

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and target)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
Preparing Site Access	Environmental Integrity	Erosion & destruction of indigenous vegetation	<p>Objective: To avoid erosion and disturbance to indigenous vegetation</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Contractor must make use of existing tracks and roads wherever possible 2) New access tracks must be constructed with minimum disturbance to surrounding vegetation. Tracks must be bush cut and in accordance with site specific requirements 3) Access tracks to be constructed to a standard suitable for use by 4x4 vehicles 4) Relocation of plants to be undertaken in accordance with site specific requirements 5) Stream and seep crossings must be reinforced using gabions and in accordance with site specific requirements 6) Vehicles must not deviate from the established access routes and stream crossings at any time 7) A turning area for vehicles must be demarcated within the fenced area. 	<p>Access to site is erosion free</p> <p>Minimum disturbance to surrounding vegetation</p> <p>Vehicles make use of established access routes and stream crossings at all times</p>	Contractor	Costs will be covered within the contract for implementation of the project	Site establishment & maintained throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and target)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Heritage	Destruction or loss of heritage resources	<p>Objective: To minimise damage to or loss of heritage resources due to access tracks or on site</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) If any heritage material is uncovered in the preparation of the access tracks or drilling site, all work will be stopped until the ECO can verify the nature of the artefact. 2) If determined necessary a heritage practitioner will inspect the site and liaise with Heritage Western Cape. 	No loss of identified heritage resources	Contractor ECO	<p>Costs will be covered within the contract for implementation of the project</p> <p>Should a Heritage Practitioner be required this would be over and above the contract.</p>	Site establishment stage & throughout project	Hydrogeologist on site ECO to audit compliance
Establish Contractor's Camp ^{1*}	Vegetation and topsoil	Destruction or loss of vegetation and topsoil	<p>Objective: To minimise damage to and loss of vegetation and retain quality of topsoil</p> <p>Targets :</p> <ol style="list-style-type: none"> 1) <u>Vegetation survey of site to be undertaken by botanical specialist before site is established</u> 2) Site to be established under supervision of ECO 3) Clearing and relocation of plants to be undertaken in accordance with site specific requirements 4) Area of the site may not exceed 600m² and must be demarcated using portable fencing 5) Drip trays and/ or lined earth bunds must be provided under vehicles and equipment, to contain spills of hazardous materials such as fuel, oil and cement 6) Where possible vegetation must be brush-cut rather than cleared. 	<p>Minimal vegetation removed/ damaged during site activities.</p> <p>No topsoil contaminated with cement, fuel or oil.</p>	Contractor	Costs will be covered within the contract for implementation of the project	Site establishment stage & throughout project	Continuous by hydrogeologist on site ECO to audit compliance fortnightly

¹ The “contractors camp” is the area of operation including the drill-rig, the vehicles for material and air pressure, storage for construction materials and storage for drilled material.

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Establish Contractor's Camp	Surface and groundwater	Pollution of surface and groundwater resources	<p>Objective: To avoid pollution of water resources</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) A chemical toilet (which uses cartridges) must be provided within the demarcated contractors camp area and cartridges replaced regularly. 2) Drip trays and/ or lined earth bunds must be provided under vehicles and equipment, to contain spills of hazardous materials such as fuel, oil and cement. 3) Repair and storage of vehicles only within the demarcated site area. 4) Where possible portapools will be used for water storage and water recycling. 5) Appropriate sumps must be hand dug to provide settling space for excess water. 6) Appropriate sprinklers must be provided so excess water can be removed from site and irrigated onto surrounding vegetation. 	<p>Effluents managed effectively</p> <p>No pollution of water resources from site</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>
	Solid Waste	Pollution of environment	<p>Objective: To avoid pollution of environment with waste materials</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Weather- and baboon-proof waste bins must be provided and emptied regularly. 	<p>No waste bins overflowing</p> <p>No litter or building waste lying in or around the site</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>

ACTIVITY	ASPECT	IMPACT	MITIGATION (objective and target)	MEASURE:	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Fire	Increased fire risk to site and surrounding areas	Objective: To decrease fire risk. Targets: <ol style="list-style-type: none"> 1) Provide adequate gas cooking and heating facilities for staff. 2) Fire extinguishers to be provided in all vehicles and fire beaters must be available on site. 3) Emergency numbers/ contact details must be available on site, where applicable. 		No open fires on site	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	Continuous by hydrogeologist on site ECO to audit compliance fortnightly
	Access	Danger to public, animals and security of materials	Objective: To secure the Contractor's camp area against unauthorised entry Targets: <ol style="list-style-type: none"> 1) Area must be cordoned off using portable fencing with warning marks for entire duration of project. 2) Fuel tanks and drums kept in safeguarded area. 		Contractor's Camp is secure at all times and there is no unauthorised entry	Contractor	Costs will be covered within the contract for implementation of the project	Site establishment & maintained throughout project	Continuous by hydrogeologist on site ECO to audit compliance fortnightly
	Communication	Ability to deal with public queries and complaints	Objective: To ensure that the public has the contact number of the site hydrogeologist in order to obtain information or report complaints Targets: <ol style="list-style-type: none"> 1) Signage on site must provide the contact number of the person responsible for the site. 		Signs on site provide contact details (cellphone number/s) Number of complaints from public and method of addressing them.	Contractor	Costs will be covered within the contract for implementation of the project	Site establishment & maintained throughout project	Continuous by hydrogeologist on site ECO to audit compliance fortnightly
	Education	Worker awareness of EMP requirements	Objective: To ensure appropriate education regarding the environmental requirements Targets: <ol style="list-style-type: none"> 1) All contractors and drilling staff must undergo an environmental training session with the ECO. 		Workers aware of site rules. No contraventions of the EM requirements.	Contractor and ECO	Costs will be covered within the contract for implementation of the project	Site establishment	

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Site Management	Access	Danger to animals	<p>Objective: To avoid any danger to wild animals or livestock</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Gates used to access the site must be left as found (i.e. open or closed). 2) Vehicles may travel at a maximum speed of 40km/ hr on access tracks. 3) No hunting or trapping of animals permitted. 4) Only security personnel may overnight on site, if required. 	<p>No animals/ livestock injured</p> <p>No speeding of vehicles</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>
	Dust	Dust nuisance	<p>Objective: To avoid dust nuisance from operation and driving</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Reduce vehicle speeds on gravel roads. 2) Ensure that loose materials are protected against wind. 3) All concrete on site will be in sealed bags and will be brought onto site only on the day it will be used. 	Appropriate management of dust	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>

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Site Management-	Waste	Pollution of environment with waste materials	<p>Objective: To avoid pollution of environment with waste materials e.g. packaging left on site or blown away.</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) All site staff to make use of the waste bins <u>and toilets</u> provided. 2) <u>All food brought to site must be stored and consumed within the designated site area.</u> 3) Waste bins to be emptied regularly. 4) Toilet cartridges to be replaced regularly and adequate toilet paper provided. 5) Set up system for regular waste removal from working area to waste facility. 6) All building rubbish to be removed from site regularly. 	<p>Appropriate management of wastes on all work sites</p> <p>No bins overflowing.</p> <p>No litter or building rubbish lying in or around site.</p> <p>Toilets in working order and toilet paper available.</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>

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	Surface water and/or existing stormwater systems	Contamination of water runoff with suspended solids or excessive runoff causing erosion	<p>Objective: Contain soils and materials within defined areas and prevent contamination of stormwater runoff.</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Stockpiling loose material may only occur within designated areas and must be protected against erosion. 2) Suspended solids to be settled out of drilling water in sump before being recycled or released into the environment. 3) Only ready-mix concrete to be used. All concrete on site will be in sealed bags and will be brought onto site only on the day it will be used. 4) Concrete mixing with water to be carried out on impermeable surfaces in an area approved by the ECO or hydrogeologist. 5) If water exceeds storage space due to unusually high flow, excess clean water will be irrigated onto surrounding vegetation using sprinklers. Water must not be allowed to flow off-site uncontrolled. 	<p>Correct stockpiling of excavated material on site</p> <p>No erosion on site</p> <p>No pollution of water courses</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and target)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Fire	Risk of destruction to environment	<p>Objective: To decrease fire risk.</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Provide adequate gas cooking and heating facilities for staff 2) Basic fire-fighting equipment must be available on site 3) Emergency numbers/ contact details must be available on site, where applicable 4) No plastics, fuel, packaging or vegetation material to be burnt on site. 5) <u>Site staff may only smoke within the demarcated site area and cigarette butts must be disposed of in the bins provided.</u> 	No open fires on site	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>
	Health and Safety	Protect health & safety of workers and public	<p>Objective: Provide adequate danger warning to public. Provide adequate educate of staff.</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Adequate signboards to be erected to inform public of the activities 2) Daily records of all visits to the site to be kept 3) Activities must comply with safety legislation (OSH Act) 4) Cell phones, where possible, or two-way radios to be used to communicate with base camp/ reserve managers 5) Emergency numbers/ contact details to be available on site 	<p>Safe site conditions</p> <p>Signboards erected before work commences.</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>

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	Communication	Ensure EMP conditions met	<p>Objective: Ensure appropriate channel of communication</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) The ECO will communicate directly with the Contractor on site regarding matters covered in the EMP. 2) In emergencies, either the ECO or site hydrogeologist may halt activities. 3) Transgressions and instructions will be communicated to the site hydrogeologist for follow up. 	Functional and effective communication	Contractor ECO Site Geohydrologist	Costs will be covered within the contract for implementation of the project	Throughout project	

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Borehole drilling	Water disposal during diamond drilling	Erosion and pollution of environment through discharge of water	<p>Objective: To ensure appropriate discharge of water from drilling</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) No contaminated water produced during diamond drilling may be discharged into the environment. 2) No additives may be used for diamond drilling without prior approval of the hydrogeologist. 3) A portapool is to be erected on site to store water for use during the drilling operation. Water for the portapool is to be brought to site in bowzers or pumped from existing streams at the site under direction of the ECO. 4) Portapools (where possible) or lined sumps will be used to contain the water emitted from the hole during drilling. 5) Sumps will be hand dug and lined with >250 µm plastic. 6) All topsoil removed in excavation of sumps will be stored in an area designated by the ECO and protected from erosion using hessian. 7) Water with high levels of suspended solids will be allowed to settle before being recycled into water supply pool. 8) All contaminated water to be disposed of off site following drilling operations. 	<p>Appropriate wastewater management.</p> <p>No contaminated water discharged into environment</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>

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Borehole drilling	Water disposal from air percussion drilling	Erosion and pollution of environment through discharge of water	<p>Objective: To ensure appropriate disposal of water</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) No additives may be used without prior approval. 2) Water emitted during air percussion drilling will be allowed to settle prior to being discharged into environment via lined channels or irrigated using sprinklers so that no erosion takes place. 3) High temperature water emitted will require prolonged channelling or temporary storage before being discharged. 	<p>Appropriate wastewater management</p> <p>No erosion occurring due to water disposal</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>

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	Measures for occurrence of artesian flow	Erosion and pollution of environment through discharge of water	<p>Objective: To ensure appropriate borehole design and availability of mechanisms for effective mitigation.</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) The upper portion of each hole must be steel cased and grouted (to an approx. depth of 30-50m) to enable effective control of artesian flow. 2) Only quick-setting, pre-mixed cement will be used for grouting. 3) Water emitted will be discharged into environment via lined channels or irrigated using sprinklers so that no erosion takes place. 4) High temperature water emitted will require prolonged channelling or temporary storage before being discharged. 5) Measures to slow the flow rates from water strikes will be implemented, as and if required. 6) Water supply to be fitted with a collapsible irrigation hose, for use if water in the drilling system exceeds the sump and portapool capacity. 	<p>Appropriate management of artesian flow</p> <p>No erosion occurring</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>
	Noise	Noise nuisance from construction equipment	<p>Objective: To avoid noise nuisance from drilling equipment</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Limit working hours of noisy equipment to daylight hours. 2) Fit silencers to equipment where appropriate. 	<p>Appropriate management of noisy activities</p> <p>Number of complaints by public</p> <p>Number of complaints from workforce</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance periodically</p>

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	Topsoil and surface water	Contamination of topsoil and surface water	<p>Objective: To avoid contamination and pollution of topsoil and surface water such as seeps and streams</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Care must be taken not to allow any leakage of fuel, cement or hydraulic fluid into the environment. 2) Drip trays must be provided to contain spills of hazardous materials such as fuel, oil and cement and contaminants removed regularly from site. 3) Drizit cushions must be available for use in the event of accidental fuel leaks. 	No contaminated topsoil or surface water (including seeps and streams).	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	Continuous by hydrogeologist on site ECO to audit compliance periodically
	Health and Safety	Hazardous working conditions for workers	<p>Objective: Provide adequate measures to ensure workers are not placed at undue risk and adequate facilities to ensure that relevant minimum standards apply to working conditions</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Ensure that Personal Protective Equipment (PPE) is available to workers. 2) Ensure working conditions adhere to minimum safety standards (OSH Act). 	<p>Safe and acceptable working conditions for workers</p> <p>Proper sign boarding on the site</p>	Contractor	Costs will be covered within the contract for implementation of the project	Throughout project	Continuous by hydrogeologist on site ECO to audit compliance fortnightly

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Closure	Environmental Integrity	Reduction in environmental integrity if not rehabilitated	<p>Objective: Contain soils within defined areas and prevent contamination of stormwater runoff.</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Site must be closed and rehabilitated within one week of completion of drilling. 2) Remove all temporary facilities and waste materials from the site. 3) Remove all contaminated water used during diamond drilling from site. 4) Refill all sumps and excavated areas with stockpiled topsoil and remove concrete slabs, where applicable. 5) Rehabilitate all disturbed areas with appropriate material and plant species, where applicable. 6) Close and cap boreholes or fill in holes as appropriate, and ensure that boreholes are safeguarded. 7) Scarify soil by hand. 	<p>All construction and camp areas cleared of equipment, materials and temporary facilities.</p> <p>No safety hazard for the public and animals.</p>	Contractor	Costs will be covered within the contract for implementation of the project	During demobilisation and closure of site	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>
		Erosion	<p>Objective: Prevent erosion of areas</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Ensure correct drainage of areas. 2) Rehabilitate all disturbed areas with stockpiled topsoil. 	Closed site erosion free	Contractor	Costs will be covered within the contract for implementation of the project	During demobilisation and closure of site	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>
	Health & Safety	Unfilled/capped boreholes creating a safety hazard	<p>Objective: Prevent boreholes from becoming a safety hazard</p> <p>Targets:</p> <ol style="list-style-type: none"> 1) Ensure all boreholes are appropriately capped or filled. 	No open boreholes	Contractor	Costs will be covered within the contract for implementation of the project	During demobilisation and closure of site	<p>Continuous by hydrogeologist on site</p> <p>ECO to audit compliance fortnightly</p>

