SILICON TECHNOLOGY PTY. LTD

DECOMMISSIONING OF SILTECH WASTE FACILITIES

ENVIRONMENTAL MANAGEMENT PLAN (REF: 12/9/11L181015193/4/S24G)

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SILICON TECHNOLOGY PTY. LTD

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PRODUCTION TEAM

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WSP

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Environmental Specialist	Nigel Seed

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1 INTRODUCTION

1.1 TERMS OF REFERENCE

WSP Environmental (Pty) Ltd (WSP) has been appointed by Silicon Technology (Pty) Ltd (Siltech) to undertake the required services in order for Siltech to rectify historical environmental legal compliance issues pertaining to the decommissioning of its historical waste facilities, and to obtain a Waste Management Licence (WML) for activities at its operations in Ballengeich, KwaZulu-Natal.

The 2014 Environmental Impact Assessment (EIA) Regulations (GNR 982), as amended, identifies the decommissioning activities as activities being subject to an EIR process due to the applicability of the EIA Listing Notices Government Regulation Notice GNR. 984, published on 7 April 2017. The Environmental Impact Assessment (EIA) process, if carried out to comply with the regulations' legal requirements, warrants the issuing of a WML from the Department of Environmental Affairs (DEA), which permits the activities to proceed legally. Failure to undertake the EIA process and obtain the WML prior to executing such activities, results in a contravention of the EIA Regulations, for which a rectification process must then be undertaken, together with the submission of the WML application.

WSP has been appointed as the independent Environmental Assessment Practitioner (EAP) to carry out the rectification and WML application process in accordance with the EIA Regulations. In consultation with the DEA, WSP was advised to compile an Environmental Impact Assessment Report, and proceed with the process and as contemplated in Regulations 41, 43 and 44 of GN No. R982 with regard to the allowance of a commenting period for interested and affected parties on a reports submitted.

The Environmental Management Plan Programme Report (EMPr) (this document) details the mitigation measures identified in the Environmental Impact Assessment Report.

1.2 ENVIRONMENTAL ASSESSMENT PRACTIONER DETAILS

As mentioned above, Siltech has appointed WSP as the EAP to undertake the BA processes required to support this application. **Table 1** outlines the details of the EAP and its expertise.

Table 1: Details of the Environmental Assessment Practitioner

NAME OF CONSULTANT: **WSP ENVIRONMENTAL (PTY) LTD.**

Contact Person:	Nigel Seed
Postal Address:	Block A, 1 on Langford Langford Road Westville Durban 3629 South Africa
Telephone:	031 240 8860
Fax:	031 240 8861
E-mail:	Nigel.seed@wsp.com

Expertise to conduct this EIA	Nigel has 17 years' environmental and social consulting experience. Nigel has led complex Environmental and Social impact Assessments (ESA) and transaction related due diligence assessments across a range of sectors including aerospace, agro-processing, chemicals, healthcare, infrastructure (ports, roads, waste management), manufacturing, mining and beneficiation, oil & gas, pulp & paper power generation (thermal & renewables), and property development.

1.3 ACTIVITY BACKGROUND

1.3.1 DESCRIPTION OF PROPOSED ACTIVITY

Key activities which are associated with the decommissioning process at each facility, and which form part of the 24G application are summarised in **Table 2** and their location is illustrated in

Figure 1.

Table 2: Decommissioning Activities

Activity	Description
Old Lime Settling Ponds	The Old Lime Settling Ponds (OLSP) were used for the disposal of lime contaminated with mercury for a period of at least 17 years. The OLSP area was last used during the mid-1980s and will no longer be used for further disposal of lime waste in future. In 2009 WSP Consulting Engineers undertook a preliminary design of the civil engineering works required to remediate the OLSP. The design criteria included: — Landscaping the area to allow for runoff generated during storm events to drain directly into the Ngagane River; and, — Protection of the boundary of the facility from scouring by placing minor engineering works such as gabions or through the use of a binding medium such as Vetiver grass. Decommissioning and remediation of the facility commenced in August 2012. This included covering the facility with topsoil and grading the area to promote drainage of surface water. Vegetation has since established across the facility. Erosion protection is still required at key points along the river as well as at the relevant surface water discharge points. This will prevent the subsequent deposition and siltation of the waste content into the river, and the exposure of waste stored in the ponds
Consolidated Waste Area	The Consolidated Waste Area (CWA) consists of a combination of the Ash and Fines Dump, Gas Cleaning Plant Fines Dump and the Solid Waste Landfill. In 2008,as part of decommissioning and rehabilitation attempts, the three waste facilities were bulldozed and graded to form a combined waste facility, and contoured to drain all run off emanating from the site into trenches that drain dirty runoff to North Dam. The graded facility was also covered with topsoil and vegetated to encourage the succession of a natural ecosystem/habitat. A closure study (WSP, 2017) undertaken at the facility recommended that the following additional measures are undertaken at the waste facility: — Removing and stockpiling the topsoil on the facility; — Reshaping of the waste layer to a suitable gradient of <3%, and lightly compacting the layer; — Upgrading the waste cover layer by placing 150mm V layers, compacted to at least 85% Standard Proctor maximum dry density at a moisture content of OMC to OMC+2%; and — Covering the compacted V layers with the stockpiled topsoil that are lightly compacted and vegetated. While vegetation is establishing erosion by wind and water should be prevented using suitable methods such as soil mats/blankets.

Old Ash Dump	The Old Ash Dump was used for the disposal of ash generated from the historic power plant located on site. Historically the ash was sold to a brick maker and used on an ad hoc basis for road construction. Under Care and Maintenance the facility has been stabilised and shaped. No formalised management practices or reduction methods are currently in place for the facility. The stormwater from this facility is incorporated in the dirty water management system associated with the operations. Currently the ash is being reclaimed by third-parties for use as raw material in the block manufacturing process. Reclaiming of ash from the dump by third parties started in about 1992 for use as road construction material, and later in about 1998 for use in ash block manufacturing. Siltech plans to allow reclamation for ash block manufacturing to continue until the waste body has been removed. The reclamation of the ash by third parties forms part of the decommissioning and rehabilitation process. Once all the ash has been reclaimed, the base of the facility will then be rehabilitated.
Historic Power Station Cooling Ponds	The Historic Power Station Cooling Ponds comprise concrete lined 1.8m deep emergency storage facilities that were historically used for the storage of slurry. In order to allow for the stockpiling of raw materials, including coal, the ponds were backfilled around 2009/2010 with silica fume and covered with a lime and ash protective capping approximately 300mm thick. Sparse vegetation has grown at the surface of the facility. Going forward the area will have no specific use other than an open semi-hard-standing area. Additional decommissioning activities have been suggested by WSP (2020) following a brief assessment of the existing capping, which suggested that the capping was not considered suitable as a final closure measure for the waste material in the Cooling Tower Pond area. The facility was inspected by the EAP as part of the impact assessment and it was determined that that the previous steps taken for closure are not adequate for final closure of the facility. It was recommended that the waste at the facility be classified and capped with a suitable capping system, and that the area be graded/shaped prior to the placement of a new capping system.

1.3.2 LOCATION OF DECOMMISSIONED INFRASTRUCTURE

The Siltech Complex (Complex) is located on Blairgowrie Drive Ballengeich, within the Newcastle Local Municipality, in the KwaZulu Natal province. Newcastle is approximately 15km to the north of the Complex, with the N11 being the access road.

Table 3: Property on which activity is located

FARM/ERF NAME	SURVEYOR GENERAL CODE	PROPERTY OWNER
Portions 2, 17, 20, 21, and 22 of the Farm Ballengeich Number 3299 Erf Numbers: 19/3299, 22/3299 (National Cadastral Database)	N0HS00000000329900022	**Silicon Technology Pty Ltd**

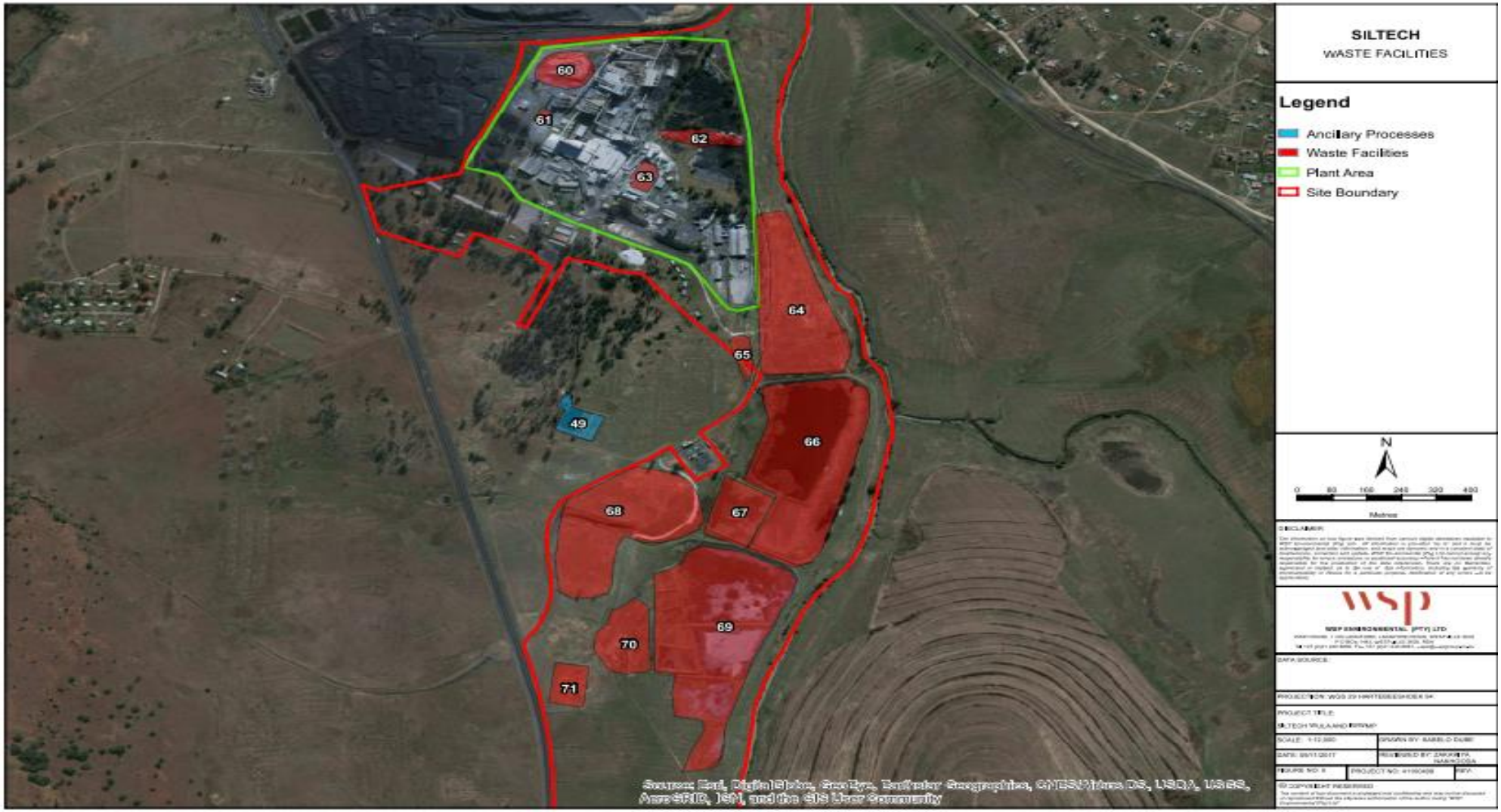

Figure 1: Site Layout Map indicating the Siltech Complex Infrastructure

1.4 ENVIRONMENTAL MANAGEMENT PROGRAMME

Table 4 outlines the legal requirements of the EMPr as set out in Appendix 4 of GNR 326 of 2017.

Table 4: Legislation Requirements as detailed in Appendix 4 of GNR 326

Appendix 4	Legislated requirements as per the NEMA GNR 326	Relevant Report Section
(a)	details of-	
	(i) the EAP who prepared the EMPr; and	Section 1.2
	(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.2 and **Appendix A**
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 3
(c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;	Section 1.3 / **Figure 1**
(d)	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	Section 3
	(i) planning and design;	
	(ii) pre-construction activities;	
	(iii) construction activities;	
	(iv) rehabilitation of the environment after construction and where applicable post closure; and	
	(v) where relevant, operation activities;	
(f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to -	Section 3
	(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	
	(ii) comply with any prescribed environmental management standards or practices;	
	(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	
	(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	
(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 2.5
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 2.5 / Section 3
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 2.1 / Section 3

(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 3
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 2.5 / Section 3
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 2.5/ Section 3
(m)	an environmental awareness plan describing the manner in which-	Section 2.2
	(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	
	(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
(n)	any specific information that may be required by the competent authority	**N/A**

1.5 OBJECTIVES OF THE EMPR

This EMPr has been compiled in fulfilment of the requirements of the EIA Regulations, and the Section 24G rectification process as prescribed by NEMA. It aims to prevent further degradation to the receiving environment and monitor environmental changes.

1.6 APPLICABLE DOCUMENTATION

This EMPr is submitted, and should be read with, the following applicable documentation:

- Environmental Impact Assessment Report (EIR) for the Decommissioning of Waste Facilities at Siltech Complex;
- Application for Rectification in terms of NEMA (as submitted-28 May 2019); and,
- WML issued by the DEA in terms of the NEMA (still to be issued).

1.7 LEGAL REQUIREMENTS

The national legislation applicable to the proposed project includes, but is not limited, to the following:

- The Constitution of the Republic of South Africa (No. 108 of 1996);
- National Environmental Management Act (No. 107 of 1998);
- National Environmental Management Act EIA Regulations 2014;
- National Environmental Management, Waste Act (No 59 of 2008);
- National Environmental Management, Air Quality Act (No 39 of 2004);
- National Environmental Management Biodiversity Act (No. 10 of 2004);
- The National Water Act, (No 36 of 1998); and
- National Heritage Resources Act, 1999, (No. 25 of 1999).

1.8 LIMITATIONS

OCCUPATIONAL HEALTH AND SAFETY

The Environmental Impact Report identified several occupational health and safety issues associated with the project including the potential for workforce exposure to mercury recorded in the OLSP waste and the old ash dump; and, asbestos fibres recorded in the CWA waste;

The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) (OHSA) was created to provide for the health and safety of persons at work, and for the health and safety of persons in connection with the use of plant and machinery. The OHSA aims to protect people (other than the employee) against hazards to their health and safety arising out of or in connection with activities of persons at work.

The management of worker health and safety falls outside of the remit of the EIA Regulations and this EMPr. To ensure that worker health and safety is addressed in accordance with the OHSA, it is recommended that Siltech appoints a third party contractor with specialist knowledge about the required PPE and other Occupational Health and Safety measures to be taken for the project. These measures are likely to include *inter alia*:

- Detailed Project / activity specific hazard identification and risk assessment (HIRA) process; and;
- Implementation of appropriate mitigation measures e.g. safe work procedures, use of PPE; design safety, occupational monitoring, training and awareness programmes, and performance assessment and reporting.

2 ENVIRONMENTAL MANAGEMENT PROGRAMME GOVERNANCE

2.1 ROLES AND RESPONSIBILITIES

Table 5 provides a high-level outline of the various roles and responsibilities of Siltech representatives and third parties.

Table 5: Roles and Responsibilities

Designation	Roles and Responsibility
Siltech Environmental Manager	– Prepare EMPr amendments / updates if required. – Authorise environmental method statements prepared by third parties. – Environmental awareness training. – Stakeholder engagement. – Maintain environmental incidents and stakeholder complaints register. – Environmental incident management. – Effect designated Management and Mitigation Actions detailed in the EMPr.
Staff and Third Parties including Contractors and Service Providers	– Prepare Method Statements as per the EMPr – Conduct regular on-site auditing to assess performance against the requirements of this EMPr. – Complete the appropriate training requirements as specified in the training program. – Implement and maintain of environmental management controls as set out in the project's environmental management documentation.

2.2 ENVIRONMENTAL AWARENESS PLAN

Siltech has the responsibility to ensure that all persons involved in the ongoing decommissioning of the waste facilities are aware of, and are familiar with, the environmental requirements for the project. All project personnel, including contractors, are required to receive training of a type and level of detail that is appropriate for the environmental aspects of their work. As a minimum, all personnel are required to complete the training requirements stipulated in **Table 6.**

Table 6: Training and Induction Requirements

Awareness Initiative	Purpose	Frequency
Site Induction	The purpose of the induction is to ensure that, as a minimum, all on-site personnel understand the EMPr in terms of: — Key issues relating to the project. — Relevant conditions of the WML (upon receipt). — Waste management and minimisation. — Minimising potential impacts to air, noise and water quality. — Surface and groundwater contamination. — Spill control measures. — Environmental Emergency Plan. — Incident reporting procedures. — Best pollution prevention practices. — Areas identified as 'No-Go' areas on site — Roles and responsibility relating to environmental protection and management.	— Prior to commencement of work by staff and / or third parties.
Toolbox Talks	Toolbox talks are intended to deliver specific training in an aspect of work or control including: — Personal Protective Equipment (PPE) requirements. — Waste handling procedures. — Ad hoc training and awareness as required to promote compliance with the EMPr. The third party contractor will compile and ensure that all its employees working on site undertake these toolbox talks and comply with the content communicated therein.	— Decommissioning Phase: As required.

Attendance records must be completed after each training session for the above and retained on site within the Environmental File.

2.3 INCIDENT MANAGEMENT AND MITIGATION

Table 7 itemises the requirements for significant incident management and mitigation:

Table 7: Incident Management and Mitigation

Aspect	Requirement

Reporting of Significant Environmental Incidents	Any environmental incident should be reported immediately to the Siltech Environmental Manager. — Immediate communication should be made with the relevant staff members to determine immediate response/ mitigation and close-out requirements. — All significant incidents are to be reported to the relevant Authority as per the legal requirements.
Contents of Significant Environmental Incident records	Significant environmental incident reporting and recording should include the following information: — Time, date and nature of the incident. — Immediate response and investigation undertaken. — Actions taken and by whom — Authorities to whom the incident was reported, if required.
Continual Improvement	— Corrective and preventative action requests should be forwarded to the responsible person so that corrective action can be taken. Open non-conformances should only be closed on verification by the Project Manager that the corrective action has been implemented effectively in order to meet the EMPr requirements. — The cause of all significant incidents should be investigated to determine root cause and to ensure that preventative and corrective action is implemented to prevent a repeat of the incident. — A summary and review of significant incidents recorded during the decommissioning activities should be included within a report by the Siltech Environmental Manager. — If required following a significant incident, a review of the efficacy of the EMPr should be undertaken by the Environmental Manager in order to identify possible areas of improvement or updating or amendment required within the EMPr.

2.4 STAKEHOLDER AND COMMUNITY ENQUIRIES AND COMPLAINTS

Enquiries or complaints should be able to be made by adjacent land-users and / or the community (i.e. stakeholders) through the following channels:

— **Contact:** Jan Combrink
— **Telephone number:** +27 (0) 34 377 7210 / +27 (0) 78 459 4669

Community enquiries or complaints that are environmental in nature must be brought to the attention of the Environmental Manager who should ensure corrective action and close-out. As a minimum the following information should be recorded:

— Time, date and nature of enquiry or complaint.
— The means by which the enquiry or complaints was made.
— Personal details of the person / party lodging the enquiry or complaint (subject to privacy considerations).
— Actions taken to investigate and close-out the complaint as well as complainant feedback.

All complaints received will be investigated and a response (even if pending further investigation) must be given to the complainant within 7 days.

Any actions that cannot be managed immediately should be assigned to the appropriate personnel and must become an outstanding action. The action remains outstanding until it is closed off by the Project Manager.

2.5 ENVIRONMENTAL PERFORMANCE MONITORING

2.5.1 INTERNAL MONITORING

The Siltech Environmental Manager is required to monitor the performance of staff and third Parties including Contractors, and Service Providers against the conditions of the WML and the EMPr. The frequency and scope of the internal monitoring is at the discretion of the Siltech Environmental Manager unless otherwise stated in the WML conditions.

2.5.2 EXTERNAL MONITORING (INDEPENDENT)

External environmental audits of the EMPr must be undertaken by an independent environmental consultant called the Environmental Control Officer (ECO). Due to the extended duration of the decommissioning activities, the frequency of the audits should be annually until the decommissioning activities are complete, unless otherwise specified in the WML.

2.6 DOCUMENT CONTROL (ENVIRONMENTAL FILE)

The Environmental Manager is responsible for ensuring that up to date documentation is kept on-site; this should include, as a minimum, the following:

- Up to date copy of the EMPr;
- Approved Contractor Method Statements;
- Material Safety Data Sheet (MSDS) and Safety Data Sheets (SDS);
- Copies of other Contractor environmental information such as waste Safe Disposal Certificates;
- Environmental Monitoring and inspection reports (internal and external);
- Environmental Incident Reports;
- Records of stakeholder and community complaints and follow-up actions taken; and
- Induction and training records.

2.7 EMPR AMENDMENTS

In the case of amendments that materially change the project impacts, the amendments are to be submitted to the DEA for approval.

3 PROPOSED MITIGATION MEASURES

This section details the management and mitigation measures required to ameliorate all potential impacts that will result from the existing and additional decommissioning activities at each facility. It should be noted that this EMP is to be read in conjunction with the EIA Report compiled for these activities. All of the impacts noted in the EIA Report have been itemised in this section (as numbered in the EIA Report), with their required mitigation measures.

3.1 OLD LIME SETTLING PONDS

3.1.1 GROUNDWATER

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objective: — To minimise potential contamination of groundwater resources associated with decommissioning activities.			
6.2(a) Groundwater contamination associated with the existing cover material The Contamination Assessment (WSP,2017) identified copper and mercury in the waste at the facility, in excess of soil screening value (SSV) 1, as well as additional pollutants in excess of SSV1 including arsenic, iron, lead, and manganese. The Hydrogeology Assessment (WSP, 2017) also identified the presence of copper and mercury in the waste, and indicated that the pH of the previously installed engineered lime liner for the facility was regarded as being hazardous. It has been noted that the monitoring wells from which the results were obtained, are located down-hydraulic of the entire complex. This suggests that results could be a representation of contamination emanating from all other operations at the site. The groundwater contamination plausibly linked to the ponds may also be a result of contamination that occurred prior to the rehabilitation of the site in 2012; as well as potential contamination after rehabilitation.	i) Implement measures specified in the hydrological assessment (WSP, 2017), including: — Monitor the cover integrity to ensure free drainage and infiltration is kept to a minimum. As per DWAF (Ref. 16/2/7/V301/B8, April 2009) acceptance of the closure of the OLSP, integrity assessments must be done biannually and include the embankment, topsoil and vegetation. — Continue undertaking groundwater monitoring to monitor the possible impacts on groundwater quality by contaminants emanating from the waste site. As per DWAF (Ref. 16/2/7/V301/B8, April 2009) acceptance of the closure of the OLSP, the groundwater monitoring must be undertaken biannually. ii) Implement measures specified in the Contamination Assessment (WSP, 2017), including: — DWAF (Ref. 16/2/7/V301/B8, April 2009) has accepted the closure of the OLSP with the following stipulations to be addressed within the EMP: 1 Biannual groundwater monitoring 2 Biennial integrity assessment of embankment, topsoil and vegetation 3 Siltech should comply with these conditions and ensure that results	Environmental Manager & Contractor	Decommissioning

	are reported to inform the regulator and adequately retained. — Monitoring wells 17A and 17B (nested pair) were installed into a known area of mercury contamination, these should be formally abandoned. Abandonment should include backfilling of the wells with bentonite or concrete to prevent these positions acting as a preferential pathway for the migration of contamination.		

3.1.2 SURFACE WATER

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objective: — To manage any potentially contaminated storm water from the site. — To ensure that soil and surface water resources are adequately protected.			
6.2(b) Surface water contamination and secondary impacts on riverine ecology and human water users: Contamination of the Ngagane River as a result of erosion of the bare patches of the facility's surface, and the scouring of the walls of the facility that will eventually expose the waste layer and all the contaminants therein. This will potentially result in an impact on the aquatic ecosystem of the River.	i) Protect the boundary of the facility from scouring by placing minor engineering works such as gabions or through the use of a binding medium such as Vetiver grass in those areas. ii) Grade/landscape the slopes of the sidewalls, thereby to reduce the impact of lateral erosion on the sidewalls, by the river. iii) Vegetate the parts of the facility surface that have no vegetation cover in order to retain the topsoil cover and reduce the erosivity of the area. iv) Continue undertaking surface water monitoring.	Contractor and Environmental Manager	Decommissioning

3.2 CONSOLIDATED WASTE FACILITY

3.2.1 GROUNDWATER POLLUTION

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objective: — To minimise potential contamination of groundwater resources associated with decommissioning activities			
6.3(a) Groundwater impacts due to the permeability characteristics of the existing cover material:	i) Implement the following recommendations contained in the Consolidated Waste Facility Closure Report (WSP, 2017):	Contractor& Environmental Manager	Decommissioning

The hydrogeological assessment (WSP, 2017) indicated the presence of naphthalene (exceeding guidelines), manganese, zinc, and C7–C9 hydrocarbons in a well down-gradient of the facility. The Contamination Assessment (WSP, 2017) identified the presence of copper, iron, lead, manganese and mercury in the waste body in excess of SSV1. The assessment indicated that whilst the facility is contaminated, it does not present an immediate risk in terms of the human health and water resource protection pathways, measures are required to address the monitoring and management of that risk. The closure assessment (WSP, 2017), highlighted that the capping of the facility is too permeable and would need augmenting to prevent the formation of leachate and possible groundwater contamination.	— The reworked waste layers are generally suitable for V layers ** (shaped and compacted waste) but, since these are not present across the entire site, the upper surface of the waste materials should be reshaped and compacted before V layers are placed. *** The requirements specify that V layers should have a plasticity index (PI) of 5-15%, a maximum particle size of 25mm and be compacted to at least 85% of Standard Proctor MDD (maximum dry density). The permeability of the V layer is very important and should be ≤0.5m/year.* — It is recommended that the topsoil currently present on the CWF be removed and stockpiled while the cover is upgraded. Once exposed the upper surface of the facility waste should be shaped to a suitable gradient (<3%) and lightly compacted. — Once the shaped surface is complete, V layer materials should be placed in 150mm layers, compacted to at least 85% Standard Proctor maximum dry density at a moisture content of OMC to OMC+2%. — Alternatively, suitable engineered barrier solutions that provide similar protection to that of a V layers should be placed on the prepared upper surface of the facility. The stockpiled topsoil can then be replaced and lightly compacted and vegetated. — While vegetation is establishing erosion by wind and water should be prevented using suitable methods such as soil mats/blankets. — Siltech is required to continue undertaking groundwater monitoring to monitor the possible impacts on groundwater quality by contaminants emanating from the waste site (WSP Hydrogeological Assessment, 2017).		

3.2.2 ALIEN VEGETATION INVASION

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objectives: — To curb the spread and establishment of alien vegetation — Prevent the destruction/degradation of soil and vegetation on site.			

6.3 (b)Existing alien vegetation invasion, and potential for further infestation during augmentation of cover material: Alien vegetation has colonised certain areas on site as a result of disturbance of the site during previous closure and rehabilitation activities. The facility in its current state is unlikely to cause the proliferation of additional alien vegetation, however the proposed additional closure measures may introduce new alien vegetation to the site.	– Conserve topsoil resources for use in rehabilitation. – Undertake a revegetation programme using appropriate species that are consistent with the naturally occurring vegetation in the area (i.e. KwaZulu Natal Highland Thornveld). – Develop and implement an alien invasive management plan to remove or control the alien species – Monitor the establishment of alien vegetation on site post decommission as part of after care.	Environmental Manager & Contractor	On-going

3.2.3 SURFACE WATER POLLUTION

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objective: – To manage any potentially contaminated storm water from the site. – To ensure that surface water resources are adequately protected.			
6.3 (c) Potential surface water and groundwater contamination during augmentation of cover material: The potential for a release of small quantities of chemicals and hydrocarbons from vehicles operating or stored on site, exposed waste during the removal of the existing cover material, and temporarily stockpiled contaminated material exists. This may cause contamination of wetlands and the river, and consequently impact on the aquatic ecosystem of the river.	– Ensure that adequate storm water management controls are employed during the re-construction of the facility cap. All run off from the site should be directed to the dirty water trench, and the North Dam. – If possible, undertake construction activities during the dry season to avoid the control of excess surface runoff during high rainfall events. – Provide and utilise drip trays for immobile vehicles and machinery that will be operated on site. – Acquire spill kits to clean up any hydrocarbon or chemical spills during closure to prevent seepage. – During cover material augmentation, all potentially contaminated material (e.g. temporarily stockpiled) must be contained within the disposal site footprint. Should temporary stockpiling be required outside of the footprint, it must be i) tested to determine the presence of potential contaminants, and ii) stored in a manner that prevents secondary contamination of the environment – Storage of hazardous materials if any, should be undertaken within impermeable bunded, ventilated and	Environmental Manager & Contractor	Decommissioning

	covered storage areas, capable of containing 110% of total volume. **Spill and Incident Management** – Spill and response equipment must be accessible on-site. – Suitable spill containment must be provided for transfer points outside of bunded areas. – Spillages / leaks are to be contained immediately; deploy oil containment berms if the spill migrates to other areas. – Cover the spill with absorbent material. – Remediation of the spill areas will be undertaken to the satisfaction of the Environmental Manager. – Dispose of the clean-up material in line with MSDS requirements of spilled material. – Staff handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate PPE must be made available.		

3.2.4 DAMAGE TO WETLANDS

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objectives: – To avoid the destruction/degradation of wetlands.			
6.3 (d)Damage to wetlands during augmentation of cover material: A total of six wetlands were delineated around the complex, with one of them (wetland 9) located directly south of the facility. There is a potential impact of having the wetland destroyed by vehicles operating on site, as well as the siltation of eroded material carried by surface runoff.	– Demarcate the potentially affected wetland areas and sign post them as 'No-Go Areas to prevent encroachment by the workforce. – Implement measures to prevent the contamination of surface water that could potentially flow into wetland 9 (see Section 6.3 (d) above).	Environmental Manager & Contractor	Decommissioning

3.2.5 FRAGMENTATION OF VEGETATION AND ASSOCIATED HABITAT

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME

Objectives: — To avoid unnecessary removal of vegetation; and — Avoid the destruction/degradation of vegetation and the natural habitat.			
6.3 (e)Fragmentation of vegetation and associated habitat impacts during augmentation of cover material: The removal of the vegetation community that has been established over the facility, which will fragment the natural habitat and temporarily displace small mammals and invertebrates.	— Ensure the area is revegetated following the construction (cap augmenting) activities. — Vegetate the area with vegetation homogenous to the surrounding vegetation communities.	Environmental Manager & Contractor	Decommissioning

CONSOLIDATED WASTE FACILITY REVEGETATION PLAN

Following its decommissioning and rehabilitation, a vegetation community primarily consisting of various grass species and shrubs was established on the Consolidated Waste Facility, forming a new habitat that has likely reached vegetative equilibrium. Implementing the proposed measures to augment the facility's cap will entail the removal of the vegetation community, thereby temporarily destroying the established habitat. A vegetative plan is therefore required to ensure the re-establishment of the habitat post all decommissioning activities.

A revegetation plan is a necessary component of the rehabilitation phase, as it also plays a key role in landscape organization, function and stability of the site. Good vegetative cover results in a reduction in the volume of surface runoff, increases soil and slope stability, and leads to the formation of an organic layer. Vegetation establishment at closure can also be used as indicator for successful rehabilitation and ecosystem health.

Re-vegetation Objectives

The overall objectives for the re-vegetation of reshaped and top-soiled land are to:

— Prevent erosion and avoid loss of topsoil.
— Restore the land, as far as practically possible, to its initial land capability.
— Prevent sedimentation into aquatic ecosystems such as rivers and wetlands.
— Encourage succession and re-establish eco-system processes to ensure that a self-sustaining and sustainable land use can be established post closure.
— Restore the biodiversity of the area as far as possible.

The following measures should be adopted to aid re-vegetation and rehabilitation of the facility:

Vegetation clearing

— All alien vegetation found on the sites must be managed. Category 1 alien invasive species must be removed from site prior to clearing (and on an on-going basis), and Category 2 alien invasive species must be controlled.
— Vegetation should be cleared prior to the removal of topsoil to allow for proper topsoil reclamation and stockpiling.
— Indigenous vegetation cleared from site must be properly dumped at a designated dumping area, for possible use as mulch when re-vegetating.
— Where possible, harvest seeds from the existing vegetation for use during re-vegetation.

Topsoil Clearing

— Topsoil should be safely stockpiled separately at demarcated areas in piles, and stockpiles should be protected from wind or water erosion.
— The establishment of alien species on stockpiles should be monitored and controlled.

Revegetation

- Areas to be rehabilitated should be ripped and the stockpiled topsoil replaced prior to revegetation.
- Revegetation should be done with vegetation indigenous to and consistent with the surrounding natural vegetation.
- Revegetation should be undertaken just before or during the rainy season.

Vegetation Monitoring

- Vegetation monitoring should be undertaken to track the establishment and progress of revegetation. Photographic monitoring sites should be established and visual inspections undertaken at the re-vegetated site.

The following are the desired outcomes of the re-vegetation plan:

- Minimised loss of native vegetation and plant communities.
- Returning the waste facility to a viable, self-sustaining ecosystem.
- Ensuring that revegetation achieves a safe, stable and functioning ecosystem.
- Weed and alien plant species infestations as a result of construction activities have been assessed and controlled as per the approved invasive species monitoring, control and eradication plan.

3.2.6 AIR QUALITY

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objective: – To minimise potential dust emissions release associated with decommissioning activities, materials transport etc.			
6.3 (f)Air quality impacts and potential community nuisance factor caused by dust emissions during augmentation of cover material: Dust emissions will reduce the air quality in the vicinity of the facility as well as off-site due to wind vectors. There are no sensitive receptors to dust (community areas) within a 1km radius of the facility therefore it is unlikely that potential dust emissions would result in a nuisance factor community.	– Conduct dust suppression via water spray prior to and during construction to minimise dust emissions from the site activities – Dampen exposed soil to suppress dust-using water if required. – Implement the grievance/complaints procedure specified in **Section 2.4** of this EMPr.	Environmental Manager & Contractor	Decommissioning

3.3 OLD ASH DUMP

3.3.1 GROUNDWATER

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objective: – To minimise potential contamination of groundwater resources associated with decommissioning activities			

6.4(a) Groundwater contamination associated with the status quo and future reclamation of the facility: The hydrogeological assessment (WSP, 2017) indicated the presence of cobalt, copper, iron, manganese, potassium, zinc (above guidelines) and fluoride in a monitoring well located generally down-hydraulic-gradient of the ash dump. Other sources of groundwater contamination located up-hydraulic gradient of the ash dump were however noted, including the raw materials storage areas and adjacent colliery. The contamination assessment (WSP, 2017) indicated that the ash dump is contaminated, but does not present an immediate risk in terms of the human health and water resource protection pathways, but that measures are required to address the monitoring and management of that potential risk.	— Continue undertaking groundwater monitoring to monitor the possible impacts on groundwater quality by contaminants emanating from the waste site. Ensure that monitoring wells are placed directly adjacent to the facility for access of ground water samples of water flowing from the facility (WSP EMP, 2012). — Continue with the ash reclamation operations to completion, for sale to block manufacturers as this will eliminate the dumps as a source of groundwater contamination (WSP EMP, 2012). — Implement measures specified in the WSP contamination assessment (2017) including: Development of a formal plan allowing provision for the removal of any significantly contaminated residual material, suitable capping and vegetation, as well as monitoring requirements. It is further recommended that this plan should be developed by a suitably qualified independent specialist; and, as this requires an assessment of the residual contamination beneath the facility the development of the detailed plan should be deferred until the completion of reclamation.	Environmental Manager & Contractor	Decommissioning

3.3.2 SURFACE WATER QUALITY

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objectives: — To manage any potentially contaminated storm water from the site. — To ensure that surface water resources are adequately protected.			
6.4(b) Spread of contaminants due to flow of surface water from the facility into the surrounding area. The potential for a release of small quantities of chemicals and hydrocarbons from vehicles operating or stored on site, exposed waste during the removal of the existing cover material, and temporarily stockpiled contaminated material exists. This may cause contamination of surface water, and consequently impact on the aquatic ecosystem of the river.	— Ensure adequate storm water management controls are employed during the re-construction of the facility cap. All run off from the site should be directed to the dirty water trench. — If possible, undertake construction activities during the dry season to avoid the control of excess surface runoff during high rainfall events. — Provide and utilise dip rays for immobile vehicles and machinery that will be operated on site — Undertake the Spill and Incident Measures as detailed in the EMP.	Environmental Manager & Contractor	Decommissioning

3.3.3 AIR QUALITY IMPACTS

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objective: — To minimise potential dust emissions release associated with decommissioning activities, materials transport etc.			
6.4(c) Air quality impacts and community nuisance factor due to potential dust emissions during reclamation: Emission of dust particles during the process of reclaiming (typically hauling) the ash by block manufacturers. This may potentially and temporarily impact on the air quality in the region and temporarily cause a nuisance to surrounding receptors.	— Conduct dust suppression by spraying water prior to or during reclamation activities to minimise dust emissions from the site. — Implement the grievance/complaints procedure specified in Section 2.4 of this EMPr. — Ensure that all ash loads leaving the site are to be covered with tarpaulins. Siltech to monitor all outgoing loads to ensure compliance.	Environmental Manager	Decommissioning

3.3.4 TRAFFIC

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objectives: — To prevent congestion from occurring particularly during peak times; and safety risks to pedestrians.			
6.4(e) Traffic impacts associated with the road hauling of ash by reclamation companies: It is anticipated that an increase in demand for ash in future may see the number of trucks accessing the site to reclaim the ash rise to about 5 trucks per day. The potential addition to the number of trucks will result in a slight increase in traffic on the N11, albeit not significantly as the road network is well developed and is currently not congested.	— As best practice, the collection of ash should be done during off peak traffic hours, between 8am and 4pm, when there is less movement of other vehicles on the road.	Environmental Manager & Contractor	Decommissioning

3.3.5 SOCIO-ECONOMIC IMPACTS

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME

Objectives: – To promote positive socio-economic impacts			
6.4(f): Socio-economic impacts related to reclamation of the ash dump by third parties and ash block manufacturing Ash reclaimed from the dump is a raw material in the block manufacturing process undertaken by third parties and therefore serves as a benefit to the local economy	– None	Environmental Manager & Contractor	Decommissioning

3.4 HISTORIC POWER STATION COOLING PONDS

3.4.1 GROUNDWATER IMPACTS

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objective: – To minimise potential contamination of groundwater resources associated with decommissioning activities			
6.5(a)Groundwater impacts due to the permeability characteristics of the existing cover material : The waste in the facility contains contaminants including arsenic, copper, lead, and mercury. The contamination assessment (WSP, 2017) and hydrogeological assessment (WSP, 2017) indicated that the ponds are lined and that the deeper materials therein were observed to be saturated, which therefore most likely mitigates the vertical migration of contamination from the facility. A specific review by WSP's closure specialist, however, indicated that the facility's capping was not suitable for the waste type therein.	– Implement the following measures recommended during the site specific review (WSP, 2020): – The waste material and current capping material on the area of interest be comprehensively investigated to determine the nature and classification of the waste materials and the groundwater conditions associated therewith. – Once completed the area should be shaped and capped with a suitable capping system according to the waste classification. The proposed capping presented above will result in the area being sterilized and not available for use. – An alternative capping design, should the use of the area for material handling be required, can be developed by shaping the area before developing an engineered impermeable pavement system with a gravel wearing course or, depending on required strength, concrete hardstanding surface. Should this option be required, the investigation of the area should include a geotechnical assessment of the current material	Environmental Manager & Contractor	Decommissioning

	strengths and suitability for re-compaction to load-bearing densities.		

3.4.2 AIR QUALITY

POTENTIAL ISSUES / IMPACTS	MANAGEMENT ACTIONS	RESPONSIBLE PERSON	TIMEFRAME
Objective: – To minimise potential dust emissions release associated with decommissioning activities etc.			
6.5(b) Air quality impacts and potential community nuisance factor caused by dust emissions during augmentation of cover material: The release of dust particulates into the surrounding atmosphere during the excavation and grading of the area may potentially and temporarily impact on the air quality in the region and temporarily cause a nuisance to surrounding receptors	– Implement dust suppression measures by spraying water for the duration of the augmenting activities. – Implement the grievance/complaints procedure specified in Section 2.4 of this EMPr. – Dampen exposed soil to suppress dust-using water if required.	Environmental Manager	Decommissioning

APPENDIX

A EAP CV

APPENDIX