Appendix F.16

CONTAMINATED LAND ASSESSMENT

ESKOM HOLDINGS SOC LTD

ESKOM KOMATI POWER STATION ESIA AND WULA

PRELIMINARY CONTAMINATED LAND STUDY

18 AUGUST 2022

CONFIDENTIAL

wsp

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PRELIMINARY CONTAMINATED LAND STUDY

ESKOM HOLDINGS SOC LTD

CONFIDENTIAL

PROJECT NO.: 41103965
DATE: AUGUST 2022

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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.

This report was updated with minor revisions at Eskom's request in 2023. This is to account for nomenclature changes in 2023 but ultimately the bulk of the report remains valid as at August 2022.

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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 and Wind Energy Facilities. This report informed the geohydrology report and the scope for subsequent additional investigations by Nemai in 2023. 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, wind energy generating facility and associated infrastructure as part of its repurposing programme for KPS. The plan is to install 150 MW of solar PV and 150 MW of BESS and up to 70 MW of Wind Turbines (within the Solar PV footprint). 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 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 ($LiFePO_4$), 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[1]), 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.
- GHT Consulting, July 2009, Komati Power Station Hydrological & geohydrological baseline study, GHT Consulting Scientists, RVN 537.5/909.
- Lidwala, December 2015, Integrated water and waste management plan for Komati Power Station, Mpumalanga Province, Lidwala Consulting Engineers (SA) (PTY) Ltd, 16906 PROS_ENV.
- Anglo American, November 2015, Goedehoop Colliery, Hope No. 4 Seam Project Draft Environmental Impact Report (EIR) and Environmental Management Programme (EMPr), DMR Reference No.: MP 30/5/1/2/2/1 (122) EA, https://minedocs.com/21/GoedehoopColliery_EIR_EMP_Report_November2015.pdf
- Kimopax, September 2019, Numerical modelling and geochemistry assessment, Eskom Komati Power Station, Gauteng, Kimopax (Pty) Ltd, KIM-WAT-2018-233
- Eskom, August 2019, Komati Hydrocensus Report - 2019, Applied chemistry and microbiology section: sustainability Division Eskom, RTD/ACM/19/240-149029270
- Eskom, Oct 2017, Komati Surface and Groundwater Monitoring Report, Phase 4, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/17/04.

[1] The Bess D area was subsequently removed from the areas for which the proposed new activities were proposed but is included herein for reference.

- Eskom, Oct 2017, Komati Surface and Groundwater Monitoring Report, Phase 3, Eskom Sustainability Division, Research, Testing and Development Technical report. RTD/ACM/16/240-118739170
- Eskom, April 2016, Komati Surface and Groundwater Monitoring Report, Phase 01, Eskom Sustainability Division, Research, Testing and Development Technical report, 240-112294332
- Eskom, January 2017, Komati Surface and Groundwater Monitoring Report, Phase 02, Eskom Sustainability Division, Research, Testing and Development Technical report, Rrtm/acm/16/240-118739170
- Eskom, April 2018, Komati Surface and Groundwater Monitoring Report, Phase 5, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/17/05
- Eskom, May 2018, Komati Surface and Groundwater Monitoring Report, Phase 6, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/17/06
- Eskom, May 2018, Komati Surface and Groundwater Monitoring Report, Phase 7, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/18/240-140434399
- Eskom, August 2018, Komati Surface and Groundwater Monitoring Report, Phase 8, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/18/240-140434709. (Mathetsa, S & Swartz, N)
- Eskom, September 2019, Komati Surface and Groundwater Monitoring Report, April to June 2019, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/19/240-150762666 (Authors Mathetsa, S & Swartz, N)
- Eskom, September 2019, Komati Surface and Groundwater Monitoring Report, July to September 2019, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/19/240-152749979 (Authors Mathetsa, S & Swartz, N)
- Eskom, May 2020, Komati Surface and Groundwater Monitoring Annual Report, 2020/2021, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/20/240-163860231
- Eskom, January 2021, Komati Surface and Groundwater Monitoring - Quarter 3, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/21/240-1615539477
- VPC, October 2021, Draft Report for Komati Thermal Power Plant Technical Analyses on retiring and repurposing four coal plants, South Africa. Report for the World Bank, VPC GmbH. P-2021-00547.
- Eskom, March 2022, Komati Surface and Groundwater Monitoring - Quarter 3, Eskom Sustainability Division, Research, Testing and Development Technical report, RTD/ACM/21/240-190000008
- SRK Consulting, March 2021, Independent Competent Person's Report on Goedehoop Colliery, SRK Report reference 566657. https://thungela.s3.eu-west-1.amazonaws.com/downloads/investors/Goedehoop-Colliery-CPR-dated-25-March-2021.pdf
- Eskom, 2022, Komati Wish_August 2021 water quality databased received on the 15 June 2022
- Eskom, 2022, Discussion on site infrastructure and existing activities with the Eskom Environmental Manager on the 07 July 2022

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.

There is information on the depth of the existing and proposed undermining activities. Based on the available information, the coal seams being targeted for mining are located at depths of between 20 to 100 m. It is understood that additional ggeotechnical investigations will be carried out by Eskom to provide further clarity.

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

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. The PV Sites A and B are vacant separated by an Eskom servitude. Komati Town is a residential area located between the KPS and PV 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™ 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 dump, subsequently identified by Eskom as a historical coal discard 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. Mining of the underlying No. 4 coal seam is understood to be planned in this area. This seam is indicated as being some 20 to 100 m below surface (Anglo American, 2015).
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 historical coal discard dump (rehabilitated) are noted to have been present in the northwest of this area. A landing strip / road crosses the area.
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 building located within the Eskom owned footprint in the south-eastern corner and used by the community.. This building 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 Geluksspruit (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.

Area	Approximate Centre Point Coordinates	Size (ha)	Locality and Current Use
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[2] 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**.

[2] 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**.

Table 3 – Lithostratigraphy

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

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[3], 1995 and DWAF[4], 1998) or Poor (DEA[5], 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[6].

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 95th 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).
- 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.

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[3] Parsons, R, 1995, A South African Aquifer System Management Classification, WRC Report No. KV77/95
[4] Department of Water Affairs and Forestry, Second Edition, 1998. Waste Management Series, Minimum Requirements for Water Monitoring as Waste Management Facilities
[5] Department of Environmental Affairs, May 2010, Framework for the Management of Contaminated Land
[6] 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.

Table 4 – Hydrocensus Boreholes

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
BB44	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

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 proposed 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 historical coal discard dump footprint
- 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

BESS C

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

BESS D

- Coal stockyard (subsequently excluded from the proposed re-development area)

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. Future mining of the No.4 coal seam underlying PV Site A is understood to be planned. The seam is located 20 to 100 m below ground surface (Anglo American, 2015).
- 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.

Future mining of the No. 4 coal seam underlying PV Site A could result in a change in the direction of groundwater flow during mining should groundwater from the regional aquifer be pumped from the workings. The mine workings will almost certainly be backfilled, but a cone of depression may remain until such time as the water levels recover post closure.

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**.

Table 5 – Groundwater Monitoring Data (06 June 2022)

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

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_7–C_9, C_{10}–C_{14} and C_{15}–C_{36})
- 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_7–C_9, C_{10}–C_{14} and C_{15}–C_{36})
- 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 historical 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 Coal discard 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 coal or ash in the vicinity of this historical Coal discard dump footprint, 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 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.

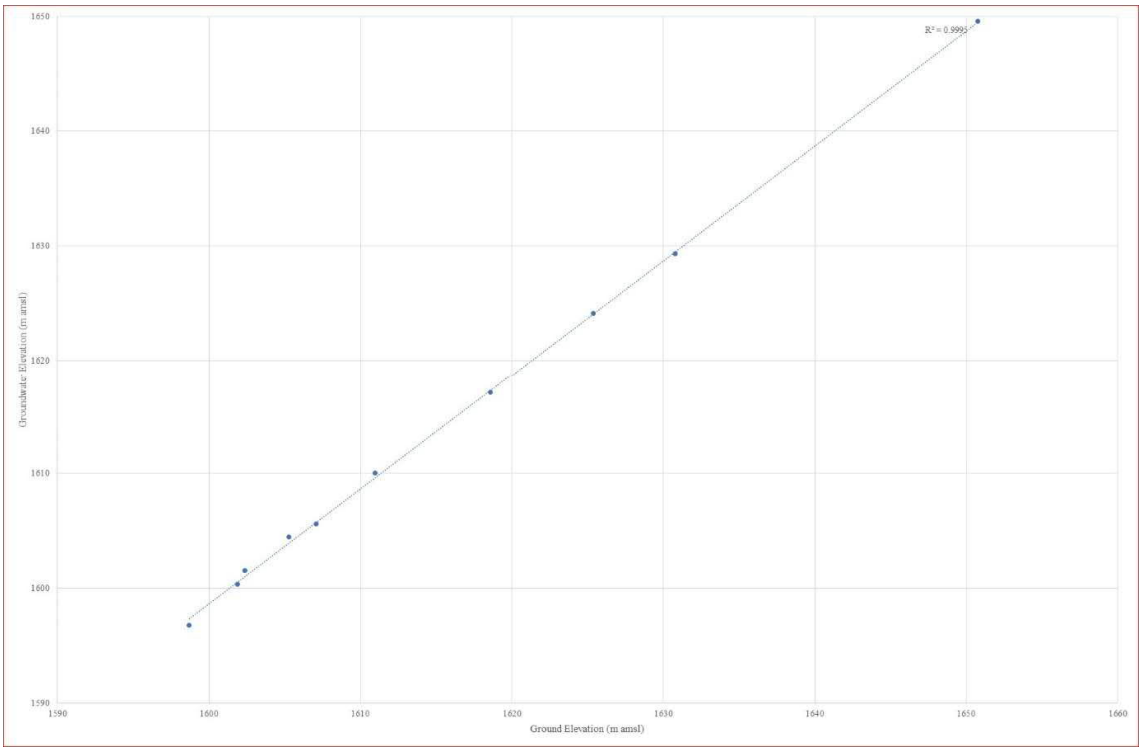


Figure A – Correlation: Topography versus Groundwater Elevation

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)[7] 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

[7] 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:

$$Relative\ Percentage\ Difference\ (RPD) = \left(\frac{(Original\ Concentration - Duplicate\ Concentration)}{\left(\frac{(Original\ Concentration + Duplicate\ Concentration)}{2}\right)} \right)$$

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.

Table 6 – Relative Percentage Differences BH03 (Original) versus BH10-01 (Duplicate)

Determinant	Units	Concentration		~RPD (%)
		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

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 95th 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 down-gradient 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 down-gradient groundwater quality with manganese at a concentration (1,718.3 µg/l) above both the drinking water chronic health standard (400 µg/l) and freshwater aquatic guideline (180 µg/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 µg/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 µg/l and 496.8 µg/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 µg/l) concentrations of zinc appear elevated within the shallow groundwater across the entire property (16.2–59 µg/l). While far below the drinking water standard of 2 000 µg/l, these are above both the Target Water Quality Range (TWQR) and Chronic Effect Value (CEV) of 2 µg/l and 3.6 µg/l, respectively for aquatic ecosystems, and also above the Acute Effect Value (AEV) of 36 µg/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 are 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.

In summary:

Table 7: Summary of findings in soil and groundwater for each area

Area of investigation	Summary of concentrations exceeding screening values	Risk Summary
PV Site A	**Soil:** Cu (in almost all samples) and As, Pb, Mn, and V were locally elevated above the SSV1 in some samples but less than SSV2 screening levels. Sulphate was elevated above SSV in AH15. **Groundwater:** Pb (all), Mn (BH6 only), SO_4 (BH8 and BH6) elevated above SANS 241:2015. Pb (all), Mn (BH6 only), Zn (all), ammoniacal N (all) elevated above SAWQG for aquatic species (SAWQG).	Potential sources: Area was historically used for crops with historical footprints in the eastern portion. Receptors to which an exposure pathway are complete include site workers (human health) and the environment. Soils are 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 is an existing groundwater plume from the adjacent Ashing area and seeps to the adjacent wetland are impacted by surface runoff from this area. No 4-coal seam is anticipated to be mined some 20 – 100m below the surface. The risk to these workings from the existing plume is outside this scope of work.
PV Site B	**Soil:** Cu (in all samples) and As, Pb, Mn, and V were locally elevated above the SSV1 in some samples but less than SSV2 screening levels. **Groundwater:** Pb (BH9 only), Mn (BH6 only), SO4 (BH8 and BH6) elevated above SANS 241:2015 and SAWQG. Zn (both) > SAWQG	Potential sources: A rehabilitated coal discard dump footprint is located to the north-west. Backfilled mine workings have been noted to occur at a depth greater than the 10m assessed by this study. Receptors to which an exposure pathway may be complete include site workers (human health), residents of Komati town, and the environment. Soils are 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 but there will, be a requirement to ensure appropriate management of excavations, and especially where these are required within areas proximal to residential dwellings of Komati.

Area of investigation	Summary of concentrations exceeding screening values	Risk Summary
BESS A	**Soil:** Cu in AH9 elevated above the SSV1 but less than SSV2 screening levels. Concentrations were all below SSV1 in the second sample AH10. **Groundwater:** No samples	Area is currently in use with several buildings and contractor's yards. Samples were therefore obtained from the adjacent area. Receptors to which an exposure pathway may be complete include site workers (human health) and the environment. Soils are 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. The risk from soils is as indicated above for the general site but visual inspection of this area may be necessary following demolition/ decommissioning to ensure there is no local areas of concern.
BESS B	**Soil:** Cu (in all samples), Pb and Mn locally in BH4 elevated above the SSV1 in some samples but less than SSV2 screening levels **Groundwater:** Fe, Mn > SANS 241-2015 aesthetic Mn, Zn > SAWQG	Potential sources: Most of the area is not in use except for community building located in the south-eastern corner.. The building is located within a bunker which was historically an old shooting range and there could be spent bullets within the bunker. Receptors to which an exposure pathway may be complete include site workers (human health). Komati town and the environment, specifically the aquatic environment of the Komati stream. Soils are 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. The risk to the water resources (aquatic and groundwater) are influenced by the surface runoff and groundwater migration from the Ashing Area.
BESS C	**Soil:** Cu (in all samples), As, Pb, Mn and V locally elevated above the SSV1 in some samples but less than SSV2 screening levels. **Groundwater:** EC, Mn, SO4 > SANS241-2015. PO4, Ammoniacal N, Mn, Zn, Pb > SAWQG	Potential sources: KPS, Ashing Area (upgradient), scrap yard and a possible temporary hazardous waste facility. Receptors to which an exposure pathway may be complete include site workers (human health) and the environment, specifically the aquatic environment of the Geluksprui (and wetland). Soils are 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. Ground water quality is affected by contamination migrating from the Ashing Area.
BESS D	All surface samples were taken from coal fill. As, Cu, Pb, Zn locally elevated above the SSV1 in some samples but less than SSV2 screening levels. Sulphate elevated above SSV locally in AH1. **Soil** results downgrade of the coal stockyard and KPS area: Cu (both samples), As, Mn and Pb (AH4 only) **Groundwater**: Fe (BH2 only and not downgrade), Mn and ammonical N (both and higher on boundary of KPS site in BH1), Eskom monitoring sites also show elevated Mn in boreholes in coal stockyard and on boundary. SO_4 higher than SANS241-2015 and WSP	Potential sources: Site is the coal stockyard currently in use by KPS. Receptors to which an exposure pathway may be complete include site workers (human health), groundwater users (combined impact from KPS area and not solely the coal stockyard) and surface runoff to the streams. Soils were not assessed due to the thickness of the coal layer. Based on the information available, soils are 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. The groundwater is affected by both the upgradient groundwater plume and the coal stock yard itself. There is a limited risk to groundwater users, but it is understood that the groundwater plume is the focus of a pending comprehensive groundwater model,

Area of investigation	Summary of concentrations exceeding screening values	Risk Summary
	borehole results. Pb, Mn, Zn > SAWQG	

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. This area was subsequently excluded from the re-development areas and is to focus of a separate study conducted in 2023.

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 micro-organism directly or indirectly affects or may affect the quality of soil or the environment adversely*"

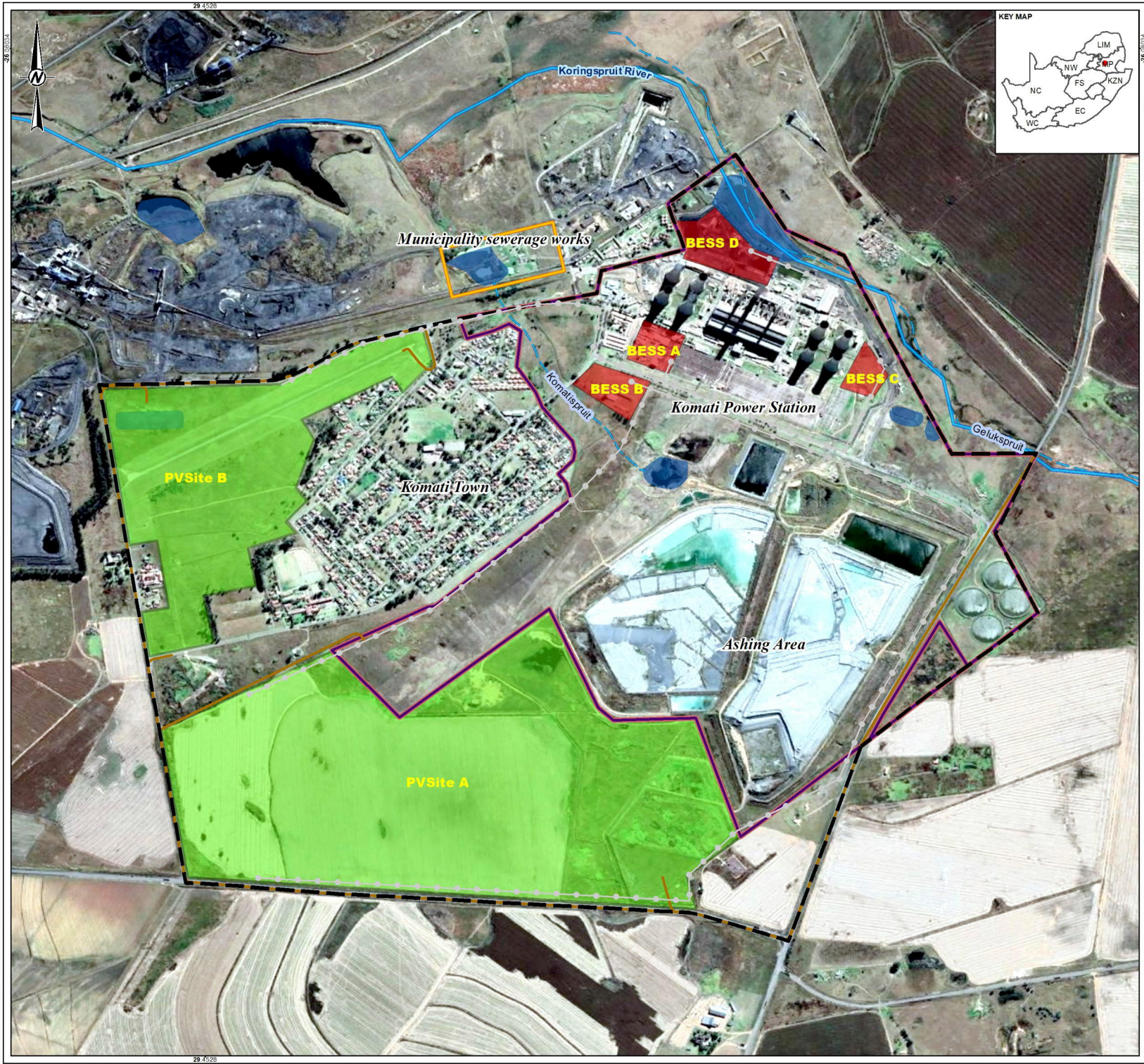
Therefore, and taking cognisance of Section 37(2) of the NEM: WA, it is WSP's opinion that the proposed development areas would likely be regarded as 'contaminated' based on definition, with certain determinants clearly being above a 'normal' level. However, recognising the outcomes of the risk assessment, 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*".

As stated above, contaminated groundwater from the Ashing Area has been shown to extend to the north towards the Koringspruit. WSP understands that this has been investigated in 2023 and is assessed separately from the WSP assessment. The potential impact from future undermining of the PV Site A is assessed in the groundwater study impact assessment..

The preliminary nature of this report is stressed. WSP understands that further investigations are in progress. . 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).

APPENDIX

A FIGURES



KEY MAP

LEGEND

- Overhead lines
- Access Roads
- Komati Power Station 56 IS
- KPS
- Municipality sewerage works
- PV Installation
- BESS Installation
- Rivers
- Rivers - Non perennial
- Dam

0 200 400 600

1:15,000 METERS

NOTE(S)

REFERENCE(S)
COORDINATE SYSTEM: GCS WGS 1984
SERVICE LAYER CREDITS:

CLIENT
ESKOM

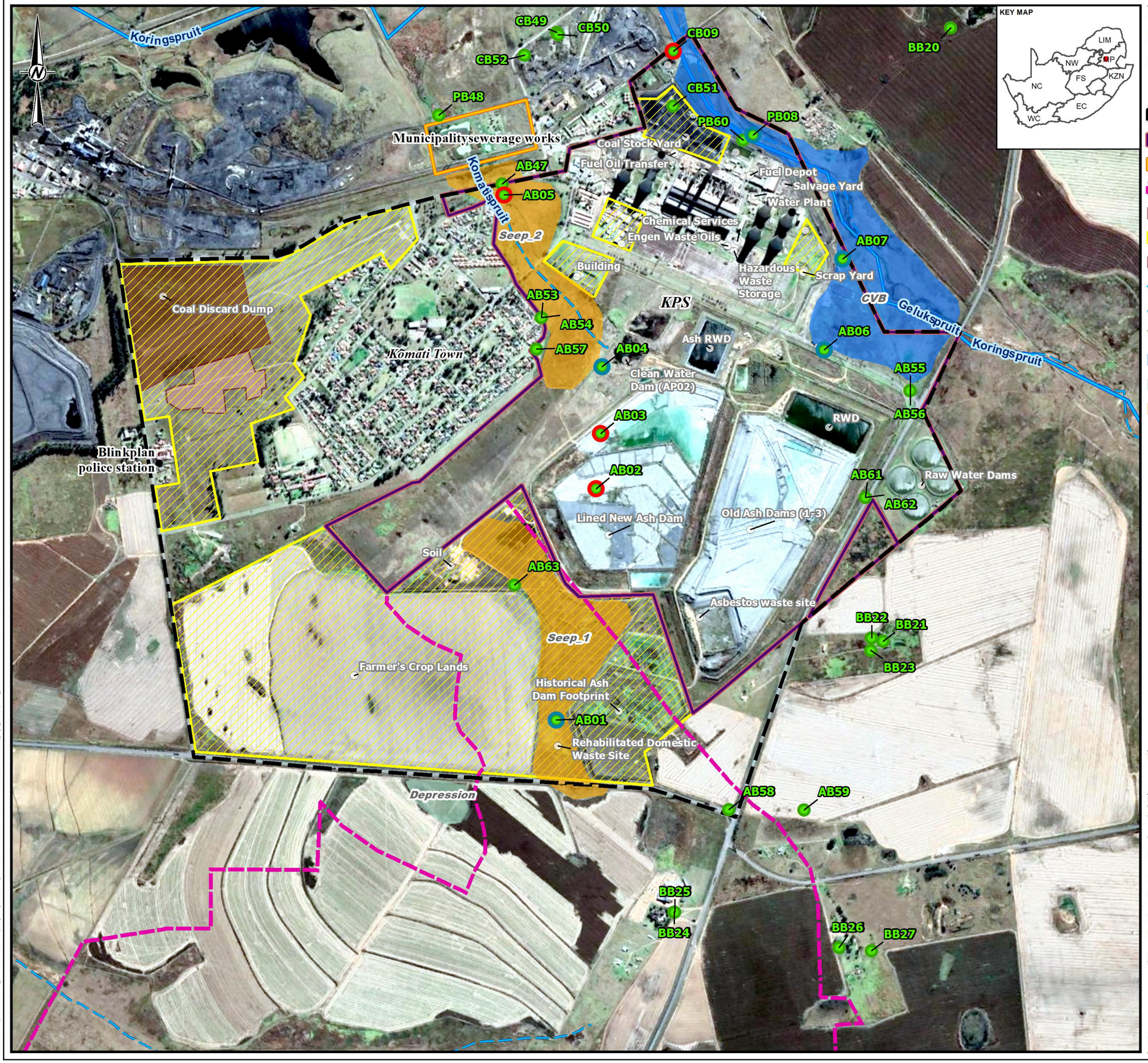
PROJECT
ESKOM KOMATI PV ESIA

TITLE
FIGURE 1: PROPOSED DEVELOPMENT

CONSULTANT
WSP GOLDER

YYYY-MM-DD	7/18/2022
DESIGNED	MB
PREPARED	MB
REVIEWED	SS
APPROVED	SS

PROJECT NO. 41103965 | CONTROL | REV. 0 | FIGURE 0



KEY MAP

LEGEND

- Census 2008
- Census 2019
- Site monitoring boreholes
- Komati Power Station 56 IS
- KPS
- Municipality sewerage works
- Goodhope No. 4 Seam
- Kroonfontein UG (Ash filled)
- Proposed Infrastructure
- Kroonfontein UG (Slurry filled)
- Rivers - Perennial
- Rivers - Non perennial

Wetland delineation

- Channelled valley-bottom
- Depression
- Seep

0 200 400 600

1:15 000 METERS

NOTE(S)

REFERENCE(S)
COORDINATE SYSTEM: WGS LO29
SERVICE LAYER CREDITS:

CLIENT
ESKOM

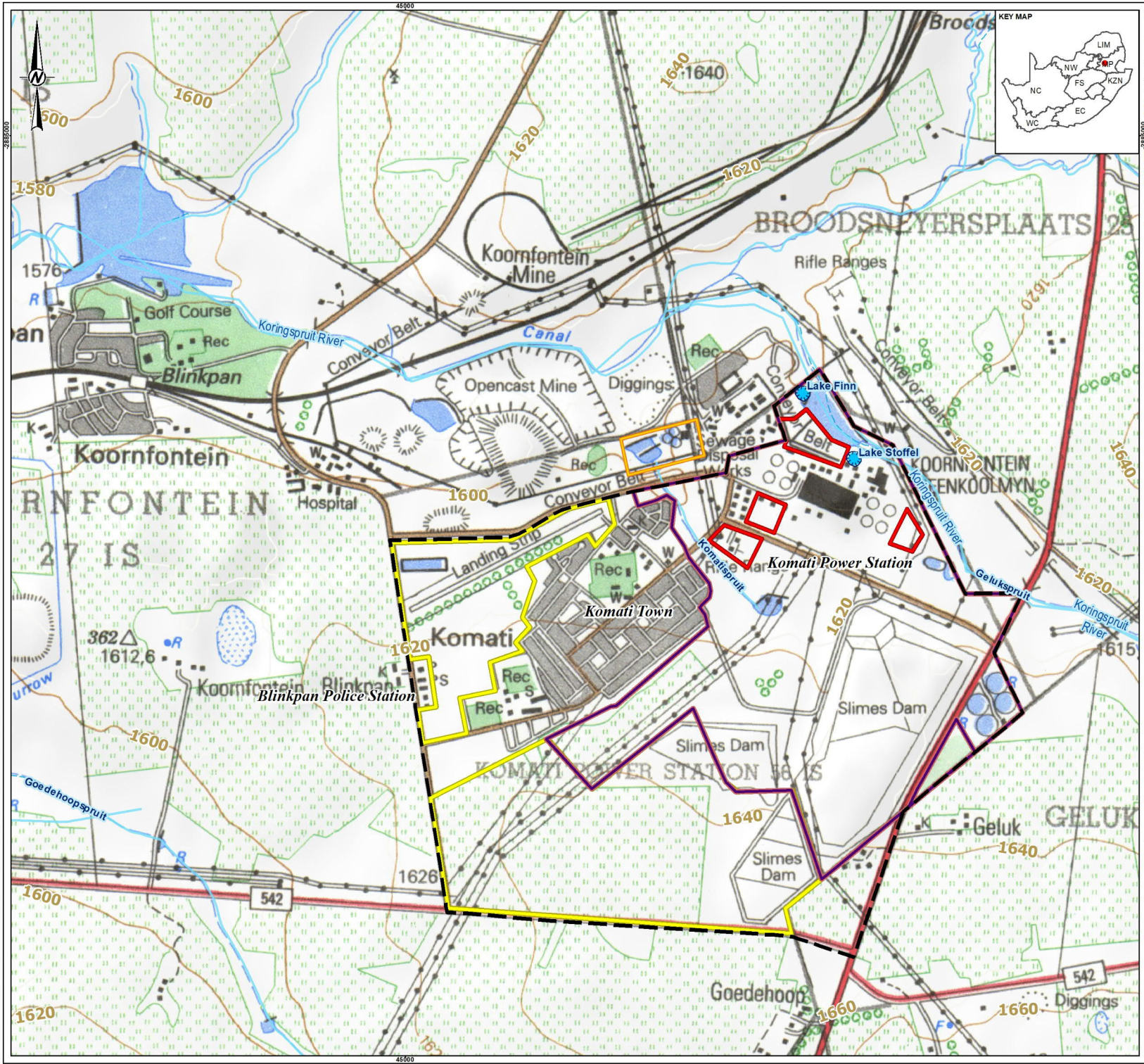
PROJECT
ESKOM KOMATI PV ESIA

TITLE
FIGURE 2: LOCALITY PLAN

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2023/12/05
DESIGNED	MB
PREPARED	MB
REVIEWED	SS
APPROVED	SS

PROJECT NO.	CONTROL	REV.	FIGURE
41103965		0	0



NOTE(S)

REFERENCE(S)
COORDINATE SYSTEM: WGS LO29
SERVICE LAYER CREDITS:

CLIENT
ESKOM

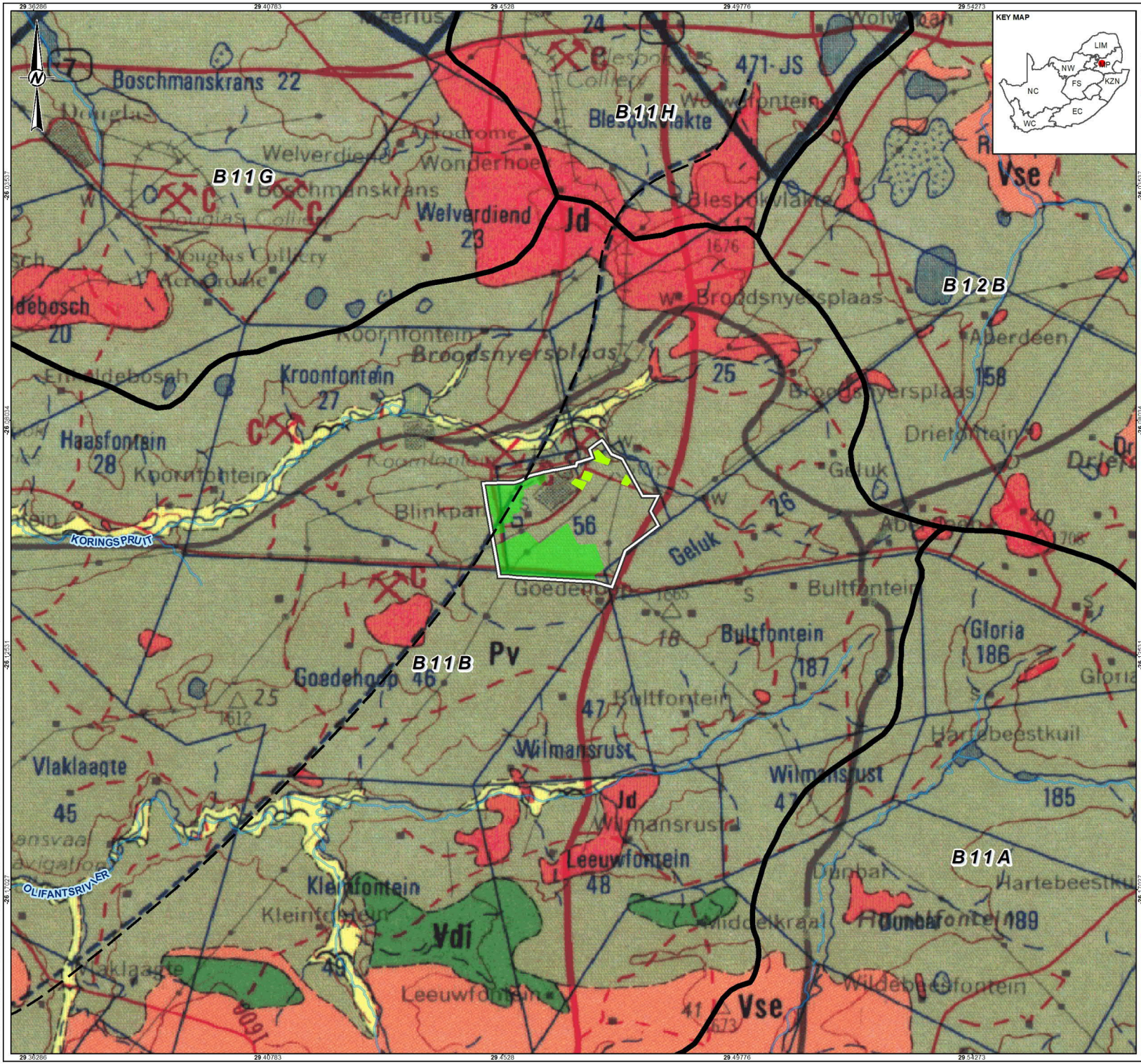
PROJECT
ESKOM KOMATI PV ESIA

TITLE
FIGURE 3: TOPOGRAPHY AND DRAINAGE

CONSULTANT
wsp GOLDER

YYYY-MM-DD	7/18/2022
DESIGNED	MB
PREPARED	MB
REVIEWED	SS
APPROVED	SS

PROJECT NO. 41103965 | CONTROL | REV. 0 | FIGURE 0



LEGEND

- Komati Power Station 56 IS
- Quaternary catchment
- PV Sites
- BESS
- Fault
- Rivers - Perennial

Lithology

- Alluvium
- Jd — Dolerite
- Pv — Sandstone, shale, coal beds
- Vdi — Diabase
- Vse — Porphyritic rhyolite with interbedded mudstone and sandstone

1:80,000 — 0 1 2 3 4 KILOMETERS

NOTE(S)
1:250 000 GEOLOGICAL SERIES
2628 EAST RAND

REFERENCE(S)
COORDINATE SYSTEM: GCS WGS 1984
SERVICE LAYER CREDITS:

CLIENT
ESKOM

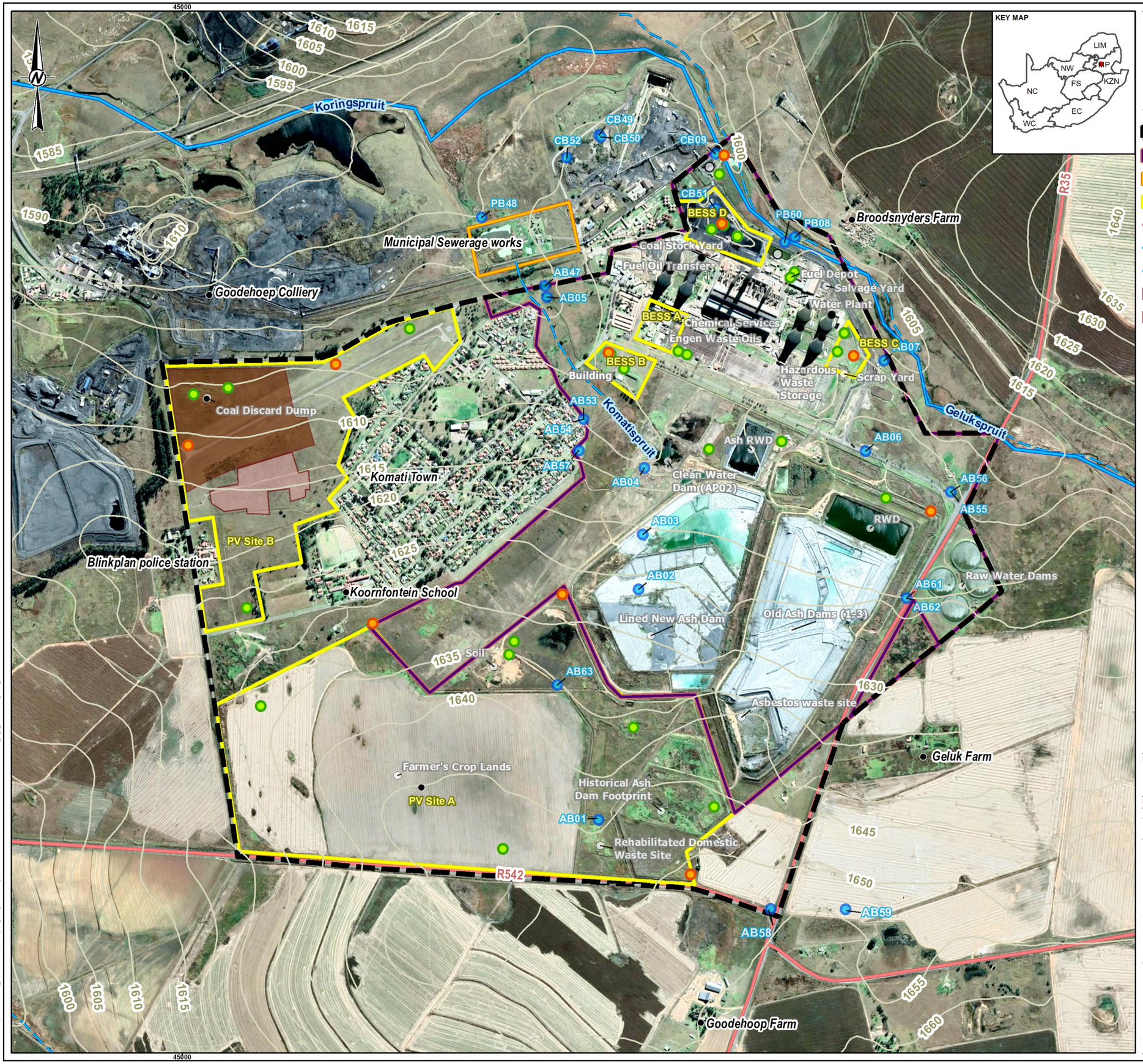
PROJECT
ESKOM KOMATI PV ESIA

TITLE
FIGURE 4: REGIONAL GEOLOGY

CONSULTANT
WSP GOLDER

YYYY-MM-DD	7/13/2022
DESIGNED	MB
PREPARED	MB
REVIEWED	SS
APPROVED	SS

PROJECT NO. 41103965 | CONTROL | REV. 0 | FIGURE 0



LEGEND

- New boreholes
- Auger boreholes
- Site monitoring boreholes
- Contours (5m)
- Komati Power Station 56 IS
- KPS
- Municipality sewerage works
- Proposed_infrastructure
- Main road
- Rivers - Perennial
- Rivers - Non perennial
- Kroonfontein UG (Ash filled)
- Kroonfontein UG (Slurry filled)

0 200 400 600
1:15 000 METERS

NOTE(S)

REFERENCE(S)
COORDINATE SYSTEM: WGS LO29
SERVICE LAYER CREDITS:

CLIENT
ESKOM

PROJECT
ESKOM KOMATI PV ESIA

TITLE
FIGURE 5: FIELD INVESTIGATIONS

CONSULTANT
WSP GOLDER

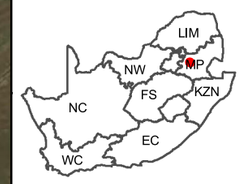
YYYY-MM-DD	2023/12/05
DESIGNED	MB
PREPARED	MB
REVIEWED	SS
APPROVED	SS

PROJECT NO.	CONTROL	REV.	FIGURE
41103965		0	0

45000

2890000

KEY MAP



Koringspruit River

BH1 (1597 mamsl)

BH2 (1600 mamsl)

BH3 (1606 mamsl)

BH4 (1604 mamsl)

BH5 (1617 mamsl)

BH6 (1624 mamsl)

BH7 (1629 mamsl)

BH8 (1650 mamsl)

BH9 (1610 mamsl)

BH10 (1602 mamsl)

1593
1600
1602
1604
1606
1608
1610
1612
1614
1616
1618
1620
1622
1624
1626
1628
1630
1632
1634
1636
1638
1640
1642
1644
1646

Goedehoopspruit

LEGEND

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

0 300 600 900

1:18,000 METERS

NOTE(S)

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

CLIENT
ESKOM

PROJECT
ESKOM KOMATI PV ESIA

TITLE
FIGURE 6: PIEZOMETRIC MAP

CONSULTANT
WSP GOLDER

YYYY-MM-DD	7/13/2022
DESIGNED	MB
PREPARED	MB
REVIEWED	SS
APPROVED	SS

PROJECT NO. 41103965 | CONTROL | REV. 0 | FIGURE 0

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A3

25mm

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PATH: S:\GIS\GIS\a Projects\22521869_Eskom Komati PS Hydrogeological Investigation\MXD\2022\Jul22\Contaminated land maps\22521869_Fig6_GW_Piezometric_A3L.mxd PRINTED ON: 2022-07-21 AT 7:20:10 PM

APPENDIX

B BACKGROUND GROUNDWATER QUALITY

Determinant	**Unit**	**Ambient Water Quality**	
		AB58 95th Percentile (October 2011-January 2022)	***AB59 95th Percentile (October 2011-January 2022)***
pH	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 $CaCO_3$	mg/l	253	122
TDS	mg/l	-	148

APPENDIX

C SERVICE CLEARANCE REPORT

Unit 20
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Maxmead, 3610
South Africa
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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;
    - 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.*

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

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

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 19: Auger Hole 23

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

APPENDIX

D EXPLORATORY HOLE LOGS

KEY TO SYMBOLS ON EXPLORATORY HOLE RECORDS

SAMPLES, FIELD TESTS, MEASUREMENTS & RESULTS

TYPE	DESCRIPTION
B	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 'x'	Undisturbed sample of specified diameter 'x'
'x' blows	'x' blows required to drive 'U' tube 0.45m
HSV	Hand Shear Vane test in kN/m^2
P(F),(P)	Piston sample, F – not recovered, P – partially recovered
P.Pen	Hand Pocket Penetrometer test in kN/m^2
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^2)
FI	Fracture Index (discontinuities per metre): NI – non intact, NR – no recovery, NA – non applicable.

GROUNDWATER OBSERVATIONS

SYMBOL	DESCRIPTION
	Groundwater strike
	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
	Conglomerate
	Gravel
	Calcrete / Gypsum


Igneous (coarse grained)


Igneous (fine grained)


Igneous (medium grained)


Limestone


Made Ground


Metamorphic (massive)


Metamorphic (schistose)


Metamorphic (banded)


Mudstone


Peat


Sand


Sandstone


Shale


Silt


Siltstone


Tarmac


Topsoil

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

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BOREHOLE LOG

Hole No. **AH01**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 02-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.471 N -26.087	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
			<0.1					(1.00)	MADE GROUND: Slightly moist black GRAVEL of subangular to subrounded fine to coarse coal.		MG	
1.00	ES		<0.1					1.00	End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH02**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 02-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.471 N -26.088	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
			<0.1					(1.00)	MADE GROUND: Slightly moist black GRAVEL of subangular to subrounded fine to coarse coal.		MG	
1.00	ES		<0.1					1.00	End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH03**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 02-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.472 N -26.088	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
			<0.1					(1.00)	MADE GROUND: Slightly moist black GRAVEL of subangular to subrounded fine to coarse coal.		MG	
1.00	ES		<0.1					1.00	End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH04**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 03-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.471 N -26.086	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.30) 0.30	MADE GROUND: Moist dark brown clayey SAND.		MG	
			<0.1					(0.80) 1.10	Moist orange-brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
1.10	ES		<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH05**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 03-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.474 N -26.089	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.20) 0.20	MADE GROUND: Brick.		MG	
			<0.1					(0.60) 0.80	Moist (firm) orange to red sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
0.80	ES		<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH06**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 03-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.474 N -26.089	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.20) 0.20	MADE GROUND: Brick.		MG	
			<0.1					(0.60) 0.80	Moist (firm) orange to red sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
								(0.70) 1.50	Moist (firm) orange to red mottled grey sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
1.50	ES		<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH07**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 02-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.476 N -26.091	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.30)	MADE GROUND: Slightly moist brown gravelly SAND. Gravel is angular to subangular fine to coarse weathered shale.		MG	
0.30	ES		<0.1					0.30	Exploratory Hole Terminated due to Refusal		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH08**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 03-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.476 N -26.092	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50)	MADE GROUND: Moist brown gravelly SAND. Gravel is angular to subangular fine to coarse weathered shale.		MG	
			<0.1					0.50				
								(0.60)	Slightly moist orange-brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					1.10				
1.10	ES								End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH09**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.470 N -26.092	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50) 0.50	Moist (firm) red-brown sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					(0.80) 1.30	Moist red mottled brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
1.30	ES		<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH10**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.470 N -26.092	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50) 0.50	Moist (firm) red-brown sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					(0.60) 1.10	Moist red clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
1.10	ES		<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH11**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 02-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.467 N -26.092	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50) 0.50	Moist (firm) red-brown sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					(0.50) 1.00	Moist red clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1						End of Exploratory Hole		END	
1.50	ES											

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH12**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No	Client	Date
41103965	Eskom Holdings SOC Limited	02-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.467 N -26.093	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50) 0.50	Moist (firm) red-brown sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					(0.50) 1.00	Moist red clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1						End of Exploratory Hole		END	
1.50	ES											

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH13**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.474 N -26.095	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
			<0.1					(0.60)	Moist (firm) dark brown to black sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
0.60	ES							0.60	Exploratory Hole Terminated due to Refusal		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH14**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.478 N -26.097	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50)	MADE GROUND: Moist grey ASH.		MG	
			<0.1					0.50				
								(0.60)	Moist (firm to stiff) orange-brown sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					1.10				
1.10	ES								End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH15**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.471 N -26.108	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.60) 0.60	Moist dark brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					(0.40) 1.00	Moist light brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
1.00	ES		<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH16**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.463 N -26.102	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.30)	Slightly moist orange to red clayey SAND with occasional weathered ferricrete nodules [Probable Weathered VRYHEID FORMATION].		VF	
0.30	ES		<0.1					0.30	Exploratory Hole Terminated due to Refusal		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH17**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.463 N -26.103	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.40)	Moist dark brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					0.40				
								(0.40)	Moist light brown mottled red clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
								0.80				
0.80	ES		<0.1						Exploratory Hole Terminated due to Refusal		END	

Boring Progress					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling				Water Added	
From	To	Hours	Tool	From	To

Water Strikes					
Date	Time	Strike	Minutes	Standing	Casing

General Remarks
1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH18**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.468 N -26.106	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50)	Moist dark brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					0.50				
			<0.1					(1.20)	Moist light brown mottled red clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					1.70				
1.70	ES								End of Exploratory Hole		END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing

Chiselling				Water Added	
From	To	Hours	Tool	From	To

General Remarks
1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH19**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.471 N -26.095	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50) 0.50	Moist orange to red mottled grey clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					(0.70) 1.20	Moist orange to grey clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
1.00	ES		<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH20**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 03-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.453 N -26.105	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
			<0.1					(1.00)	Moist dark brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					1.00				
			<0.1					(0.60)	Moist light brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
1.60	ES							1.60				
									End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH21**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.463 N -26.110	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50)	Moist dark brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					0.50				
								(0.70)	Moist brown to red SAND with occasional weathered ferricrete nodules [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					1.20				
1.20	ES								End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

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BOREHOLE LOG

Hole No. **AH22**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 04-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.452 N -26.101	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(1.00)	Moist dark brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1									
1.00	ES		<0.1					1.00	End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks

1. Elevation not surveyed; position digitised by eye only.
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 visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH23**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 03-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.450 N -26.094	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50)	MADE GROUND: Moist (firm to stiff) dark brown gravelly CLAY. Gravel is angular to subangular fine to coarse weathered shale [Suspected Reworked/Transported Natural Material].		MG	
			<0.1			▼1		0.50				
								(0.60)	Moist (firm) orange to brown sandy CLAY with occasional weathered ferricrete nodules [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					1.10				
1.10	ES								End of Exploratory Hole		END	

Boring Progress					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling				Water Added	
From	To	Hours	Tool	From	To

Water Strikes					
Date	Time	Strike	Minutes	Standing	Casing
		0.50			

General Remarks
1. Elevation not surveyed; position digitised by eye only.
2. Seepage at 0.5m bgl.

Scale 1:12.5

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **AH24**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 03-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.459 N -26.091	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50)	MADE GROUND: Moist dark brown gravelly SAND. Gravel is angular to subangular medium to coarse weathered sandstone [Suspected Reworked/Transported Natural Material].		MG	
			<0.1			1		0.50				
								(0.60)	Moist (firm) orange to brown sandy CLAY with occasional weathered ferricrete nodules [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1					1.10				
1.10	ES								End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing
		0.50			

General Remarks

1. Elevation not surveyed; position digitised by eye only.
2. Seepage at 0.5m bgl.

Scale 1:12.5

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

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BOREHOLE LOG

Hole No. **AH25**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 03-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Hand Auger	R. Netshirembe	E 29.452 N -26.093	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. mm
								(0.50)	MADE GROUND: Moist dark brown gravelly SAND. Gravel is angular to subangular medium to coarse weathered sandstone [Suspected Reworked/Transported Natural Material].		MG	
			<0.1			▼1		0.50				
								(0.80)	Moist (firm) orange to brown sandy CLAY with occasional weathered ferricrete nodules [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1									
								1.30				
1.30	ES		<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing
		0.50			

General Remarks

1. Elevation not surveyed; position digitised by eye only.
2. Seepage at 0.5m bgl.

Scale 1:12.5

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **BH01**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 02-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.471 N -26.085	1598.742

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. 50 mm
			<0.1				1597.74	(1.00) 1.00	Moist orange-brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
1.50	ES		<0.1 <0.1 <0.1						Wet black slightly gravelly clayey SAND. Gravel is subangular to subrounded fine to coarse coal [Probable Weathered VRYHEID FORMATION].			
			<0.1					(6.00)			VF	
			<0.1									
			<0.1			▼1	1591.74	7.00				
			<0.1						Wet pale brown mottled black clayey SAND [Probable Weathered VRYHEID FORMATION].			
			<0.1					(3.00)			VF	
							1588.74	10.00				
									End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing
		7.00			

General Remarks

1. Seepage at 7m bgl.

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

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BOREHOLE LOG

Hole No. **BH02**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 02-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.471 N -26.087	1601.869

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Install / Backfill Dia. 50 mm
1.00	ES		<0.1				1600.37	(1.50) 1.50	MADE GROUND: Moist black GRAVEL of subangular to subrounded fine to coarse coal.		MG	
			<0.1				1599.37	(1.00) 2.50	Moist orange-brown mottled black clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1				1596.87	(2.50) 5.00	Moist orange-brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1				1592.87	(4.00) 9.00	Moist pale brown silty SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1				1591.87	(1.00) 10.00	Moist grey to black silty SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1						End of Exploratory Hole		END	

Water level 1 ▼

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
								8.00			

Chiselling				Water Added	
From	To	Hours	Tool	From	To

General Remarks
1. Seepage at 8m bgl.

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

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BOREHOLE LOG

Hole No. **BH03**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 02-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.477 N -26.092	1607.060

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Install / Backfill Dia. 50 mm
							1606.56	0.50	MADE GROUND: Moist brown SAND.		MG	
			<0.1						Moist orange-brown clayey SAND [Probable Weathered VRYHEID FORMATION].			
			<0.1					(1.50)			VF	
1.50	ES		<0.1				1605.06	2.00				
			<0.1						Moist pale orange silty SAND [Probable Weathered VRYHEID FORMATION].			
			<0.1					(3.00)			VF	
			<0.1				1602.06	5.00				
			<0.1						Moist light brown silty SAND [Probable Weathered VRYHEID FORMATION].			
			<0.1					(5.00)			VF	
			<0.1			▼1						
			<0.1									
			<0.1				1597.06	10.00				
			<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing
		8.00			

General Remarks

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **BH04**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 01-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.467 N -26.092	1605.338

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. 50 mm
							1604.84	0.50	Moist (firm) red-brown sandy CLAY [Probable Weathered VRYHEID FORMATION].		VF	
1.00	ES		<0.1			▼1			Moist becoming wet red mottled brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1									
			<0.1									
			<0.1									
			<0.1					(5.50)				
			<0.1									
			<0.1									
			<0.1				1599.34	6.00				
			<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing
		1.50			

General Remarks

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **BH05**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 31-05-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.480 N -26.098	1618.645

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. 50 mm
			<0.1				1618.15	0.50	MADE GROUND: Moist grey ASH.		MG	
			<0.1				1617.15	(1.00) 1.50	MADE GROUND: Red brown and grey sandy GRAVEL of angular to subrounded fine to coarse brick and concrete.		MG	
1.50	ES		<0.1									
			<0.1						Moist red to brown clayey SAND with frequent weathered ferricrete nodules [Probable Weathered VRYHEID FORMATION].			
			<0.1					(2.50)			VF	
			<0.1			▼1	1614.65	4.00				
			<0.1						Wet brown clayey SAND [Probable Weathered VRYHEID FORMATION].			
			<0.1									
			<0.1					(6.00)			VF	
			<0.1									
			<0.1									
			<0.1				1608.65	10.00				
			<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing
		4.00			

General Remarks

1. Hole collapsed from 6 - 10 m bgl.

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **BH06**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 31-05-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.465 N -26.101	1625.457

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Install / Backfill Dia. 50 mm
							1624.96	0.50	MADE GROUND: Moist grey ASH.		MG	
			<0.1						Moist (firm to stiff) orange-brown sandy CLAY [Probable Weathered VRYHEID FORMATION].			
			<0.1					(1.50)			VF	
1.50	ES		<0.1				1623.46	2.00				
			<0.1						Moist red-brown clayey SAND with occasional ferricrete nodules [Probable Weathered VRYHEID FORMATION].			
			<0.1					(2.00)			VF	
			<0.1			▼	1621.46	4.00				
			<0.1						Wet pale brown silty SAND [Probable Weathered VRYHEID FORMATION].			
			<0.1					(6.00)			VF	
			<0.1									
			<0.1									
			<0.1				1615.46	10.00				
			<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing
		4.00			

General Remarks

1. Seepage at 4m bgl.

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

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BOREHOLE LOG

Hole No. **BH07**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 01-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.457 N -26.102	1630.761

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. 50 mm
			<0.1				1629.76	(1.00) 1.00	Moist dark brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
			<0.1				1628.76	(1.00) 2.00	Moist light brown clayey SAND [Probable Weathered VRYHEID FORMATION].		VF	
2.00	ES		<0.1						Moist light brown silty SAND [Probable Weathered VRYHEID FORMATION].			
			<0.1									
			<0.1									
			<0.1					(8.00)			VF	
			<0.1									
			<0.1									
			<0.1									
			<0.1				1620.76	10.00				
			<0.1						End of Exploratory Hole		END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing

General Remarks
1. Groundwater not encountered.

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

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BOREHOLE LOG

Hole No. **BH08**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 01-06-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.470 N -26.111	1650.798

SAMPLES & TESTS							STRATA						Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description		Legend	Geology	Dia. 50 mm
			<0.1				1649.80	(1.00) 1.00	Moist dark brown clayey SAND [Probable Weathered VRYHEID FORMATION].			VF	
1.00	ES		<0.1										
			<0.1				1648.80	(1.00) 2.00	Moist light brown clayey SAND [Probable Weathered VRYHEID FORMATION].			VF	
			<0.1										
			<0.1						Moist light brown silty SAND [Probable Weathered VRYHEID FORMATION].				
			<0.1										
			<0.1										
			<0.1										
			<0.1										
			<0.1					(8.00)				VF	
			<0.1										
			<0.1										
			<0.1										
			<0.1										
			<0.1				1640.80	10.00					
			<0.1						End of Exploratory Hole			END	

Boring Progress					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling				Water Added	
From	To	Hours	Tool	From	To

Water Strikes					
Date	Time	Strike	Minutes	Standing	Casing

General Remarks
1. Groundwater not encountered.

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

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BOREHOLE LOG

Hole No. **BH09**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 31-05-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.450 N -26.095	1611.041

SAMPLES & TESTS							STRATA						Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description			Legend	Geology	Dia. 50 mm
							1610.54	0.50	MADE GROUND: Moist (firm) dark brown gravelly CLAY. Gravel is angular to subangular fine to coarse weathered shale [Suspected Reworked/Transported Natural Material].				MG	
			<0.1						Moist (firm) light orange to brown sandy CLAY with occasional ferricrete nodules [Probable Weathered VRYHEID FORMATION].					
			<0.1					(1.50)					VF	
1.50	ES		<0.1											
			<0.1				1609.04	2.00						
			<0.1						Moist (firm) light orange sandy CLAY [Probable Weathered VRYHEID FORMATION].					
			<0.1					(2.00)					VF	
			<0.1				1607.04	4.00						
			<0.1						Moist becoming wet light brown clayey SAND [Probable Weathered VRYHEID FORMATION].					
			<0.1											
			<0.1			▼1		(6.00)					VF	
			<0.1											
			<0.1											
			<0.1				1601.04	10.00						
			<0.1						End of Exploratory Hole				END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
								7.00			

Chiselling				Water Added		General Remarks
From	To	Hours	Tool	From	To	

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

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BOREHOLE LOG

Hole No. **BH10**

Project: Komati Solar PV & BESS ESIA

Sheet: 1 of 1

Job No: 41103965

Client: Eskom Holdings SOC Limited

Date: 30-05-22

Contractor / Driller	Method/Plant Used	Logged By	Co-Ordinates (DEC)	Ground Level (m AOD)
Soil & Groundwater Remediation Services	Air Percussion	R. Netshirembe	E 29.456 N -26.092	1602.403

SAMPLES & TESTS							STRATA						Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description		Legend	Geology	Dia. 50 mm
							1601.90	0.50	MADE GROUND: Moist (firm) dark brown gravelly CLAY. Gravel is angular to subangular fine to coarse weathered shale [Suspected Reworked/Transported Natural Material].			MG	
			<0.1						Moist (firm) light orange to brown sandy CLAY with occasional ferricrete nodules [Probable Weathered VRYHEID FORMATION].				
			<0.1					(1.50)				VF	
1.50	ES		<0.1										
			<0.1			▼1	1600.40	2.00					
			<0.1						Moist (firm) light orange sandy CLAY [Probable Weathered VRYHEID FORMATION].				
			<0.1					(2.00)				VF	
			<0.1				1598.40	4.00					
			<0.1						Moist light brown clayey SAND [Probable Weathered VRYHEID FORMATION].				
			<0.1										
			<0.1					(6.00)				VF	
			<0.1										
			<0.1										
			<0.1				1592.40	10.00					
			<0.1						End of Exploratory Hole			END	

Boring Progress

Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt

Chiselling

From	To	Hours	Tool

Water Added

From	To

Water Strikes

Date	Time	Strike	Minutes	Standing	Casing
		2.00			

General Remarks

1. Seepage at 2m bgl.

Scale 1:68.75

Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.

08 WSP BH LOG 41103965-GINT LOGS.GPJ WSPETEMPLATE1.03.GDT 21/07/22

APPENDIX

E CERTIFICATES OF ANALYSIS

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
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Johannesburg
Gauteng
South Africa
2191

Attention :	Noma Nyoka
Date :	17th June, 2022
Your reference :	
Our reference :	Test Report 22/528 Batch 1
Location :	Eskom Komati Project
Date samples received :	7th June, 2022
Status :	Final report
Issue :	1

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.

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

Client Name: WSP Group Africa
Reference:
Location: Eskom Komati Project
Contact: Noma Nyoka
EMT Job No: 22/528

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2	3	4	5	6	7	8	9	10	LOD/LOR	Units	Method No.
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			
COC No / misc													
Containers	B	B	B	B	B	B	B	B	B	B			
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			
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			
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	521 AB	37	21	19	29	30	29	13	<1	mg/kg	UK_TM30/UK_PM15
Iron*	51570 AB	39370	35070	55880 AB	43890	32340	44670	37180	49310	19340	<20	mg/kg	UK_TM30/UK_PM15
Lead*	24	15	28	45	30	11	20	7	8	6	<5	mg/kg	UK_TM30/UK_PM15
Manganese*	754	663	543	1003	1006	275	1076	445	166	132	<1	mg/kg	UK_TM30/UK_PM15
Mercury*	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	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	mg/kg	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 SA	<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 SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Chlorobenzene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Ethylbenzene SA	3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Xylenes (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 SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
1,2,4-Trimethylbenzene SA	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	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
1,2-Dichlorobenzene SA	<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/kg	SA_TM15/SA_PM10
1,2,3-Trichlorobenzene	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	ug/kg	SA_TM15/SA_PM10
1,2-Dichloroethene (cis & trans)	<6	<6	17	<6	<6	<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	<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

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: WSP Group Africa
Reference:
Location: Eskom Komati Project
Contact: Noma Nyoka
EMT Job No: 22/528

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2	3	4	5	6	7	8	9	10	LOD/LOR	Units	Method No.
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			
COC No / misc													
Containers	B	B	B	B	B	B	B	B	B	B			
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			
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													
Phenols													
2-Chlorophenol [SA]	<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$_{AC}$	124	14	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
Benzo(a)pyrene [SA]	49	<10	<10	<10	<10	26723$_{AC}$	162	<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_PM12
C10-C14	<4	<4	<4	<4	<4	55	<4	<4	<4	<4	<4	mg/kg	SA_TM5/SA_PM8/PM16
C15-C36	<7	<7	<7	<7	<7	1278	<7	<7	<7	<7	<7	mg/kg	SA_TM5/SA_PM8/PM16
Total aliphatics C7-C36	<12	<12	<12	<12	<12	1333	<12	<12	<12	<12	<12	mg/kg	SA_TM5/TM36/SA_PM8/PM12/PM16
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 [SA]	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 [SA]	<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) [SA]	4173$_{AD}$	286	675$_{AA}$	1228$_{AC}$	61	116	512$_{AA}$	248	217	117	<3	mg/kg	SA_TM27/SA_PM20
Nitrite as N [SA]	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 [SA]	<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_TM38/TM89/UK_PM15/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 [SA]	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

Please see attached notes for all abbreviations and acronyms

Client Name: WSP Group Africa
Reference:
Location: Eskom Komati Project
Contact: Noma Nyoka
EMT Job No: 22/528

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	11	12	13	14	15	16	17	18	19	20	LOD/LOR	Units	Method No.
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			
COC No / misc													
Containers	B	B	B	B	B	B	B	B	B	B			
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	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022			
Antimony*	5	4	3	5	3	5	5	3	3	4	<1	mg/kg	UK_TM30/UK_PM15
Arsenic*	3.7	3.6	6.4	6.9	13.8	9.2	10.4	5.4	3.9	5.5	<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*	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_TM30/UK_PM15
Cobalt*	35.5	9.8	31.7	45.8	5.3	25.5	9.4	8.5	24.3	140.5	<0.5	mg/kg	UK_TM30/UK_PM15
Copper*	21	20	42	41	246$_{AB}$	41	56	37	30	30	<1	mg/kg	UK_TM30/UK_PM15
Iron*	37430	40390	52830$_{AB}$	79580$_{AB}$	49030	68330$_{AB}$	101500$_{AB}$	56300$_{AB}$	39520	54470$_{AB}$	<20	mg/kg	UK_TM30/UK_PM15
Lead*	19	14	24	49	29	28	15	15	17	100	<5	mg/kg	UK_TM30/UK_PM15
Manganese*	421	240	1209	983	121	850	45	66	831	1804	<1	mg/kg	UK_TM30/UK_PM15
Mercury*	0.1	<0.1	<0.1	0.2	0.9	0.1	0.2	<0.1	0.1	<0.1	<0.1	mg/kg	UK_TM30/UK_PM15
Nickel*	20.2	16.3	48.3	30.0	10.3	29.1	36.7	30.9	22.6	42.5	<0.7	mg/kg	UK_TM30/UK_PM15
Selenium*	2	1	3	2	2	2	1	2	2	1	<1	mg/kg	UK_TM30/UK_PM15
Vanadium*	85	87	128	169	47	159	177	122	76	92	<1	mg/kg	UK_TM30/UK_PM15
Zinc*	19	18	38	24	13	30	25	21	24	18	<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 ^{SA}	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
cis-1-2-Dichloroethene ^{SA}	<3	<3	<3	<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 ^{SA}	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Chlorobenzene ^{SA}	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Ethylbenzene ^{SA}	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Xylenes (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 ^{SA}	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
1,2,4-Trimethylbenzene ^{SA}	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	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
1,2-Dichlorobenzene ^{SA}	<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/kg	SA_TM15/SA_PM10
1,2,3-Trichlorobenzene	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	ug/kg	SA_TM15/SA_PM10
1,2-Dichloroethene (cis & trans)	<6	<6	<6	<6	<6	<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	<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

Please see attached notes for all abbreviations and acronyms

Client Name: WSP Group Africa
Reference:
Location: Eskom Komati Project
Contact: Noma Nyoka
EMT Job No: 22/528

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	11	12	13	14	15	16	17	18	19	20	LOD/LOR	Units	Method No.
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			
COC No / misc													
Containers	B	B	B	B	B	B	B	B	B	B			
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	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022			
SVOC MS													
Phenols													
2-Chlorophenol [SA]	<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 [SA]	<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_PM12
C10-C14	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	SA_TM5/SA_PM8/PM16
C15-C36	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	SA_TM5/SA_PM8/PM16
Total aliphatics C7-C36	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	mg/kg	SA_TM5/TM36/SA_PM8/PM12/PM16
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_PM0
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_PM20
Chloride [SA]	6	10	33	6	32	6	<2	5	19	7	<2	mg/kg	SA_TM27/SA_PM20
Nitrite as NO2 [SA]	<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_PM20
Nitrate as NO3 [SA]	<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_PM20
Sulphate as SO4 (2:1 Ext) [SA]	311	185	534$_{AA}$	338	4302$_{AD}$	412	54	172	2723$_{AD}$	51	<3	mg/kg	SA_TM27/SA_PM20
Nitrite as N [SA]	<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_PM20
Nitrate as N [SA]	<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*	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_TM38/TM89/UK_PM15/PM20
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_PM20
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_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)	158	109	287	194	2640	222	<100	103	1047	<100	<100	uS/cm	SA_TM28/SA_PM58
pH [SA]	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_PM11

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: WSP Group Africa
Reference:
Location: Eskom Komati Project
Contact: Noma Nyoka
EMT Job No: 22/528

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	21	22	23	24	25	26	27	28	29	30	LOD/LOR	Units	Method No.
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 / misc													
Containers	B	B	B	B	B	B	B	B	B	B			
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			
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			
Antimony*	<5 AB	<5 AB	<5 AB	2	3	2	<1	<5 AB	3	<5 AB	<1	mg/kg	UK_TM30/UK_PM15
Arsenic*	28.6	14.0	14.8	2.6	4.5	3.2	3.5	7.6	3.0	9.3	<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*	610.3 AB	341.6 AB	388.9 AB	83.6	133.6	86.5	11.0	313.1 AB	156.5	301.3 AB	<0.5	mg/kg	UK_TM30/UK_PM15
Cobalt*	103.7	28.2	8.6	66.7	3.9	8.0	5.3	16.5	74.2	38.8	<0.5	mg/kg	UK_TM30/UK_PM15
Copper*	99	63	48	20	19	21	14	40	28	47	<1	mg/kg	UK_TM30/UK_PM15
Iron*	176900 AB	127300 AB	77500 AB	31800	24840	29140	3903	77050 AB	36030	88420 AB	<20	mg/kg	UK_TM30/UK_PM15
Lead*	64	25	11	23	<5	<5	16	12	93	24	<5	mg/kg	UK_TM30/UK_PM15
Manganese*	885	397	55	1104	21	104	70	238	2680 AB	926	<1	mg/kg	UK_TM30/UK_PM15
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_PM15
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_PM15
Selenium*	3	2	2	1	<1	1	<1	1	1	2	<1	mg/kg	UK_TM30/UK_PM15
Vanadium*	371 AB	247 AB	293 AB	76	140	71	22	175	97	202	<1	mg/kg	UK_TM30/UK_PM15
Zinc*	28	22	13	21	9	24	16	21	18	26	<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 SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
cis-1-2-Dichloroethene SA	<3	<3	<3	<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 SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Chlorobenzene SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Ethylbenzene SA	<3	<3	<3	<3	<3	<3	4	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
Xylenes (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 SA	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/kg	SA_TM15/SA_PM10
1,2,4-Trimethylbenzene SA	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	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
1,2-Dichlorobenzene SA	<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/kg	SA_TM15/SA_PM10
1,2,3-Trichlorobenzene	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	ug/kg	SA_TM15/SA_PM10
1,2-Dichloroethene (cis & trans)	<6	<6	<6	<6	<6	<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	<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

Please see attached notes for all abbreviations and acronyms

Client Name: WSP Group Africa
Reference:
Location: Eskom Komati Project
Contact: Noma Nyoka
EMT Job No: 22/528

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	21	22	23	24	25	26	27	28	29	30	LOD/LOR	Units	Method No.
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 / misc													
Containers	B	B	B	B	B	B	B	B	B	B			
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			
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													
Phenols													
2-Chlorophenol [SA]	<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	<10	<10	934	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
Pyrene [SA]	<10	<10	<10	<10	<10	<10	540	<10	<10	<10	<10	ug/kg	SA_TM16/SA_PM8
Benzo(a)pyrene [SA]	<10	<10	<10	<10	<10	<10	321	<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_PM12
C10-C14	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	SA_TM5/SA_PM8/PM16
C15-C36	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	SA_TM5/SA_PM8/PM16
Total aliphatics C7-C36	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	mg/kg	SA_TM36/SA_PM8/PM12/PM16
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	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_PM0
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_PM20
Chloride [SA]	<2	3	4	6	2	3	2	9	17	74	<2	mg/kg	SA_TM27/SA_PM20
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_PM20
Nitrate as NO3 [SA]	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	2.6	<2.5	mg/kg	SA_TM27/SA_PM20
Sulphate as SO4 (2:1 Ext) [SA]	448[AA]	85	88	216	67	56	1997[AC]	280	34	584[AB]	<3	mg/kg	SA_TM27/SA_PM20
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	mg/kg	SA_TM27/SA_PM20
Nitrate as N [SA]	<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*	610.3[AB]	341.6[AB]	388.9[AB]	83.6	133.6	86.5	11.0	313.1[AB]	156.5	301.3[AB]	<0.5	mg/kg	UK_TM38/TM39/UK_PM15/PM20
Ammoniacal Nitrogen as N	1.0	<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_PM20
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/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)	172	<100	<100	127	<100	<100	729	187	<100	228	<100	uS/cm	SA_TM28/SA_PM58
pH [SA]	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_PM11

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: WSP Group Africa
Reference:
Location: Eskom Komati Project
Contact: Noma Nyoka
EMT Job No: 22/528

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	31	32	33	34	35						LOD/LOR	Units	Method No.
Sample ID	BH 6	BH 7	BH 8	BH 9	BH 10								
Depth	1.5M	2M	1M	1.5M	1.5M								
COC No / misc													
Containers	B	B	B	B	B								
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								
Date of Receipt	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022								
Antimony*	1	2	<5 AB	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 AB	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	60	50						<1	mg/kg	UK_TM30/UK_PM15
Iron*	12680	20020	92300 AB	71270 AB	68530 AB						<20	mg/kg	UK_TM30/UK_PM15
Lead*	<5	5	50	29	53						<5	mg/kg	UK_TM30/UK_PM15
Manganese*	43	101	968	967	5196 AB						<1	mg/kg	UK_TM30/UK_PM15
Mercury*	<0.1	<0.1	0.2	0.1	0.2						<0.1	mg/kg	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 SA	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Chloroform SA	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Carbon tetrachloride SA	<4	<4	<4	<4	<4						<4	ug/kg	SA_TM15/SA_PM10
1,2-Dichloroethane SA	<4	<4	<4	<4	<4						<4	ug/kg	SA_TM15/SA_PM10
Benzene SA	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Toluene SA	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Chlorobenzene SA	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Ethylbenzene SA	<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 SA	<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

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: WSP Group Africa
Reference:
Location: Eskom Komati Project
Contact: Noma Nyoka
EMT Job No: 22/528

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	31	32	33	34	35						LOD/LOR	Units	Method No.
Sample ID	BH 6	BH 7	BH 8	BH 9	BH 10								
Depth	1.5M	2M	1M	1.5M	1.5M								
COC No / misc													
Containers	B	B	B	B	B								
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								
Date of Receipt	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022								
SVOC MS													
Phenols													
2-Chlorophenol [SA]	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
2,4,6-Trichlorophenol [SA]	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
PAHs													
Naphthalene [SA]	<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 [SA]	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
Other SVOCs													
Nitrobenzene [SA]	<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	mg/kg	SA_TM36/SA_PM12
C10-C14	<4	<4	<4	<4	<4						<4	mg/kg	SA_TM5/SA_PM8/PM16
C15-C36	<7	<7	<7	<7	<7						<7	mg/kg	SA_TM5/SA_PM8/PM16
Total aliphatics C7-C36	<12	<12	<12	<12	<12						<12	mg/kg	SA_TM5/TM36/SA_PM8/PM12/PM16
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 [SA]	0.9	<0.5	<0.5	<0.5	<0.5						<0.5	mg/kg	SA_TM27/SA_PM20
Nitrate as NO3 [SA]	<2.5	<2.5	<2.5	<2.5	<2.5						<2.5	mg/kg	SA_TM27/SA_PM20
Sulphate as SO4 (2:1 Ext) [SA]	34	51	247	60	27						<3	mg/kg	SA_TM27/SA_PM20
Nitrite as N [SA]	0.3	<0.2	<0.2	<0.2	<0.2						<0.2	mg/kg	SA_TM27/SA_PM20
Nitrate as N [SA]	<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 [AB]	244.7	190.7						<0.5	mg/kg	UK_TM38/TM89/UK_PM15/PM20
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 [SA]	6.91	6.46	6.73	6.44	7.21						<2.00	pH units	SA_TM19/SA_PM11

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

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°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°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 HCl (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.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	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
CO	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
TB	Trip Blank Sample
OC	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/SANAS)	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 Ion 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 Ion 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 Ion 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/SANAS)	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	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum 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 fractions	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	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °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 soil 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

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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
Issue :	1

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.
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

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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70	LOD/LOR	Units	Method No.
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Depth													
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			
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/l	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$_{AB}$	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$_{AB}$	1241.8$_{AB}$	1718.3$_{AB}$	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/l	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/l	UK_TM170/UK_PM14
Dissolved Vanadium*	<0.6	4.8	1.0	1.5	1.1	<0.6	<0.6	<0.6	2.2	1.5	<0.6	ug/l	UK_TM170/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/l	UK_TM170/UK_PM14
Dissolved Calcium [SA]	73.1	27.7	141.0	11.0	46.3	42.4	13.6	83.0	17.0	8.0	<0.3	mg/l	SA_TM27/SA_PM0
Dissolved Magnesium [SA]	50.0	22.5	125.4$_{AB}$	11.2	26.4	34.6	9.1	74.3	11.2	5.0	<0.2	mg/l	SA_TM27/SA_PM0
Dissolved Potassium [SA]	4.2	7.0	6.2	3.6	11.2	6.9	7.9	18.5	3.2	2.3	<0.1	mg/l	SA_TM27/SA_PM0
Dissolved Sodium [SA]	71.6	85.8	136.4	15.2	82.6	44.2	26.3	48.4	46.5	25.6	<0.1	mg/l	SA_TM27/SA_PM0
Dissolved Silicon*	21309$_{AB}$	28801$_{AB}$	19617$_{AB}$	10607$_{AB}$	8902	9616	6005	9986	23415$_{AB}$	9350	<100	ug/l	UK_TM30/UK_PM14

Please see attached notes for all abbreviations and acronyms

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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70	LOD/LOR	Units	Method No.
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Depth													
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			
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			
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10
Methyl Tertiary 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
Chloromethane [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
Vinyl Chloride	<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
Bromomethane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM15/SA_PM10
Chloroethane [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
Trichlorofluoromethane [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	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	ug/l	SA_TM15/SA_PM10
2,2-Dichloropropane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM15/SA_PM10
Bromochloromethane [SA]	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10
Chloroform [SA]	<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 [SA]	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10
Dibromomethane [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
Bromodichloromethane [SA]	<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 [SA]	<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) [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,3-Dichloropropane [SA]	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10
Dibromochloromethane [SA]	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10
1,2-Dibromoethane [SA]	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10
Chlorobenzene [SA]	<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 [SA]	<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
Bromobenzene [SA]	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	SA_TM15/SA_PM10
1,2,3-Trichloropropane [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10

Please see attached notes for all abbreviations and acronyms

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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70	LOD/LOR	Units	Method No.
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Depth													
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			
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			
VOC MS Continued													
Propylbenzene [SA]	<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 [SA]	<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 [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
4-Isopropyltoluene [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,3-Dichlorobenzene [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,4-Dichlorobenzene [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
n-Butylbenzene [SA]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	SA_TM15/SA_PM10
1,2-Dichlorobenzene [SA]	<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	ND	ND	ND	ND	ND	ND	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-Chloro-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/l	SA_TM16/SA_PM30
4-Methylphenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
4-Nitrophenol	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	SA_TM16/SA_PM30
Pentachlorophenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Phenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30

Please see attached notes for all abbreviations and acronyms

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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70	LOD/LOR	Units	Method No.
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Depth													
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			
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 [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
2-Methylnaphthalene [SA]	<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 [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
Acenaphthene [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Fluorene [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
Phenanthrene [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
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
Fluoranthene [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
Pyrene [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
Benzo(a)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
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/l	SA_TM16/SA_PM30
Benzo(b)fluoranthene [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Benzo(k)fluoranthene [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Benzo(a)pyrene [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Indeno(123cd)pyrene [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Dibenzo(ah)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
Benzo(ghi)perylene [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
Phthalates													
Bis(2-ethylhexyl) phthalate [SA]	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	SA_TM16/SA_PM30
Butylbenzyl phthalate	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Di-n-butyl phthalate [SA]	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	ug/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 [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30

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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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70	LOD/LOR	Units	Method No.
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Depth													
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			
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													
Other SVOCs													
1,2-Dichlorobenzene [SA]	<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 [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
1,4-Dichlorobenzene [SA]	<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 [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
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 [SA]	<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 [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
Bis(2-chloroethoxy)methane [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
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 [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
Hexachlorobenzene [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Hexachlorobutadiene [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Hexachlorocyclopentadiene [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Hexachloroethane [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
Isophorone [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
N-nitrosodi-n-propylamine [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
Nitrobenzene [SA]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	SA_TM16/SA_PM30
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_TM5/SA_PM16/PM30
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	ug/l	SA_TM17/SA_PM30
Fluoride [SA]	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 [SA]	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 [SA]	133.1	183.6[AA]	983.1[AB]	5.4	213.0[AA]	234.8[AA]	67.3	446.0[AB]	51.1	55.4	<0.5	mg/l	SA_TM27/SA_PM0
Nitrate as N [SA]	<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

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	1-9	10-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70	LOD/LOR	Units	Method No.
Sample ID	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10			
Depth													
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			
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			
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
Ammoniacal Nitrogen as N [SA]	2.60	0.47	0.75	<0.03	0.47	0.19	<0.03	0.05	<0.03	<0.03	<0.03	mg/l	SA_TM27/SA_PM0
Hexavalent Chromium*	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	mg/l	UK_TM38/UK_PM0
Total Alkalinity as CaCO3 [SA]	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 [SA]	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 [SA]	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

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	71-77												
Sample ID	BH 10-01												
Depth													
COC No / misc													
Containers	V HN P G												
Sample Date	07/06/2022												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	10/06/2022												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method 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 AB										<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 SA	141.5										<0.3	mg/l	SA_TM27/SA_PM0
Dissolved Magnesium SA	116.5 AB										<0.2	mg/l	SA_TM27/SA_PM0
Dissolved Potassium SA	6.0										<0.1	mg/l	SA_TM27/SA_PM0
Dissolved Sodium SA	137.1										<0.1	mg/l	SA_TM27/SA_PM0
Dissolved Silicon*	20135 AB										<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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	71-77												
Sample ID	BH 10-01												
Depth													
COC No / misc													
Containers	V HN P G												
Sample Date	07/06/2022												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	10/06/2022												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2										<2	ug/l	SA_TM15/SA_PM10
Methyl Tertiary Butyl Ether	<0.1										<0.1	ug/l	SA_TM15/SA_PM10
Chloromethane SA	<3										<3	ug/l	SA_TM15/SA_PM10
Vinyl Chloride	<0.1										<0.1	ug/l	SA_TM15/SA_PM10
Bromomethane	<1										<1	ug/l	SA_TM15/SA_PM10
Chloroethane SA	<3										<3	ug/l	SA_TM15/SA_PM10
Trichlorofluoromethane SA	<3										<3	ug/l	SA_TM15/SA_PM10
1,1-Dichloroethene (1,1 DCE) SA	<3										<3	ug/l	SA_TM15/SA_PM10
Dichloromethane (DCM) SA	<5										<5	ug/l	SA_TM15/SA_PM10
trans-1-2-Dichloroethene SA	<3										<3	ug/l	SA_TM15/SA_PM10
1,1-Dichloroethane SA	<3										<3	ug/l	SA_TM15/SA_PM10
cis-1-2-Dichloroethene SA	<3										<3	ug/l	SA_TM15/SA_PM10
2,2-Dichloropropane	<1										<1	ug/l	SA_TM15/SA_PM10
Bromochloromethane SA	<2										<2	ug/l	SA_TM15/SA_PM10
Chloroform SA	<2										<2	ug/l	SA_TM15/SA_PM10
1,1,1-Trichloroethane SA	<2										<2	ug/l	SA_TM15/SA_PM10
1,1-Dichloropropene SA	<3										<3	ug/l	SA_TM15/SA_PM10
Carbon tetrachloride SA	<2										<2	ug/l	SA_TM15/SA_PM10
1,2-Dichloroethane SA	<2										<2	ug/l	SA_TM15/SA_PM10
Benzene	<0.5										<0.5	ug/l	SA_TM15/SA_PM10
Trichloroethene (TCE) SA	<3										<3	ug/l	SA_TM15/SA_PM10
1,2-Dichloropropane SA	<2										<2	ug/l	SA_TM15/SA_PM10
Dibromomethane SA	<3										<3	ug/l	SA_TM15/SA_PM10
Bromodichloromethane SA	<2										<2	ug/l	SA_TM15/SA_PM10
cis-1-3-Dichloropropene	<2										<2	ug/l	SA_TM15/SA_PM10
Toluene SA	<5										<5	ug/l	SA_TM15/SA_PM10
trans-1-3-Dichloropropene	<2										<2	ug/l	SA_TM15/SA_PM10
1,1,2-Trichloroethane SA	<2										<2	ug/l	SA_TM15/SA_PM10
Tetrachloroethene (PCE) SA	<3										<3	ug/l	SA_TM15/SA_PM10
1,3-Dichloropropane SA	<2										<2	ug/l	SA_TM15/SA_PM10
Dibromochloromethane SA	<2										<2	ug/l	SA_TM15/SA_PM10
1,2-Dibromoethane SA	<2										<2	ug/l	SA_TM15/SA_PM10
Chlorobenzene SA	<2										<2	ug/l	SA_TM15/SA_PM10
1,1,1,2-Tetrachloroethane SA	<2										<2	ug/l	SA_TM15/SA_PM10
Ethylbenzene SA	<1										<1	ug/l	SA_TM15/SA_PM10
p/m-Xylene SA	<2										<2	ug/l	SA_TM15/SA_PM10
o-Xylene SA	<1										<1	ug/l	SA_TM15/SA_PM10
Styrene	<2										<2	ug/l	SA_TM15/SA_PM10
Bromoform SA	<2										<2	ug/l	SA_TM15/SA_PM10
Isopropylbenzene SA	<3										<3	ug/l	SA_TM15/SA_PM10
1,1,2,2-Tetrachloroethane	<4										<4	ug/l	SA_TM15/SA_PM10
Bromobenzene SA	<2										<2	ug/l	SA_TM15/SA_PM10
1,2,3-Trichloropropane SA	<3										<3	ug/l	SA_TM15/SA_PM10

All solid results are expressed on a dry weight basis unless stated otherwise.

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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	71-77												
Sample ID	BH 10-01												
Depth													
COC No / misc													
Containers	V HN P G												
Sample Date	07/06/2022												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	10/06/2022												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
VOC MS Continued													
Propylbenzene [SA]	<3										<3	ug/l	SA_TM15/SA_PM10
2-Chlorotoluene [SA]	<3										<3	ug/l	SA_TM15/SA_PM10
1,3,5-Trimethylbenzene [SA]	<3										<3	ug/l	SA_TM15/SA_PM10
4-Chlorotoluene [SA]	<3										<3	ug/l	SA_TM15/SA_PM10
tert-Butylbenzene [SA]	<3										<3	ug/l	SA_TM15/SA_PM10
1,2,4-Trimethylbenzene [SA]	<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 [SA]	<3										<3	ug/l	SA_TM15/SA_PM10
1,4-Dichlorobenzene [SA]	<3										<3	ug/l	SA_TM15/SA_PM10
n-Butylbenzene [SA]	<3										<3	ug/l	SA_TM15/SA_PM10
1,2-Dichlorobenzene [SA]	<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													
Phenols													
2-Chlorophenol	<1										<1	ug/l	SA_TM16/SA_PM30
2-Methylphenol	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
2-Nitrophenol	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
2,4-Dichlorophenol	<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
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Contact: Sarah Skinner
EMT Job No: 22/556

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$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	71-77												
Sample ID	BH 10-01												
Depth													
COC No / misc													
Containers	V HN P G												
Sample Date	07/06/2022												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	10/06/2022												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
SVOC MS													
PAHs													
2-Chloronaphthalene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
2-Methylnaphthalene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
Naphthalene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
Acenaphthylene [SA]	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
Acenaphthene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
Fluorene [SA]	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
Phenanthrene [SA]	<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 [SA]	<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 [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
Benzo(k)fluoranthene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
Benzo(a)pyrene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
Indeno(123cd)pyrene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
Dibenzo(ah)anthracene [SA]	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
Benzo(ghi)perylene [SA]	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
Phthalates													
Bis(2-ethylhexyl) phthalate [SA]	<5										<5	ug/l	SA_TM16/SA_PM30
Butylbenzyl phthalate	<1										<1	ug/l	SA_TM16/SA_PM30
Di-n-butyl phthalate [SA]	<1.5										<1.5	ug/l	SA_TM16/SA_PM30
Di-n-Octyl phthalate	<1										<1	ug/l	SA_TM16/SA_PM30
Diethyl phthalate [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
Dimethyl phthalate [SA]	<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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	71-77										LOD/LOR	Units	Method No.
Sample ID	BH 10-01												
Depth													
COC No / misc													
Containers	V HN P G												
Sample Date	07/06/2022												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	10/06/2022												
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
1,2,4-Trichlorobenzene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
1,3-Dichlorobenzene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
1,4-Dichlorobenzene [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
2-Nitroaniline	<1										<1	ug/l	SA_TM16/SA_PM30
2,4-Dinitrotoluene [SA]	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
2,6-Dinitrotoluene	<1										<1	ug/l	SA_TM16/SA_PM30
3-Nitroaniline	<1										<1	ug/l	SA_TM16/SA_PM30
4-Bromophenylphenylether [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
4-Chloroaniline	<1										<1	ug/l	SA_TM16/SA_PM30
4-Chlorophenylphenylether [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
4-Nitroaniline	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
Azobenzene [SA]	<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	ug/l	SA_TM16/SA_PM30
Carbazole [SA]	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
Dibenzofuran [SA]	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
Hexachlorobenzene [SA]	<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 [SA]	<1										<1	ug/l	SA_TM16/SA_PM30
Isophorone [SA]	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
N-nitrosodi-n-propylamine [SA]	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
Nitrobenzene [SA]	<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_TM5/TM36/SA_PM12/PM16/PM30
PCBs (Total vs Aroclor 1254)	<0.2										<0.2	ug/l	SA_TM17/SA_PM30
Fluoride [SA]	0.4										<0.3	mg/l	SA_TM27/SA_PM0
Chloride [SA]	69.9										<0.3	mg/l	SA_TM27/SA_PM0
Sulphate [SA]	837.9 [AB]										<0.5	mg/l	SA_TM27/SA_PM0
Nitrate as N [SA]	<0.05										<0.05	mg/l	SA_TM27/SA_PM0

Element Materials Technology

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

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	71-77										Please see attached notes for all abbreviations and acronyms		
Sample ID	BH 10-01												
Depth													
COC No / misc													
Containers	V HN P G												
Sample Date	07/06/2022												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	10/06/2022												
											LOD/LOR	Units	Method No.
Ortho Phosphate as P	0.042										<0.015	mg/l	SA_TM191/SA_PM31
Ammoniacal Nitrogen as N [SA]	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 [SA]	256										<3	mg/l	SA_TM32/SA_PM0
Electrical Conductivity @25C [SA]	1850										<2	uS/cm	SA_TM28/SA_PM0
pH [SA]	6.62										<2.00	pH units	SA_TM19/SA_PM0
Total Dissolved Solids [SA]	1533										<35	mg/l	SA_TM20/SA_PM31
Total Organic Carbon*	<2										<2	mg/l	UK_TM60/UK_PM0

Client Name: WSP Group Africa

Matrix : Liquid

Reference: 41103965

Location: Eskom Komati Power Station (ESIA and WULA project)

Contact: Sarah Skinner

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°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°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 HCl (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.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	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
CO	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
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x2 Dilution
AB	x5 Dilution

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	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/SANAS)	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	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum 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 fractions	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.				