

RISK MATRIX (Based on DWS 2015 publication: Section 21 c and I water use Risk Assessment Protocol)

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SACNASP No 400129/12

Risk to be scored for construction and operational phases of the project. MUST BE COMPLETED BY SACNASP PROFESSIONAL MEMBER REGISTERED IN AN APPROPRIATE FIELD OF EXPERTISE.

Construction Phase																								
No.	Phases	Activity	Aspect	Impact	Severity				Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal issues	Detection	Likelihood	Significance	Risk Rating before mitigation	Confidence level	Control Measures	Borederline low - moderate Rating class	Impact on wetland/river/stream/p and Sensitivity Rating by Indicating PES and EIS.	Risk rating after mitigation
					Flow Regime	Physico & Chemical (Water Quality)	Habitat (Geomorph + Vegetation)	Biota																
1	C	Construction activity	Upgrade the culverts and bridges on the section of road that is to be upgraded	There is the likelihood of flow disruption while the culverts and bridges are being upgrade	1	1	2	2	1,5	1	2	4,5	1	3	5	2	11	49,5	L	80	Culvert and bridge upgrades should be done during the dry season where possible		Refer to Wetland Assessment Report	L
2	C		Confine traffic to defined areas	Damage to the environment	1	3	3	1	2	2	1	5	2	1	5	2	10	50	L	85	Traffic control must be implemented away from wetland areas		Refer to Wetland Assessment Report	L
3	C		Construction vehicle traffic on the site must be regulated to prevent damage to the adjacent environment. This includes pollution by diesel and oil from spillage or leakage.	Damage to the environment	2	2	2	1	1,75	2	1	4,75	2	1	5	2	10	47,5	L	85	Provide vehicles with defined routes to be used when servicing the work and ensure that vehicles stick to these. Overflows or spills detected should be attended to promptly and a record of these should be kept up to date for audit purposes.		Refer to Wetland Assessment Report	L
4	C		Increase in ambient noise levels in the area due to construction activities, increase in traffic and operations	Causes a Nuisance to surrounding people and activities	1	2	1	2	1,5	1	2	4,5	2	2	1	1	6	27	L	80	Use scheduled construction times		Refer to Wetland Assessment Report	L
5	C		Increase in dust emissions during construction	Causes health and nuisance issues	1	3		3	2,5	3	1	6,5	1	3	1	1	6	39	L	90	Roads must be watered to ensure dust does not form and settle in the wetland area		Refer to Wetland Assessment Report	L
6	C		Increase in impermeable surfaces	Pollution of the site	1	3	1	5	2,5	3	1	6,5	2	2	5	1	10	65	M	85	Provide vehicles with defined routes to be used when servicing the work and ensure that vehicles stick to these. These routes must be ripped and planted with suitable indigenous vegetation once they are no longer needed. Vehicle movement must be closely controlled and kept out of the wetland areas as far as possible	After considering he potential impacts/risks of the activity to the resource quality post mitigation measures, the sensitivity (EIS) and status (PES) of the wetland receptor and the mitigation measure to be implemented we recommend that the risk rating be changed from Moderate to Low. These impacts are engineering or design related and if these are carried out with due consideration to protection of the environment then they can be successfully mitigated. Risk rating before mitigation was within 25 points of Low risk.	Refer to Wetland Assessment Report	L
7	C		The increase in impermeable surfaces (e.g. road surfaces) will increase runoff from the site and may erode the wetlands	Increased runoff will require adequately designed drainage to manage	3	3	2	2	2,5	1	4	7,5	1	3	3	3	10	75	M	85	Drainage must be designed to cope with estimated runoff and water calming measures must be constructed with outflow into the wetlands. Well designed infrastrcture with water calming devices will reduce the risks	After considering he potential impacts/risks of the activity to the resource quality post mitigation measures, the sensitivity (EIS) and status (PES) of the wetland receptor and the mitigation measure to be implemented we recommend that the risk rating be changed from Moderate to Low. These impacts are engineering or design related and if these are carried out with due consideration to protection of the environment then they can be successfully mitigated. Risk rating before mitigation was within 25 points of Low risk.	Refer to Wetland Assessment Report	L
8	#DIV/0! #DIV/0! 0 #DIV/0!																							
9	C	Personnel issues	Personnel must be properly trained and understand their responsibilities in terms of wetland conservation	Improperly trained personnel are likely to cause accidents	1	1	1	1	1	1	2	4	1	1	1	2	5	20	L	85	Management to ensure that personnel are properly trained and supervised around wetland areas		Refer to Wetland Assessment Report	L
10	C		Waste produced during construction may impact on the surrounding land	Waste that is disposed incorrectly will cause pollution and degradation of the wetlands	1	3	1	2	1,75	1	2	4,75	2	2	1	1	6	-	L	90	Strict control should be exercised over the correct waste disposal procedure.		Refer to Wetland Assessment Report	L
11	C		Increase in the volumes of sewage generated on site due to the increased number of people present on site during construction	Needs to be handled correctly or this will cause pollution of wetlands	2	3	1	3	2,25	2	2	6,25	2	2	1	1	6	37,5	L	90	Ablution facilities conforming to SABS standards must be provided and may only be placed far away from wetlands		Refer to Wetland Assessment Report	L
12	C		Supervision of the work site during and after hours	Mischief or crime will delay the work and add extra expense	1	1	1	1	1	1	2	4	2	2	1	3	8	32	L	85	There must always be someone on site to watch it. The response procedure must be well-defined in case of emergency		Refer to Wetland Assessment Report	L
13	#DIV/0! #DIV/0! 0 #DIV/0!																							

14	C	Spillages and leaks	These will pollute the wetlands	2	3	2	3	2,5	2	2	6,5	2	3	5	2	12	78	M	90	There must be properly trained and equipped personnel on site to clean up any spillage. In addition, the reporting procedures must be clearly spelt out and followed. Close supervision of all staff involved in this activity is essential	We recommend that the risk rating be changed from Moderate to Low if these mitigation measures are implemented. These impacts are engineering related and if these are carried out with due consideration to protection of the environment then they can be successfully mitigated. Risk rating before mitigation was within 25 points of Low risk.	Refer to Wetland Assessment Report	L
15	C	Top soil	Top soil needs to be kept separate so that it can be replaced when the tasks have been completed. This should be placed in an area where it will not cause damage to plant growth and especially where they will not interfere with wetland function	2	2	2	3	2,25	1	2	5,25	1	1	1	1	4	21	L	90	Care must be taken to keep top soil separate from subsoil when excavations are undertaken. This must be replaced in the correct way once the work is complete. Topsoil must not be stored in wetland areas where they can limit wetland function		Refer to Wetland Assessment Report	L
16	C	Overburden	The overburden needs to be kept separate so that it can be replaced when tasks have been completed. This should be placed in an area where it will not cause damage to wetlands	1	1	2	2	1,5	1	2	4,5	1	1	1	1	4	18	L	90	Any overburden should be handled in the same way as the top soil		Refer to Wetland Assessment Report	L
17	C	Excavation and construction may lead to soil washing away and increasing sediment loads in surface runoff during construction	Downstream of the wash, substrate, together with flora and fauna, will be smothered, reducing the biodiversity of the environment	1	2	2	3	2	3	3	8	2	2	1	2	7	56	M	85	Work should be planned for a time when the chance of rain is reduced. In addition, sediment traps must be in place to contain any sediment in the runoff. Sediment pollution must be adequately controlled	We recommend that the risk rating be changed from Moderate to Low if these mitigation measures are implemented	Refer to Wetland Assessment Report	L
18	C	Invasive vegetation	Disturbance of the environment may provide opportunity for invasive vegetation to colonise the disturbed areas	3	2	3	3	2,75	3	3	8,75	3	3	5	3	14	122,5	M	85	There must be an ongoing programme of removing invasive vegetation in the wetland areas affected. This will require ongoing monitoring and control activities after the completion of the construction phase.	The wetland areas are infested with alien invasive plant species. The risk remains Medium after mitigation as it is not within 25 points of a Low risk.	Refer to Wetland Assessment Report	M

Operational phase - this includes both existing and new infrastructure

19	O	Discharge from roadside drains and stormwater outlets will have high energy flows.	This will cause erosion	2	4	4	4	3,5	2	4	9,5	3	2	5	1	11	104,5	M	95	All outlets discharging into the environment must be designed to spread the flow, thereby reducing the velocity and so the erosive potential of the stream. All outlets discharging into the environment must be designed to spread the flow, thereby reducing the velocity and so the erosive potential of the stream.	We recommend that the risk rating be changed from Moderate to Low if these mitigation measures are implemented. These impacts are engineering related and if these are carried out with due consideration to protection of the environment then they can be successfully mitigated. Risk rating before mitigation was within 25 points of Low risk.	Refer to Wetland Assessment Report	L
20	O	Spills of fuel, pesticide, or other chemicals	These are toxic to the environment	1	3	2		2	2	1	5	1	1	1	1	4	20	L	90	A protocol outlining actions to be taken should be developed and widely communicated to all staff. Where necessary, the appropriate authorities must be notified. This is normally required within 24 hours but must be stated in the protocol.		Refer to Wetland Assessment Report	L
21	O	Invasive vegetation	Invasive vegetation tends to dominate indigenous vegetation. This reduces productivity of the ecosystem and affects biodiversity negatively.	3	2	3	3	2,75	2	1	5,75	1	1	5	1	8	46	L	90	There must be an ongoing programme to control invasive vegetation		Refer to Wetland Assessment Report	L
22	O	Inspection of infrastructure	Inadequate inspection protocol will mean that problems will not be attended to timeously	2	3	2	2	2,25	1	1	4,25	2	2	1	1	6	25,5	L	95	All problems identified should be attended to timeously and the wetland should be protected		Refer to Wetland Assessment Report	L
24	O	Personnel issues	Staff working on-site	Ablution facilities for staff working on-site must conform to SABS standards	1	1	1	1	1	1	3	1	1	1	1	4	12	L	90	Facilities must be properly maintained and kept clean		Refer to Wetland Assessment Report	L