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 CRITIERIA	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/ Insignificant	-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)**

**INSERT RATING SCORING MATRIX*

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)**
CONSTRUCTION PHASE					
1	**Freshwater Resources**	Loosening of soil during construction phase, washing of soil down the drainage line and into the Oorlogskloof River during a storm event	High (Negative)	- Compact back-fill. - Use suitable back-fill material. - Construction only during the dry season. -	Low (Negative)
2		Building material, rubble and litter washing down the drainage line and into the Oorlogskloof River	High (Negative)	- Best industry practices, due diligence, - cleaning up of site following construction	Low (Negative)
3		Construction of Reno matrasses and gabions, further downstream erosion.	High (Negative)	- Construct flood-calming structures downstream of culverts	Low (Negative)
4		Leaks in pipeline, formation of wetlands where it should be naturally dry	High (Negative)	- Maintain infrastructure, preventative maintenance - Regular inspection of infrastructure - Immediately repair pipeline	Low (Negative)

5	**Botanical**	Possible impact on socio-economic activities	Low (Negative)	- 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. - The layout of the development footprint should take the sensitivity map (see Figure 16 of the Botanical Impact Assessment (Appendix D3)) into account. - Search & rescue as described in Table 4, must be done before construction may commence; - Lay-down areas or construction sites must be located on areas already disturbed; - No unnecessary clearing of any area outside of the construction footprint may be allowed. - An integrated waste management approach must be implemented during construction. • Construction related general and hazardous waste may only be disposed of at suitably approved waste disposal sites. The following site-specific recommendations were made to minimise impact within the more sensitive areas: - **Kreitzberg Area (aboveground pipelines)**: In the Kreitzberg area on the Farms Aurets Kloof & Vlakke Fontein, consideration should be given to place the pipelines above ground. The reasoning being that the potential impact on natural vegetation can be negated to a very large degree. In dry semi-desert areas, rehabilitation can take a long time. However, this will lead to a long term visual impact and may impact on the free movement of livestock on the property (land-owner approval should be obtained – whichever option is taken). - **Akkerendam Nature Reserve (Routes**): Figure 13 shows two potential pipeline route options for linking the pipeline from the northwest of Calvinia to the existing water treatment works (WTW). The red route (which should be the preferred route), will follow the outer edge of the existing build footprint of Calvinia and could link up with the southern and eastern pipeline (existing) to enter the WTW from the east. This route will NOT impact on the Akkerendam NR and will have only a small impact on remaining natural veld (<200 m). The proposed yellow route	Insignificant
6		Vegetation Status: Loss of vulnerable or endangered vegetation and associated habitat.	Medium Low (Negative)		Low (Negative)
7		Conservation Priority Areas: Possible impact on Protected areas, CBA, ESA or centres of endemism.	Medium Low (Negative)		Low (Negative)
8		Connectivity: Possible loss of ecological migration corridors.	Low (Negative)		Low (Negative)
9		Protected & endangered plant species: Potential impact on threatened or protected plant species.	Medium Low (Negative)		Low (Negative)
10		Invasive Alien Species: Possible alien infestation as a result of activities.	Low (Negative)		Insignificant
11		Veld Fire: The risk of veld fires as a result of the proposed activities.	Medium Low (Negative)		Insignificant
12		No-Go Alternative: Potential impact associated with the No-Go alternative.	Low (Negative)		

				will run along the existing entrance route to the WTW through the Akkerendam NR (for about 3.5 km). This will mean the pipeline will have an impact on remaining natural veld for almost the whole of the 3.5 km, which is not preferable, especially within a Nature Reserve in a semi-desert region where rehabilitation will be very slow. - Larger **water courses along the Toren Road**: A number of water courses cross this road from south (the Hantam Mountains) across the road into the valley below (to the north). A number of larger trees (most notably *Searsia lancea*) have established itself (mostly in the downslope riparian corridor) along these streams. The main objective should be to minimise the impact on larger indigenous trees (next to the water courses). They are mostly on the downslope (or northern side of the road verge). Unfortunately, the southern or upper slope is in places very narrow and steep, which might result in future erosion problems. The location of the pipeline should thus be a careful consideration between the protection of larger indigenous trees and the minimisation of future erosion problems.	
13	**Palaeontological resources**	Loss and/or damage to potential fossils within the construction footprint	Low (Negative)	- No areas of particular palaeontological sensitivity are identified. - Notably, where the new water main pipeline is below ground in the superficial Q-s2 deposits, it replaces the pipeline in the existing disturbed material of the shallow trench, further decreasing the potential for fossil finds. - Notwithstanding, although improbable, a chance occurrence of fossil bone material cannot be entirely dismissed and when fossils are found in low-sensitivity formations, they are often very significant additions to the geological understanding of the area. - The monitoring of excavations by on-site personnel is recommended during installation of the upgraded water supply infrastructure, under supervision of the Environmental Control Officer (ECO). As part of Environmental and Health & Safety awareness training, personnel must be instructed to be alert for the occurrence of fossil bones, archaeological material and of unrecorded burials. - A basic Fossil Find Procedure for incorporation into the Environmental Management Programme for the project.	Insignificant
14	**Archaeological resources**	The one occurrence of MSA core, located on the Farm	Low (Negative)	No significant heritage sites or features were identified within the surveyed sections of the BH4-7 borehole developments, and P2-4 pipeline trajectories. The isolated Middle Stone Age cultural material identified at BH3	Low (Negative)

		No. 114, near BH3, (Cal_Phase3_9).		(Cal_Phase3_9) is not conservation worthy. No further mitigation is recommended with regards to these resources. Therefore, from a heritage point of view, we recommend that the proposed development can continue at BH3-7, P2-4.	
15		Twelve occurrences of historical features and material recorded on the Farm Aurets Kloof No. 854, in a 70-160m radius from BH 1 (Cal_S2_4) and BH2 (Cal_S2_3).	Medium (Negative)	The historical farmscape situated close to BH 1 (Cal_S2_4) to BH2 (Cal_S2_3) borehole developments and the first section of the P1 pipeline is of medium to high heritage significance (sites AUK002-013). These resources would require costly mitigation before destruction. It is, therefore, our recommendation that a buffer/safety zone should be implemented and that development should not exceed a 20m radius from the boreholes BH1 and BH2. Including all development activities and vehicle use associated with the development phase.	Medium (Negative)
16		Three graves enclosed by stonewalls, AUK001, less than 50m from BH1 (Cal_S2_4).	High (Negative)	The small graveyard (AUK001) situated close to the BH1 (Cal_S2_4) borehole development and the first section of the P1 pipeline is graded as IIIB and is of High Local Significance. These resources would require costly mitigation before destruction. It is, therefore, our recommendation that a buffer/safety zone should be implemented and that development should not exceed a 20m radius from the borehole BH1. This includes all development activities and vehicle use associated with the development phase.	High (Negative)
17		The two occurrences of historical material identified on Parcels 1447 and 300.	Low (Negative)	No mitigation required	Low (Negative)
18	Socio-economic	Creation of short- and long-term employment opportunities.	Low (Positive)	The construction of the Komaggas pipeline will have positive impacts on the socio-economic dynamics relative to direct and indirect, short- and long-term employment opportunities and skills development.	Low (Positive)
19	Dust	Dust will be generated during the construction of the proposed development which may impact drivers on the R355 and R27.	Low (Negative)	The following mitigation measures must be implemented: - Stockpiled material must be covered with a plastic sheet, tarp or similar in windy conditions; - A water cart must be used on utilized roads to reduce construction-related dust generation; - If dust generation is not adequately mitigated by proposed measures, shade netting must be installed along the eastern boundary of the site to reduce the amount of dust being blown onto the N7 from the construction site; - Sprinklers may need to be installed to reduce the generation of dust by construction activities.	Low (Negative)

20	Visual	Site may be not aesthetic amid natural background.	Low (Negative)	This impact cannot be avoided. Mitigation measures as per the EMP	Low (Negative)
21	Traffic	Increase in trucks and other construction vehicles.	Low (Negative)	Given the location of the site, it is likely that construction traffic will impact road users however the following mitigation measures will be implemented: - The site must be made easily accessible to all construction traffic travelling along main routes; - If required, point's men must be in attendance to direct traffic when heavy vehicles are accessing or leaving the site to ensure that there are no accidents.	Low (Negative)
22	Noise	Noise will be generated during the construction phase.	Low (Negative)	Any noise generated by construction activities will be a temporary impact however, the following mitigation measures will be implemented: - 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; - 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).	Low (Negative)
OPERATION PHASE					
23	Socioeconomic	Creation of short- and long-term employment opportunities.	Low (Positive)	This is a positive impact. The construction and operation of the pipeline will have positive impacts on the socio-economic dynamics relative to direct and indirect, short- and long-term employment opportunities and skills development.	Low (Positive)
24		Improvement access to freshwater for the community.	Medium (Positive)	Proper management and maintenance of the pipeline	Medium (Positive)