

CHRIS HANI DISTRICT MUNICIPALITY

CHDM CLUSTER 9 PHASE 5 AND CLUSTER 8 LINKAGE

ENVIRONMENTAL MANAGEMENT PROGRAMME

DEDEAT Reference No.:

Prepared by EAP:

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1. COMPILER OF EMPR

CURRICULUM VITAE & COMPANY DETAILS

Name	Christopher John Bradfield	Organisation	isi-Xwiba Consulting CC
Nationality	South African	Registration No.	CK 2003 / 003178 / 23
Date of Birth	17 th April 1952	Income Tax Ref.	905 357 715 2
Profession	Natural Resource Management	Professional Indemnity Insurance	SACNASP Indemnity Insurance Policy SPL/SLFG/000013915
Postal Address	16 Milner Street		
E-mail	isix@lcom.co.za		
Mobile	083 441 1189		

REGISTRATIONS

- (i) Environmental Assessment Practitioners Association of South Africa – Environmental Assessment Practitioner – Registration No. 2022/4543
- (ii) South African Council for Natural Scientific Professions – Professional Natural Scientist Registration Number 400354/04
- (iii) Chamber of Engineering Technology – Professional Engineering Technician - Member No. 200230145
- (iv) Engineering Council of South Africa (**Retired**) - Professional Engineering Technician - Member no. 200230145

TERTIARY QUALIFICATIONS

- (i) National Diploma in Agricultural Extension - Pretoria Technikon (1974)
- (ii) Resource Utilization (soil classification / soil potential and land use planning) - Potchefstroom Agricultural College (1980)
- (iii) Diploma in Project Management - DAMELIN (1999)

COURSES / WORKSHOPS / SEMINARS

- (i) Soil Conservation (Mathematics / Hydraulics / Structures / Hydrology) – Directorate Soil Conservation (1994)
- (ii) Minimum tillage and reduced run-off (CSIR)
- (iii) Near shore physical processes – Coastal zone management (CSIR)
- (iv) Veld Management – Stocking rates /rotational grazing / fire as a management tool (EC Department of Agriculture)
- (v) Construction and Asbestos Regulations (NOSA)
- (vi) Occupational Health & Safety Act (SAACE)
- (vii) The New Construction Regulations (SAACE)
- (viii) Irrigation design and scheduling - (National Department of Agriculture)
- (ix) Design of soil conservation structures - (National Department of Agriculture)
- (x) Boreholes – abstraction design and pump selection (S& L / M & B)

EMPLOYMENT HISTORY

PERIOD	ORGANISATION & POSITION HELD
1971 – 1997	Department of Agriculture (Eastern Cape) Student Technician through the ranks to Deputy Director – Engineering Services (Resource Conservation)
1997 – 2005	ATS Consulting Engineers (Pty) Ltd - Managing Director
2005 to date	isi-Xwiba Consulting CC - Managing Member

NATURAL RESOURCE MANAGEMENT - SUMMARY

Chris Bradfield has 48-years working experience in the field of natural resource management. He's specialised field is soil conservation and he is a firm believer that the conservation of the natural resources, soil, water and vegetation should be the cornerstone of any sustainable development. During the period 1974 – 2005 he was actively involved in soil potential determination, land-use and farm planning, survey and design of earth dams, pipelines and soil conservation works and business management. He has been involved since 2005 in compiling environmental impact assessments and environmental management programmes and undertaking environmental audits in terms of the National Environmental Management Act, 1998, as amended (NEMA), NEM: Biodiversity Act, 2004, NEM: Waste Act, 2008, NEM: Air Quality Act, 2004 and the Minerals and Petroleum Resources Development Act, 2002, as amended.

2. SCOPE

This project being the CHDM Cluster 9 Phase 5 and Cluster 8 Linkage will provide bulk water supply to IYLM (Ward 9) and Engcobo Local Municipality (Ward 1-Cluster 8). Cluster 8 will be supplied with water (reticulation not part of this BAR) via the proposed Nxamagele Command Reservoir, which is considered in this BAR.

The CHDM Cluster 9 Phase 5 and Cluster 8 Linkage project consists of the following:

- (i) Construction of a 315 mm ID pipeline linking the Ngqamakhwe Command Reservoir and the proposed Nxamagele Command Reservoir. This pipeline in itself does not require an EIA process as the ID is <360 mm and the throughput <120 lt/sec. **However the pipeline crosses three (3) identified watercourses/wetland areas, coordinates as follows:**

Watercourse description	Latitude (S):		Longitude (E):	
B-C				
Starting point (B)	32°	2.523'	27°	58.985'
End point (C)	32°	2.381'	27°	59.140'
D-E				
Starting point (D)	32°	2.433'	27°	59.916'
End point (E)	32°	2.375'	28°	0.176'
F-G				
Starting point (F)	32°	2.343'	28°	0.298'
End point (G)	32°	2.308'	28°	0.426'

- (ii) Construction of the Nxamagele Command Reservoir with a capacity of 3 500 m³ located within a CBA 2
- (iii) Construction of a 160 mm ID pipeline linking the Ngqamakhwe / Nxamagele to the existing Catshile Reservoir. This pipeline does not require an EIA process

The CHDM appointed a Contractor to construct these works, prior to any EIA process. The EAP met with Mrs N Mdekazi-Nkqubezelo and the outcome of the discussion with the EQM was that construction could commence on the two pipelines, but that construction should stop short of any watercourse/wetland area and then re-commence on the opposite boundary of such watercourse/wetland - **thus no construction within a wetland/watercourse prior to Authorisation. The sections of pipeline through a wetland/watercourse must be subjected to an EIA process (BAR) as well as the Nxamagele Command Reservoir.** It must be noted that the decision by the EQM was based on this being a service delivery project and to assist the CHDM in not incurring financial losses due to claims from the Contractor. The correspondence from the EQM made it clear that implementation as considered, was at the applicant's/Consulting Engineer's risk.

Notwithstanding the Environmental Authorisation and EMPr, the contractor shall be cognisant of the:

- "Duty of Care" principles prescribed in Section 28 of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended and included in section 14 of this EMPr; **see Section 19**

- the “Pollution prevention and emergency incidents” protocol in terms of the National Water Act, 1998 (Act 36 of 1998); **see Section 20**
- the Protocol for Incidental/Chance Finds (Archaeology and Cultural Heritage and Palaeontology) in terms of the National Heritage Resources Act, 1999; **see Section 21**

NOTE:

- (i) This EMPr is to be **READ IN CONJUNCTION** with the Environmental Authorisation from the Authority.
- (ii) The Contractor shall maintain copies of the Environmental Authorisation, EMPr, Water Use License and any other permits in a file at the site office.

3. INTERPRETATIONS

3.1 Supporting Specifications

Where this Specification is required for a project the following specifications shall, inter alia, form part of the Contract Document.

- (a) Project Specification;
- (b) SANS 1200 A or SANS 1200 AA, as applicable.

3.2 Application

This Specification contains clauses that are generally applicable to the undertaking of civil engineering works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment. In the event of any difference or discrepancy between the provisions of the Standardized Specifications and the provisions of this Specification, the latter shall prevail.

3.3 Definitions

For the purposes of this Specification the definitions and abbreviations given in the applicable Specifications listed in 2.1 and the following definitions shall apply:

Contract: The General Conditions of Contract and Special Conditions, Specifications, Drawings, Tender, written records of matters agreed after the submission of the Contractor's tender, Letter of Acceptance and Agreement, together with other documents which the parties have agreed in writing shall form part of the Contract and such amendments or additions to the Contract as may be agreed in writing between the parties.

Contaminated Water: Water contaminated by the Contractor's activities, e.g. concrete water and runoff from plant/personnel wash areas.

DMR: Department: Mineral Resources

DEDEAT: Department Economic Development, Environmental Affairs and Tourism

Environment: The surroundings within which humans exist and is made up of:

- i) The land, water and atmosphere of the earth;

- ii) micro-organisms, plant and animal life;
- iii) any part or combination of i) and ii) and the interrelationships among and between them; and
- iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

ECO: Environmental Control Officer (Independent specialist – Consultant)

Method Statement: A written submission by the Contractor to the Engineer in response to the Specification or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications. The Method Statement shall cover applicable details with regard to:

- Construction procedures
- Materials and equipment to be used
- Transportation of equipment/materials to and from Site
- Movement of equipment/materials on Site
- Storage of materials on Site
- Containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur
- Timing and location of activities
- Rehabilitation of the environment (refer 5.16)
- Areas of non-compliance with the Specifications, and
- Any other information deemed necessary by the Engineer

MPRDA: Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) and its Regulations

NEMA: National Environmental Management Act, 1998, (Act 107 of 1998) as amended and its Regulations

NEM: WA: National Environmental Management: Waste Act, 2008 (Act 59 of 2008) and its Regulations

NWA: National Water Act, 1998 (Act 36 of 1998) and its Regulations

Operational area means an area where development/construction activities are carried out

Potentially Hazardous Substance: A substance that, in terms of SANS 10234.2008, can have a deleterious effect on the environment.

Reasonable: Unless the context indicates otherwise, reasonable in the opinion of the Engineer after he has consulted with a person, not an employee of the Employer, suitably

experienced in “environmental implementation plans” and “environmental management plans” (both as defined in Act No. 107, 1998).

Regulations unless the context indicates otherwise, this shall include but is not limited to:

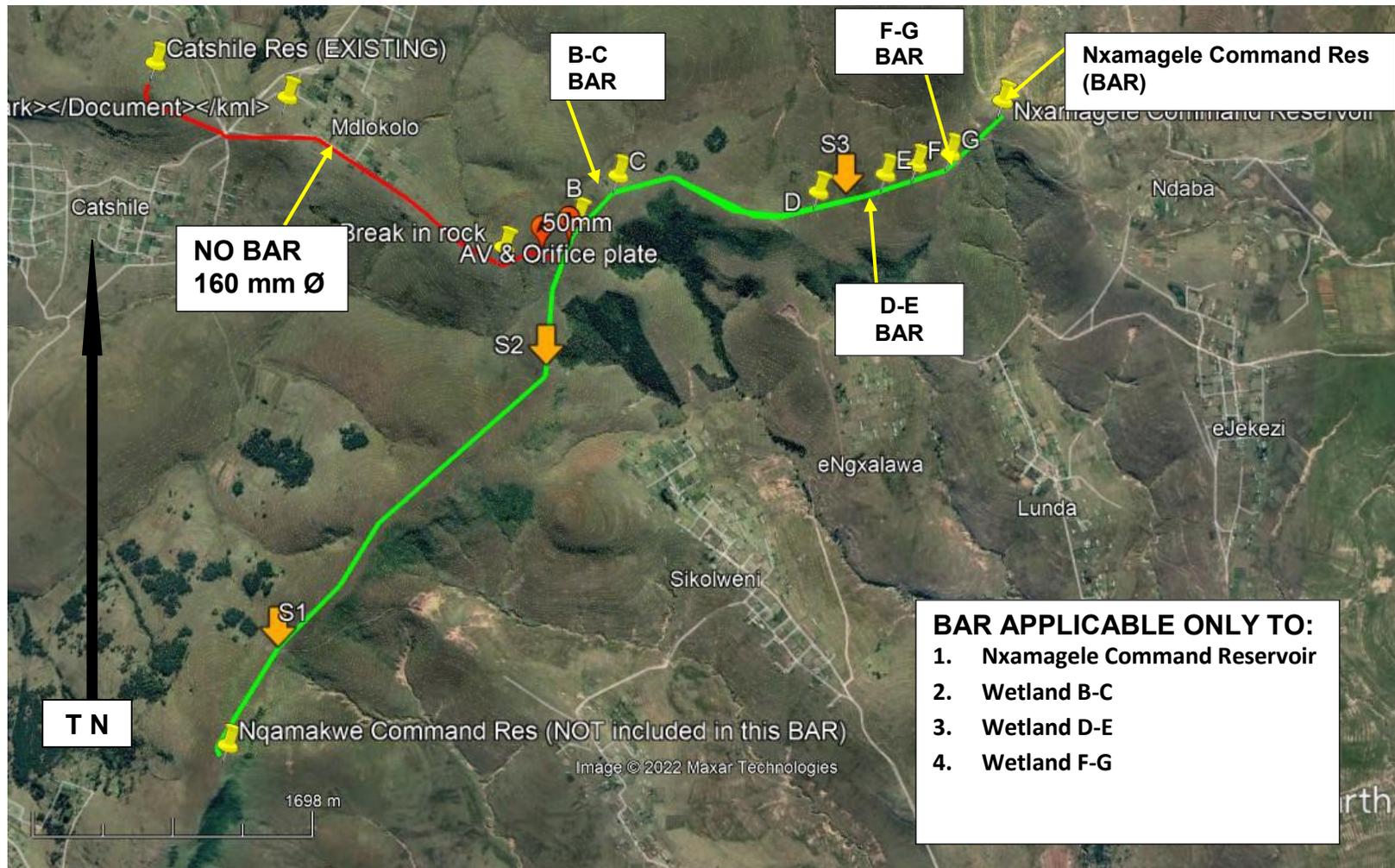
- (i) The National Environmental Management Act, 1998 (Act 107 of 1998) (“NEMA”), as amended, 2010, 2014 and 2017;
- (ii) NEMA, 1998 (Act 1-7 of 1998) – GN 326 dated 7th April 2017 – Amendments to the EIA Regulations, 2014
- (iii) NEM: Biodiversity Act (Act 10 of 2004)
- (iv) NEM: Air Quality Act, 2004 (Act No. 39 of 2004) National Dust Control Regulations
- (v) The National Water Act, 2008 (Act 36 of 1998) and its Regulations
- (vi) Conservation of Agricultural Resources Act, 1983 9Act 43 of 1983)
- (vii) National Heritage Resources Act, 1999 (Act 25 of 1999), as amended

SHEQ: Safety Health and Environmental Quality officer (Contractor’s staff compliment)

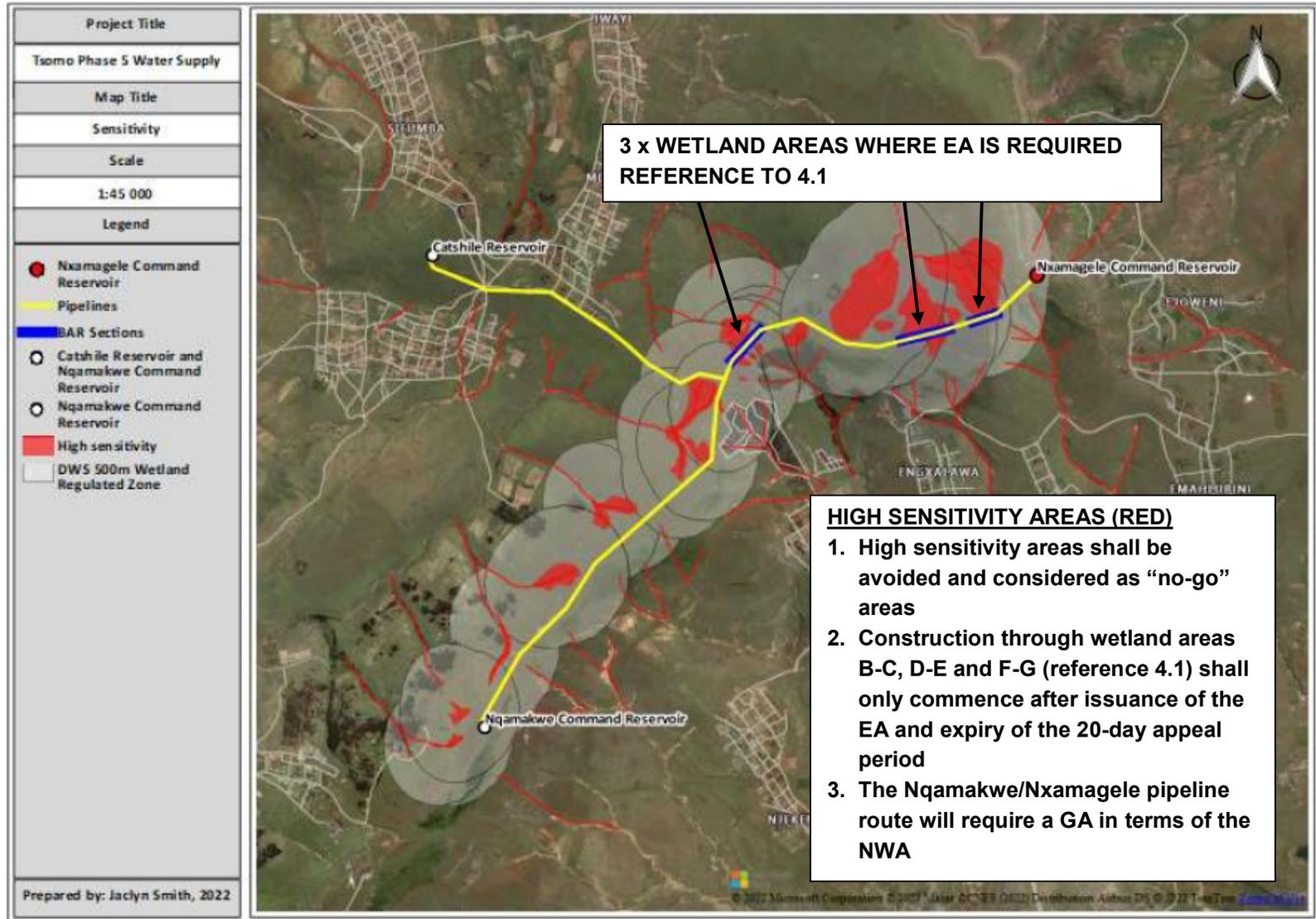
Solid Waste: All solid waste, including construction debris, chemical waste, excess cement/concrete wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

4. SITE MAPS

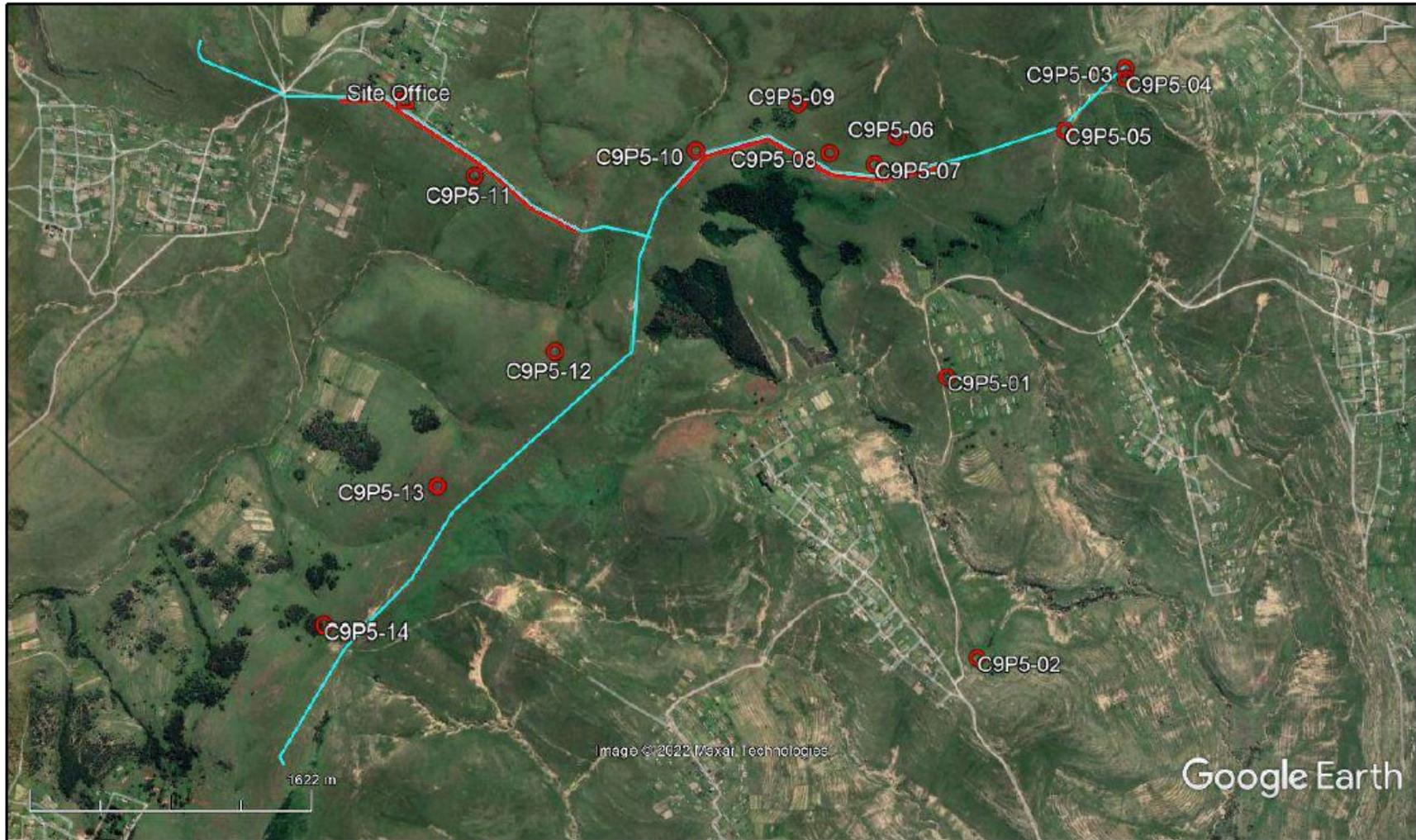
4.1 ROUTE MAP INDICATING AREAS SUBJECT TO EIA PROCESS



4.2 HIGH SENSITIVITY AREAS



4.3 ARCHAEOLOGICAL & CULTURAL HERITAGE SITES IN PROJECT AREA (REFER TO SECTIONS 18 & 21)



Map 13: Field assessment results – the Cluster 9 Phase 5 and Cluster 8 Linkage, Water Supply and Access Road development

5. PLANT

5.1 Site Office & Construction Camp

No camping is allowed. The site office and construction camp shall be sited within the community built up area and staff should be placed in accommodation within the community or closest towns.

5.2 Ablution Facilities

A sufficient number of chemical toilets shall be provided by the contractor in the construction camp area and at appropriate locations approved by the Engineer. The ratio of ablution facilities to workers should not be less than that required by the Construction Regulations 2003 of the Occupational Health and Safety Act and facilities shall be located within 100 m from any point of work but no closer than 100 m to any water body, river/stream and wetland and shall be outside the 1-in-100-year flood line of any watercourse. All temporary/portable toilets shall be secured to the ground to prevent them from toppling due to wind or any other cause. The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are properly stored and removed from Site. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. Washing, whether of the person or of personal effects and acts of excretion and urination are strictly prohibited other than at the facilities provided.

5.3 Solid Waste Management

The Contractor shall provide sufficient bins with lids or skips on Site and no on-Site burying, dumping or burning of any waste materials, vegetation, litter or refuse shall occur. Bins shall be emptied a minimum of once daily. The waste may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, as approved by the Engineer. Storage shall not cause any groundwater or surface water pollution or pose any health hazard. All solid waste shall be disposed of off Site at an approved landfill Site. The Contractor shall supply the Engineer with a certificate of disposal.

5.4 Contaminated Water

Contractor shall set up a contaminated water management system, which shall include collection facilities, as well as suitable methods of disposal of contaminated water. The Contractor shall prevent the discharge of water contaminated with any pollutants, into the environment. The Contractor shall notify the Engineer immediately of any pollution incidents of Site. Contaminated water shall be disposed of at a properly authorized facility and proof of collection and disposal by the exterior source shall be maintained at the site office and made available on request to DWS and/or DEDEAT. The Engineer's approval is required prior to the discharge of contaminated water into a Municipal sewer system and the Engineer shall discuss this with the Municipality prior to authorisation.

5.5 Fuel (Petrol and Diesel) and Oil

Fuel may be stored on Site in an area approved by the Engineer. The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut or in bowzers. The tanks/bowzers shall be situated on a smooth impermeable surface (concrete or 250 µm plastic) with an earth bund (plastic must have a 5cm layer of sand on top to prevent damage and perishing). The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 130% of the total capacity of all the storage tanks/bowzers. Provision shall be made for refueling at the fuel storage area, by protecting the soil with 250 µm plastic covered with minimum of a 5 cm layer of sand. The Contractor shall prevent unauthorized access into the fuel storage area. No smoking shall be allowed within the vicinity of the fuel storage area. The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

5.6 Equipment Maintenance and Storage

All vehicles and equipment shall be kept in good working order. Leaking equipment shall be repaired immediately or removed from the Site. Where practical, maintenance of plant shall not occur on Site. Where emergency maintenance is necessary, the Contractor shall ensure that this does not result in contamination of the soil or vegetation. Drip trays shall be provided in construction areas for stationary and “parked” plant as well as during emergency servicing of vehicles. Drip trays shall be the approved type as used in workshops and geyser trays may not be used. Drip trays shall be inspected and emptied daily. The contents of drip trays shall be disposed of at an authorized facility. Drip trays shall be closely monitored during rain events to ensure that they do not overflow. The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. The use of detergents for washing shall be restricted to low phosphate and nitrate containing, low “sudsing-type” detergents.

5.7 Noise

The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). The provisions of SANS 1200A Sub Clause 4.1 regarding “built-up areas” shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas. Appropriate directional and intensity settings are to be maintained on all hooters and sirens and no amplified music shall be allowed on Site other than in emergency situations. The Contractor shall restrict any of his operations that may result in undue noise disturbance to the hours of 08:00 to 17:00 on weekdays and Saturdays, unless otherwise agreed to with the Engineer.

6. MATERIALS

6.1 Materials Handling, Use and Storage

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including “no go” areas) required to comply with the Specifications. The Contractor shall ensure that these delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Specifications. Materials shall be appropriately secured and covered to ensure safe passage between destinations. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or supplier to properly secure transported materials. All manufactured and/or imported material shall be stored within the Contractor’s camp, and, if so required by the Project Specification, out of the rain. Any lay down areas outside of the construction camp shall be subject to the Engineer’s and ECO’s approval.

6.2 Hazardous Substances

Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. All hazardous substances and hazardous waste must be stored in impermeable structures placed in secondary impermeable bunded structures 130% the volume of the primary structure. The relevant Material Safety Data Sheets (MSDS) shall be available on Site. Procedures detailed in the MSDS’s shall be followed in the event of an emergency situation. Potentially hazardous substances shall be stored, handled and disposed of as prescribed by the Engineer and disposed of at a properly authorized facility and proof of collection and disposal by the exterior source shall be maintained at the site office and made available on request to DWS and/or DEDEAT.

6.3 Quarry Materials (Stone, gravel, sand and weathered dolerite e.g. sabunga)

These materials typically used for back-filing and bedding under pipe lines, shall be sourced from a registered commercial source and cognisance must be taken of legislation which Authorities are the DMRE and DEDEAT. The Engineer may request the Contractor to obtain a copy of the permit for the relevant source he/she is obtaining material from. **Transgressions will be reported to the relevant Authority.**

7. CONSTRUCTION

NOTE:

- (i) This EMPr is applicable to the components of the CHDM Cluster 9 Phase 5 and Cluster 8 Linkage as set out hereunder:
- Construction of the 3,5 ML Nxamagele Command Reservoir; and
 - Construction of the 315 mm ID pipeline (Nqamakwe Command Reservoir to the Nxamagele Command Reservoir) through watercourse/wetland areas B-C, D-E and F-G as indicated on the map in section 4.1
- (ii) As required by ECPHRA, the conditions of the Archaeological/Cultural Heritage and Paleontological Reports are applicable to the entire project area being the pipeline linking the Nqamakwe Command Reservoir to the Nxamagele Command Reservoir, construction of the Nxamagele Command Reservoir and the pipeline linking to the existing Catshile Reservoir

7.1 Method Statements

Any Method Statement required by the Engineer, Specification EMA or the Project Specification shall be produced within such reasonable time as the Engineer shall specify or as required by Specification EMA or the Project Specification. The Contractor shall not commence the activity until the Method Statement has been approved. Except in the case of emergency activities, the Contractor shall allow a period of two weeks for approval of the Method Statement by the Engineer. Such approval shall not unreasonably be withheld.

The Engineer may require changes to a Method Statement if the proposal does not comply with the specification or if, in the reasonable opinion of the Engineer, the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted by the Specifications.

Approved Method Statements shall be readily available on the Site and shall be communicated to all relevant personnel. The Contractor shall carry out the Works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

Method Statements that shall be provided by the Contractor within 14 days of receipt of the letter of acceptance and prior to the activity covered by the Method Statement being undertaken, include:

1. Location and structure of the fuel storage Site, including the type and volume of storage container and the design and capacity of the bund.

2. Solid waste (refuse) control and removal of waste from the Site, including the number, type and location of rubbish bins, the manner and frequency with which the waste will be removed from Site and the disposal Site.
3. Contaminated water management system, including an indication of the source and volume of contaminated water and how this would be disposed of.
4. Emergency procedures for fire, and accidental leaks and spillages of hazardous materials.

7.2 Environmental Awareness Training

Within seven days of the Commencement Date, the Contractor's Site staff, including foremen and Site Management staff shall attend an environmental awareness training course, of approximately one-hour duration. The Contractor shall liaise with the Engineer prior to the Commencement Date to fix a date and venue for the course. The Contractor shall provide a suitable venue with facilities as required by the Project Specification, and ensure that the specified employees attend the course. This training will be for the contractor's account.

Any new employees coming onto Site after the initial training course and the Contractor's suppliers and sub-contractors shall also attend this course, which shall be run by the SHE. The Contractor shall ensure that all attendees sign an attendance register, and shall provide the Engineer with a copy of the attendance register the day after each course. This training will be for the contractor's account.

7.3 Construction Personnel Information Posters

As required by the Project Specification, the Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with aspects of the Specifications. Such posters shall be erected at a location specified by the Engineer.

7.4 Site Clearance

The Contractor shall ensure that the clearance of vegetation is restricted to that required to facilitate the execution of the Works. Site clearance shall occur in a planned manner, and cleared areas shall be stabilized as soon as possible. The detail of vegetation clearing shall be subject to the Engineer's approval. Top-soil shall be stripped and stockpiled for use in rehabilitation. Should fauna be encountered during Site clearance, earthworks shall cease until such fauna have been safely relocated.

7.5 Site Division and Site Demarcation

The Contractor shall restrict all his activities, materials, equipment and personnel to within the area specified. As required by the Project Specification, the Contractor shall erect and maintain

permanent and/ or temporary fences of the type and in the locations directed by the Engineer. Such fences shall, if so specified, be erected before undertaking designated activities.

7.6 Barricading

Barricading may be required for the protection of sensitive areas as identified by the ECO, graves or cultural/heritage sites and any area where litter may be stored temporarily until removal to the municipal site etc. All barricading shall be maintained until the ECO or Engineer approves the removal or at closure of the contract. The type of barricading will be specified by the Engineer.

7.7 Access Routes / Haul Roads

No access or haul road may be **constructed** along this pipeline route. No access route shall be used through the wetland areas until the EA is issued. All travel shall be around and outside the wetland footprint and at a higher elevation than the wetland areas. All access or haul roads shall be rehabilitated and re-established to vegetation at closure.

There is a single access point through the ridge used by the community to access the mountain top. Only this access may be used. The access shall be rehabilitated at closure; **See photos hereunder of access prior to use by construction vehicles/plant**



On the Site, and, if so required by the Project Specification, within such distance of the Site as may be stated, the Contractor shall control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes and are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition such vehicles and plant shall be so routed and operated as to minimize disruption to regular users of the routes not on the Site. On gravel or earth roads on Site and within 500m of the Site, the vehicles of the Contractor and his supplier shall not exceed a speed of 20km/hr. Mud and sand deposited onto public roads by construction activities shall be cleared on a daily basis.

7.8 Management of solid construction waste

Concrete waste shall be disposed of at a Municipal solid waste site, with prior authorisation from the Municipality.

Excavated stone and/or rock must not be left abandoned at the excavation sites, but shall be removed and properly packed in eroded donga sites to control and prevent further erosion. This shall be done in consultation with the engineer, who shall liaise with the ECO and DEDEAT for approval for use of the site(s). Such sites must be identified by the Contractor in consultation with the PSC. The Contractor shall then advise the Engineer who will inspect the site(s) with the ECO. The ECO will liaise with and request approval from DEDEAT for use of the site(s). Such approval must be requested 30 days prior to any planned use. The disposal of this solid waste falls within the ambit of the NEM: WA and no solid waste or rock is to be disposed of in eroded areas, without prior approval from DEDEAT.

7.9 Cement and Concrete Batching

No cement or concrete batching may take place within 100 m of any water body, river/stream or watercourse/wetland. Where applicable, the location of the batching plant (including the location of cement stores, sand and aggregate stockpiles) shall be as approved by the Engineer. The concrete/cement batching plant shall be kept neat and clean at all times and **concrete stone shall be stockpiled on dpc and not on the vegetation or bare ground. The batching plant shall be located on a smooth impermeable surface (plastic) and shall be bunded and sloped towards the sump to contain spillages of substances.** All wastewater resulting from batching of concrete shall be disposed of via the contaminated water management system and shall not be discharged into the environment. Empty cement bags shall be stored in temporary weatherproof containers and shall be disposed of on a regular basis via the solid waste management system. The Contractor shall take all reasonable measures to prevent the spillage of cement/concrete during batching and construction operations. During pouring, the soil surface shall be protected using plastic and all visible remains of concrete shall be physically removed on completion of the cement/concrete pour and appropriately disposed of via the solid waste management system.

Where “readymix” concrete is used, the Contractor shall ensure that the delivery vehicles do not empty their chutes directly onto the ground.

Any spillage resulting from the “readymix” delivery or on-site batching shall be immediately cleared and disposed of via the solid waste management system.

Mixing of plaster may be done on steel or wooden trays, fitted with permanent sides as approved by the Engineer.

7.10 Fire Control

No fires may be lit on Site. Any fires that occur shall be reported to the Engineer immediately. Smoking shall not be permitted in those areas where it is a fire hazard. In terms of the Atmospheric Pollution Prevention Act (No. 45 of 1965), burning is not permitted as a disposal method.

The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall forward the name of the Fire Officer to the Engineer for his approval.

The Contractor shall ensure that there is basic fire-fighting equipment available on Site at all times. This shall include at least five (5) sets of rubber beaters when working in open spaces and at least one fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken.

7.11 Emergency Procedures

The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Engineer and the relevant authorities. **The Contractor shall ensure that a spill-kit is available on Site for dealing with spills and leaks at all times.** Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer. In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The area shall be cordoned off and secured. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 litres of hydrocarbon liquid spill. CHDM or the implementing agent/consulting engineer shall notify DWS within 24 hours of any incident, which may result in pollution or have the potential to pollute any water resource.

7.12 Community Relations

The Contractor shall record any complaints or queries from the public, as well as the action taken in response, in the Site request book. Complaints and associated responses shall be communicated to the Engineer on a weekly basis. The Contractor’s contact details shall be posted on the Site board to enable the public to telephone should they have any queries or complaints.

7.13 Protection of Natural Features

The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes unless agreed beforehand with the Engineer. Any features affected by the Contractor in contravention of this clause shall be restored / rehabilitated to the satisfaction of the Engineer. The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams or open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

7.14 Protection of Flora and Fauna

Except to the extent necessary for the carrying out of the Works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted without authorization. No listed tree, aloe or vegetation may be removed without prior authorization from DEDEAT and DWAF. The Contractor shall uproot and replant such plants in accordance with the permit and the recommended guidelines for uprooting and re-planting. Trapping, poisoning and / or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted on Site.

7.15 Protection of Archaeological and Paleontological Remains (Cultural Heritage)

It is recommended that the Contractor, PSC and the Engineer inspect the construction terrain or pipeline route as the case may be to identify any possible heritage impacts. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any fossils, coins, articles of value or antiquity and structures and other remains of archaeological interest discovered on the Site, immediately upon discovery thereof and before removal. The Contractor shall inform the Engineer immediately of such a discovery and carry out the Engineers instructions for dealing therewith. All works within the vicinity of the discovery must cease immediately and the area shall be cordoned off until such time as the Engineer authorizes resumption of the works in writing. Any associated costs will be at the cost of the Chris Hani District Municipality. **See Sections 18 and 21.**

- a) An archaeologist should be consulted if flaked stone artefacts, accumulations of bones and graves or human remains are found
- b) A palaeontologist consulted if any fossil plant material, bones or teeth and or trace fossils are discovered

The protocol for dealing with incidental/chance finds is included **Section 21** to this document.

7.16 Stockpiling

The Engineer will identify suitable sites for stockpiling of top-soil, sub-soil and/or materials and these shall not be on steep gradients. Stockpiles shall be convex in shape, shall be no higher than 2m and shall be located so as to cause minimal disturbance. Where required, appropriate precautions shall be taken to prevent erosion and limit the compaction of the stockpiles. The Contractor shall ensure that all stockpiles do not result in the damming-up of water or run off, or is itself washed away. These bunded areas must be dampened periodically to ensure that the natural vegetation does not die off. Stockpile areas shall be located >100 m from any water body, river/stream and watercourse/wetland and shall not be located within the 1-in-100-year flood line of any watercourse.

7.17 Dust

The Contractor shall take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the Engineer. Appropriate dust suppression measures, e.g. dampening with water, shall be used when dust generation is unavoidable,

particularly during prolonged periods of dry weather in summer. A water cart shall be maintained on site and used when dry windy conditions prevail.

7.18 Blasting

This is not applicable to the wetland areas as no blasting should be required in these areas. Where blasting is necessary on areas of the route, the community must be consulted regarding the timing and the blasting contractor shall undertake a risk assessment and ensure that the required safety measures are implemented as required by the applicable regulations.

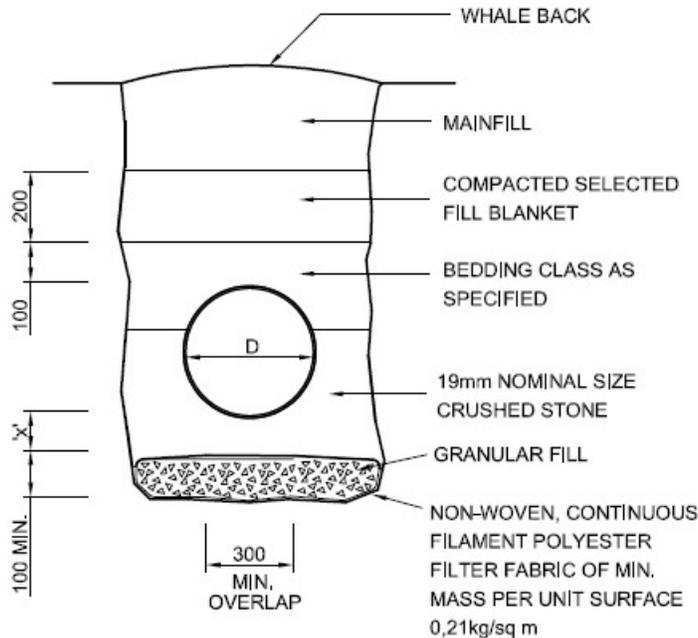
7.19 Pipelines - management of excavation and back-filling of trenches

- a) Prior to trench excavation, sods of biologically active topsoil should be removed manually. This includes grass roots and the “seed-bank” of indigenous plants. Excavated soil should be placed and stockpiled at the “trench-side” with topsoil on the one side of the trench and subsoil on the other. The two must not be mixed. Alternatively, when excavating, the sods of topsoil should be placed ± 1.5 m from the trench with the subsoil between the sods and the trench i.e. the sods of topsoil being the furthest away.
- b) In some areas it may be necessary to excavate rock in order to excavate the trenches sufficiently deep to accommodate the pipes to specifications. This can result in boulders being brought to the surface. Excavated rock must not be left to spoil the environment. This rock should be packed in dongas (or put to some community use) but only with the necessary prior authorisation from DEDEAT; See Section 5.7 for detailed process to be followed.
- c) Where there is no natural vegetation or top-soil because of the presence of surface rock, the contractor shall provide photographic evidence to the Engineer, recorded prior to excavation
- d) The length of open trenches must be controlled especially in steep areas where the erosion hazard is high.

Allowable Open Trenches		
PERIOD	Continuous per section of trench (m)	
	$\leq 5\%$ gradient	$> 5\%$ gradient
Over night	1000	300
Over weekends	300	150
Long weekends	150	50
Shutdown period	5	5

- e) Bedding material should be obtained from a registered source and cognisance must be taken of mining legislation under the jurisdiction of the Department: Mineral Resources.

- f) Pipe laying through watercourses/wetlands (authorisation is required) or where there is seepage into trenches shall be as follows:



e) TRENCH SUBSURFACE DRAIN

- g) The trenches must be backfilled as soon as the pipes have been tested. It is important that the sub-soil be backfilled first with the excavated topsoil being placed on top.
- h) Soil will be needed to fill trenches from which rocks have been excavated. Care must be taken in sourcing such soil and all areas from which material is removed must be properly rehabilitated, fertilised and seeded. In terms of legislation presided over by the Department: Mineral Resources operation of even an existing borrow pit requires authorisation from the Department: Mineral Resources & Energy. No provision has been made for such approval in terms of this contract.
- i) Erosion is accelerated if the soil remains bare after the pipes have been installed and the soil replaced (backfilled). In areas, particularly on long slopes, the potential for erosion is greatly increased by the mound (haunch) of soil placed over the trench to allow for consolidation of the backfill material. These “mounds” tend to concentrate the run-off water, resulting in increased volumes and velocity thus increasing the erosion hazard. This can be mitigated by implementing the following precautionary measures:
- A mound of soil to allow for consolidation of the backfilled material should remain above the trench after backfilling. This prevents the formation of a furrow along the backfilled area. Where the gradient is long and it is obvious that runoff water will

bank up against the mound of soil on the topside of the backfilled trench, “gaps” must be spaced to allow run-off water to pass through the barrier and over the backfilled area. These “gaps” must not be spaced too far apart so as to prevent concentration of the run-off water. Extra care must be taken to compact the soil at these spots so as to ensure that water does not erode the pipeline route by entering it at this point.

- On sloping ground and particularly where gradients are long, a compacted cross-berm is to be constructed to deflect surface water run-off away from the backfilled trench and thereby prevent soil erosion. The position of these cross-berms will be indicated by the Engineer, but must always be spaced sufficiently close to prevent scoring along the trench.
- All disturbed or bare areas should be seeded with a grass seed mixture.

7.20 Measures specific to aquatic, wetland and freshwater biodiversity

Watercourse description	Latitude (S):		Longitude (E):	
B-C				
Starting point (B)	32°	2.523'	27°	58.985'
End point (C)	32°	2.381'	27°	59.140'
D-E				
Starting point (D)	32°	2.433'	27°	59.916'
End point (E)	32°	2.375'	28°	0.176'
F-G				
Starting point (F)	32°	2.343'	28°	0.298'
End point (G)	32°	2.308'	28°	0.426'

- (i) All necessary authorisations in the form of an EA, GAWUL and/or other, must be obtained prior to construction in the above areas.
- (ii) An ECO must be appointed for the duration of the construction period to monitor compliance with the conditions of the EA, GAWUL and/or other permits
- (iii) A suitably qualified ecologist or ECO should do a survey of the development footprint prior to construction to identify any potential plant SCC and apply for relevant permits for removal.
- (iv) No access route shall be used through the wetland areas until the EA is issued. All travel during construction between the wetlands shall be around and outside the wetland footprint and at a higher elevation than the wetland areas. All access or haul roads shall be rehabilitated and re-established to vegetation at closure.
- (v) Trenching shall follow the methodology discussed in Section 7.19 (f)

(vi) A Rehabilitation and Alien Vegetation Management Plan must be developed and implemented during the construction and operation phases.

(vii) A Maintenance Management Plan shall be developed for implementation during the operational phase

Construction phase

- All site clearance and construction activities must be limited to the development footprint.
- Material lay down and stock pile areas must be established in already transformed, low sensitivity areas within the development footprint or adjacent transformed and low sensitivity areas adjacent to the development site but more than 100 m from any watercourse/wetland.
- There must be no encroachment into the surrounding high sensitivity wetland areas outside of the project footprint.
- Soil excavated for pipeline installation should be stockpiled where possible adjacent to the excavated area and reused for backfilling.
- Topsoil and subsoil must be stored separately and subsoil placed first with topsoil on top during backfilling.
- Topsoil and associated vegetation layer should be kept intact as far as possible, for easy reinstatement during backfilling.
- Alien invasive vegetation management plan to be implemented.
- All disturbed areas must be rehabilitated as soon as possible to limit the possibility of erosion and resultant sedimentation
- All hazardous substances and hazardous waste must be stored in impermeable structures placed in secondary impermeable banded structures 110% the volume of the primary structure.
- All hazardous substances and hazardous waste should be placed outside of the high sensitivity areas and more than 100 m from riparian areas
- Emergency response plan must be drawn up to deal with any hazardous spillages/accidental leakages.
- Spill kit and drip tray must be kept on site at all times during the construction phase.
- All chemical toilets/ablution facilities must be properly secured so that they cannot be windblown, be regularly serviced and should be placed outside of and more than 32m from the high sensitivity riparian area
- Concrete mixing (if any) should take place more than 100 m from any watercourse with appropriate runoff control measures in place.

- Any debris/solid waste accumulated as a result of construction activities must be removed from and surrounding the watercourses/wetlands.
- Bare soil surfaces must be protected against erosion using appropriate erosion control measures such as earthen berms, silt fences and sandbags.
- Should any erosion channels become evident these must be backfilled, compacted and revegetated as soon as possible.
- Material stockpiles should be placed more than 50m from the nearby watercourses, should not exceed 1,5m in height, should be covered during windy periods and monitored for any erosion channels

Operational phase

- Care must be taken during any maintenance activities to ensure that there is no unnecessary encroachment into sensitive surrounding wetland habitat.
- Any growth of alien invasive plant species within the rehabilitated areas must be removed and regular monitoring must take place and for a period agreed with by the Environmental Control Officer.
- The site should be monitored for 12 months after construction to ensure disturbed areas are appropriately rehabilitated.
- All infrastructure put in place should be monitored and maintained in accordance with a maintenance management plan.
- Should any infrastructure appear to be failing then the affected areas must be rectified.
- Should any erosion channels development these must be backfilled, compacted and revegetated
- All infrastructure put in place should be monitored and maintained in accordance with an approved maintenance management plan.
- All maintenance activities should be undertaken under the guidance of the maintenance management plan which includes measures to prevent any adverse impacts on the surrounding wetland environment

7.21 Measures specific to Terrestrial Biodiversity

Mitigation and Management Measures

Vegetation	<p>Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place.</p> <p>Topsoil must be stripped and stockpiled separately during site preparation and replaced on completion where revegetation will take place.</p> <p>Any laydown areas requiring clearing must be located within already</p>
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	disturbed areas away from watercourses.
Flora Species	A flora search and rescue is recommended before commencement. Respective permits to be obtained beforehand
Alien Invasive Species	Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. A suitable weed management strategy to be implemented in construction and operation phases. After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner. This will also minimise dust on the site.
Erosion	Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. Topsoil must be stripped and stockpiled separately and replaced on completion. If natural vegetation re-establishment does not occur, a suitable grass must be applied.
Ecological Processes	Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.
Faunal Habitat	Blanket clearing of vegetation must be limited to the footprint. It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas.
Faunal Processes	The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific

	<p>measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity.</p> <p>Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances.</p> <p>Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented.</p>
Faunal species	<p>A pre-commencement faunal search and rescue is recommended.</p> <p>Respective permits to be obtained beforehand.</p> <p>No animals are to be harmed or killed during the course of operations.</p> <p>Workers are NOT allowed to snare any faunal species.</p>

Flora Search and Rescue

The following flora relocation plan is recommended:

- Once the final layout has been determined the botanist will be consulted in order to finalise the plant relocation and vegetation clearing plan.
- Respective permits to be obtained.
- Flora search and rescue is to be conducted before vegetation clearing takes place.
- Areas should only be stripped of vegetation as and when required and once species of special concern have been relocated for that area.
- Once site clearing is to commence, the area to be cleared of vegetation will be surveyed by the vegetation and plant search and rescue team clearing under the supervision of the botanist to identify and remove species suitable for rescue and commence removal of plants.
- These species are to be replanted immediately in a suitable area of similar vegetation, where future development is unlikely to occur, or within a protected area.

7.22 Fires

- The Contractor must ensure that an emergency preparedness plan is in place in order to fight accidental fires or veld fires, should they occur. The adjacent landowners/users/communities *should* also be informed or otherwise involved.
- No open fires are allowed.
- The Contractor *should* take all reasonable and active steps to avoid increasing the risk of fire through their activities on-site. No fires may be lit except at places approved by the ECO.
- The Contractor *must* ensure that the basic fire-fighting equipment is to the satisfaction of the Local Emergency Services.
- The Contractor *must* supply all living quarters, site offices, kitchen areas, workshop areas, materials, stores and any other relevant areas with tested and approved fire-fighting equipment.
- Fires and “hot work” *must* be restricted to demarcated areas.
- No cooking or braai fires are allowed on site.
- The Contractor *must* take precautions when working with welding or grinding equipment near potential sources of combustion. Such precautions include having a suitable, tested and approved fire extinguisher immediately at hand and the use of welding curtains.

7.23 Soil Aspects

- Sufficient topsoil must be stored for later use during decommissioning, particularly from outcrop areas.
- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- All available topsoil shall be removed after consultation with the botanist and horticulturalist prior to commencement of any operations.
- The removed topsoil shall be stored on high ground within the site footprint outside the 1:50 flood level within demarcated areas.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded. The application of a suitable grass seed/runner mix will facilitate this and reduce the minimise weeds.

7.24 Alien and Invasive Plant Management Plan

The following mitigation measures have been identified in order to ensure that the introduction and spread of alien invasive vegetation is minimised:

- Alien species must be removed from the site as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) requirements.
- A suitable weed management strategy must be implemented in the construction phase and carried through the operational phase.
- Weeds and alien species *must* be cleared by hand before the rehabilitation phase of the areas. Removal of alien plants are to be done according to the Working for Water Guidelines.
- The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas.
- In consultation with relevant authorities, the Engineer may order the removal of alien plants (when necessary). Areas within the confines of the site are to be included.
- All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site. Should brushwood be utilised for soil stabilization or mulching, it must be seed free.
- After clearing is completed, an appropriate cover crop may be required, should natural re-establishment of grasses not take place in a timely manner.

7.25 Rehabilitation Plan

7.25.1 Rehabilitation Objective

The overall objective of the rehabilitation plan is to minimize adverse environmental impacts associated with the activity whilst maximizing the future utilization of the property. Significant aspects to be borne in mind in this regard is, revegetation of undeveloped footprint and stability and environmental risk. The depression and immediate area of the working must also be free of alien vegetation. Additional broad rehabilitation strategies / objectives include the following:

- Rehabilitating the worked-out areas to take place concurrently within prescribed framework established in the EMP.
- All infrastructure, equipment, plant and other items used during the construction period will be removed from the site.
- Waste material of any description, including scrap, rubble and tyres, will be removed entirely from the site and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on site.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.

Topsoil and Subsoil Replacement

Topsoil and subsoil will be stripped and stockpiled separately and only used in rehabilitation work towards the end of the operation. This is in contrast to the gravel activity where rehabilitation and topsoil replacement was earmarked at the completion of each phase.

Stripped overburden will be backfilled into the worked-out areas where needed. Stripped topsoil will be spread over the re-profiled areas to an adequate depth to encourage plant regrowth. The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Reseeding may be required should the stockpiles stand for too long and be considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year.

The topsoil and overburden will be keyed into the reprofiled surfaces to ensure that they are not eroded or washed away. The topsoiled surface will be left fairly rough to enhance seedling establishment, reduce water runoff and increase infiltration.

Revegetation

All prepared surfaces will be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface. The following recommendations can be followed for application of fertiliser at planting:

- (a) The soil should be limed with agricultural lime at a rate of 500 kg/ha and 2:3:2 (22) fertiliser should be applied at a rate of 300 kg per ha before seeding

OR

- (b) Apply 500 kg/ha of an enriched organic granule of 13.3.5 (21), which comes complete with all trace elements and the N has a slower release effect.

The following grass seed-mix is recommended and is commonly available and suitable.

Botanical name	Common name	Approx seed mixture /Ha
<i>Cynodon dactylon</i>	Kweek	12 kg/ Ha
<i>Eragrostis curvula</i>	Weeping Love Grass	6 kg/ Ha
<i>Eragrostis tef</i>	Teff	2 kg/ Ha
<i>Digitaria eriantha</i>	Smuts Grass	4 kg/ Ha
Other indigenous veld grasses can be added to the seed mix		± 4 kg/Ha

The overall revegetation plan will, therefore, be as follows:

- Ameliorate the aesthetic impact of the site
- Stabilise disturbed soil and rock faces
- Minimize surface erosion and consequent siltation of natural water course located on site

- Control wind-blown dust problems
- Enhance the physical properties of the soil
- Re-establish nutrient cycling
- Re-establish a stable ecological system

7.25.2 Rehabilitation Post-construction

All land which is disturbed during construction, including any roadside “cut”, abandoned track, exposed verge, back-filled trench, area used for stockpiling of construction materials and camp/stores site must be rehabilitated at closure of the contract. On completion of operations, the vehicle maintenance yard, secured storage areas and camp site shall be cleared of any contaminated soil, which must be dumped at an approved area. All building rubble shall be removed.

The surface area shall then be scarified or ripped to a depth of at least 200 mm and the topsoil previously stored adjacent to the site, shall be spread evenly to its original depth over the whole area. The area shall then be fertilised if necessary (based on a soil analysis). The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

Topsoil (sods of natural vegetation) must be returned and spread over the areas to be rehabilitated to a minimum depth of 200 mm. If there is insufficient topsoil/natural vegetation to cover the entire area, then topsoil must be spread in strips of ± 2 m wide placed at right angles to the natural slope so as to control run-off. Vegetation must be re-established on surrounding or denuded areas impacted upon by the project. Ideally soil samples should be submitted for analysis and the generation of a fertiliser programme. A seed merchant in the area should be consulted to recommend an appropriate seed mix for the area. Watering should be considered if planting is done in a dry period. Livestock should if at all possible, be kept off of the rehabilitated areas until the grasses are well established.

8. STORM WATER MANAGEMENT & EROSION CONTROL

Storm water management shall include the following:

- (i) It is preferable not to implement blanket clearing of the site when construction commences and to minimise this to areas being worked on. Existing vegetation must be retained as far as possible to minimise erosion;
- (ii) Limiting the length of open trenches as indicated in section 7.19(d);
- (iii) Overland run-off water from catchments above trenched areas shall be controlled by placement of excavated top-soil above the trenches leaving open areas (gaps) across the trench for run-off to pass over/through. Backfilling after pipe laying should be expedited;
- (iv) Visual inspections shall be done by the RE and Contractor after every rain event and corrective action implemented immediately at areas where scouring is noted;

9. PERSONS RESPONSIBLE FOR THE IMPLEMENTATION OF THE MEASURES CONTEMPLATED IN THIS EMPr

- a) The Contractor shall be held responsible for all construction and reinstatement of the project area for the duration of the contract and maintenance period until full rehabilitation has taken place. All structures that have been damaged or interfered with by the Contractor shall be restored to a condition at least equivalent to their original condition.
- b) The Contractor shall be held responsible for keeping the operational plant in good repair and will minimise pollution or contamination of the soil and water. In the event of a spillage oil (diesel, oil, fuels, etc.), the Contractor must take suitable measures to contain the pollution and prevent it from spreading. The Department Economic Development, Environmental Affairs and Tourism (DEDEAT) and DWS must be informed immediately such spillage occurs. Once the spill has been contained, contaminated material (soil, etc.) shall be removed and disposed of using methods as specified by DEDEAT and/or any other relevant State Authority.
- c) The Contractor shall be deemed responsible for implementation of the environmental management programme in terms of the DEDEAT, DWS authorisations and ECPHRA requirements.
- d) The Consulting Engineer shall monitor the construction and general environmental management process. The Consulting Engineer is responsible for ensuring that the Contractor abides by the conditions in this EMPr and whatever additional conditions DEDEAT may set out in their environmental authorisation (EA) as well as any DWS authorisation and standard conditions.
- e) An independent environmental control officer (ECO) must be appointed to undertake monthly environmental monitoring and reporting to DEDEAT.
- f) The contractor should appoint a suitably qualified Safety, Health and Environmental officer (SHE) as part of their staff compliment to guide site management and work supervisors in compliance with the EA and EMPr.
- g) The contractor when appointed is required by the OH&S Act to submit an OH&S plan for approval before construction commences. The applicant and Consulting Engineer are responsible to ensure that all OH&S aspects are complied with.

10. TIME PERIODS WITHIN WHICH THE MEASURES CONTEMPLATED IN THE ENVIRONMENTAL MANAGEMENT PLAN MUST BE IMPLEMENTED

All measures contemplated in this environmental specification shall be completed by the end of the contract period, which normally includes a contractual maintenance period of twelve (12) months commencing after completion of the project.

11. PROPOSED MECHANISMS FOR MONITORING COMPLIANCE WITH THE ENVIRONMENTAL MANAGEMENT PLAN AND REPORTING THEREON

Monitoring of all the environmental management measures and components shall be carried out to ensure that the provisions of the EMP, the Basic Assessment Report, DEDEAT authorisation and any other authorisation e.g. DWS are adhered to and shall be carried out by an independent environmental control officer (ECO). Monitoring reports are to be submitted to DEDEAT within fourteen (14) days of each inspection. Any deviations to the approved authorisation are to be requested in writing to DEDEA, allowing at least twenty one days for approval.

11.1 DURING CONSTRUCTION

Monitoring of all the environmental management measures and components shall be carried out to ensure that the provisions of the EMP, DEDEAT, DWS and any other Authorisation are adhered to and shall be carried out by an independent environmental control officer (ECO). It is recommended that environmental monitoring be carried out as follows:

- Project start-up
- Environmental training of Contractor’s supervisory staff
- Monthly during the construction phase
- Two weeks prior to the practical completion of the Works in order to assist the engineer in compiling the “snag” list in relation to environmental issues
- Three weeks before the expiry of the contractual 12 month maintenance period and prior to the release of the contractual retention moneys.

Monitoring	Time Frames
ECO to meet with the engineer and contractor	Prior to commencement of construction
ECO to implement an environmental awareness training exercise with the contractor’s site management and supervisory staff	Prior to commencement of construction
The ECO to conduct site audit and submit these to DEDEAT	<ul style="list-style-type: none"> • Upon commencement • Monthly audits • Upon completion of the development
The Engineer and Contractor is to monitor the area for scouring and or erosion	After every rain event during the construction period and for the duration of the contract maintenance period

12. OPERATIONAL IMPACT MANAGEMENT

12.1 Monitoring, time frames and actions

Monitoring	Time Frames	Action
The applicant is to monitor the pipeline route and access tracks area for scouring/erosion	After every heavy rain event for the lifespan of the works	Immediately attend to any scouring and / or damage to any vegetative cover. Protect area with stone packs, re-introduce material and re-plant vegetation
The applicant is to monitor the pipeline and associated infrastructure for leaks	On-going for the lifespan of the works	Immediately attend to any leaks
Removal of alien and / or invasive vegetation	Applicant will monitor on an on-going basis	Alien and invasive vegetation shall be controlled by hand removal methods only and to be done prior to plants flowering. No herbicides or chemicals may be used.

13. EMERGENCY PREPAREDNESS PLAN (CONSTRUCTION)

The applicant/Contractor must minimise environmental impacts by implementing an emergency preparedness plan, which must include the following:

- (a) Preventative measures; and
- (b) Remedial actions.

EMERGENCY	PREVENTATIVE ACTION	REMEDIAL ACTION
Fire (Highly unlikely)	<ul style="list-style-type: none"> • No fires are allowed on site • Fire officer to be appointed • Train staff in fire control and use of equipment • The Contractor shall ensure that there is basic fire-fighting equipment available on Site at all times. This shall include at least five (5) sets of rubber beaters when working in open spaces and at least one fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken 	Implement prescribed fire drill
Contaminated water management (concrete batching etc.)	<p>No cement or concrete batching may take place within 100 m of any water body, river/stream or watercourse/wetland. The batching plant shall be located on a smooth impermeable surface (plastic) and shall be bunded and sloped towards the sump to contain spillages of substances. All wastewater resulting from batching of concrete shall be disposed of via the contaminated water management system and shall not be discharged into the environment. The Contractor shall take all reasonable measures to prevent the spillage of cement/concrete during batching and construction operations. During pouring, the soil surface shall be protected using plastic and all visible remains of concrete shall be physically removed on completion of the cement/concrete pour and appropriately disposed of via the solid waste management system.</p> <p>Where “readymix” concrete is used, the Contractor shall ensure that the delivery</p>	<p>Spillage shall be reported to DEDEAT and DWS</p> <p>Any spillage resulting from the “readymix” delivery or on-site batching shall be immediately cleared and disposed of via the solid waste management system.</p>

	vehicles do not empty their chutes directly onto the ground.	
Spill management (Highly unlikely)	<ul style="list-style-type: none"> • No fuel or oils to be stored on project route • No refuelling allowed on site • Plant to be checked for leaks regularly • Drip trays to be placed under parked vehicles • Spill kit to be maintained on site 	<ul style="list-style-type: none"> • Spillage to be contained to prevent spreading • Apply spill kit procedures as per manual
Scouring and/or erosion	Monitor after every rain event	Immediately re-instate any scoured areas by back filling and re-introduction of vegetation

14. ENVIRONMENTAL AWARENESS PLAN

The contractor is to instil environmental awareness amongst the site staff and employees by:

- (i) Making employees aware of the conditions contained in the Environmental Authorisation and the contents of this EMP. Site management who undergo environmental awareness training with the ECO shall be responsible for this;
- (ii) Providing on-going training and information sessions to employees of any environmental risk which may result from their work as required in terms of the Health and Safety Act and including HIV/AIDS and Covid-19;
- (iii) Train a compliment of the staff in use of fire-fighting equipment.

15. REQUIREMENTS FOR DECOMMISSIONING / CLOSURE

This EMPr does not deal with decommissioning and/or closure as the design lifespan is not limited and the infrastructure will be used for the foreseeable future. The applicant (CHDM) shall appoint a registered Environmental Assessment Practitioner to compile a decommissioning and/or closure report as may be required at that time.

16. COMPLIANCE AND PENALTIES

16.1 Compliance

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the Works but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the Works. It is thus required that the Contractor shall comply with the environmental requirements on an on-going basis and any failure on his part to do so will entitle the Engineer to certify the imposition of a penalty as may be set out in the Contract Documentation.

16.2 Imposition of Penalties

Penalties may be issued for certain transgressions per incident or event at the discretion of the Engineer in consultation with the ECO. Such penalties will be issued in addition to any remedial costs incurred as a result of non-compliance with this Specification. The Engineer will inform the Contractor of the contravention and the amount of the penalty, and shall be entitled to deduct the amount from monies due under the Contract. Penalties will be as set out in the Contract Documentation, but should be guided as set out in section 16.2.1 hereunder.

16.2.1 Penalty Quantum

No.	Action	Fine (R)
a	Any employees, vehicles, plant, or "thing" related to the Contractor's operations operating within the designated boundaries of a "no-go" area including the 1-in-100 year flood zone	R 10 000
b	Damage to indigenous vegetation outside of construction areas	R 10 000
c	Failure to separate stripped top-soil and excavated sub-soil	R 2 000
d	Un-repaired oil leaks from machinery	R 2 000
e	Failure to use or monitor and empty drip trays timeously	R 2 000
f	The use of inappropriate methods storage of fuel or for refuelling	R 2 000
g	Failure to carry out concrete mixing on a tray or method approved by the Engineer and/or failure to place concrete stone on dpc and placing it directly on the natural vegetation or soil	R 2 000
h	Litter on site associated with construction activities	R 2 000
i	Deliberate lighting of fires on site	R 2 000
j	Chemical toilets not provided or employees not making use of the site ablution facilities	R 2 000
k	Failure to supply and/or empty waste bins on a regular basis (weekly)	R 2 000
l	Failure to maintain barricading	R 1 000
m	Removal or damage by any means to any listed flora (plant, tree or <i>Aloe</i>) without an authorisation or permit where necessary – fine imposed per plant, tree or <i>Aloe</i>	R 5 000
n	A spillage, pollution, fire or any damage to any watercourse/wetland or area outside of the project footprint, resulting from negligence on the part of the	R 10 000

	contractor and/or any Sub-contractor	
o	Failure to implement mitigation and/or conservation measures in respect of archaeological and cultural heritage sites and/or implementation of incidental/chance finds protocols as prescribed – fine imposed per incident	R 10 000

For each subsequent and similar offence, the fine shall be doubled in value to a maximum value of Thirty Thousand Rand (R 30 000.00) per offence. The ECO and the Engineer shall be the judge as to what constitutes a transgression in terms of this clause.

17. MEASUREMENT AND PAYMENT

17.1 Basic Principles

Except as specified below or in the Project Specification or as Scheduled, no separate measurement and payment will be made to cover the costs of complying with the provisions of any items specified in the Environmental Authorisation and this EMPr and such costs shall be deemed to be covered by the rates tendered for the items in the Schedule of Quantities completed by the Contractor when submitting his tender.

17.2 Scheduled Items

17.2.1 All Requirements of the Environmental Management Specification

The tendered rate shall cover any cost associated with complying with the environmental management specification and shall include for all materials, labour and plant required to execute and complete the work as specified, described in the Schedule of Quantities or shown on the drawing(s).

17.2.2 Method Statements

No separate measurement and payment will be made for the provision of Method Statements.

17.2.3 Work “Required By The Project Specification”

Where a Clause in this Specification includes a requirement as “required by the Project Specification”, measurement and payment for compliance with that requirement shall be in accordance with the relevant measurement and payment Clause of the Project Specification.

18. PROTECTION OF ARCHAEOLOGICAL AND PALAEOANTHROPOLOGICAL REMAINS

18.1 Archaeology & Cultural Heritage Impact Assessment

A total of 14 archaeological and cultural heritage resources / sites, as defined and protected by the NHRA 1999, are recorded, situated within or in direct proximity to the Cluster 9 Phase 5 and Cluster 8 Linkage, Water Supply.

Incidental finds (section 18.3) shall be dealt with as prescribed in section 21.1

The archaeologist, Ms K van Ryneveld met on site with the ECO, RE and Contractor on 14/07/2022 to formalise the conservation/protection measures at possible impact areas

Identified heritage resources are labelled Sites C9P5-01 to C9P5-14. The sites and applicable conservation measures are listed in the table hereunder.

MAP CODE	SITE	COORDINATE	SITE SIGNIFICANCE	RECOMMENDATIONS
C9P5-03	Colonial Period – Nxamagele Trigonometric Beacon	S32°02'08.1"; E28°00'39.1"	SAHRA High Significance – Local Grade III-B Field Rating	Site Conservation: Temporary conservation measures (fence with a 3m conservation buffer and signage) to be instated for tenure of construction works in the vicinity of the site. [Conservation buffer in consultation with CDSM]
C9P5-04	LIA – Monolith	S32°02'10.0"; E28°00'39.2"	SAHRA Low Significance – Generally Protected IV-C Field Rating	Site Conservation: Temporary conservation measures (fence with a 5m conservation buffer and signage) to be instated for tenure of construction works in the vicinity of the site.
C9P5-05	LIA – Monolith	S32°02'19.2"; E28°00'26.3"	SAHRA Low Significance – Generally Protected IV-C Field Rating	Site Conservation: Temporary conservation measures (fence with a 5m conservation buffer and signage) to be instated for tenure of

				construction works in the vicinity of the site.
C9P5-06	LIA – Homestead	S32°02'20.0"; E27°59'50.0"	SAHRA Medium Significance – Generally Protected IV-B Field Rating	<p>Site Conservation – Sensitive Area 1 Conservation Corridor:</p> <ol style="list-style-type: none"> 1. Temporary conservation corridor (fence with 15–20m conservation buffer and signage) ensuring that construction activities are contained within the demarcated development area. 2. Archaeological environmental– heritage monitoring of construction works and submission of monitoring report to EC PHRA. 3. The archaeological monitoring report must include a sketch plan layout recording of the Sensitive Area 1 settlement pattern.
C9P5-07	LIA – Homestead	S32°02'25.3"; E27°59'45.1"	SAHRA Medium Significance – Generally Protected IV-B Field Rating	
C9P5-08	LIA – Homestead	S32°02'23.1"; E27°59'35.3"	SAHRA Medium Significance – Generally Protected IV-B Field Rating	
C9P5-09	LIA – Farmstead	S32°02'14.0"; E27°59'28.7"	SAHRA High Significance – Local Grade III-B Field Rating	
C9P5-10	LIA – Farmstead	S32°02'22.5"; E27°59'06.7"	SAHRA High Significance – Local Grade III-B Field Rating	
C9P5-11	LIA – Mdlokolo Village Kraal Cluster	S32°02'26.7"; E27°58'19.3"	SAHRA High / Medium Significance – Generally Protected Grade IV-A Field Rating	<p>Site Conservation – Sensitive Area 2 Conservation Corridor:</p> <ol style="list-style-type: none"> 1. Temporary conservation corridor (fence with 5–7m conservation buffer and signage) ensuring that

				<p>construction activities are contained within the demarcated development area.</p> <p>2. Archaeological / ECO environmental-heritage monitoring of construction works and submission of monitoring report to EC PHRA.</p>
C9P5-12	LIA – Livestock Enclosures	S32°02'58.8"; E27°58'36.2"	N/A	Non-compliance Site Conservation: In-situ conservation without the developer having to comply with additional site conservation measures.
C9P5-13	LIA – Livestock Enclosure	S32°03'23.2"; E27°58'10.9"	N/A	Non-compliance Site Conservation: In-situ conservation without the developer having to comply with additional site conservation measures.
C9P5-14	LIA – Livestock Enclosures	S32°03'48.7"; E27°57'45.2"	N/A	Non-compliance Site Conservation: In-situ conservation without the developer having to comply with additional site conservation measures.

18.2 Palaeontological Impact Assessment

Faint plant impressions (fossils) were identified. These impressions were uncovered during excavations for the pipeline. Other outcrops in the area could produce well-preserved fossils.

If significant fossil remains or plant remains are discovered during any phase of construction, either on the surface or exposed by excavations, the **Chance Find Protocol** must be implemented by the ECO/RE/site manager in charge of these developments. These discoveries ought to be protected (if possible, *in situ*) and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carry out by a paleontologist.

18.3 Incidental/Chance finds (archaeological/cultural artefacts and palaeontological material)

In view of the findings and recommendations contained in the studies, the protocol set out in Section 21.1 and 21.2 to this EMP shall be followed in the event of any incidental find related to any archaeological material (grave/artefact) or palaeontological material (fossil).

19. SECTION 28 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998, AS AMENDED

19.1 Duty of care and remediation of environmental damage

- (1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.
- (1A) Subsection (1) also applies to a significant pollution or degradation that-
 - (a) occurred before the commencement of this Act;
 - (b) arises or is likely to arise at a different time from the actual activity that caused the contaminating; or
 - (c) arises through an act or activity of a person that results in a change to pre-existing contamination.
- (2) Without limiting the generality of the duty in subsection (1), the persons on whom subsection (1) imposes an obligation to take reasonable measures, include an owner of land or premises, a person in control of land or premises or a person who has a right to use the land or premises on which or in which -
 - (a) any activity or process is or was performed or undertaken; or
 - (b) any other situation exists, which causes, has caused or is likely to cause significant pollution or degradation of the environment.
- (3) The measures required in terms of subsection (1) may include measures to -
 - (a) investigate, assess and evaluate the impact on the environment;
 - (b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;
 - (c) cease, modify or control any act, activity or process causing the pollution or degradation;
 - (d) contain or prevent the movement of pollutants or the cause of degradation;
 - (e) eliminate any source of the pollution or degradation; or
 - (f) remedy the effects of the pollution or degradation.
- (4) The Director-General or a provincial head of department may, after consultation with any other organ of state concerned and after having given adequate opportunity to affected persons to inform him or her of their relevant interests, direct any person who fails to take the measures required under subsection (1) to -
 - (a) investigate, evaluate and assess the impact of specific activities and report thereon;
 - (b) commence taking specific reasonable measures before a given date;
 - (c) diligently continue with those measures; and

(d) complete them before a specified reasonable date:

Provided that the Director-General or a provincial head of department may, if urgent action is necessary for the protection of the environment, issue such directive, and consult and give such opportunity to inform as soon thereafter as is reasonable.

- (5) The Director-General or a provincial head of department, when considering any measure or time period envisaged in subsection (4), must have regard to the following:
- (a) the principles set out in section 2;
 - (b) the provisions of any adopted environmental management plan or environmental implementation plan;
 - (c) the severity of any impact on the environment and the costs of the measures being considered;
 - (d) any measures proposed by the person on whom measures are to be imposed;
 - (e) the desirability of the State fulfilling its role as custodian holding the environment in public trust for the people;
 - (f) any other relevant factors.
- (6) If a person required under this Act to undertake rehabilitation or other remedial work on the land of another, reasonably requires access to, use of or a limitation on use of that land in order to effect rehabilitation or remedial work, but is unable to acquire it on reasonable terms, the Minister may -
- (a) expropriate the necessary rights in respect of that land for the benefit of the person undertaking the rehabilitation or remedial work, who will then be vested with the expropriated rights; and
 - (b) recover from the person for whose benefit the expropriation was effected all costs incurred.
- (7) Should a person fail to comply, or inadequately comply, with a directive under subsection (4), the Director-General or provincial head of department responsible for environmental affairs may take reasonable measures to remedy the situation or apply to a competent court for appropriate relief.
- (8) Subject to subsection (9), the Director-General or provincial head of department may recover costs for reasonable remedial measures to be undertaken under subsection (7), before such measure are taken and all costs incurred as a result of acting under subsection (7), from any or all of the following persons -
- (a) any person who is or was responsible for, or who directly or indirectly contributed to, the pollution or degradation or the potential pollution or degradation;
 - (b) the owner of the land at the time when the pollution or degradation or the potential for pollution or degradation occurred, or that owner's successor in title;
 - (c) the person in control of the land or any person who has or had a right to use the land at the time when -
 - (i) the activity or the process is or was performed or undertaken; or
 - (ii) the situation came about; or

- (d) any person who negligently failed to prevent -
 - (i) the activity or the process being performed or undertaken; or
 - (ii) the situation from coming about:

Provided that such person failed to take the measures required of him or her under subsection (1).

- (9) The Director-General or provincial head of department may in respect of the recovery of costs under subsection (8), claim proportionally from any other person who benefited from the measures undertaken under subsection (7).
- (10) The costs claimed under subsections (6), (8) and (9) must be reasonable and may include, without being limited to, labour, administrative and overhead costs.
- (11) If more than one person is liable under subsection (8), the liability must be apportioned among the persons concerned according to the degree to which each was responsible for the harm to the environment resulting from their respective failures to take the measures required under subsections (1) and (4).
- (12) Any person may, after giving the Director-General or provincial head of department 30 days' notice, apply to a competent court for an order directing the Director-General or any provincial head of department to take any of the steps listed in subsection (4) if the Director-General or provincial head of department fails to inform such person in writing that he or she has directed a person contemplated in subsection (8) to take one of those steps, and the provisions of section 32 (2) and (3) shall apply to such proceedings with the necessary changes.
- (13) When considering any application in terms of subsection (12), the court must take into account the factors set out in subsection (5).
- (14) No person may -
 - (a) unlawfully and intentionally or negligently commit any act or omission which causes significant or is likely to cause significant pollution or degradation of the environment;
 - (b) unlawfully and intentionally or negligently commit any act or omission which detrimentally affects or is likely to affect the environment in a significant manner; or
 - (c) refuse to comply with a directive issued under this section.
- (15) Any person who contravenes or fails to comply with subsection (14) is guilty of an offence and liable on conviction to a fine not exceeding R1 million or to imprisonment for a period not exceeding 1 year or both such a fine and such imprisonment.

20. NATIONAL WATER ACT, 1998 (ACT 36 OF 1998): POLLUTION PREVENTION AND EMERGENCY INCIDENTS

Part 4: Pollution prevention - deals with pollution prevention, and in particular the situation where pollution of a water resource occurs or might occur as a result of activities on land. The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources. If these measures are not taken, the catchment management agency concerted may itself do whatever is necessary to prevent the pollution or to remedy its effects, and to recover all reasonable costs from the persons responsible for the pollution.

20.1 Prevention and remedying effects of pollution

19(1) An owner of land, a person in control of land or a person who occupies or uses the land on which—

- (a) any activity or process is or was performed or undertaken; or
- (b) any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.

(2) The measures referred to in subsection (1) may include measures to—

- (a) cease, modify or control any act or process causing the pollution;
- (b) comply with any prescribed waste standard or management practice;
- (c) contain or prevent the movement of pollutants;
- (d) eliminate any source of the pollution;
- (e) remedy the effects of the pollution; and
- (f) remedy the effects of any disturbance to the bed and banks of a watercourse.

(3) A catchment management agency may direct a any person who fails to take the measures required under subsection (1) to-

- (a) commence taking specific measures before a given date;
- (b) diligently continue with those measures; and
- (c) complete them before a given date.

(4) Should a person fail to comply, or comply inadequately with a directive given under subsection (3), the catchment management agency may take the measures it considers necessary to remedy the situation.

(5) Subject to subsection (6), a catchment management agency may recover all costs incurred as a result of it acting under subsection (4) jointly and severally from the following persons:

- (a) Any person who is or was responsible for or who directly or indirectly contributed to, the pollution or the potential pollution;
- (b) the owner of the land at the time when the pollution or the potential for pollution occurred or that owner's successor-in-title:

- (c) the person in control of the land or any person who has a right to use the land at the time when—
 - (i) the activity or the process is or was performed or undertaken; or
 - (ii) the situation came about: or
- (d) any person who negligently failed to prevent—
 - (i) the activity or the process being performed or undertaken: or
 - (ii) the situation from coming about.

(6) The catchment management agency may in respect of the recovery of costs under subsection (5) claim from any other person who, in the opinion of the catchment management agency, benefitted from the measures undertaken under subsection (4) to the extent of such benefit.

(7) The costs claimed under subsection (5) must be reasonable and may include without being limited to labour, administrative and overhead costs.

(8) If more than one person is liable in terms of subsection (5) the catchment management agency must, at the request of any of those persons and after giving the others an opportunity to be heard, apportion the liability, but such apportionment does not relieve any of them of their joint and several liability for the full amount of the costs.

20.2 Control of emergency incidents

Part 5: Emergency incidents - deals with pollution of water resources following an emergency incident, such as an accident involving the spilling of a harmful substance that finds or may find its way into a water resource. The responsibility for remedying the situation rests with the person responsible for the incident or the substance involved. If there is a failure to act, the relevant catchment management agency may take the necessary steps and recover the costs from every responsible person.

20(1) In this section “incident” includes any incident or accident in which a substance-

- (a) pollutes or has the potential to pollute a water resource: or
- (b) has, or is likely to have a detrimental effect on a water resource.

(2) In this section “responsible person” includes any person who-

- (a) is responsible for the incident:
- (b) owns the substance involved in the incident: or
- (c) was in control of the substance involved in the incident at the time of the incident

(3) The responsible person or any other person involved in the incident or any other person with knowledge of the incident must, as soon as reasonably practicable after obtaining knowledge of the incident, report to-

- (a) the Department:
- (b) the South African Police Service or the relevant fire department: or
- (c) the relevant catchment management agency

(4) A responsible person must-

- (a) take all reasonable measures to contain and minimise the effects of the incident:
- (b) undertake clean-up procedures:
- (c) remedy the effects of the incident: and
- (d) Take such measures as the catchment management agency may either verbally or in writing direct within the time specified by such institution.

(5) A verbal directive must be confirmed in writing within 14 days, failing which it will be deemed to have been withdrawn.

(6) Should-

- (a) the responsible person fail to comply. or Inadequately comply with a directive: or
- (b) it not be possible to give [he directive to the responsible person timeously. the catchment management agency may take the measures it considers necessary to—
 - (i) contain and minimise the effects of the incident:
 - (ii) undertake clean-up procedures: and
 - (iii) remedy the effects of the incident.

(7) The catchment management agency may recover all reasonable costs incurred by it from every responsible person jointly and severally.

(8) The costs claimed under subsection (7) may include without being limited to labour, administration and overhead costs.

(9) If more than one person is liable in terms of subsection (7) the catchment management agency must at the request of any of those persons and after giving the others an opportunity to be heard apportion the liability but such apportionment does not relieve any of them of their joint and several liability for the full amount of the costs.

21. NATIONAL HERITAGE RESOURCES ACT, 1999 HERITAGE PROTOCOL FOR INCIDENTAL / CHANCE FINDS DURING CONSTRUCTION / REHABILITATION PHASES

NOTE: Officer designations used in the Heritage Protocol for Incidental Finds during the Construction Phase of Development may well vary from that used on-site, in which case it is the responsibility of the developer / principal engineering or construction consultant to ensure that described duties be assigned to designated staff.

21.1 Heritage Protocol for Incidental Finds during the Construction Phase of Development

Should any archaeological or cultural heritage resources, including cemeteries / grave sites (human remains), as defined and protected by the NHRA 1999, be identified during the construction phase of development, including as a norm during vegetation clearing, surface scraping / levelling, trenching and excavation, the process described below should be followed:

ON-SITE REPORTING PROCESS

1. The identifier should immediately notify his / her supervisor of the find.
2. The identifier's supervisor should immediately (and within 24 hours after reporting by the identifier) report the incident to the on-site SHE / SHEQ2 officer or RE and ECO.
3. The on-site SHE / SHEQ officer should immediately (and within 24 hours after reporting by the relevant supervisor) report the incident to the appointed ECO / ELO3. [Should the find relate to human remains the SHE / SHEQ officer should immediately notify the nearest SAPS4 station informing them of the find].
4. The ECO / ELO should ensure that the find is within 72 hours after the SHE / SHEQ officer's report reported on SAHRIS5 / EC PHRA6 / project heritage specialist, and arrangements should be made for a heritage site inspection by a suitably qualified and accredited heritage specialist. [Should the find relate to human remains the ECO / ELO should ensure that the heritage site inspection coincides with a SAPS site inspection, to verify if the find is of forensic, authentic (informal / older than 60 years), or archaeological (older than 100 years) origin].
5. The appointed heritage specialist should compile a heritage site inspection report based on site-specific conditions / findings. The site inspection report should make recommendations for the destruction, conservation or mitigation, as may apply, of the find, and prescribe a recommended way forward for development. The heritage site inspection report should be submitted to the ECO / ELO, who should ensure submission thereof on SAHRIS / to the EC PHRA7, or arrange with the heritage specialist to ensure submission of the report on SAHRIS / to the EC PHRA.
6. The EC PHRA will state legal requirements for development to proceed in the EC PHRA Comment on the heritage site inspection report.

7. The developer should proceed with implementation of EC PHRA Comment requirements. EC PHRA Comment requirements may stipulate permit specifications for development to proceed:

- Should EC PHRA permit specifications stipulate further Phase 2 archaeological investigation [including cemetery / grave site (human remains) exhumation and relocation) a suitably accredited heritage specialist should be appointed to conduct the work according to the applicable EC PHRA process. The heritage specialist should apply for the permit. Upon issue of the EC PHRA permit the Phase 2 heritage mitigation programme may commence.
- Upon completion of the Phase 2 heritage mitigation programme the heritage specialist will submit a Phase 2 mitigation report to the ECO / ELO, who should in turn ensure submission thereof on SAHRIS / to the EC PHRA, or arrange with the heritage specialist to do the relevant report submission. Report recommendations may include that the remainder of a heritage site be destroyed under an EC PHRA permit, or be conserved under recommended alterations to development design and layout.
- Should the find relate to human remains of forensic origin the matter will be directly addressed by the SAPS: an EC PHRA permit will not be applicable.
- Should EC PHRA permit specifications stipulate destruction of the find under an EC PHRA permit the developer should immediately proceed with the permit application. Upon the issue of the EC PHRA permit the developer may legally proceed with destruction of the heritage resource.

NOTE: EC PHRA permit requirements relating to the mitigation of human remains is subject to a prescribed process, including public consultation, health and heritage permissions, mitigation and re-internment / deposition of remains.

DUTIES OF THE SUPERVISOR

1. The supervisor should immediately upon reporting by the identifier ensure that all work in the vicinity of the find is ceased.
2. The supervisor should ensure that the location of the find is immediately secured (and within 12 hours of reporting by the identifier), by means of a temporary conservation fence (construction netting or similar measures) allowing for a 5–10m heritage conservation buffer zone around the find. The temporary conserved area should be sign-posted as a “No Entry – Heritage Site” zone.
3. Where development has impacted on the resource, no attempt should be made to remove artefacts / objects / remains further from their context, and artefacts / objects / remains that have been removed should be collected and placed within the conservation area or kept for safekeeping with the SHE / SHEQ officer. It is imperative that where development has impacted on heritage resources the context of the find be preserved as good as possible for interpretive and sampling / testing purposes.

The supervisor should record the name, company and capacity of the identifier and compile a brief report describing the events surrounding the find. The report should be submitted to the SHE / SHEQ officer at the time of the incident report.

DUTIES OF THE SHE / SHEQ OFFICER

1. The SHE / SHEQ officer should ensure that the location of the find is recorded with a GPS. A photographic record of the find (including implementation of temporary conservation measures) should be compiled. Where relevant a scale bar or object that can indicate scale should be inserted in photographs for interpretive purposes.
2. The SHE / SHEQ officer should ensure that the supervisors report, GPS co-ordinate(s) and photographic record of the find be submitted to the ECO / ELO. [Should the find relate to human remains the SHE / SHEQ officer should ensure that the mentioned reporting be made available to the SAPS at the time of the incident report].
3. Any retrieved artefacts / objects / remains should, in consultation with the ECO / ELO, be deposited in a safe place (preferably on-site) for safekeeping.

DUTIES OF THE ECO / ELO OFFICER

1. The ECO / ELO should ensure that the incident is reported on SAHRIS. (The ECO / ELO officer should ensure that he / she is registered on the relevant SAHRIS case / request the heritage specialist to ensure reporting on SAHRIS on his / her behalf].
2. The ECO / ELO should ensure that the incident report is forwarded to the heritage specialist for interpretive purposes at his / her soonest opportunity and prior to the heritage site inspection.
3. The ECO / ELO should facilitate appointment of the heritage specialist by the developer / construction consultant for the heritage site inspection.
4. The ECO / ELO should facilitate access by the heritage specialist to any retrieved artefacts / objects / remains that have been kept in safekeeping.
5. The ECO / ELO should facilitate coordination of the heritage site inspection and the SAPS site inspection in the event of a human remains incident report.
6. The ECO / ELO should facilitate heritage reporting to, and heritage compliance requirements by SAHRA / the relevant PHRA, between the developer / construction consultant, the heritage specialist, the SHE / SHEQ officer (where relevant) and the SAPS (where relevant).

DUTIES OF THE DEVELOPER / PRINCIPAL ENGINEERING OR CONSTRUCTION CONSULTANT

The developer / principal engineering or construction consultant should ensure that an adequate heritage contingency budget is accommodated within the project budget to facilitate and streamline the heritage compliance process in the event of incidental heritage resources being uncovered during the course of development, including as a norm during vegetation clearing, surface scraping / levelling, trenching and excavation phases, when resources not visible at the time of the surface assessment may well be exposed.

21.2 Fossil Chance Find Procedure

It is the responsibility of the Environmental Site Officer (ESO) or ECO or RE or site manager of the project to train the workmen and foremen in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ECO, a member of the staff must be appointed to be responsible for the proper implementation of the chance find protocol as not to compromise the conservation of fossil material.

Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.
- Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.
- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- If the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO. Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once the Heritage Authority has issued the written authorization, the developer may continue with the development on the affected area.