40	180
Dissolved Nickel	4.70	8.20	12.80	6.30	5.50	7.00	4.50	23.60	1.70	3.20	12.60	NV
Dissolved Vadium	BDL	4.80	1.00	1.50	1.10	BDL	BDL	BDL	2.20	1.50	1.00	NV
Dissolved Zinc	16.20	30.70	37.90	29.40	37.80	46.40	34.50	59.00	32.40	24.50	37.00	2
Dissolved Silicon	21,309.00	28,801.00	19,617.00	10,607.00	8,902.00	9,616.00	6,005.00	9,986.00	23,415.00	9,350.00	20,135.00	NV
TPH C16-C22	NA	NV										
TPH C22-C30	NA	NV										
TPH C30-C40	NA	NV										
No. of Aquatic TWQR exceedances	4	5	4	2	4	4	2	3	2	2	4	

NA - Not Analysed BDL - below detection limit

Exceeds screening value

Locality	AB04	AB06	AB07	AB08	AB51	AB52	AB53	AB54	AB55	AB56	AB57	SAWQG: 1996
Date of Receipt Parameters	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	Aquatic (TWQR)
рН	NA	NV										
Electrical Conductivity	NA	NV										
Total Dissolved Solids	NA	NV										
Total Organic Carbon	NA	NV										
Total Alkalinity as CaCO3	NA	NV										
Fluoride	NA	0.75										
Chloride	NA	NV										
Sulphate	NA	NV										
Nitrate as N	NA	NV										
Ammoniacal Nitrogen as N	NA	0.007										
Ortho Phosphate as P	NA	NV										
Dissolved Calcium	NA	NV										
Dissolved Magnesium	NA	NV										
Dissolved Potassium	NA	NV										
Dissolved Sodium	NA	NV										
Dissolved Boron	NA	NV										
Dissolved Barium	NA	NV										
Dissolved Strontium	NA	NV										
Dissolved Cadmium	BDL	0.2										
Total Dissolved Chromium	BDL	7.00										
Dissolved Arsenic	BDL	10.00										
Dissolved Cobalt	NA	NV										
Dissolved Copper	BDL	0.3										
Total Dissolved Iron	BDL	BDL	503.00	NA	BDL	NV						
Dissolved Lead	BDL	0.2										
Dissolved Manganese	231.00	371.00	5,350.00	NA	90.00	2,030.00	180.00	BDL	4.00	495.00	42.00	180
Dissolved Nickel	BDL	BDL	BDL	NA	BDL	9.00	BDL	BDL	BDL	BDL	BDL	NV
Dissolved Vadium	NA	NV										
Dissolved Zinc	BDL	BDL	BDL	NA	BDL	9.00	BDL	BDL	BDL	BDL	BDL	2
Dissolved Silicon	NA	NV										
TPH C16-C22	BDL	BDL	41.60	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	NV
TPH C22-C30	BDL	BDL	58.80	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	NV
TPH C30-C40	BDL	BDL	34.00	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	NV
No. of Aquatic TWQR exceedances	1	1	1	0	0	2	0	0	0	1	0	

NA - Not Analysed

BDL - below detection limit

Exceeds screening value

Locality	AB58	AB59	AB61	AB62	AB63	CB08	CB52	CB60	PB47	PB48	CB64 New BH	MW6	KMR07	SAWQG: 1996
Date of Receipt Parameters	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	11/08/2022	05/08/2022	05/08/2022	Aquatic (TWQR)
рН	NA	8.17	8.21	NV										
Electrical Conductivity	NA	728.00	1,080.00	NV										
Total Dissolved Solids	NA	598.00	724.00	NV										
Total Organic Carbon	NA	NA	NA	NV										
Total Alkalinity as CaCO3	NA	395.00	186.00	NV										
Fluoride	NA	BDL63	0.26	0.75										
Chloride	NA	20.00	64.10	NV										
Sulphate	NA	9.97	282.00	NV										
Nitrate as N	NA	0.21	0.61	NV										
Ammoniacal Nitrogen as N	NA	0.13	0.21	0.007										
Ortho Phosphate as P	NA	0.13	0.21	NV										
Dissolved Calcium	NA	98.00	95.20	NV										
Dissolved Magnesium	NA	18.00	40.90	NV										
Dissolved Potassium	NA	22.00	16.30	NV										
Dissolved Sodium	NA	27.10	87.90	NV										
Dissolved Boron	NA	0.04	0.503	NV										
Dissolved Barium	NA	0.28	0.07	NV										
Dissolved Strontium	NA	0.38	1.35	NV										
Dissolved Cadmium	BDL	NA	NA	0.2										
Total Dissolved Chromium	BDL	BDL	BDL	7.00										
Dissolved Arsenic	BDL	BDL	BDL	10.00										
Dissolved Cobalt	NA	NA	NA	NV										
Dissolved Copper	BDL	BDL	BDL	0.3										
Total Dissolved Iron	BDL	BDL	BDL	BDL	BDL	BDL	NA	822.00	BDL	BDL	171.00	BDL	BDL	NV
Dissolved Lead	BDL	BDL	BDL	0.2										
Dissolved Manganese	158.00	6.00	34.00	14.00	18.00	496.00	NA	97.00	3.00	30.00	117.00	1,220.00	BDL	180
Dissolved Nickel	BDL	NA	NA	NV										
Dissolved Vadium	NA	NA	NA	NV										
Dissolved Zinc	BDL	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	8.00	BDL	BDL	2
Dissolved Silicon	NA	3,360.00	BDL6	NV										
TPH C16-C22	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	887.00	NA	NA	NV
TPH C22-C30	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	189.00	NA	NA	NV
TPH C30-C40	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	NA	NA	NV
No. of Aquatic TWQR exceedances						1					1	2	1	

NA - Not Analysed

BDL - below detection limit

Exceeds screening value