

## PROJECT IMPACT ASSESSMENT, SIGNIFICANCE AND MITIGATION MEASURES SUMMARY

The following impact rating approach used by EnviroAfrica CC is a basic exponential rating system to assess actual and potential negative and positive environmental impacts.

Environmental activities or aspects are identified, based on:

- the phases of the project,
- the nature (or description) of the actual and potential impacts of the activities.

For every project activity or aspect, various environmental impacts are listed. Every negative impact is allocated a -value as per each of the following criteria:

- Probability (Likelihood)
- Extent
- Duration (Frequency)
- Consequence (Receiving Environment)
- Magnitude (Intensity/severity)

Every positive impact is allocated a +value as per each of the following criteria:

- Probability (Likelihood)
- Extent
- Duration (Frequency)
- Magnitude (Intensity/severity)

Once a value is allocated for each of the criterion, the scores are averaged to determine the final impact rating see Table 1 below.

EnviroAfrica then further assesses environmental significance, based on the nature of the impact, as per the score and colour key which forms part of Table 1 below. This results in impacts having either a low (indicated in green), medium (indicated in yellow) or high (indicated in orange and red) negative significance, and a low (light blue), medium (blue) or a high (dark blue) positive significance

**Note:** i. As a baseline, impact rating values/scores are allocated taking the **worst case** scenario into account i.e. with no mitigation. The baseline rating is compared with those after mitigation has been taken into account i.e. the post-mitigation rating. Post mitigation rating is used for the actual impact assessment.

**APPENDIX J – IMPACT ASSESSMENT**



<b>SIGNIFICANCE CRITERIA</b>	<b>Very High</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>	<b>Negligible (very-low)</b>
<b>Value</b>	<b>16</b>	<b>8</b>	<b>4</b>	<b>2</b>	<b>1</b>
<b>Probability (likelihood) (P)</b>	Definite. Impact will definitely occur (impact will occur regardless of any prevention measures)	Highly probable. Very likely for impact to occur.	Probable. Impact may likely occur.	Improbable. Impact may occur. Distinct Possibility	Improbable. Low likelihood/unlikely for impact to occur.
<b>Extent (E)</b>	Impact potentially reaches beyond national boundaries	Impact has definite provincial/potential national consequences	Impact confined to regional area/ town	Impact confined to local region and impact on neighbouring properties	Impact confined to project property / site
<b>Duration (D)</b>	Permanent The impact is expected to have a permanent impact, with very little to no rehabilitation possible	Long-Term The impact is expected to last for a long time after construction with rehabilitation expected to be 15-50 years. Impact is reversible but only with long-term mitigation	Medium-term The impact is expected to last for some time after construction with rehabilitation expected to be 5 - 15 years. Impact is reversible but only with on-going mitigation	Short-term The impact is expected to last for a relatively short time with rehabilitation expected to be 2-5 years. The impact is reversible through natural process and/or some mitigation.	Very short/ temporary The impact is expected to be temporary and last for a very short time with rehabilitation expected to be less than 2 years. The impact is easily reversible through natural process and/or some mitigation.
<b>Magnitude (Intensity/ Severity) (M)</b>	It is expected that the activity will have a very severe to permanent impact on the surrounding environment. Functioning irreversibly impaired. Rehabilitation often impossible or unfeasible	It is expected that the activity will have a severe impact on the surrounding environment. Functioning may be severely impaired and may be temporarily cease. Rehabilitation will be needed to restore system integrity	It is expected that the activity will have an impact on the surrounding environment, but it will maintain its function, even if moderately modified (overall integrity not compromised). Rehabilitation easily achieved	It is expected that the activity will have a perceptible impact on the surrounding environment, but it will maintain its function, even if slightly modified (overall integrity not compromised). Rehabilitation easily achieved	It is expected that the impact will have little or no effect on the integrity of the surrounding environment
<b>Receiving environment (Consequence): (RE)</b>	Very sensitive, pristine area – protected site or species permanently or seasonally present	Unused area containing only indigenous fauna / flora species	Unused area containing indigenous and alien fauna / flora species	Semi-disturbed area already rehabilitated / recovered from prior impact, or with moderate alien vegetation	Disturbed area/ transformed/ heavy alien vegetation

**ENVIRONMENTAL RATING SIGNIFICANCE KEY:**

**Negative Impacts**

SIGNIFICANCE	RATING	Final rating score / value range
Very Significant	Very High	-11 to -16
Significant	High	-7 to <-11
Increasing Significance	Medium	-4 to <-7
	Low	-2 to <-4
Insignificant	Very Low	-1 to <-2

**Positive Impacts**

SIGNIFICANCE	RATING	Final rating score / value range
Significant	High	10 to 16
Increasing Significance	Medium	4 to <10
Insignificant	Low	1 to <4

Table 1: Environmental Significance Rating Methodology (rating criteria and significance key)

Nature of Impact			Impact Assessment Ranking and Proposed Mitigation		
No.	Aspect	Impact	Environmental Significance (without Mitigation)	Proposed Mitigation (i.e. Proposed mitigation to reverse/ avoid, manage or mitigate identified impacts associated with construction, operation, and decommissioning/ closure phases)	Environmental Significance (After Mitigation)
<b>CONSTRUCTION PHASE</b>					
1	<b>Impact on Cultural, Archaeological, and Heritage Resources</b>	Loss and/or damage to potential archaeological and historical sites within the construction footprint	Negligible	<p>The proposed development is unlikely to impact on significant archaeology, built environment or cultural landscape heritage resources. No mitigation required.</p> <p>However:</p> <ul style="list-style-type: none"> <li>- If any archaeological remains (including but not limited to fossil bones and fossil shells, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts and bone remains, structures and other built features, rock art and rock engravings) are discovered during construction they must immediately be reported to HWC and must not be disturbed further until the necessary approval has been obtained from HWC.</li> <li>- Should any human remains/burial or archaeological material be disturbed, exposed or uncovered during construction, these should immediately be reported to the South African Heritage Resources Agency (021 462 4502) and Heritage Western Cape (021 483 9685). The ECO and ER are also to be informed. An archaeologist will be required to remove the remains at the expense of the developer.</li> </ul>	Negligible
2	<b>Impact on Palaeontological Resources</b>	Loss and/or damage to potential fossils within the construction footprint	Medium (Negative)	<p>The area proposed for development is underlain by formations of very high palaeontological sensitivity.</p> <p>A Fossil Find Procedure must be implemented. Should any fossil material be discovered during construction, this must be safeguarded (preferably <i>in situ</i>) and the Environmental Control Officer (ECO) should alert Heritage Western Cape so that appropriate mitigation (e. g. recording, sampling, or collection) can be taken by a professional palaeontologist.</p>	Low (Negative)
3	<b>Botanical</b>	Vegetation Status: Loss of vulnerable vegetation and associated habitat.	Low (Negative)	<ul style="list-style-type: none"> <li>- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase.</li> <li>- Both areas of degraded natural veld should be protected as remaining natural veld (Figure 10).</li> <li>- Before any work is done the site and access routes must be clearly demarcated (with the aim at minimal width/smallest footprint).</li> </ul>	Negligible

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				<ul style="list-style-type: none"> <li>- Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.</li> <li>- All areas impacted as a result of construction must be rehabilitated on completion of the project.</li> <li>- An integrated waste management approach must be implemented during construction.</li> <li>- It is recommended that a small artificial wetland is established where the small seasonal stream enters the dam and that all water from the Water Scheme are pumped to above this wetland, so that it will also enter the dam through the wetland. This inlet should then be planted with reeds like <i>Phragmites australis</i> and / or <i>Typha capensis</i>, which will over time, establish itself in a dense stand, which will help to clean the incoming water before it reaches the dam. Properly designed and managed farm dams can attract a variety of birds, insects and animals to the area and so contribute to conservation of biodiversity.</li> <li>- A second potential positive spin-off could be to incorporate the remaining natural veld on the rocky ridge to the east of the dam within the dam site itself, by fencing it in with the dam, or by refraining from cultivating the land between the dam and the rocky ridge, so that a slightly larger natural corridor can be established linking the artificial wetland with the remaining natural veld and with the dam.</li> </ul>	
4	<p><b>Freshwater Resources:</b> Vehicular movement (transportation of construction materials) and access to the site.</p>	<ul style="list-style-type: none"> <li>• Degradation to the remaining vegetation within and surrounding the drainage line;</li> <li>• Transportation of construction materials can result in disturbances to soils, and increased risk of sedimentation/erosion; and</li> </ul>	Low (Negative)	<ul style="list-style-type: none"> <li>- It is recommended that the construction activities be undertaken during the dry summer period when the flow is limited in the drainage line;</li> <li>- Due to the erosion that was noted within the drainage line, use should be made of existing roads to gain access to the proposed dam footprint area. Due to the relative accessibility of the site, no unnecessary crossing of the drainage line may be permitted. This will limit any further erosion of the drainage line and its downstream reach;</li> <li>- Contractor laydown areas, vehicle re-fuelling areas and material storage facilities to remain outside of the proposed dam footprint area;</li> </ul>	Low (Negative)

Nature of Impact			Impact Assessment Ranking and Proposed Mitigation		
No.	Aspect	Impact	Environmental Significance (without Mitigation)	Proposed Mitigation (i.e. Proposed mitigation to reverse/ avoid, manage or mitigate identified impacts associated with construction, operation, and decommissioning/ closure phases)	Environmental Significance (After Mitigation)
		<ul style="list-style-type: none"> <li>Soil and stormwater contamination from oils and hydrocarbons.</li> </ul>		<ul style="list-style-type: none"> <li>All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is essential, and preferably only alien floral species to be removed. Based on the site conditions at the time of the field assessment (January 2019), very few vegetation species were present within the drainage line. Nevertheless, any indigenous species present outside of the dam footprint area must be preserved to maintain the current ecological condition of the immediate area and prevent any erosion and keep the soil profile intact. Once alien species are removed, they may not be stockpiled on site, but must immediately be removed from the site and disposed of at a registered waste disposal facility;</li> <li>Exposed soils to be protected using a suitable geotextile covering such as hessian sheeting.</li> <li>Ensure sediment control devices are in place before the start of the construction activities;</li> <li>Maintain sediment/erosion control devices to minimise the risk of sedimentation of the downgradient drainage line reach using silt traps;</li> <li>The spillway outlet of the dam should be constructed from energy dissipating structures (such as Armorflex or reno mattresses) to slow down the velocity of water inflow into the downgradient drainage line reach and preventing erosion thereof;</li> <li>Excavated materials and topsoil may not be contaminated, and it must be ensured that the minimum surface area is taken up by the stockpiles, and the stockpiles may not exceed 2m in height. Mixture of the lower and upper layers of the excavated soil should be kept to a minimum, for later usage as backfill material or as part of rehabilitation of the dam wall;</li> <li>All exposed soils must be protected for the duration of the construction phase with a suitable geotextile (e.g. Geojute or hessian sheeting) to prevent erosion and sedimentation of the downgradient drainage line reach; and</li> <li>Construction of the dam wall should be done in a layered phased manner, where layers of imported material are placed on the dam wall and compacted. This process should be repeated until the desired height has been reached.</li> </ul>	
5	<b>Freshwater Resources:</b> Removal of vegetation and associated disturbances to soils	<ul style="list-style-type: none"> <li>Earthworks could be potential sources of sediment, which may be transported as runoff into the downgradient areas;</li> <li>Exposure of soils, leading to increased runoff, and erosion, and thus sedimentation of the drainage line;</li> <li>Increased sedimentation of the drainage line, leading to smothering vegetation associated with the drainage line; and</li> <li>Further proliferation of alien vegetation as a result of disturbances.</li> </ul>	Low (Negative)		Low (Negative)
6	<b>Freshwater Resources:</b> Bulk earthworks associated with importing of material, placing it and compaction thereof to construct the dam wall and proposed spillway.	Runoff from the imported material could increase the sediment load of the downstream reach of the drainage line.	Low (Negative)		Low (Negative)
7		Sedimentation and water quality impairment (increased hydrocarbons, suspended solids, hazardous substances and oils from the heavy machinery used) of the downgradient drainage line reach leading to further	Low (Negative)		Low (Negative)

Nature of Impact			Impact Assessment Ranking and Proposed Mitigation		
No.	Aspect	Impact	Environmental Significance (without Mitigation)	Proposed Mitigation (i.e. Proposed mitigation to reverse/ avoid, manage or mitigate identified impacts associated with construction, operation, and decommissioning/ closure phases)	Environmental Significance (After Mitigation)
8		degradation of the downgradient habitat.	Low (Negative)	Mitigation measures applicable to the spillway: <ul style="list-style-type: none"> <li>- Energy dissipating structures should be installed at the spillway outlet to prevent erosion and scouring of the drainage line where the overflow will be discharged;</li> <li>- At the outlet, rocks must be placed and vegetation established (if applicable considering the highly episodic nature of the system) to bind the soil of the bed, and to prevent erosion. This will also diffuse flow and lower the velocity of water into the lower reach of the drainage line; and</li> <li>- Upon completion of the construction activities, all footprint areas should be revegetated with indigenous vegetation.</li> </ul>	Low (Negative)
		Loosening and exposure of soils leading to <i>in situ</i> erosion, and sedimentation of the downgradient drainage line reach.			
9	<b>Freshwater Resources:</b> Covering the dam wall with topsoil and revegetation of the dam wall	Potential sedimentation for the downstream drainage line reach;	Low (Negative)	<ul style="list-style-type: none"> <li>- Previously removed soils (removed as part of the site preparation activities) should be used as topsoil for covering of the dam wall;</li> <li>- It should be ensured that the topsoil used are weed free to limit the establishment of alien and invasive vegetation species;</li> <li>- Re-seed the dam wall with indigenous species as soon as construction activities are completed.</li> </ul>	Low (Negative)
10		Potential proliferation of alien and invasive vegetation species.	Low (Negative)		Low (Negative)
11	Socioeconomic	Creation of short-term employment opportunities.	Low (Positive)	The development is expected to create jobs during the construction phase, and about 12 permanent job opportunities during the operational phase	
12	Dust	Dust may be generated during the construction of the proposed development.	Medium-Low (Negative)	The Contractor must take all reasonable measures to minimize the generation of dust as a result of construction activities resulting from along-construction-route activities (but must also take into account possible water constrictions of the area). <ul style="list-style-type: none"> <li>- The onsite construction site agent must take into account prevailing wind strength and wind direction and must have preventative measures on standby to minimize dust pollution that may cause damage to people and property.</li> <li>- The liberation of dust into the surrounding environment shall be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.</li> <li>- Earth-works to take place after harvest season</li> </ul>	Low (Negative)

APPENDIX F – IMPACT ASSESSMENT



Nature of Impact			Impact Assessment Ranking and Proposed Mitigation		
No.	Aspect	Impact	Environmental Significance (without Mitigation)	Proposed Mitigation (i.e. Proposed mitigation to reverse/ avoid, manage or mitigate identified impacts associated with construction, operation, and decommissioning/ closure phases)	Environmental Significance (After Mitigation)
13	Visual	Visual impact of construction activities and plant on site	Low (Negative)	<ul style="list-style-type: none"> <li>- Construction activities limited to within the construction footprint</li> <li>- The contractor may not operate any machinery outside the demarcated area.</li> <li>- Appropriate machinery to be used</li> </ul>	Low (Negative)
14	Traffic	Increase in trucks and construction plant	Very Low (Negative)	Cognisance of traffic and other road users	Very Low (Negative)
15	Noise	Noise will be generated during the construction phase.	Low (Negative)	<p>Any noise generated by construction activities will be a temporary impact however, the following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> <li>- A complaint register to be maintained on-site. Any complaints received must be responded to and rectified accordingly. The ECO must be notified of any complaints;</li> <li>- All construction vehicles must be fitted with standard silencers. All silencers must be maintained. All machinery used on site must have suppressors.</li> <li>- Working hours must be limited to and strictly adhered to standard daylight working hours (08h00-17h00).</li> </ul>	Very Low (Negative)



OPERATION PHASE					
16	<p><b>Freshwater Resources:</b> Increased inundation caused by dam development.</p>	<ul style="list-style-type: none"> <li>• Changes in the wetting patterns and hydroperiod of the drainage line;</li> <li>• Loss of ecoservice provisioning by the drainage line; and</li> <li>• Increased periods of saturation along the edge of the dam.</li> </ul>	Low (Negative)	<ul style="list-style-type: none"> <li>- During the site visit undertaken by SAS in January 2019, no obligate freshwater vegetation species were noted in the drainage line. To increase the habitat of the immediate environment, indigenous obligate freshwater vegetation species should be established in the areas where extended periods of saturation would occur, such as within the drawdown area of the constructed dam; and</li> <li>- Implement an alien and invasive species control plan to prevent the establishment of such species.</li> </ul>	Low (Negative)
17	<p><b>Freshwater Resources:</b> Operation of the spillway associated with the dam.</p>	<ul style="list-style-type: none"> <li>• Erosion of the downstream drainage line reach where water enters the drainage line from the spillway; and</li> <li>• Potential increased sedimentation of the downstream drainage line due to erosion associated with the spillway.</li> </ul>	Medium (Negative)	<ul style="list-style-type: none"> <li>- The spillway should regularly be inspected for erosion, especially after heavy rainfall events when overflow from the dam is expected and the flow, velocity is increased. If erosion is noted, this should be rectified, preferably by the reinstatement of the embankments through compaction of soil and revegetation thereof. If erosion is pronounced, erosion control devices such as reno mattresses should be considered, in consultation with a freshwater ecological specialist.</li> <li>- The spillway should be maintained free of any debris and silt/sediment.</li> </ul>	Low (Negative)
18	<p><b>Freshwater Resources:</b> Maintenance of the dam wall, including inspections, desilting and leak detection.</p>	<p>Desilting activities resulting in the:</p> <ul style="list-style-type: none"> <li>• Removal of vegetation (terrestrial and wetland); and</li> <li>• Earthworks and silt stockpiling, the runoff from which has the potential to increase silt loads within the downstream drainage line.</li> </ul>	Medium (Negative)	<p>Control measures applicable to this activity would be as per Activity 4 – 8 above. Additionally, the following is applicable:</p> <ul style="list-style-type: none"> <li>- During desilting, silt associated with the dam should immediately be removed to prevent sedimentation of the downgradient drainage line reach. Additionally, during desilting, a temporary silt trap should be installed at the spillway. This must be emptied regularly and not permitted to reduce the capacity of the dam.</li> </ul>	Low (Negative)
19		<p>In the event where a leak has been detected within the dam wall itself, impacts include:</p> <ul style="list-style-type: none"> <li>• An increase in water quantity could cause extended periods of water saturation of the</li> </ul>	Medium (Negative)		Low (Negative)

**APPENDIX F – IMPACT ASSESSMENT**



		<p>downstream drainage line reach;</p> <ul style="list-style-type: none"> <li>• Repair of a leak would entail the impacts as per Activity 4 - 8 above.</li> </ul>			
20	Visual	<p>Visual impact of the dam and agricultural development</p>	Low (Negative)	<ul style="list-style-type: none"> <li>- Appropriate colour shade netting to be used where possible</li> <li>- Maintain and/or increase screening with trees</li> </ul>	Low (Negative)
21	Socio-economic	<p>Creation of long-term employment opportunities.</p>	Low (Positive)	<p>The development is expected to create 12 permanent job opportunities during the operational phase</p>	