

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

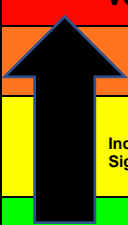
Note: i. As a baseline, impact rating values/scores are allocated taking the **worst-case** scenario into account i.e. with no mitigation. The baseline rating is compared with those after mitigation has been taken into account i.e. the post-mitigation rating. Post mitigation rating is used for the actual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

SIGNIFICANCE CRITERIA	Very High	High	Medium	Low	Negligible (very-low)
Value	16	8	4	2	1
Probability (likelihood) (P)	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.
Extent (E)	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
Duration (D)	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.
Magnitude (Intensity/ Severity) (M)	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
Receiving environment (Consequence): (RE)	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
Insignificant	Low	-2 to <-4
	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)

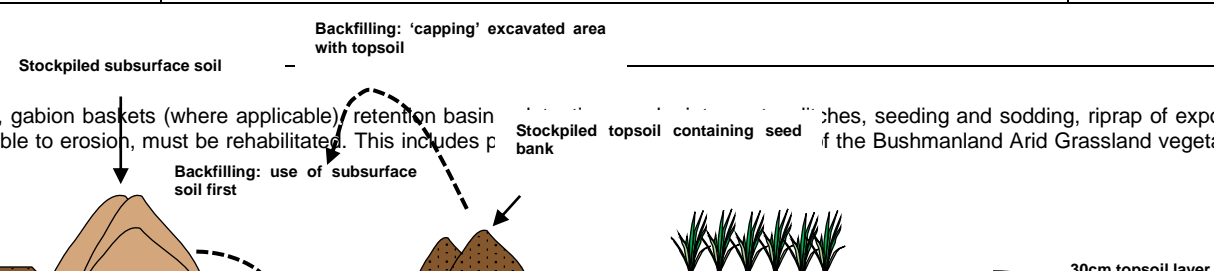
**PLEASE SEE RATING SCORING MATRIX*

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)
CONSTRUCTION PHASE					
1	Botanical	Geology & soils: Potential impact on special habitats	-3	<ul style="list-style-type: none"> 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. 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. Before any work is done protected tree species must be marked and demarcated. If any of these species are to be removed, the appropriate permits approvals must first be obtained. Lay-down areas or construction sites must be located within the construction footprint. No clearing of any area outside of the construction footprint may be allowed. All waste that had been illegally dumped within the footprint must be removed to a Municipal approved waste disposal site. An integrated waste management approach must be implemented during construction. Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites. Alien invasive Prosopis plants within the footprint (and immediate surroundings) must be removed in a responsible way (to ensure against regrowth). The Municipality must ensure that adequate waste and sewerage facilities and or services are established to service this community. 	-2
2		Land-use and cover: Potential impact on socio-economic activities.	-4		-3
3		Vegetation status: Loss of Least Threatened vegetation and associated habitat.	-4		-3
4		Conservation priority: Potential impact on protected areas, CBA's, ESA's or Centre's of Endemism.	-4		-3
5		Connectivity: Potential loss of ecological migration corridors.	-4		-2
6		Watercourses and wetlands: potential impact on natural watercourses and its ecological support areas.	-6		-3
7		Protected & endangered plant species: Potential impact on threatened	-6		-2

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		or protected plant species.			
8		Invasive alien plant species: Potential invasive plant infestation as a result of the activities.	-3		-2
9		Veld fire risk: Potential risk of veld fires as a result of the activities.	-2		-2
10		Cumulative impacts: Cumulative impact associated with proposed activity.	-4		-3
11		The "No-Go" option: Potential impact associated with the No-Go alternative.	-6		N/A
12		Traces of lithic occurrences across the development footprint.	-3	<ul style="list-style-type: none"> The lithic traces of low significance: 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. It must be noted that although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit 	-2
13	Heritage	The Grootdrink cemetery, situated outside of the development footprint.	-3		-2

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				(Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.	
14	Palaeontology	Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required.	-2	<ul style="list-style-type: none"> Site has a low palaeontological significance: 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 2018). 	-2
15	Freshwater	Cumulative impact of sewage and solid waste ending up in the drainage line and Orange River.	-7	Large quantities of raw sewage flowing down drainage lines. Household solid waste is not collected and removed according to standard municipal operating procedures. Large quantities of waste accumulate in the townships and the streets. Large quantities of waste end up in the drainage lines as well. The significant combined impact of the various developments stem from the sewage and waste issues must be addressed. Adequate municipal services should resume. Anthropogenic activities impact ecosystem drivers or responses and this can have a knock-on effect on all of the other drivers and responses. This, in turn, will predictably impact on	-3
16		Impact of graveyards on the drainage line riparian zone	-6		-3

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17		Animal husbandry (i.e. overgrazing and trampling)	-6	<p>the ecosystem services. The WULA and the EIA must provide mitigation measured for these impacts. As per the Engineer's Services Report (Appendix 4B), recommended bulk sewer infrastructure upgrades (Figure 28) include;</p> <ul style="list-style-type: none"> • Construction of two new sewer pump stations capable of delivering 73 L/s direct to the Wastewater Treatment Plant; • New 250mm diameter and 200mm diameter Class 6 PVC pipelines (750m & 1200m) between the pump stations and a upgraded Waste Water Treatment Plant (oxidation ponds); and • Upgrading of the Wastewater Treatment Plant (oxidation ponds) to a capacity of 1.1ML per day. <p>A prominent tree line on the site that resembles that of a drainage line. This is entirely artificial, as it is the result of raw sewage being dumped from tanker trucks on the site and on its flow path down the incline has created the conditions for the trees to establish themselves. This tree line starts as abruptly as it ends and is not connected to any other drainage line. The locality on which the dumping takes place and the flow path is clearly visible. This malpractice must have been going on for years, judging from the height of the trees. Since the tree line is not there because of natural circumstance, it cannot have any conservation status in terms of the requirements of the WULA and Fresh Water Report. Meanwhile the WWTW is lying idle. Initially it was used but judging from the vegetation growth in the intake structure, it must have been idle for some time now. The ponds are partly filled to entirely empty and overgrown with reeds. The WWTW and concomitant infrastructure was constructed at great cost. no mitigation measures are proposed where the loss of the drainage line is of little significance. The significant combined impact of the various developments stem from the sewage and waste issues must be addressed. Adequate municipal services should resume. Therefore, a waste management plan must be compiled and implemented to service the expected increase in sewage production and solid waste production.</p>	-2
18	Soil	On site erosion due to improper management of	-6	All construction activities must be carried out with caution. The following mitigation measures must be implemented:	-3

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		stormwater during construction. Exposed platforms and trenches excavated for any pipeline are susceptible to erosion during the construction phase.		<ul style="list-style-type: none"> - Erosion mitigation measures must be implemented¹; - No storage of materials, including stockpiling of any material, is permitted within 32m of the drainage line; - Any soil which has been exposed due to construction activities must be rehabilitated to prevent erosion; - 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; - 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; - 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; 	
19		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"> - 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); - Trenches must be excavated in sections and backfilled once the pipeline has been laid. The excavated trench must not remain open indefinitely; - Any pooled water in open trenches must be pumped out. - Trenches must be demarcated; - Material must be backfilled in the order it was excavated (i.e. backfilled first with subsoil followed by topsoil). Backfilled trenches must be rehabilitated. 	-3
					

¹ Erosion control methods include, but are not limited to, silt fences, gabion baskets (where applicable), retention basin embankments, erosion mats and mulching. Exposed areas, susceptible to erosion, must be rehabilitated. This includes p... of the Bushmanland Arid Grassland vegetation type (where the ecosystem type was impacted), to stabilize the soil.

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20	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"> - All construction activities, within close proximity to the drainage line, must be carried out with extreme caution; - Erosion mitigation measures must be implemented¹; - The proposed access road must be strictly adhered to. No ad hoc roads are permitted; - Excluding the proposed access road, the drainage line must be demarcated as a “no-go” zone; - No storage of materials, including stockpiling of any material, is permitted within 32m of the drainage line; - Any soil which has been exposed due to construction activities must be rehabilitated to prevent erosion; - 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; 	-3

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				<ul style="list-style-type: none"> - 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; - 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; - 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; - The contractor must check the site for erosion after each rainfall event and rectify any areas eroded/ susceptible to erosion. 	
21	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"> - Appropriate and sufficient toilet facilities (1 toilet per 15 employees) must be provided by the contractor; - All toilet facilities must be checked on a daily basis; - All toilet facilities must be emptied and cleaned on a weekly basis or as agreed (in writing) with the ECO and DENC. - A registered waste removal company must remove sewage waste from the site or be disposed of at a permitted disposal facility; and - Toilet waste receipts must be obtained, and kept on site, for proof of safe disposal. 	-3
22		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"> - Littering will not be permitted on site; - 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; 	-3

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				<ul style="list-style-type: none"> - Waste must be removed from site and disposed of at a registered waste disposal site; - Safe disposal slips for the disposal of all waste must be obtained and kept on site as proof of safe disposal. 	
23	Socio-economic	Creation of short-term employment opportunities during the construction phase.	4	The construction of Grootdrink Housing Project will create employment and skills development opportunities during the construction phase. This will upskill local community members and lowering the high unemployment rate within the !Kheis Local Municipality and more specifically, the Grootdrink Settlement.	4
24	Dust	Dust will be generated during the construction of the proposed development which may impact drivers and commuters.	-4	<p>The proposed site for development is located approximately 50m west of the N10 and adjacent to the existing Grootdrink Settlement. Although the generation of dust will be temporary, the following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> - 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. - All material, being transported in the back of trucks, must be covered. - Should the mitigation measures be inadequate, water carts must be used on site along the access roads. - The applicant must comply with the National Dust Regulations (Government Notice R827, 2013) with regards to dust levels produced on site. 	-2
25	Visual	Site may be not aesthetic amid natural background.	-4	A section of the proposed development will be visible from the N10 however, the proposed nature of the development will be in line with surrounding land use, namely the existing Grootdrink Development.	-3
26	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"> - A complaints register must be maintained on-site. Any complaints received must be responded to and rectified accordingly. - The ECO must be notified of any complaints; 	-3

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				<ul style="list-style-type: none"> - All construction vehicles must be fitted with standard silencers. All silencers must be maintained. All machinery used on site must have suppressors. - Working hours must be limited to and strictly adhered to standard daylight working hours (08h00-17h00). 	
27	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"> - Contractors must obtain and provide proof of sustainable sourcing of materials brought to, and used on, site. These receipts must be retained on site. - The volume of material (e.g. gravel, sand, etc.) must be recorded. These records must be kept on site. 	-4
OPERATION PHASE					
28	Water supply	Increased pressure on water source for water supply	-6	<p>Refer to Engineer's Services Report (Appendix 4B) for more information of proposed services.</p> <p>The following mitigation measures must be implemented:</p> <ul style="list-style-type: none"> - 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; - 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 - Any equipment utilized must be placed on a hardened surface (e.g. concrete surface or batching board) to prevent the contamination of exposed soil. 	-4
29	Sewage management	Increased production of sewage which requires effective management	-11	<p>Houses in the Grootdrink village is currently serviced by conservancy tanks or VIP toilets. There are presently no waterborne sewer systems. The conservancy tanks are currently emptied by a honey sucker truck and spilt in an oxidation pond system to the west of the village. Proposed upgrades include;</p>	-4

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				<ul style="list-style-type: none"> Construction of two new sewer pump stations capable of delivering 50 l/s direct to the Wastewater Treatment Plant. New 250mm diameter and 160mm diameter Class 6 PVC pipelines (1600m & 1800m) between the pump stations and a upgraded Waste Water Treatment Plant (oxidation ponds). Upgrading of the Wastewater Treatment Plant (oxidation ponds) to a capacity of 0.7MI per day. 	
30	Solid waste management	Increased pressure on municipal waste removal services and illegal dumping of waste	-9	All waste generated during the operational phase must be collected, consolidated, stored, removed, and disposed of at a registered disposal facility. Provisions must be made for these solid waste management activities.	-4
DECOMMISSIONING AND CLOSURE PHASE					
31	Waste	Demolition of infrastructure resulting in waste accumulation on-site and surrounding area.	-7	The following mitigation measures must be implemented: - 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; - The burying and/or burning of waste is strictly prohibited.	-3
32	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: - 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.	-3