Appendix F: Impact Tables

1.1 IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN AND CONSTRUCTION PHASE OF THE PROJECT

The Planning and Design and the Construction Phase of the project only deals with the removal of the flood attenuation earth berm, the construction of a new earth berm to protect the low lying areas of Alexander Bay and the sports fields from inundation during floods once the existing berm has been removed, and the breaching of the sand berm across the flood channel to the south of the Orange River Mouth and the breaching from time to time of the berm across the mouth of the Orange River. The removed material from the berm is to be used to fill old mine workings within the town of Alexander Bay and within the Alexkor mine area.

The following tables outline the methodology used to assess the significance of the potential environmental impacts associated with the proposed project.

1. The significance of each impact identified was assessed according to the following variables (evaluation components)

- **EXTENT** (spatial scale);
- **MAGNITUDE**;
- **DURATION** (time scale);
- **PROBABILITY** of occurrence;
- **IRREPLACEABLE** loss of resources; and
- the **REVERSIBILITY** of the impact.

2. Each impact was assessed in terms of each of the above variables, in terms of scale of severity as described in **Tables 1 and Table 2 below.** Cumulative impacts were also assessed and ranked according to their potential severity.

3. After the evaluation components (variables) were ranked on a scale for each impact, the significance of the potential impact was calculated using the following formula:

SP (significance points) = (magnitude + duration + extent + irreplaceable + reversibility) x probability (The maximum value is 150).

Table 1: Evaluation components, ranking scales and descriptions (criteria).	
Evaluation component	**Ranking scale and description (criteria)**
MAGNITUDE of NEGATIVE IMPACT (at the indicated spatial scale)	**10 - Very high**: Biophysical and/or social functions and/or processes might be *severely* altered. **8 - High**: Biophysical and/or social functions and/or processes might be *considerably* altered. **6 - Medium**: Biophysical and/or social functions and/or processes might be *notably* altered. **4 - Low**: Biophysical and/or social functions and/or processes might be *slightly* altered. **2 - Very Low**: Biophysical and/or social functions and/or processes might be *negligibly* altered. **0 - Zero**: Biophysical and/or social functions and/or processes will remain *unaltered.*
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	**10 - Very high (positive)**: Biophysical and/or social functions and/or processes might be *substantially* enhanced. **8 - High (positive)**: Biophysical and/or social functions and/or processes might be *considerably* enhanced. **6 - Medium (positive)**: Biophysical and/or social functions and/or processes might be *notably* enhanced. **4 - Low (positive)**: Biophysical and/or social functions and/or processes might be *slightly* enhanced. **2 - Very Low (positive)**: Biophysical and/or social functions and/or processes might be *negligibly* enhanced. **0 - Zero (positive)**: Biophysical and/or social functions and/or processes will remain *unaltered.*
DURATION	**5 - Permanent** **4 - Long term**: Impact ceases after operational phase/life of the activity. **3 - Medium term**: Impact might occur during the operational phase/life of the activity. **2 - Short term**: Impact might occur during the construction phase – (up to 3 years). **1 - Immediate**
EXTENT (or spatial scale/influence of impact)	**5 - International**: Beyond National boundaries. **4 - National**: Beyond Provincial boundaries and within National boundaries. **3 - Regional**: Beyond 5 km of the proposed development and within Provincial boundaries. **2 - Local**: Within 5 km of the proposed development. **1 - Site-specific**: On site or within 100 m of the site boundary. **0 -** None
IRREPLACEABLE loss of resources	**5 – Definite** loss of irreplaceable resources. **4 – High** potential for loss of irreplaceable resources. **3 – Moderate** potential for loss of irreplaceable resources. **2 – Low** potential for loss of irreplaceable resources. **1 – Very low** potential for loss of irreplaceable resources. **0 - None**
REVERSIBILITY of impact	**5 –** Impact **cannot** be reversed. **4 – Low** potential that impact might be reversed. **3 – Moderate** potential that impact might be reversed. **2 – High** potential that impact might be reversed. **1 –** Impact **will be** reversible. **0 –** No impact.

PROBABILITY (of occurrence)	**5 - Definite**: >95% chance of the potential impact occurring. **4 - High probability**: 75% - 95% chance of the potential impact occurring. **3 - Medium probability**: 25% - 75% chance of the potential impact occurring **2 - Low probability**: 5% - 25% chance of the potential impact occurring. **1 - Improbable**: <5% chance of the potential impact occurring.
CUMULATIVE impacts	**High**: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Medium**: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Low**: The activity is localised and might have a negligible cumulative impact. **None**: No cumulative impact on the environment.

Once the evaluation components have been ranked for each impact, the significance of potential impact are assessed (or calculated) using the following formula:
SP (significance points) = (magnitude + duration + extent + irreplaceable + reversibility) x probability
The maximum value is 150 SP (significance points). The unmitigated and mitigated scenarios for each environmental impact should be rated as per **Table 2** below.

Table 2: Definition of significance ratings (positive and negative)

Significance Points	Environmental Significance	Description
125 – 150	**Very high (VH)**	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	**High (H)**	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	**Medium-high (MH)**	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be re-evaluated at.
41 – 74	**Medium (M)**	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
0 – 40	**Low (L)**	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	**Positive impact (+)**	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

(**Note:** *Evaluation components: M – Magnitude; D – Duration; E – Extent; I - Irreplaceable; R – Reversibility; P – Probability; S – Significance; SP – Significance Points)*																				
CONSTRUCTION PHASE		**ENVIRONMENTAL SIGNIFICANCE**																		**MITIGATION**
		BEFORE MITIGATION									**AFTER MITIGATION**									
PROJECT ACTIVITY / ALTERNATIVE	**NATURE OF IMPACT**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	
Impact on biological aspects: Fauna and Flora																				
Preferred Alternative -Removal of Earth Berm -Construction of Earth Berm -Breaching of ORM	Biological impacts (impact on estuary, wetland, saltmarsh, river mouth) and construction-phase impacts on flora and fauna	2	2	3	0	2	4	**36**	**L**	**Low**	2	2	3	0	1	4	**32**	**L**	**Low**	•Ensure that disturbed areas are protected from wind erosion as soon as possible after clearing. • Shade netting barriers can be erected to slow wind down, thereby reducing dust on bare surfaces.
Design Alternative: -Removal of intermittent sections of the Earth Berm	Biological impacts (impact on estuary, wetland, saltmarsh, river mouth) and construction-phase impacts on flora and fauna	2	2	3	0	2	3	**27**	**L**	**Low**	2	2	3	0	1	3	**21**	**L**	**Low**	
"No-go" alternative	The site remain as it is. Habitat will continue to be lost and degraded by natural and human-caused activities in and around the site. This will cause further destruction to the Orange River Estuary that will be irreversible	10 (-)	5	5	5	5	5	**150**	Very High (-)	**High**	-	-	-	-	-	-	**-**	-	**-**	No mitigation possible if status quo remains the same.

(**Note:** *Evaluation components: M – Magnitude; D – Duration; E – Extent; I - Irreplaceable; R – Reversibility; P – Probability; S – Significance; SP – Significance Points)*																				
CONSTRUCTION PHASE		**ENVIRONMENTAL SIGNIFICANCE**																		**MITIGATION**
		BEFORE MITIGATION									**AFTER MITIGATION**									
PROJECT ACTIVITY / ALTERNATIVE	**NATURE OF IMPACT**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	
Dust Impacts																				
Preferred Alternative -Removal of Earth Berm -Construction of Earth Berm -Breaching of ORM	Dust generated by machinery during removal of earth berm could become a nuisance to neighbouring landowners and blow into Orange River Estuary.	6	2	2	0	3	4	**52**	**M**	**Low-Medium**	4	2	2	0	3	3	**33**	**L**	**Low**	Bare surfaces should be kept moist by spraying water on it during windy periods to prevent dust formation, until such time that the construction phase is over.
Design Alternative: -Removal of intermittent sections of the Earth Berm	As above for the Preferred Alternative. If only sections of the Earth Berm is removed - less dust will be generated	4	2	2	0	1	4	**36**	**L**	**Low**	2	2	1	1	1	1	**7**	**L**	**Low**	
"No-go" alternative	Nuisance impacts associated with construction will not be realised.	-	-	-	-	-	-	**-**	**-**	**-**	-	-	-	-	-	-	**-**	**-**	**-**	N/A

(**Note:** *Evaluation components: M – Magnitude; D – Duration; E – Extent; I - Irreplaceable; R – Reversibility; P – Probability; S – Significance; SP – Significance Points)*																				
CONSTRUCTION PHASE		**ENVIRONMENTAL SIGNIFICANCE**																		**MITIGATION**
		BEFORE MITIGATION									**AFTER MITIGATION**									
PROJECT ACTIVITY / ALTERNATIVE	**NATURE OF IMPACT**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	
Noise and Security Impacts																				
Preferred Alternative **-Removal of Earth Berm** **-Construction of Earth Berm** **-Breaching of ORM**	Noise from construction activities, personnel and vehicles and Security Concerns	4	2	1	0	3	2	**20**	**L**	**Low**	2	2	1	0	3	2	**16**	**L**	**Low**	Site workers to undergo environmental induction training before starting work so that they are aware of the various environmental requirements. The induction training must address keeping noise to a minimum and mindful of labourers conduct. Noise generation will be limited to the normal construction activities associated with construction vehicles during normal working hours.

(**Note:** *Evaluation components: M – Magnitude; D – Duration; E – Extent; I - Irreplaceable; R – Reversibility; P – Probability; S – Significance; SP – Significance Points)*																				
CONSTRUCTION PHASE		**ENVIRONMENTAL SIGNIFICANCE**																		**MITIGATION**
		BEFORE MITIGATION									**AFTER MITIGATION**									
PROJECT ACTIVITY / ALTERNATIVE	**NATURE OF IMPACT**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	
Design Alternative: -Removal of intermittent sections of the Earth Berm	Noise from construction activities, personnel and vehicles and Security Concerns.	4	2	1	0	3	2	**20**	**L**	**Low**	2	2	1	0	3	2	**16**	**L**	**Low**	The Contractor /RE and ECO will need to implement and monitor security steps to be taken.
"No-go" alternative	Nuisance impacts associated with construction will not be realised.	-	-	-	-	-	-	**-**	**-**	**-**	-	-	-	-	-	-	**-**	**-**	**-**	N/A
Soil pollution during the construction phase																				
Preferred Alternative -Removal of Earth Berm -Construction of Earth Berm -Breaching of ORM	Potential soil, surface water and groundwater pollutions from spillages of hazardous materials (oils, fuel).	4	2	2	2	2	3	**36**	**L**	**Low**	2	2	1	1	1	2	**14**	**L**	**Low**	All vehicles, equipment and fuel tanks (e.g. trucks, excavator) must be maintained in a good condition that prevents leakages and potential contamination of soil. All fuels and oils must be stored in a bund to prevent pollution from spills and leaks.
Design Alternative: -Removal of intermittent sections of the Earth Berm	Potential soil, surface water and groundwater pollutions from spillages of hazardous materials (oils, fuel).	4	2	2	2	2	3	**36**	**L**	**Low**	2	2	1	1	1	2	**14**	**L**	**Low**	
"No-go" alternative	No Impact	-	-	-	-	-	-	**-**	**-**	**-**	-	-	-	-	-	-	**-**	**-**	**-**	N/A

(**Note:** *Evaluation components: M – Magnitude; D – Duration; E – Extent; I - Irreplaceable; R – Reversibility; P – Probability; S – Significance; SP – Significance Points)*																				
CONSTRUCTION PHASE		**ENVIRONMENTAL SIGNIFICANCE**																		**MITIGATION**
		BEFORE MITIGATION									**AFTER MITIGATION**									
PROJECT ACTIVITY / ALTERNATIVE	**NATURE OF IMPACT**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	
Fire risks during Construction Phase																				
Preferred Alternative -Removal of Earth Berm -Construction of Earth Berm -Breaching of ORM	Construction workers could cause accidental wild fires within the riparian fringe vegetation.	4	2	2	1	2	2	**22**	**L**	**Low**	2	2	2	1	2	1	**9**	**L**	**Low**	Staff should only smoke within demarcated areas. No fires will be allowed on the site unless authorised by the Safety Officer. Site workers must undergo environmental induction training before undertaking work so that they are aware of the various environmental requirements.
Design Alternative: -Removal of intermittent sections of the Earth Berm	Construction workers could cause accidental wild fires within the riparian fringe vegetation.	4	2	2	1	2	2	**22**	**L**	**Low**	2	2	2	1	2	1	**9**	**L**	**Low**	
"No-go" alternative	The status quo will remain unchanged.	-	-	-	-	-	-	**-**	**-**	**-**	-	-	-	-	-	-	**-**	**-**	**-**	N/A

(**Note:** *Evaluation components: M – Magnitude; D – Duration; E – Extent; I - Irreplaceable; R – Reversibility; P – Probability; S – Significance; SP – Significance Points)*																				
CONSTRUCTION PHASE		**ENVIRONMENTAL SIGNIFICANCE**																		**MITIGATION**
		BEFORE MITIGATION									**AFTER MITIGATION**									
PROJECT ACTIVITY / ALTERNATIVE	**NATURE OF IMPACT**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	
Solid Waste Management																				
Preferred Alternative -Removal of Earth Berm -Construction of Earth Berm -Breaching of ORM	Potential pollution of the site with solid waste generated during Construction phase (paper, plastic, timber, wire, berm material and sand).	4	2	1	1	2	2	**20**	**L**	**None**	2	2	1	1	1	1	**7**	**L**	**None**	The earth-fill material removed from the earth berm (at Location A), will be used to construct the proposed new flood protection berm (at Location B). Excess fill removed from the berm (at Location A) will be used to fill in old alluvial diamond mine excavations around Alexander Bay and at the old mine workings within Alexkor. The excavated material from the berm must be assessed for any pollutants.

(**Note:** *Evaluation components: M – Magnitude; D – Duration; E – Extent; I - Irreplaceable; R – Reversibility; P – Probability; S – Significance; SP – Significance Points)*																				
CONSTRUCTION PHASE		**ENVIRONMENTAL SIGNIFICANCE**																		**MITIGATION**
		BEFORE MITIGATION									**AFTER MITIGATION**									
PROJECT ACTIVITY / ALTERNATIVE	**NATURE OF IMPACT**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	
Design Alternative: -Removal of intermittent sections of the Earth Berm	Potential pollution of the site with solid waste generated during Construction phase (paper, plastic, timber, wire, berm material and sand).	4	2	1	1	2	2	**20**	**L**	**Low**	2	2	1	1	1	1	**7**	**L**	**None**	As above
"No-go" alternative	The status quo will Remain.	-	-	-	-	-	-	**-**	**-**	**-**	-	-	-	-	-	-	**-**	**-**	**-**	N/A
Socio-economic impacts																				
Preferred Alternative -Removal of Earth Berm -Construction of Earth Berm -Breaching of ORM	New employment opportunities will be created during the construction/re-habilitation phase	6	2	3	0	1	4	**48**	**M (+)**	**M (+)**	6	2	3	0	1	5	**60**	**M (+)**	**M (+)**	Ensure that the required project workers are sourced from local communities and that maximum employment numbers are maintained throughout the project duration.
Design Alternative: -Removal of intermittent sections of the Earth Berm	New employment opportunities will be created during the construction/re-habilitation phase	6	2	2	0	1	4	**44**	**M (+)**	**M (+)**	6	2	2	0	1	5	**55**	**M (+)**	**M (+)**	

(**Note:** *Evaluation components: M – Magnitude; D – Duration; E – Extent; I - Irreplaceable; R – Reversibility; P – Probability; S – Significance; SP – Significance Points)*																				
CONSTRUCTION PHASE		**ENVIRONMENTAL SIGNIFICANCE**																		**MITIGATION**
		BEFORE MITIGATION									**AFTER MITIGATION**									
PROJECT ACTIVITY / ALTERNATIVE	**NATURE OF IMPACT**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	**M** Magnitude	**D** Duration	**E** Extent	**I** Irreplaceable	**R** Reversibility	**P** Probability	**TOTAL (SP)**	Significance	**CUMULATIVE**	
"No-go" alternative	No job opportunities will be realised	-	-	-	-	-	-	**-**	**-**	**-**	-	-	-	-	-	-	**-**	**-**	**-**	

1.2 IMPACTS THAT MAY RESULT FROM THE POST CONSTRUCTION PHASE (OPERATIONAL PHASE) COMPRISING REHABILITATION

The Post Construction Phase (Operational Phase), which is to encompass the rehabilitation of the old flood channels and wetlands that were historically filled in when the earth berm was constructed to protect mine workings, inundation of the low-lying northern sections of Alexander Bay, and to create agricultural fields for food production and grazing of livestock, is beyond the scope of this project and will be carried out in accordance with the existing *Strategic Management Plan for the Orange River Mouth Ramsar Site.* The benefits of the rehabilitation of the old flood channels and associated wetlands, previously filled in are envisaged to have highly significant positive impacts on the ecology and biodiversity of this lower portion of the Orange River Estuary. The rehabilitation of the flood plain and the normalisation of the functioning of this important section of the estuary will also have far reaching positive impacts on the socio-political front between Namibia and South Africa and internationally in terms of realising the conservation of the Orange River Ramsar site. Refer to Appendix G: EMPr - **Section F**: The Way Forward after Implementation of this EMPr