

APPENDIX F

Impact Assessment

IMPACT ASSESSMENT

Proposed construction of an abstraction works and pipeline from the Orange River to the Plangeni Settlement near Keimoes, Northern Cape Province

Applicant: Kai !Garib Municipality
MDA Ref No: 41056
Date: June 2023



Town & Regional Planners,
Environmental & Development
Consultants

Physical Address: 9 Barnes Street,
Westdene, Bloemfontein, 9301
Postal Address: P.O. Box 100982,
Brandhof, 9324
Tel: 051 447 1583, Fax: 051 448 9839
E-mail: admin@mdagroup.co.za

1. METHODOLOGY

1.1. Impact assessment must take into account the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages from planning, through construction and operation to the decommissioning phase. Where necessary, the proposal for mitigation or optimization of an impact is noted. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

1.2. A rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each issue the following criteria is used:

Table 1: Criteria for the classification of an impact		
Nature	A brief description of the environmental aspect being impacted upon by a particular action or activity is presented.	
Extent (Scale)	Considering the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact.	
	Site	Within the construction site
	Local	Within a radius of 2 km of the construction site
	Regional	Provincial (and parts of neighbouring provinces)
	National	The whole of South Africa
Duration	Indicates what the lifetime of the impact will be.	
	Short-term	The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase
	Medium-term	The impact will last for the period of the construction phase, where after it will be entirely negated
	Long-term	The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter
	Permanent	The only class of impact which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient

Table 1: Criteria for the classification of an impact

Intensity	Describes whether an impact is destructive or benign. It is important to note that the status of an impact is assigned based on the status quo – i.e. should the project not proceed. Therefore not all negative impacts are equally significant.	
	Low	Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.
	Medium	Effectuated environment is altered, but natural and social functions and processes continue albeit in a modified way.
	High	Natural, cultural and social functions and processes are altered to extent that they temporarily cease
	Very high	Natural, cultural and social functions and processes are altered to extent that they permanently cease
Probability	Describes the likelihood of an impact actually occurring.	
	Improbable	Likelihood of the impact materializing is very low
	Possible	The impact may occur
	Highly probable	Most likely that the impact will occur
	Definite	Impact will certainly occur
Significance	Significance is determined through a synthesis of impact characteristics. It is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.	
	Low impact	No permanent impact of significance. Mitigatory measures are feasible and are readily instituted as part of a standing design, construction or operating procedure
	Medium impact	Mitigation is possible with additional design and construction inputs
	High impact	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment
	Very high impact	The design of the site may be affected. Intensive remediation as needed during construction and/or operational phases. Any activity which results in a “very high impact” is likely to be a fatal flaw

Table 1: Criteria for the classification of an impact

Status	Denotes the perceived effect of the impact on the affected area.	
	Positive	Beneficial impact
	Negative	Deleterious or adverse impact
	Neutral	Impact is neither beneficial nor adverse

The suitability and feasibility of all proposed mitigation measures will be included in the assessment of significant impacts. This will be achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented.

2. DESCRIPTION AND ADDRESSING OF POSSIBLE IMPACTS, ISSUES AND CUMULATIVE IMPACTS

Developments such as these do have, like many other types of developments, various direct but also indirect impacts on the environment. These impacts have to be managed in order to have the minimum environmental impact and the maximum benefit to man.

Issues identified during the Basic Assessment process are discussed and assessed below in Table 2 and include recommended mitigation measures:

Table 2: Possible Impacts and Recommended Mitigation Measures

1. VEGETATION DESTRUCTION						
Construction activities and trenching along the pipeline route will lead to vegetation destruction. An Ecological and Wetland Assessment was undertaken to determine the vegetation along the site and identify possible protected plant species. The Ecological and Wetland Assessment is included as Appendix D1 in the Basic Assessment Report (BAR).						
Assessment						
Mitigation Status	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Permanent	High	Definite	Medium	Negative
With Mitigation	Site	Long term	Medium	Highly probable	Low	Negative
Recommended Mitigation Measures						
Phase	Description of recommendation					
Planning Phase	<ul style="list-style-type: none"> The design of the abstraction works should aim to minimise the impact on the flow regime and should incorporate erosion structures such as rock-packs or other suitable structures to prevent erosion around the inlet pipeline. A suitably qualified ecologist or botanist should undertake a walkthrough survey of the pipeline route prior to construction to identify and locate all protected plants that will be affected by construction. Where the two tree species (<i>Boscia albitrunca</i>, <i>Boscia foetida</i>) will be affected and will require removal, the necessary permits will have to be obtained to do so. Several widespread and common protected species are of lower conservation value and permits should be obtained to remove any of these that will be affected by the pipeline. These species consist of <i>Ruschia</i> sp., <i>Ruschia cononotata</i>, <i>Mesembryanthemum coriarium</i>, and <i>Mesembryanthemum guerichianum</i>. A few other succulents are considered less common, has a higher conservation value and it is recommended that permits be obtained where these will be affected by the pipeline construction and then moved to adjacent areas where they will remain unaffected. These species are <i>Aloe claviflora</i>, <i>Aloe gariensis</i>, <i>Aloe hereroensis</i> and <i>Orbea lutea</i> subsp. <i>vaga</i>. 					

Construction phase	<ul style="list-style-type: none">• Removal of vegetation should also be kept to a minimum.• The disturbance caused by construction will also cause susceptible conditions for further establishment of exotics and the current survey has also indicated this to be the case. It is therefore recommended that weed eradication be initiated at the construction sites and maintained until rehabilitation has been completed.• The footprint of disturbance and clearance of vegetation must always be kept to a minimum. This is especially relevant where clearance of any riparian vegetation is required along the Orange River or watercourses affected by the pipeline will take place.• Care should be taken to limit unnecessary destruction of the surrounding natural vegetation.• All human movement and activities must be contained within designated construction areas and the planned site access road in order to prevent peripheral impacts on surrounding natural habitat.
Post construction phase and rehabilitation phase	<ul style="list-style-type: none">• Adequate monitoring of weed and invasive species establishment and their continued eradication must be maintained (Appendix B of the Ecological and Wetland Assessment). Where category 1 and 2 weeds occur, they require removal by the property owner according to the Conservation of Agricultural Resources Act, No. 43 of 1983 and National Environmental Management: Biodiversity Act, No. 10 of 2004.• Vegetation should be allowed to re-establish naturally over disturbed areas.

2. LOSS OF TOPSOIL

Due to trenching and construction activities, topsoil will need to be stored for reuse during the rehabilitation phase. These stockpiles need to be managed to prevent loss of topsoil and erosion.

Assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Long-term	Medium	Highly probable	High	Negative
With Mitigation	Site	Medium-term	Low	Possible	Low	Neutral

Recommended Mitigation Measures

Phase	Description of recommendation
Planning Phase	<ul style="list-style-type: none"> The design of the abstraction works should aim to minimise the impact on the flow regime and should incorporate erosion structures such as rock-packs or other suitable structures to prevent erosion around the inlet pipeline.
Construction phase	<ul style="list-style-type: none"> The soil surface should also be re-instated to the virgin soil level and not depressed or elevated as this will promote erosion and cause flow barriers. When excavating trenches the upper 30 cm, or topsoil, should be removed together with the vegetation and stored on the site. These should then be replaced on top of the installed pipeline. Subsoil should be used as backfilling and not as top dressing. The soil surface should also be re-instated to the virgin soil level and not depressed or elevated as this will promote erosion and will hamper integration with the surrounding natural areas. Topsoil stockpiles should be stored in an approved location and in an approved manner for later re-use in the rehabilitation process, for example: <ul style="list-style-type: none"> - Bricks may be placed around the stockpiles, to limit the loss thereof due to rainy events. - Stockpiles should not be higher than 2 m. - The gradient of stockpiles should not be greater than 1:1.5. Dust control measures will be implemented if nuisance dust generation occurs during the construction period. Storm water measures will be implemented in order to manage storm water and this will also prevent erosion. Visual inspections for the occurrence of erosion should be undertaken on a weekly basis during the construction phase.

Post construction phase and rehabilitation phase	<ul style="list-style-type: none">• If erosion is evident, proper erosion control measures should be implemented as soon as possible.• Return and spread topsoil over rehabilitated areas.• The areas must be rehabilitated.• Any excavated rock may not be left in heaps and must be removed or distributed evenly over the terrain to represent a natural environment. Compacted areas must be ripped. Construction roads not being utilised afterwards must be rehabilitated.• After rehabilitation any excess soil or material should be removed and disposed of at a registered disposal facility.• Erosion should be prevented as far as possible and attended to, as serious erosion may occur at barren areas.• Vegetation should be allowed to re-establish naturally over rehabilitated areas.
--	--

3. IMPACT ON ANIMAL LIFE

The impact that the proposed pipeline will have on the mammal population in the area is mainly concerned with the loss of habitat. The impact will also be mostly temporary as long as adequate rehabilitation is undertaken.

Assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Permanent	Medium	Highly probable	Medium	Negative
With Mitigation	Local	Medium-term	Low	Possible	Low	Neutral

Recommended Mitigation Measures

Phase	Description of recommendation
Planning Phase	<ul style="list-style-type: none"> • None
Construction phase	<ul style="list-style-type: none"> • The hunting, capturing and trapping of fauna should be prevented by making this a punishable offense during the construction phase of the development. • Open trenches may act as pitfall traps to mammals, reptiles and amphibians and trenches should be daily monitored for trapped animals which should be removed promptly. • In the event of poisonous snakes or other dangerous animals encountered on the site an experienced and certified snake handler or zoologist must remove these animals from the site and re-locate them to a suitable area.
Post construction phase and rehabilitation phase	<ul style="list-style-type: none"> • None

4. IMPACT ON SURFACE WATER

The impact on the Orange River and associated riparian zone, as well as several small watercourses that drain toward the Orange River, needs to be limited. The Ecological and Wetland Assessment included as Appendix D1 in the BAR includes a Risk Assessment.

Assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Regional	Permanent	High	Possible	High	Negative
With Mitigation	Site	Medium-term	Low	Improbable	Low	Neutral

Recommended Mitigation Measures

Phase	Description of recommendation
Planning Phase	<ul style="list-style-type: none"> Given the scope of the abstraction works it is unlikely to involve the removal of large volumes of water from the river and should therefore not have any significant impact in terms of flow regime and functioning of the river. The necessary authorisations should be obtained from the Department of Water and Sanitation (DWS). The alignment of the pipeline route should attempt to avoid being placed directly within the main channel of the southern drainage system as this will result in significantly higher impacts.
Construction phase	<ul style="list-style-type: none"> The footprint of the abstraction pipeline and pump plinths should be retained, as far as possible, to a footprint of 100 m². Disturbance of the banks should be kept to a minimum and erosion remediated where it occurs. Where the pipeline will result in the disturbance of these small watercourses, disturbance should be kept to a minimum and the removal of vegetation should also be kept to a minimum. The disturbance caused by construction will also cause susceptible conditions for further establishment of exotics. It is therefore recommended that weed eradication be initiated where the pipeline will cross over these watercourses and continued until rehabilitation of the pipeline route has been completed. The geomorphology of the small watercourses (channel, banks and bedrock) should also be re-instated as far as possible, which will also speed up the stabilisation of these systems as it will resemble the downstream watercourse morphology.

	<ul style="list-style-type: none">• Given that these watercourses drain by means of flash floods, substantial erosion may also occur and where this is found to be problematic, the appropriate structures should also be implemented which may include rock-packs, gabions or contouring.• Only removed vegetation and topsoil should be utilised to rehabilitate the bed of the affected watercourses.• Storm water measures will be implemented in order to manage storm water and this will also prevent erosion.• Daily inspections for the occurrence of surface water pollution and soil pollution are to be undertaken, during the construction phase.• Best practices should be implemented in the case of spillages / pollution / erosion, especially at or near watercourses.
Post construction phase and rehabilitation phase	<ul style="list-style-type: none">• After construction has ceased all construction materials should be removed from the area.• All waste is to be removed from site.

5. POLLUTION

The risk of pollution is to be limited at all times. This includes litter and other waste, as well as the use of chemicals, cement mixing etc., that could pose a risk to the environment.

Assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Long-term	High	Highly probable	High	Negative
With Mitigation	Site	Short-term	Low	Possible	Low	Neutral

Recommended Mitigation Measures

Phase	Description of recommendation
Planning Phase	<ul style="list-style-type: none"> • None
Construction phase	<ul style="list-style-type: none"> • Visual inspections for the occurrence of pollution should be undertaken regularly. • Best practices should be implemented in the case of spillages / pollution / erosion. • No waste (general / construction / potential hazardous / etc.) may be dumped in the veld / water features. • Suitable waste bins etc. will be available on site for the temporary disposal of waste. • Waste will be removed from site and disposed of at an authorised landfill site. • DWS should be notified of any spillage / pollution within 24 hours of occurrence within water resources. • Record should be kept on site during the construction phase to indicate date of visual inspection, any spillages observed, and manner in which spill was treated.
Post construction phase and rehabilitation phase	<ul style="list-style-type: none"> • All temporary infrastructure related to the construction phase will be removed from site. • Temporary concrete surfaces (if any) will be removed and compacted areas ripped. • No waste will be dumped on site and any waste occurring on site will be removed and disposed of according to best practices. • Proper erosion mitigation measures should be implemented, where necessary.

6. VISUAL IMPACT

The visual impact of the proposed abstraction works and pipeline in the landscape is expected to be low as the pipeline will be placed under the ground and the abstraction works is not of a large scale nor expected to be visually intrusive, considering the visual character of the area.

Assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Permanent	Medium	Definite	Medium	Negative
With Mitigation	Local	Long-term	Medium	Definite	Low	Negative

Recommended Mitigation Measures

Phase	Description of recommendation
Planning Phase	<ul style="list-style-type: none"> • None
Construction phase	<ul style="list-style-type: none"> • No waste may be dumped in the veld / watercourses.
Post construction phase and rehabilitation phase	<ul style="list-style-type: none"> • All temporary infrastructure related to the construction phase will be removed from site. • Temporary concrete surfaces (if any) will be removed and compacted areas ripped.