

## 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.

<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**

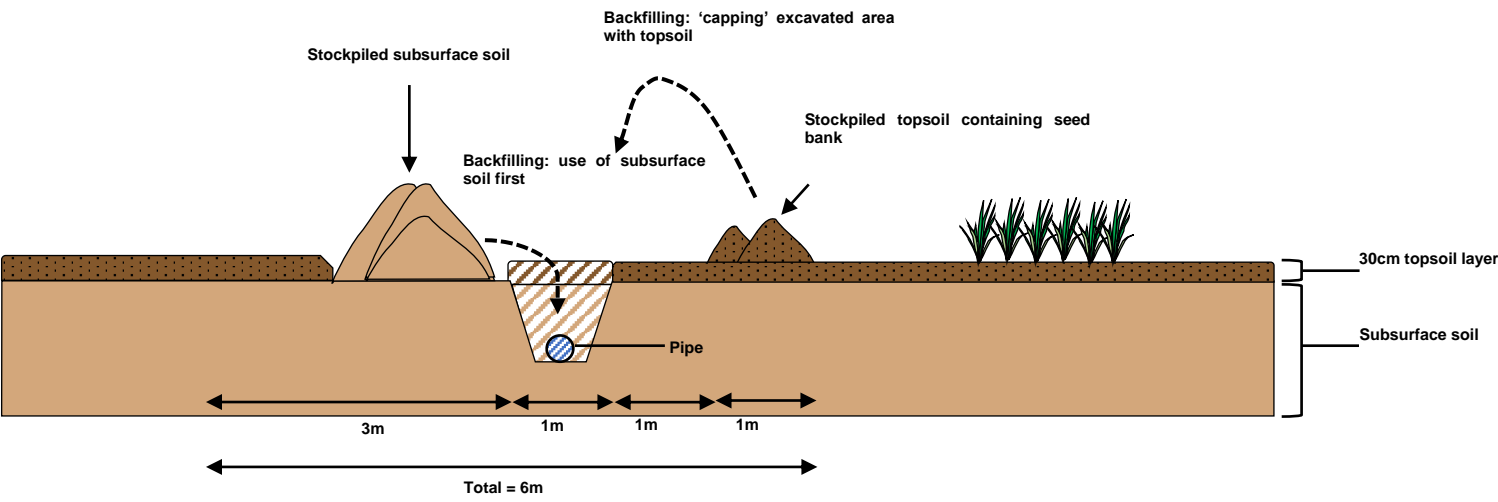
SIGNIFICANCE	RATING	Final rating score / value range
Significant	High	10 to 16
Increasing Significance	Medium	4 to <10
	Low	1 to <4

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

*\*PLEASE SEE RATING SCORING MATRIX*

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	Soil	<p>On site erosion due to improper management of stormwater during construction.</p> <p>Exposed platforms and trenches excavated for any pipeline are susceptible to erosion during the construction phase.</p>	-6	<p>All construction activities must be carried out with caution. The following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> <li>- Erosion mitigation measures must be implemented<sup>1</sup>;</li> <li>- No storage of materials, including stockpiling of any material, is permitted within 32m of the drainage line;</li> <li>- Any soil which has been exposed due to construction activities must be rehabilitated to prevent erosion;</li> <li>- Vegetation must be cleared in phases (i.e. where construction activities are to be conducted) to reduce the extent of soil susceptible to erosion at any point in time;</li> <li>- Temporary stormwater measures, such as the use of temporary berms, with silt traps (e.g. shade netting) to prevent stormwater runoff flowing into the drainage line, should be implemented to ensure that material does not wash into the drainage line during construction;</li> <li>- Once areas of exposed soil have been adequately shaped, these areas must be rehabilitated with vegetation characteristic of the Bushmanland Arid Grassland (LT) vegetation type. Implemented erosion mitigation measures can only be removed once vegetation has established;</li> </ul> <p>The presence of alien invasive plant species must be managed (see Impact No. 23).</p>	-3

<sup>1</sup> Erosion control methods include, but are not limited to, silt fences, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats and mulching. Exposed areas, susceptible to erosion, must be rehabilitated. This includes planting vegetation, characteristic of the Lower Gamakor Alluvial vegetation or Bushmanland Arid Grassland vegetation type (where the ecosystem type was impacted), to stabilize the soil.

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2		Erosion and safety hazards associated with excavated pipelines which are not backfilled.	-6	<p>The following mitigation measures must be implemented for any excavated trenches:</p> <ul style="list-style-type: none"> <li>- Excavated material must be separated into topsoil (generally upper 30cm) and subsoil (remaining) and stockpiled accordingly. Stockpiles must be located at least 32m away from any drainage line or other sensitive area (see figure below);</li> <li>- Trenches must be excavated in sections and backfilled once the pipeline has been laid. The excavated trench must not remain open indefinitely;</li> <li>- Any pooled water in open trenches must be pumped out.</li> <li>- Trenches must be demarcated;</li> <li>- Material must be backfilled in the order it was excavated (i.e. backfilled first with subsoil followed by topsoil). Backfilled trenches must be rehabilitated.</li> </ul>	-3
		 <p>The diagram illustrates the backfilling process for an excavated trench. It shows a cross-section of the ground with a trench containing a pipe. The trench is divided into sections of 1m each, with a 3m section for stockpiling subsurface soil. The backfilling process involves using subsurface soil first, followed by capping the area with topsoil. Stockpiled topsoil containing a seed bank is used for the final layer. The total width of the backfilled area is 6m. The diagram also shows a 30cm topsoil layer and subsurface soil layers.</p>			

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3	Watercourse	Sedimentation of drainage line due to the uncontrolled stormwater runoff naturally flowing towards the drainage line.	-7	<p>The following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> <li>- All construction activities, within close proximity to the drainage line, must be carried out with extreme caution;</li> <li>- Erosion mitigation measures must be implemented<sup>1</sup>;</li> <li>- The proposed access road must be strictly adhered to. No ad hoc roads are permitted;</li> <li>- Excluding the proposed access road, the drainage line must be demarcated as a “no-go” zone;</li> <li>- No storage of materials, including stockpiling of any material, is permitted within 32m of the drainage line;</li> <li>- Any soil which has been exposed due to construction activities must be rehabilitated to prevent erosion;</li> <li>- Vegetation must be cleared in phases (i.e. where construction activities are to be conducted) to reduce the extent of soil susceptible to erosion at any point in time;</li> <li>- Temporary stormwater measures, such as the use of temporary berms, with silt traps (e.g. shade netting) to prevent stormwater runoff flowing into the drainage line, should be implemented to ensure that material does not wash into the drainage line during construction;</li> <li>- Once areas of exposed soil have been adequately shaped, these areas must be rehabilitated with vegetation characteristic of the Bushmanland Arid Grassland vegetation type. Implemented erosion mitigation measures can only be removed once vegetation has established;</li> <li>- Stormwater runoff from any platforms must be diverted away from the drainage line. If no formalized stormwater network exists, water should be directed to a temporary detention pond to reduce the sedimentation of stormwater networks on site;</li> <li>- The contractor must check the site for erosion after each rainfall event and rectify any areas eroded/ susceptible to erosion.</li> </ul>	-3
4		Contamination of drainage line due to inappropriate storage	-7	<p>The following mitigation measures must be implemented:</p>	-2

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		and use of hazardous materials/ substances.		<ul style="list-style-type: none"> <li>- All hazardous materials and substances must be stored within a secured (i.e. lockable), banded (at least 110% capacity), undercover area with a hardened surface;</li> <li>- Any spillage must be immediately cleaned. Contaminated soil must be collected, stored, and disposed of at a registered, hazardous disposal facility. A disposal receipt is required as proof of safe disposal. A complete spill kit is required;</li> <li>- The use of hazardous materials and substances, such as cement mixing, must be conducted on hardened surfaces (such as batching boards or concrete) protected from stormwater runoff;</li> <li>- Used oil must be collected, securely stored and disposed of by a registered used-oil contractor. The collection and disposal of used oil must be recorded and proof of disposal (i.e. disposal receipt) must be obtained and kept on site;</li> <li>- The construction site camp must be located at least 50m away from the watercourse;</li> <li>- Vehicle washing and maintenance areas must be demarcated.</li> <li>- All waste, generated, must be collected, stored, and disposed of at the relevant (general or hazardous) waste disposal facility;</li> <li>- MSDS of all hazardous materials must be kept on site.</li> </ul>	
5		Contamination of drainage line with sewage due to spillages associated with the existing WWTW.	-10	As per the Freshwater Impact Assessment ( <b>Appendix 6C</b> ), sewage spillages have been reported by the community. According to the Draft Engineer's Service Report ( <b>Appendix 4B</b> ), the existing WWTW and associated infrastructure (oxidation ponds) can only treat 50% of the current sewer outflows. In addition to the capacity problems, the oxidation ponds are only 300 meters away from Extension 7. Therefore, the Draft Engineer's Services Report recommends the construction of a new WWTW, including a 2.5ML (based on a future ADWWF of 2 413 kL/day) oxidation pond system is proposed. The construction of the new WWTW will mitigate negative impacts, including sewage spillages, associated with the existing, under capacity WWTW. Moreover, it is proposed that the new WWTW be located 2.5km away from the Gamakor development. The WWTW will also have to be located at a low	-2



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				elevation relative to Keimoes in order to minimize pumping costs. The construction of the new WWTW will reduce sewage spillages.	
6	Waste	Insufficient number of toilets and / or inappropriate disposal of sewage generated during the construction phase.	-6	<p>The increase in construction personnel during the construction phase will require an appropriate number of toilet facilities for the site. This impact can be fully mitigated.</p> <ul style="list-style-type: none"> <li>- Appropriate and sufficient toilet facilities (1 toilet per 15 employees) must be provided by the contractor;</li> <li>- All toilet facilities must be checked on a daily basis;</li> <li>- All toilet facilities must be emptied and cleaned on a weekly basis or as agreed (in writing) with the ECO and DENC.</li> <li>- A registered waste removal company must remove sewage waste from the site or be disposed of at a permitted disposal facility; and</li> <li>- Toilet waste receipts must be obtained, and kept on site, for proof of safe disposal.</li> </ul>	-3
7		Temporary increase in waste and litter contaminating the receiving environment	-5	<p>The construction phase of the project will see an increase in construction staff on site and therefore an increase in waste.</p> <ul style="list-style-type: none"> <li>- Littering will not be permitted on site;</li> <li>- A designated waste storage area must be established at the construction site camp. Appropriate waste receptacles must be set up at intervals along any pipeline routes and emptied into the main waste storage area at the end of each day;</li> <li>- Waste must be removed from site and disposed of at a registered waste disposal site;</li> <li>- Safe disposal slips for the disposal of all waste must be obtained and kept on site as proof of safe disposal.</li> </ul>	-3
8	Botanical	Clearance of vegetation from within the Bushmanland Arid Grassland.	-10	<p>As per the Botanical Impact Assessment (Appendix 6A), the following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> <li>• All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must include the recommendations made in this report.</li> </ul>	-4

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				<ul style="list-style-type: none"> <li>• A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EA and the construction phase EMP and any other conditions pertaining to specialist studies.</li> <li>• <b>Before any work is done</b> the development footprint and access routes must be clearly demarcated and approved by the ECO. The demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance.</li> <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>• No <i>Vachellia erioloba</i> (Camel Thorn) trees may be removed or damaged (the three trees within the footprint must be protected).</li> <li>• An effort should be made to transplant some of the <i>Aloe claviflora</i> plants as well as all viable (transplantable) <i>Boscia foetida</i> shrubs/trees.</li> <li>• Indiscriminate clearing of any area outside of the construction footprint must be avoided.</li> <li>• An integrated waste management approach must be implemented during construction.                         <ul style="list-style-type: none"> <li>○ Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.</li> <li>○ All rubble and rubbish should be collected and removed from the site to a suitable registered waste disposal site.</li> </ul> </li> <li>• Special attention must be given to alien and invasive control within the construction footprint. All alien invasive species</li> </ul>	

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				<p>within the footprint and at least 5 m to the side of the footprint must be removed responsibly.</p> <ul style="list-style-type: none"> <li>○ Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g. spreading of the AIP due to incorrect eradication methods);</li> <li>○ Care must be taken to dispose of alien plant material responsibly</li> </ul>	
9		Impact on existing protected flora.	-8	<p>This impact cannot be fully mitigated. Protected plant species, namely three (3) <i>Vachellia erioloba</i> (Camel Thorn) trees (NFA protected) and five (5) NCNCA protected plant were noted on site. The Botanical Specialist recommended the protection of the Camel Thorn trees and search and rescue of <i>Aloe</i> and <i>Boscia</i> individuals within the development footprint:</p> <ul style="list-style-type: none"> <li>- A permit, as per the NFA or NCNCA, is required should any protected plant species need to be disturbed, relocated, removed, or destroyed;</li> <li>- As per the Botanical Assessment, <i>Aloe</i> and <i>Boscia</i> individuals must be actively searched for and rescued. These plants must be relocated in the presence of the ECO;</li> <li>- All protected plant species, outside of the development footprint, must not be disturbed;</li> <li>- No plant species are to be harvested from site, and</li> <li>- Should the contractor be unsure of whether a plant species is protected, the ECO must be contacted immediately prior to the disturbance of the plant species in question.</li> </ul>	-4
10		Encroachment of alien invasive vegetation in disturbed areas during construction activities.	-7	<p>The following mitigation measures must be implemented to manage alien invasive plant species within the proposed site for development:</p> <ul style="list-style-type: none"> <li>- Special attention must be given to alien and invasive control within the construction footprint. All alien invasive species within the footprint and at least 5 m to the side of the footprint must be removed responsibly.</li> </ul>	-3

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				<ul style="list-style-type: none"> <li>- Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g. spreading of the AIP due to incorrect eradication methods);</li> <li>- Care must be taken to dispose of alien plant material responsibly;</li> <li>- The construction area must be kept free of alien invasive plants. Regular inspections of the site must take place. The following methods of alien plant control can be adapted:                             <ul style="list-style-type: none"> <li>o Physical control – which includes pulling alien plants out by hand, using hand tools, and/ or mechanised tools, as well as ringbarking/ girdling;</li> <li>o To reduce alien plant encroachment, construction areas must be rehabilitated as soon as practically possible after the completion of construction activities.</li> <li>o The area previously disturbed by construction activities must be regularly inspected following rehabilitation where any alien invasive plant species must be removed.</li> </ul> </li> </ul>	
11		No-Go	-1	The vegetation present on site will remain as is. The presence of alien invasive plant species must be managed in accordance with due diligence.	-1
12	Biodiversity	Loss of area within the CBA	-10	<p>As per the 2016 Northern Cape Critical Biodiversity Map (CBA), the proposed development footprint is located within a terrestrial CBA. This impact cannot be avoided. However the following mitigation measures will be implemented;</p> <ul style="list-style-type: none"> <li>- Any exposed area will be rehabilitated with indigenous plant species, characteristic of the Bushmanland Arid Grassland vegetation type.</li> <li>- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and any other conditions pertaining to specialist studies and requirements of the any competent authority;</li> <li>- Before any work is done, the site and access routes must be clearly demarcated (with the aim at minimal width / smallest footprint). The demarcation must include;</li> </ul>	-5

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				<ul style="list-style-type: none"> <li>○ Site access, which must be limited to routes approved by the ECO;</li> <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>○ Indiscriminate clearing of areas must be prohibited;</li> <li>○ All alien plants must be removed from within the construction footprint and immediate surroundings.</li> </ul> <p>- All areas impacted as a result of construction must be rehabilitated on completion of the project.</p> <ul style="list-style-type: none"> <li>○ This includes the removal of all excavated material, spoil and rocks, all construction related material and all waste material.</li> <li>○ It also included replacing the topsoil back on top of the excavation as well as shaping the area to represent the original shape of the environment.</li> </ul>	
13	Services	Increased demand for services impacting current services capacity (i.e. increased demand for water, electricity, sewage disposal) and receiving environment.	-10	<p>As standard construction practice, the engineer and contractor must identify all existing services that may be affected in the study area prior to construction. The following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> <li>- Any infrastructure which was damaged or removed, during the construction phase, must be repaired and/or replaced.</li> <li>- As per the Services Report, a new Wastewater Treatment Works (WWTW) is recommended to service the existing and future demands (refer to Appendix 4B) as the capacity of the existing WWTW is under capacity.</li> <li>- Stormwater management must be implemented. The guiding principle for stormwater management is that the peak run-off from the post-developed site should not exceed that of the pre-developed site for the full range of storm return periods (1:2 to 1:50). Stormwater measurements must be incorporated into the site development plan to attenuate the post-development flows to pre-development rates – these measures include, but are not limited to, controlled overland flows, above-ground attenuation storage (if</li> </ul>	-4

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				<p>required) and berms at the higher end of the site (if required). Measures mitigating the pooling of water must be implemented, areas susceptible to erosion must be identified and subsequently protected.</p> <ul style="list-style-type: none"> <li>- Solid waste: all waste generated during the construction phase must be separated (into general or hazardous waste), stored separately, and disposed at a licensed disposal general or hazardous waste facility. A waste disposal receipt is required as proof of safe disposal.</li> </ul>	
14	Impact on Cultural, Archaeological Palaeontological, and Heritage	Artefacts may be discovered and/or damaged during the construction phase.	-3	The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No other heritage was identified. Therefore, no further mitigation is required, and from a heritage point of view we recommend that the proposed development can continue.	-2
15		Loss and/or damage to potential fossils and archaeological and historical sites within the construction footprint	-3	<p>Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).</p> <p>The following mitigation measures must be implemented where applicable;</p> <ul style="list-style-type: none"> <li>- Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas,</li> <li>- It is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find.</li> </ul>	-2
16	Socio-economic	Creation of short-term employment	4	The construction of Gamakor Housing Project will create employment and skills development opportunities during the construction phase. This	4

APPENDIX 7 – 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)
		opportunities during the construction phase.		will upskill local community members and lowering the high unemployment rate within the !Kai !Garib Local Municipality and more specifically, the Gamakor Township.	
17	Dust	Dust will be generated during the construction of the proposed development which may impact drivers and commuters.	-5	<p>The proposed site for development is located approximately 300m north of the N14 and adjacent to the existing Gamakor Settlement. Although the generation of dust will be temporary, the following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> <li>- Vehicle speed must be limited to 20km/h to reduce the amount of dust generated along the gravel roads (and especially in 20m of the drainage line which must be treated as an environmental sensitive area.</li> <li>- All material, being transported in the back of trucks, must be covered.</li> <li>- Should the mitigation measures be inadequate, water carts must be used on site along the access roads.</li> <li>- The applicant must comply with the National Dust Regulations (Government Notice R827, 2013) with regards to dust levels produced on site.</li> </ul>	-3
18	Visual	Site may be not aesthetic amid natural background.	-8	The proposed development may be visible from the N14 however, the proposed nature of the development will be in line with surrounding land use, namely the existing Gamakor Development.	-5
19	Noise	Noise will be generated during the construction phase.	-4	<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 complaints register must be maintained on-site. Any complaints received must be responded to and rectified accordingly.</li> <li>- 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>	-3



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20	Unsustainable sourcing of raw materials	Illegal sourcing of raw materials, such as gravel, sand, water etc. promoting illegal mining operations causing significant damage to the environment.	-8	<p>This impact can be fully mitigated. The following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> <li>- Contractors must obtain and provide proof of sustainable sourcing of materials brought to, and used on, site. These receipts must be retained on site.</li> <li>- The volume of material (e.g. gravel, sand, etc.) must be recorded. These records must be kept on site.</li> </ul>	-4
<b>OPERATION PHASE</b>					
21	Inadequate capacity and/or failure of the Wastewater Treatment Works (WWTW).	Impact on the receiving environment, especially the Orange river and its tributaries, due to the inability of the current sewage disposal method (VIPs) to adequately prevent the contamination of the surrounding environment.	-10	<p>The construction of a new WWTW was recommended by the Engineer's Services Report (Appendix 4B) as the current WWTW and associated infrastructure (e.g. oxidation ponds) can only treat 50% of the current sewer outflows. In addition to the capacity problems, the oxidation ponds are only 300 meters away from Extension 7. It is therefore recommended that a new WWTW be constructed. A 2.5ML (based on a future ADWWF of 2 413 kL/day) oxidation pond system is proposed. Due to concerns about the future expansion of Keimoes, it is proposed that the new WWTW be located 2.5km away from the Gamakor development. The WWTW will also have to be located at a low elevation relative to Keimoes in order to minimize pumping costs. The proposed location of the WWTW is shown in Figure 8 at No. 3. The entire Keimoes will be accommodated at the new location in the future</p> <p>Please note, mitigation includes the construction of the recommended WWTW.</p>	-5
22		Maintenance of WWTW resulting in contamination of receiving environment.	-10	<p>The construction of a new WWTW, as per the Draft Engineer's Services Report (Appendix 4B), is recommended to effectively treat sewage generated by the existing and future communities. The recommended WWTW must be managed and maintained to reduce the breakdown of equipment resulting in the temporary shut-down of the plant leading to overflows within the site or release of raw sewage into the receiving environment.</p>	-5



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)
				Please note: Mitigation includes the construction of the recommended WWTW	
23	Water supply	Increased pressure on water source for water supply	-6	<p>As per the Services Report (Appendix D4), based on the current state of the Gamakor bulk water infrastructure and calculated annual average daily demand (AADD), the following recommendations have been made:</p> <ul style="list-style-type: none"> <li>• The proposed construction of a new 3ML concrete storage reservoir to the north of Keimoes (Figure 9);</li> <li>• Construction of a new 4.2km rising main to supply the proposed 3ML concrete reservoir with potable water. The rising main will require that the supply from the WTW pump station be increased. It is proposed that one of the pumps will have to be replaced with a larger pump. The pump will be sized for a nominal flow of 327m<sup>3</sup>/h and 45 m of head.</li> <li>• Installation of a new 450mm diameter bulk water distribution main to the Gamakor development.</li> <li>• Repairs at the WTW, including the repair of mechanical and electrical components and the control system.</li> </ul> <p>The following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> <li>- All water pipelines, pumps, and associated equipment must be routinely checked and monitored for leakages/ malfunction. Any leakages or malfunctioning equipment must be immediately fixed/ rectified;</li> <li>- No hazardous substances/ dangerous goods are to be used/ stored in close proximity to water storage areas. Any contaminated water must be disposed of as hazardous waste at a registered hazardous waste disposal facility. A waste receipt is required as proof of safe disposal; and</li> <li>- Any equipment utilized must be placed on a hardened surface (e.g. concrete surface or batching board) to prevent the contamination of exposed soil.</li> </ul>	-4
24	Botanical	Encroachment of alien invasive vegetation throughout the site.	-5	<p>Portions of the site has been heavily invaded by the alien invasive <i>Prosopis</i> tree. Although these alien trees will be removed during the construction phase, alien invasive plant species present on site must be managed.</p> <p>The following mitigation measures must be implemented:</p>	-3

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>- The construction area must be kept free of alien invasive plants. Regular inspections of the site must take place. The following methods of alien plant control can be adapted:</li> <li>- Physical control – which includes pulling alien plants out by hand, using hand tools, and/ or mechanised tools, as well as ringbarking/ girdling;</li> <li>- To reduce alien plant encroachment, construction areas must be rehabilitated as soon as practically possible after the completion of construction activities.</li> <li>- The area previously disturbed by construction activities must be regularly inspected following rehabilitation where any alien invasive plant species must be removed.</li> </ul>	
<b>DECOMMISSIONING AND CLOSURE PHASE</b>					
25	Waste	Demolition of infrastructure resulting in waste accumulation on-site and surrounding area.	-7	The following mitigation measures must be implemented: <ul style="list-style-type: none"> <li>- All infrastructure which has been demolished must be consolidated, removed, and disposed of at a registered disposal facility. Waste receipts are required as proof of safe disposal;</li> <li>- The burying and/or burning of waste is strictly prohibited.</li> </ul>	-3
26	Soil and water sources	Exposed soil becoming prone to erosion resulting in the sedimentation of the drainage line.	-6	The following mitigation measures must be implemented: <ul style="list-style-type: none"> <li>- Previously transformed areas must be ripped and subsequently rehabilitated with indigenous vegetation characteristic of the Bushmanland Arid Grassland (LT). Previously implemented erosion mitigation measures must remain in place.</li> </ul>	-3