Appendix J2.1:

Environmental impacts and risk assessment/Impact Risk Matrix – WWTP Ponds Upgrade

	1,1		N _O			Þ
	Soil Erosion	Soils	ASPECT			Impact Rating: Site Establishment & Construction
	Clear durin migh susci erosi		7			ment &
	ring of vegetation g earthworks t make the site eptible to soil on in case of		IMPACT			Construction
1.2.1 Prevent infiltration of incoming raw sewage into soil diverting the incoming sewage from the primary facultative pond to one of the completed dams to undertake construction on the primary facultative pond	1.1.1 Limit the risk of soil erosion		Objective			Construction: WWTP Ponds
-16	4		Probability	1	1	
'n	<i>\'</i>		Extent	WOLLAST IN LOCAL IN INC.		
4	4		Duration]		
ά	'n		Magnitude	Ģ.		
ń	77		Receiving Environment	Ş		
්ර 4.	Š		Without Mitigation Score (Baseline)			
ż	<u>-1</u> ₂		Probability	5		
7	<u> </u>		Extent	WITH MITIGATION	L	
'n	7		Duration	MITIG	L	
'n	4		Magnitude	ATIO	L	
7	7		Receiving nvironment	z		
9 0 0 77 77 77	<u>T</u> -	doocooment)	With Mitigation Score (Impact			
Construction and lining of the secondary and tertiary ponds must take place first (the ponds that does not fall within the existing footprint), so that the incoming sewage which is currently held in the primary facultative pond can be safely transferred/ diverted to these ponds when construction work commences on the primary facultative pond; No pit tollets on site, workers to be provided with temporary chemical toilets; toilets not to be placed within the drainage lines on site; workers not to use the veld for sanitary purposes; suitable washing facilitates must be proved for the workers and should be established in a suitable manner that environment is not polluted any soil contamination on site must be remediated and disposed of in a responsible manner	Earth works and site preparation to take place during the drier winter season; Storm water to be channelled away from the exposed area for the duration of construction; soil stockpiles (if any) not to be placed in drainage lines and must be protected from erosion as stated in the EMPr, erosion should be remediated if erosion does take place as per the EMPr.		Short Description of Mitigation Measures			

2.1	N	1.2
Water quality (groundwater and surface water)	Water	Soil contamination
Possible leakage or spillage of sewage when diverting the incoming sewage from the primary facultative pond to one of the completed dams to undertake construction on the primary facultative pond		Possible soil contamination from construction activities
2.1.1. Prevention spillage of sewage		1.2.2 Prevent spillage of water potentially contaminated by cement/ chemicals/ fuel & oil from construction vehicles/ machines
-16		ċo
	-	·2
4.	-	4.
7	-	- 'è
ტ		
ю́		<i>'</i> o
Ь		ю
ν̈́		7
ΐ		<u> </u>
ń.		4
-16		\$
Construction and lining of the secondary and tertiary ponds must take place first (the ponds that does not fall within the existing footprint), so that the incoming sewage which is currently held in the primary facultative pond can be safely transferred/ diverted to these ponds when construction work commences on the primary facultative pond; No pit toilets on site, workers to be provided with temporary chemical toilets; toilets not to be placed within the drainage lines on site; workers not to use the veld for sanitary purposes; suitable washing facilitates must be proved for the workers and should be established in a suitable manner that environment is not polluted; any soil contamination on site must be remediated and disposed of in a responsible manner; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Appropriate measures must be implemented to prevent a recurrence of a spillage event.		The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits on settify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.

<u>ω</u>		T 85	
	ω	2.2	
Fauna	Flora & Fauna	2.2 Storm water	
Possible killing of fauna e.g. killing of snakes/ spiders out of fauna fear		Storm water may cause soil erosion on cleared construction site	Possible leakage or spillage of sewage from portable toilets during construction, or contamination of water by runoff containing construction-related substances such as cement/ paint/ oil/ fuel
3.1.1. Prevent killing of fauna		2.2.1 Minimize water- related soil erosion	2.1.2 Prevent spillage of water potentially contaminated by cement, paint, oil, fuel, etc
4		4	4
.\b		'n	ź
<u>ئ</u>	-	4	4
7	1	'n	ż
7		'n	'n
is .		2.8	\$5 60
4		-2	ю
7		-2	7
7		7	<u> </u>
77	L	7	<u>.</u>
7		<u> </u>	<u> </u>
Ä		2,4	io io
Environmental Awareness training to be conducted with all labourers, educating the importance of not simply killing fauna that is perceived as dangerous; Keep contact details in the site office for someone who can be called if catching and relocation of fauna is required, no hunting/ snaring allowed on site.		Construction should ideally take place in dry winter months; stormwater should be channelled away from the exposed area. Implementation of proposed storm water management plan.	The Contractor must prevent the discharge of any pollutants, such as cernent, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.

ن ت	4.1	4		3 22
Air quality	Heritage Resources	Heritage Resources		2 Flora
	Potential loss of Heritage Resources		Loss of Critical Biodiversity Areas	Temporary impact and/or potential loss of disturbed Prince Albert Succulent Karoo Vegetation
	4.1.1. Prevent the unnecessary loss of heritage resources		3.2.2. Prevent the unnecessary loss of CBAs	3.2.1. Prevent unnecessary loss of vegetation
	ż		å	- 6
-	'n		'n	. 2
1	4		4	4
ŀ	7		4	4
-	7		-2	ю
	i,			
	4		'n	٨
	<u> </u>		r/s	7
L	7	L	7	ь
L	7		7	7
	7		7	7
	Δ		2	<u>1</u>
	It is recommended that the HWC Fossil Finds Procedure be implemented throughout the development phase; In the case of any significant new fossil finds exposed during construction, these should be safeguarded - preferably in situ - and reported by the ECO as soon as possible to Heritage Western Cape.		A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads	Temporary impact on disturbed Prince Albert Succulent Karoo Vegetation.: A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads.

*

6.1 |Solid waste management œ 7.1 7 5 6 Noise construction activities on Visual Impacts Noise caused by construction site Visual Impacts of Waste Management Air quality and machinery construction vehicles relate mostly to and delivery of Construction related involved in earthworks noise is expected to site Untidy construction generated during general solid waste construction Incorrect dispoal of establishment earthworks and site levels during Potentially high dust equipment from construction in form of emissions vehicles and Possible air pollution neighbours disturbance to site must be kept as 8.1.1 Minimise 6.1.1. Safety dispose of all solid waste. possible neat and tidy as 7.1.1. The construction airborne dust 5.1.2 Limit levels of 5.1.1 Limit air pollution 4 င္စ ᇮ 4 ż 샹 4 'n 4 4 4 4 'n 'n <u>'</u>2 'n 4 7 7 _ င် 4.6 -3,4 -3,8 'n 'n 4 'n 'n 工 7 72 그 <u>'</u> <u>.</u> 'n 4 -'n 7 <u>.</u> <u>.</u> 그 which any complaints about noise is noted hours; a complaints register should be maintained in Construction activities should be limited to daylight or landscaping. rubble not allowed to accumulate on site, but must be material should be used for backfilling, rehabilitation licensed disposal site; Stockpiles of soil or excavated removed at regular intervals and disposed of at a regularly; Litter picked up where necessary; Building must be provided on site and must be emptied staff and discourage littering; Sufficient waste bins Conduct environmental awareness training with all training with all staff and discourage littering. emptied regularly; Conduct environmental awareness for disposal of general waste; refuse bins to be site; Sufficient refuse bins are to be provided on site licensed hazardous waste contractors at a suitable must be contained and disposed of by suitably disposal site; If hazardous waste is generated, this the site; any soil contaminated during construction waste disposal site; No dumping or burning on near (e.g. by cement) to be disposed off at a suitable All solid waste to be disposed of at a licensed landfill should be located in areas where they are not construction activities; Where possible stockpiles minimise the generation of dust resulting from exposed to the erosive effects of the wind. allowed to idle for unnecessary long periods of time must be in good working condition to prevent The Contractor must take all reasonable measures to regular intervals to reduce levels of airborne dust; If necessary, exposed soil must be watered down at unnecessary emissions; Vehicles should not be All vehicles and machinery on the construction site

2		7		_	N _o	Т	in in
Soils					, <u>, , , , , , , , , , , , , , , , , , </u>	+	-
S		Water quality		Water	ASPECT		Impact Rating: Operations
	from trigation from trigation from trigation from trigation from trigation from trigately treated wastewater	7	1.1 Potential leakage or spillage of waste water from works into drainage lines & ground water		IMPACT		Operatio
	Treated effluent used for irrigation must comply with the standards set by DWS.	Accommodate peak flow to prevent overflow/ remain freeboard	Maintain a closed system to prevent leakage or spillage		OBJECTIVE		Operations: WWTP Ponds
	-16	-16	- <u>1</u>	Ì	Probability	€	
1	-4	4	4		Extent	팋	
	ά		άo	1	Duration	WITHOUT MITIGATION	
	4	φ	ç		Magnitude	ĮŠ.	
	'n	الم	<i>'</i> 2		Receiving Environment	힣	
	-6.8	-7,6	-7,6		Without Mitigation Score (Baseline)		
	ь	-2	'n	Ī	Probability		
1	'n	-2	'n		Extent	HTIM	
	'n	4	4		Duration	MITIGATION	
-	7	7	7		Magnitude	SATIC	
	7	7	<u>-</u>	[Receiving Invironment	ž	
	à	*-	- &	accomming			
	Treatment of waste water must take place strictly according to engineers' prescriptions in order to meet wastewater quality standards as set out by DWS; Treated water to be monitored on a regular basis to verify water quality. Treated water should be chlorinated to ensure that any remaining pathogens are eliminated before effluent is released; Hand screens & grid channels must be cleaned regularly and waste disposed of at in a suitable manner. Implement Stormwater Management Plan. Implement Operational Management Plan	Daily visual inspections of the plant to determine whether ponds are nearing full capacity and whether there is an overflow, remain freeboard; Keep sludge and waste water out of drainage lines and the river; Remove sludge periodically and dispose of properly; Harvest reeds annually and remove harvested reeds; A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered; A groundwater quality monitoring programme must be in place to detect any contamination that may be linked with the plant. Implement Stormwater Management Plan.	Ponds to be lined to prevent infiltration; Daily visual inspection of plant for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage. Berms of ponds must be high enough remain freeboard. Implement Stormwater Management Plan. Implement Operations Manual.		Short Description of Mitigation Measures		

- -

CJ	O	4	4	ω	ω	22	
Visual	Visual	Noise	Noise	Air C	<u>A</u> ir		
<u> </u>	<u> </u>	0	ő	Air Quality	Air Quality	Soil erosion	Soil contamination
					₹	9	amina
							ation
Po		P	1	unp asso sewa caua		<u></u>	Lea of surresurresurresurresurresurresurresurr
Potential visual		Potential Noise Impact		Release of unpleasant odours associated with raw sewage and sludge cause by methane and hydrogen sulphide		Soil erosion	Leakage or spill of sewage may result in pollution surrounding soil
act		ential Noi Impact		ase on tod of with od with od with od on the odd of the		9	or sp e ma oollut ing s
							n of
Potential visual impact from operations		Reduce noise impact from operations		Reduce unpleasant odours.		Prevent soil erosion	Maintain a closed system to prevent leakage or spillage
tial vi		ce no tions		s. ce un		ent sc	kain a event ge
sual		ise in		pleas		iil ero	clos
mpac		npact		sant		sion	age o
¥		from					r stem
7	Ì	7		å		ċ	-16
		7		4		'n	4
		7		6		4	ά
_	-	7		ارا		<i>\</i> 2	4
		7		½		<i>\</i> 2	ώ
				Ž.		As .	<u>_</u>
				-3,6		-3,6	,6 ,6
		7		4	ľ	-2	-2
		스		'n		7	'n
		ㅗ		7		7	-2
		۲		7		7	-2
		7		7		<u>.</u>	-1
E .				4		4	
				-t.8		- <u>4</u>	÷
NO V		No.	ľ	Ensi in go func be n	ľ	exc pote be c flow sign back take	Por instance in stance in
isual		No noise expected during operations		ure the bod with minimin		It must be ensured that storm water excessive speeds, as that would inc potential for soil erosion; storm wate be concentrated in any one place or flows over unpaved (erodible) surfactions of erosion be found, remedial a backfilling, compaction and re-veget taken immediately to avoid exacerbe erosion; Monthly monitoring for erosiplace, especially after heavy rainfall,	Ponds to be lined to prevent infiltration; Da inspection of plant for signs of leakage or preventing of grass in certain areas which may greening of grass in certain areas which may greening of grass in certain areas which may greening of leakage. Daily visual inspection plant to determine whether ponds are near capacity and whether there is an overflow, freeboard; Remove sludge periodically and properly; Harvest reeds annually and remo properly; Harvest reeds annually and remo harvested reeds; A water monitoring programust be in place to detect any contamination the plant; Immediately institute appropriate measures if contamination is discovered; In Stormwater Management Plan; Implement Operations Manual
. mg		expe		hat all vorkin ng pro ised,		e ense e spe for so intrate runper sicosico prosico pr	be lip of grant of lettern detern and varieties Hand of lettern detern d
ex ex		cted		com g ord perly Imple		ured eds, eds, oil erc on be on be ately the oil of the oil	ned t plant plant ass i sakag nine move wheth move est n ds; A ds; A ds; A ds; A ds; A
pecte		urin		pone ler at the men		that as that as that as the as the asign any can any can found found found tion a contor onitor ber he	o pre for si for si pe. Da wheth her the eeds wate dete hely ir hinati emer
d du		g ope		nts of all tir gene t Ope		storm at wo at wo one pl dible) dible, ren d, ren d, ren ind re ind re ind re	vent gns c gns c tain a aily vi her po her po lge po annu annu ar mo ct an ct an stitut on is
No visual impact expected during ope		ration		f the ines.	1	waten	infiltration infil
pera		≅		treatr If the n of o ns M		etatice etatics bation	ation; kage whic inspe are r averflu ically ically ind re ng pr ng pr ng pr ng pr opr
ions				Ensure that all components of the treatment plain good working order at all times. If the plant is functioning properly, the generation of odours see minimised, implement Operations Manual.		It must be ensured that storm water does not rexcessive speeds, as that would increase the potential for soil erosion; storm water runoff must concentrated in any one place or channel we flow over unpaved (erodible) surfaces; Should signs of erosion be found, remedial action such backfilling, compaction and re-vegetation should taken immediately to avoid exacerbation of the erosion; Monthly monitoring for erosion should place, especially after heavy rainfall,	Ponds to be lined to prevent infiltration; Daily visit inspection of plant for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage. Daily visual inspections of the plant to determine whether ponds are nearing ful capacity and whether there is an overflow, remainded freeboard; Remove sludge periodically and dispersonally; Harvest reeds annually and remove harvested reeds; A water monitoring programme must be in place to detect any contamination link the plant; Immediately institute appropriate mitigate measures if contamination is discovered; Implement Stormwater Management Plan; Implement Operations Manual
No visual impact expected during operations as the				Ensure that all components of the treatment plant are in good working order at all times. If the plant is functioning properly, the generation of odours should be minimised, implement Operations Manual.		It must be ensured that storm water does not reach excessive speeds, as that would increase the potential for soil erosion; storm water runoff must not be concentrated in any one place or channel where it flows over unpaved (erodible) surfaces; Should any signs of erosion be found, remedial action such as backfilling, compaction and re-vegetation should be taken immediately to avoid exacerbation of the erosion; Monthly monitoring for erosion should take place, especially after heavy rainfall,	Ponds to be lined to prevent infiltration; Daily visual inspection of plant for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage. Daily visual inspections of the plant to determine whether ponds are nearing full capacity and whether there is an overflow, remain freeboard; Remove sludge periodically and dispose of properly; Harvest reeds annually and remove harvested reeds; A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered; Implement Stormwater Management Plan; Implement
0				uld are		e or reit	lar lar lar lar lar se c

. .

		<u> </u>	_	N _O	Т	0
			Soils		+	
	Soil contamination	Soil Erosion	iis	ASPECT		Impact Rating: Decommissioning
	Possible soil contamination from construction/ decommissioning activities	If structures are to be demolished and cleared, the site susceptible to soil erosion in case of rains		IMPACT		Decommissioni
	1.2.1 Prevent spillage/ infiltration of raw sewage or semi- treated sewage or waste water to soil	1.1.1 Limit the risk of soil erosion		Objective		Decommissioning: WWTP Ponds
	ά	φ		Probability	8	
	4	4		Extent	WITHOUT MITIGATION	
	4	4		Duration	M	
	ь	4		Magnitude	IGAT	
	7	<u>'</u>		Receiving Environment	2	
	3,8	್ತಿ ಹ		Without Mitigation Score (Baseline)		
	ν̈́	ż		Probability	5	
	4	7		Extent	NHTIW	
	ю	Ν		Duration	TH MITIGATION	
	7	그		Magnitude	ATIO	
	7	7		Receiving Environment	z	
	*	- \$		With Mitigation Score (Impact assessment)		
	All waste water contained in the system must be treated and discharged before dismantling of the system commences; if the system is no longer fully functional, the waste water still in the system must be revormed to an appropriate licensed treatment facility for treatment before work commences on the site. No pit toilets on site, workers to be provided with temporary chemical toilets; toilets not to be placed within the drainage lines on site; workers not to use the veld for sanitary purposes; suitable washing facilitates must be proved for the workers and should be established in a suitable manner that environment is not polluted any soil contamination on site must be remediated and disposed of in a responsible manner; in case of a spillage spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation.	If structures are to be demolished and cleared, this is to take place during the drier winter season; Storm water to be channelled away from the exposed area for the duration of construction; soil stockpiles (if any) not to be placed in drainage lines and must be protected from erosion as stated in the EMPr, erosion should be remediated if erosion does take place as per the EMPr. Refer to decommissioning section in the EMPr. Implement Stormwater Management Plan.		Short Description of Mitigation Measures		

-

ω	2.2 S	2.1	N	
Flora & Fauna	Storm water	2.1 Water quality	Water	3
	Storm water may cause soil erosion on cleared site	Possible leakage or spillage of sewage and portable toilets during construction/decomissioning, or contamination of water by runoff containing construction-related substances such as cement/ paint/ oil/ fuel		
	2.2.1 Minimize water- related soil erosion	2.1.2 Prevent spillage of water potentially contaminated by sewage, cement, paint, oil, fuel, etc		1.2.2 Safely dispose of contaminated waste
	&	-16		۵
	4	ά		4
	4	ò		-2
ŀ	4	4		7
ŀ	-			<u> </u>
	-4.2	-7,6		-3.2
	7	<i>ن</i>		-2
	7	ν̈́		7
	7	4		7
	7	'n		7
	7	7		7
	-	10 No		4.2
	Construction/ demolition should ideally take place in dry winter months; stormwater should be channelled away from the exposed area. Implement Stormwater Management Plan.	All waste water contained in the system must be treated and discharged before dismantling of the system commences. If the system is no longer fully functional, the waste water still in the system must be revomed to an appropriate licensed treatment facility for treatment before work commences on the site The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil/ water.		Waste water or any parts of the system which were in direct contact with the sewage must be disposed of at a registered landfill as agreed upon between the competent authority and the ECO.

- --

.

6	, cu	رن ن		4		T .	ω
		_			4		3.2
Noise	Visual Impacts of demolition on site	Visual impacts		Solid waste management	Waste Management		Flora
	Untidy construction/ demolition site			Waste generated at site not disposed of at a suitably licensed		Colonisation of alien invasive species	No rehabilitation of the site
	5.1.1. The construction site must be kept as neat and tidy as possible		4.1.2 Dispose of hazardous waste at suitable disposal site	4.1.1. Remove general solid waste to a landfill site		3.2.2. Prevent colonisation by alien invasive species	3.1.1. Rehabilitation of the site to a state approximating the predevelopment state or a condition similar to undeveloped areas nearby.
	4		ф	ბ		ధ	φ.
	<u>.</u>		4	4		ż	4
			₽	4		φ.	¢
	<u>.</u>			'n		7	-2
Į	7		<u>.</u>	7		<u> </u>	-1
	÷		44,6	\$5 80		<u>A</u>	4,6
-	ķ	-	'n	'n		'n	4
-	7		. '2	'n		7	'n
-	<u> </u>	-	<u> </u>	7		⊹	4
-	7	-		7		ㅗ	7
			77	7		7	7
	- 1		<u>4</u>	<u>A</u>		1	ko A
	Conduct environmental awareness training with all staff and discourage littering; Sufficient waste bins must be provided on site and must be emptied regularly; Litter picked up where necessary; Building rubble not allowed to accumulate on site, but must be removed at regular intervals and disposed of at a licensed disposal site.		Any parts of the system which were in direct contact with the sewage must be disposed of by a suitably licensed waste contractor at a suitable, registered waste disposal site as agreed upon between the local authority's waste division and the ECO.	General solid waste must be disposed of at a general landfill site or another licensed waste disposal site; General rubble from demolition can be used as fill at nearby construction sites (if any) or disposed of at a licensed landfill site. The ECO will have to be consulted regarding the disposal of linings and other components of the system which where directly in contact with untreated sewage. Waste not to be dumped on or near the site.		No alien plan species may be established on site during rehabilitation; Any alien vegetation on site must be eradicated before seeding/ planting of indigenous vegetation; Monitor the site for re-growth of vegetation.	Prepare soil for re-vegetation, e.g. by removing potentially contaminated soil (for disposal at a suitable site), ripping compacted soil and adding organic material; Re-establish locally indigenous vegetation under the guidance of an ecologist.

-

Noise caused by 6.1 construction activities on Construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials 'n <u>.</u> 'n Construction/ demolition activities should be limited to daylight hours; a complaints register should be maintained in which any complaints about noise is noted.

Appendix J2.2:

Environmental impacts and risk assessment/Impact Risk Matrix – Pipeline Route Alt 1 (Not Preferred)

1.2 |Soil contamination Ξ. N_O Water Soil Erosion Soils Construction Site Establishment & Impact Rating: ASPECT Soil contamination from construction activities erosion in case of susceptible to soil might make the site during earthworks Clearing of vegetation Construction: Pipeline Route_Alternative A IMPACT (Not - Preferred) machines fuel & oil from cement/ chemicals/ contaminated by of water potentially 1.1.1 Limit the risk of soil erosion construction vehicles/ 1.2.1 Prevent spillage Objective 4 ۵ **Probability** WITHOUT MITIGATION 4 4 Extent 4 4 Duration 'n 'n Magnitude <u>_</u> Receiving <u>_</u> Environment Mitigation (Baseline) Without 3,8 Score -3,8 'n 'n **Probability** WITH MITIGATION 4 ㅗ **Extent** 'n 'n Duration 7 스 Magnitude _ Receiving <u>.</u> **Environment** assessment) Mitigation (Impact Score ¥ith to use spill kits to rectify a spill immediately, Records of spills should be kept on site, Mixing of cement not contaminated water may not be allowed to flow into to take place on impermeable surfaces; Potentially be available on site & workers should be trained how of Water and Sanitation who may conduct a site visit drainage lines or infiltrate into the soil. to recommend appropriate mitigation; Spill kits must significant spills must be reported to the Department the ECO so that he/ she can investigate the incident should ensure drip trays are placed under stationary chemicals, fuel, oil, waste water, etc; Inspects all if erosion does take place as per the in drainage lines and must be protected from erosion and recommend the appropriate mitigation; Any vehicles/ machines; All spills should be reported to detection of deterioration or leaks; The Contractor construction vehicles/ machinery daily for early pollutants, such as cement, concrete, lime, EMPr.Implement Stormwater Management Plan. as stated in the EMPr; erosion should be remediated construction; soil stockpiles (if any) not to be placed away from the exposed area for the duration of the drier winter season; Storm water to be channelled Earth works and site preparation to take place during The Contractor must prevent the discharge of any Short Description of Mitigation Measures

<u>ω</u> 2.2 Storm water 2.1 Water Quality (Surface ယ |Flora & Fauna and ground water) snakes/ spiders out of fauna fauna e.g. killing of Possible killing of cleared construction cause soil erosion on Storm water may construction-related containing contamination of cement/ paint/ oil/ fuel substances such as water by runoff Possible 3.1.1. Prevent killing of 2.2.1 Minimize waterrelated soil erosion 2.1.1 Prevent spillage of water potentially etc cement, paint, oil, fuel, contaminated by 4 4 4 4 4 4 4 4 4 <u>'</u>2 'n 'n 'n 'n 'n 32 -3,2 -3,2 7 'n 'n <u>.</u> 'n <u>.</u> <u>.</u> ᅶ <u>.</u> ٠. <u>.</u> <u>.</u> ᆚ <u>.</u> _ is required, no hunting/ snaring allowed on site. Keep contact details in the site office for someone of spills should be kept on site; Mixing of cement not significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit who can be called if catching and relocation of fauna simply killing fauna that is perceived as dangerous; with all labourers, educating the importance of not Environmental Awareness training to be conducted the exposed area. Implement Storm Water months; stormwater should be channelled away from Construction should ideally take place in dry winter to take place on impermeable surfaces; Potentially to use spill kits to rectify a spill immediately; Records be available on site & workers should be trained how to recommend appropriate mitigation; Spill kits must Management Plan drainage lines or infiltrate into the soil. contaminated water may not be allowed to flow into and recommend the appropriate mitigation; Any construction vehicles/ machinery daily for early the ECO so that he/ she can investigate the incident vehicles/ machines; All spills should be reported to should ensure drip trays are placed under stationary detection of deterioration or leaks; The Contractor

chemicals, fuel, oil, waste water, etc; Inspects all

The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime,

CI	4.1	4		3.2
<u>Ş</u>	Her	퓬		iò
Air quality	4.1 Heritage Resources	Heritage Resources		Flora
	Potential loss of Heritage Resources		Loss of Critical Biodiversity Areas	Temporary impact and/or potential loss of disturbed Prince Albert Succulent Karoo Vegetation
	4.1.1. Prevent the unnecessary loss of heritage resources		3.2.2. Prevent the unnecessary loss of CBAs	3.2.1. Prevent unnecessary loss of vegetation
	'n		င်	۵
		-	4	4
	<u>.</u>	-	4	4
-	<u>.</u>	-	'ò	ю
-	7		7	7
	ä		3.8	38
	7		'n	7
	7		7	7
-	<u> </u>	-	2	7
-	7	1	2	7
	<u>.</u>		7	7
	- <u>-</u>		Ä	<u>.</u>
	It is recommended that the HWC Fossil Finds Procedure be implemented throughout the development phase; In the case of any significant new fossil finds exposed during construction, these should be safeguarded - preferably in sitt - and reported by the ECO as soon as possible to Heritage Western Cape.		A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads	Temporary impact on disturbed Prince Albert Succulent Karoo Vegetation.: A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads.

The second secon

~ .

8.1 |construction activities on 7.1 Visual Impacts of 6.1 |Solid waste management 00 5. 6 Noise site construction site Visual Impacts Noise caused by |Waste Management Air quality materials and delivery of and machinery construction vehicles involved in earthworks relate mostly to noise is expected to Construction related Untidy construction generated during general solid waste construction Incorrect dispoal of earthworks and site levels during Potentially high dust in form of emissions establishment equipment vehicles and Possible air pollution from construction 8.1.1 Minimise neighbours disturbance to site must be kept as 6.1.1. Safety dispose of all solid waste. possible neat and tidy as airborne dust 5.1.2 Limit levels of 7.1.1. The construction 5.1.1 Limit air pollution |-4 4 4 4 ۵ <u>'</u> 'n 4 스 ż 4 7 'n ㅗ <u>.</u> ᆚ -3,8 Ń 'n 므 'n 工 7 7 7 7 ㅗ 그 7 7 7 7 which any complaints about noise is noted. Construction activities should be limited to daylight or landscaping. material should be used for backfilling, rehabilitation hours; a complaints register should be maintained in licensed disposal site; Stockpiles of soil or excavated removed at regular intervals and disposed of at a regularly; Litter picked up where necessary; Building must be provided on site and must be emptied rubble not allowed to accumulate on site, but must be staff and discourage littering; Sufficient waste binds Conduct environmental awareness training with all training with all staff and discourage littering. site; Sufficient refuse bins are to be provided on site must be contained and disposed of by suitably disposal site; If hazardous waste is generated, this the site; any soil contaminated during construction emptied regularly; Conduct environmental awareness for disposal of general waste; refuse bins to be licensed hazardous waste contractors at a suitable (e.g. by cement) to be disposed off at a suitable waste disposal site; No dumping or burning on near All solid waste to be disposed of at a licensed landfill/ should be located in areas where they are not minimise the generation of dust resulting from allowed to idle for unnecessary long periods of time exposed to the erosive effects of the wind. construction activities; Where possible stockpiles The Contractor must take all reasonable measures to If necessary, exposed soil must be watered down at unnecessary emissions; Vehicles should not be must be in good working condition to prevent All vehicles and machinery on the construction site regular intervals to reduce levels of airborne dust;

Impedance of normal 9.1 traffic flow 9 Traffic pipeline crossing the 9.1.1. Minimise
N12 through culvert impedence of traffic traffic flow due to Impedance of normal ç 4 4 'n ᅺ -3.8 'n 'n 스 Traffic management plan in place. Comply with legislative requirements. If necessary, use traffic controllers.

To the Land Control of the Control o

N				No.	Τ	in
Solls	Water quality		Water	ASPECT		Impact Rating:
	riz Contamination of surface waster from irrigation from inadequately treated wastewater	1.1 Potential leakage or spillage of waste water from pipelines		IMPACT		Operations: Pipeli
	reated effluent used for irrigation must comply with the standards set by DWS.	1.1 Potential Maintain a closed system leakage or spillage to prevent leakage or of waste water from spillage/ Monitor pipeline pipelines for signes of leakage		ОВЈЕСТІVЕ		Operations: Pipeline Route Aternative A (Not Preferred)
	<u>-7</u>	-&		Probability	×	
	4	4		Extent	WITHOUT MITIGATION	
	4	4		Duration	M	
	6	4		Magnitude	GAT	
	'n	. '2		Receiving Environment	Š	
	-0, O,B	4,4		Without Mitigation Score (Baseline)		
	-2	-2		Probability	_	
	'n	ئ		Extent	WITH MITIGATION	
	'n	-2		Duration	<u>M</u>	
	'n	2		Magnitude	ATIO	
	7	7		Receiving Environment	ž	
	- L	10) 100		With Mitigation Score (Impact		
	Treatment of waste water must take place strictly according to engineers' prescriptions in order to meet wastewater quality standards as set out by DWS; Treated water to be monitored on a regular basis to verify water quality. Treated water should be chlorinated to ensure that any remaining pathogens are eliminated before effluent is released; Hand screens & grid channels must be cleaned regularly and waste disposed of at in a suitable manner. A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered;	Visual inspection of the pipeline route for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage; perhaps streamline leakage detection through mobilising the community to report any leakages along the pipeline route. A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered;		Short Description of Mitigation Measures		

2.2 Soil erosion Ċī 2.1 Soil contamination Visual Air Quality Noise Noise Air Quality and hydrogen associated with raw Reduce unpleasant Release of of the pipeline Potential visual Potential Noise sulphide may result in cause by methane unpleasant odours causing exposure Soil erosion treated sewage surrounding soil pollution of -eakage of semi-Potential visual impact odours. Reduce noise impact from from operations Prevent soil erosion spillage/ Monitor pipeline for signes of leakage to prevent leakage or Maintain a closed system 6 φ ᆂ ထ 4 4 ᅩ 4 4 4 4 4 6 4 7 'n 7 그 L 4 <u>۲</u> -3,8 -3,B 4.2 Ÿ 'n ㅗ 4 <u>.</u> Ŀ 'n ㅗ 'n <u>.</u> <u>'</u>2 4 4 4 7 'n <u>_</u> <u>.</u> 7 7 7 <u>.</u> <u>.</u> <u>.</u> No visual impact expected during operations as the site was previously used as a WWTP No noise expected during operations should be minimised, plant is functioning properly, the generation of odours pipeline are in good working order at all times. If the Ensure that all components of the treatment plant & place, especially after heavy rainfall. erosion; Monthly monitoring for erosion should take backfilling, compaction and re-vegetation should be signs of erosion be found, remedial action such as be concentrated in any one place or channel where it excessive speeds, as that would increase the taken immediately to avoid exacerbation of the flows over unpaved (erodible) surfaces; Should any potential for soil erosion; storm water runoff must not It must be ensured that storm water does not reach place to detect any contamination linked to the plant; route; A water monitoring programme must be in community to report any leakages along the pipeline streamline leakage detection through mobilising the areas which may be indicative of leakage; perhaps leakage or particular greening of grass in certain if contamination is discovered; Immediately institute appropriate mitigation measures Visual inspection of the pipeline route for signs of

1.2 : 8 ဂ Soil contamination Soils Soil Erosion Decommissioning Impact Rating: ASPECT contamination from demolition activities construction/ Possible soil susceptible to soil demolished and erosion in case of cleared, the site If structures are to be **Decommissioning: Pipeline Route** IMPACT Alternative A (Not- Preferred) treated sewage or infiltration of raw waste water to soil sewage or semi-1.2.1 Prevent spillage/ soil erosion 1.1.1 Limit the risk of Objective ç φ **Probability** WITHOUT MITIGATION 4 'n **Extent** 4 4 Duration 'n 'n Magnitude Receiving 느 ㅗ Environment Mitigation (Baseline) Score Without -3,8 -3.4 'n 'n Probability WITH MITIGATION 4 ㅗ **Extent** Ÿ Ÿ Duration <u>.</u> ㅗ Magnitude Receiving 4 <u>.</u> Environment assessment) Mitigation (Impact Score ۷ith of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation. significant spills must be reported to the Department ECO so that he/ she can investigate the incident and In case of a spillage spills should be reported to the remediated and disposed of in a responsible manner; is not polluted any soil contamination on site must be be established in a suitable manner that environment the veld for sanitary purposes; suitable washing site. No pit toilets on site, workers to be provided with system commences. if the system is no longer fully recommend the appropriate mitigation; Any facilitates must be proved for the workers and should within the drainage lines on site; workers not to use temporary chemical toilets; toilets not to be placed be removed to an appropriate licensed treatment functional, the waste water still in the system must treated and discharged before dismantling of the All waste water contained in the system must be per the EMPr. Refer to decommissioning section in the EMPr. protected from erosion as stated in the EMPr; erosion not to be placed in drainage lines and must be facility for treatment before work commences on the should be remediated if erosion does take place as for the duration of construction; soil stockpiles (if any) water to be channelled away from the exposed area to take place during the drier winter season; Storm If structures are to be demolished and cleared, this is Short Description of Mitigation Measures

ω		l N			
3.2	ω <u>π</u>	2.2 S	2.7	2	
Flora	Flora & Fauna	Storm water	2.1 Water quality	Water	
No rehabilitation of the site		Storm water may cause soil erosion on cleared construction site	Possible leakage or spillage of semitreated sewage, or contamination of water by runoff containing construction-related substances such as cement/ paint/ oil/ fuel		
3.1.1. Rehabilitation of the site to a state approximating the predevelopment state or a condition similar to undeveloped areas nearby.		2.2.1 Minimize water- related soil erosion	2.1.2 Prevent spillage of water potentially contaminated by waste water/ sewage, cement, paint, oil, fuel, etc		1.2.2 Safely dispose of contaminated waste
φ	-	'n	ώ		φ
4		'n	4		-2
4		<u> </u>	4		-2
∾		7	'n		7
7		7	ю		7
.3.6 6		ž.			42.8
'n		7	'n		'n
7		7	7		7
'n		7	ź.		7
7		7	<u> </u>		<u> </u>
7		7	7		7
24		L.			i. No
Prepare soil for re-vegetation, e.g. by removing [potentially contaminated soil (for disposal at a suitable site), ripping compacted soil and adding organic material; Re-establish locally indigenous vegetation under the guidance of an ecologist.		Decommissioning should ideally take place in dry winter months; stormwater should be channelled away from the exposed area. Implement Storm Water Management Plan.	All waste water contained in the system must be treated and discharged before dismantling of the system commences. If the system is no longer fully functional, the waste water still in the system must be removed to an appropriate licensed treatment facility for treatment before work commences on the site. The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil/ water.		Waste water or any parts of the system which were in direct contact with the sewage must be disposed of by a suitably licensed waste contractor at a suitable, registered waste disposal site as agreed upon between the local authority's waste division and the ECO.

1,12

7.1 00 4.1 4 construction activities on Noise Visual Impacts Noise caused by |Waste Management demolition on site Visual Impacts of Solid waste management relate mostly to Waste generated at site not disposed of at materials and delivery of involved in earthworks and machinery construction vehicles noise is expected to Construction related demolition site Untidy construction/ a suitably licensed Colonisation of alien invasive species disposal site neighbours 8.1.1 Minimise disturbance to site must be kept as neat and tidy as suitable disposal site hazardous waste at 4.1.2 Dispose of solid waste to a landfill 4.1.1. Remove general invasive species colonisation by alien 3.2.2. Prevent 7.1.1. The construction Ā å ۵ ٣ ㅗ 4 'n 'n 4 4 4 그 'n 'n 4 스 7 4 스 <u>.</u> 4.2 -3.8 -3.4 ń 'n 'n 'n 'n 7 'n 4 'n 工 <u>.</u> 'n 'n 7 7 <u>.</u> 'n ㅗ <u>.</u> <u>.</u> 7 daylight hours; a complaints register should be Construction/ demolition activities should be limited to maintained in which any complaints about noise is removed at regular intervals and disposed of at a rubble not allowed to accumulate on site, but must be regularly; Litter picked up where necessary; Building must be provided on site and must be emptied staff and discourage littering; Sufficient waste bins Conduct environmental awareness training with all authority's waste division and the ECO. waste disposal site as agreed upon between the local contact with untreated sewage. Water not to be components of the system which where directly in consulted regarding the disposal of linings and other General rubble from demolition can be used as fill at of vegetation. must be eradicated before seeding/ planting of icensed disposal site. licensed waste contractor at a suitable, registered with the sewage must be disposed of by a suitably dumped on or near the site. nearby construction sites (if any) or disposed of at a landfill site or another licensed waste disposal site; General solid waste must be disposed of at a general indigenous vegetation; Monitor the site for re-growth No alien plan species may be established on site during rehabilitation; Any alien vegetation on site Any parts of the system which were in direct contact licensed landfill site. The ECO will have to be

No 1.2 Soil contamination : ਨ Soil Erosion Soils Decommissioning Impact Rating: ASPECT demolition activities construction/ contamination from erosion in case of susceptible to soil cleared, the site demolished and If structures are to be Decommisioning: Pipeline Route IMPACT Alternative B_Not preferred treated sewage or soil erosion 1.1.1 Limit the risk of waste water to soil sewage or semiinfiltration of raw 1.2.1 Prevent spillage/ Objective φ ٩ Probability WITHOUT MITIGATION 4 'n **Extent** 4 4 Duration 'n 'n Magnitude Receiving <u>۔</u> 4 Environment Mitigation (Baseline) Without Score -3.8 3.4 'n 'n **Probability** WITH MITIGATION 4 4 **Extent** Ÿ 'n Duration <u>.</u> ᆚ Magnitude Receiving <u>.</u> <u>.</u> Environment assessment) Mitigation Score (Impact ¥ith of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation. ECO so that he/ she can investigate the incident and remediated and disposed of in a responsible manner; is not polluted any soil contamination on site must be significant spills must be reported to the Department recommend the appropriate mitigation; Any In case of a spillage spills should be reported to the be established in a suitable manner that environment the veld for sanitary purposes; suitable washing temporary chemical toilets; toilets not to be placed site. No pit toilets on site, workers to be provided with be reomed to an appropriate licensed treatment functional, the waste water still in the system must system commences. if the system is no longer fully per the EMPr. Refer to decommissioning section in should be remediated if erosion does take place as protected from erosion as stated in the EMPr; erosion not to be placed in drainage lines and must be for the duration of construction; soil stockpiles (if any) water to be channelled away from the exposed area to take place during the drier winter season; Storm facilitates must be proved for the workers and should within the drainage lines on site; workers not to use facility for treatment before work commences on the treated and discharged before dismantling of the All waste water contained in the system must be If structures are to be demolished and cleared, this is Short Description of Mitigation Measures

41 - 4 F F F F F

THE RESERVE OF THE PERSON OF

3 i2	ω	N	2		
N		2.2 St	2.1 ≷	2	
Flora	Flora & Fauna	Storm water	Water quality	Water	
No rehabilitationof the site		Storm water may cause soil erosion on cleared construction site	Possible leakage or spillage of semitreated sewage from pipelines and portable toilets during construction, or contamination of water by runoff construction-related substances such as cement/ paint/ oil/ fuel		
3.1.1. Rehabilitation of the site to a state approximating the predevelopment state or a condition similar to undeveloped areas nearby.		2.2.1 Minimize water- related soil erosion	2.1.2 Prevent spillage of water potentially contaminated by cement, paint, oil, fuel, etc		1.2.2 Safely dispose of contaminated waste
- &		'n	ώ		φ
4		ή.	4		'n
4		7	4		ż
, v		7	ю		7
7		7	۵		<u>t</u>
<u>ئ</u> 80		2			-2,8
\		7	42		6
7		7	7		<u> </u>
'n		7	'n		7
7		7	7		7
7		7	7		7
#		*	<u>*</u>		1,2
Prepare soil for re-vegetation, e.g. by removing [potentially contaminated soil (for disposal at a suitable site), ripping compacted soil and adding organic material; Re-establish locally indigenous vegetation under the guidance of an ecologist.		Construction should ideally take place in dry winter months; stormwater should be channelled away from the exposed area.	All waste water contained in the system must be treated and discharged before dismantling of the system commences, if the system is no longer fully functional, the waste water still in the system must be removed to an appropriate licensed treatment facility for treatment before work commences on the site. The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil/ water.		Waste water or any parts of the system which were in direct contact with the sewage must be disposed of by a suitably licensed waste contractor at a suitable, registered waste disposal site as agreed upon between the local authority's waste division and the ECO.

The second secon

Г	8.1	8	7.1	7		4.	4	
H	A	Noise		1				
	Noise caused by construction activities on site	ise	Visual Impacts of demolition on site	Visual Impacts		Solid waste management	Waste Management	
	Construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials		Untidy construction/ demolition site		disposal site	Waste generated at site not disposed of at a suitably licensed		Colonisation of alien invasive species
	8.1.1 Minimise disturbance to neighbours		7.1.1. The construction site must be kept as neat and tidy as possible		4.1.2 Dispose of hazardous waste at suitable disposal site	4.1.1. Remove general solid waste to a landfill site		3.2.2. Prevent colonisation by alien invasive species
Ц	4		4		ф	å		ç
Ц			7		4	4		ή.
Ц	-2		-2		4	4		4
Н	<u></u>		7		4	'n		'n
Н	7				7	7		7
	4		4		42	-3,8		3,4
			<i>\</i> ⁄ ₀		-2	'n		ż
Ц	<u>-</u>		7		٨.	'n		<u> </u>
Ш			7	-	'n	7	ļ	'n
Ц		-	7		'n	7		7
	-	1			7	7	,	7
	-1,2		L N		-3(8	<u>*</u>		1/4
	Construction/ demolition activities should be limited to daylight hours; a complaints register should be maintained in which any complaints about noise is noted.		Conduct environmental awareness training with all staff and discourage littering. Sufficient waste bins must be provided on site and must be emptied regularly; Litter picked up where necessary; Building rubble not allowed to accumulate on site, but must be removed at regular intervals and disposed of at a licensed disposal site.		Any parts of the system which were in direct contact with the sewage must be disposed of by a suitably licensed waste contractor at a suitable, registered waste disposal site as agreed upon between the local authority's waste division and the ECO.	General solid waste must be disposed of at a general landfill site or another licensed waste disposal site; General rubble from demolition can be used as fill at nearby construction sites (if any) or disposed of at a licensed landfill site. The ECO will have to be consulted regarding the disposal of linings and other components of the system which where directly in contact with untreated sewage. Water not to be dumped on or near the site.		No allen plan species may be established on site during rehabilitation; Any allen vegetation on site must be eradicated before seeding/ planting of indigenous vegetation; Monitor the site for re-growth of vegetation.

Appendix J2.3:

Environmental impacts and risk assessment/Impact Risk Matrix – Pipeline Route Alt B (Not preferred)

		Short Description of Mitigation Measures		Earth works and site preparation to take place during the drier winter season; Storm water to be channelled away from the exposed area for the duration of construction; soil stockpiles (if any) not to be placed in drainage lines and must be protected from erosion as stated in the EMPr; erosion should be remediated if erosion does take place as per the EMPr.	Minimise construction footprint; Pipeline route Alternative C/D is preferred as it will not impact the banks of the river Pipeline RouteC/D preferred alternative as no impact or loss of aquatic habitat will occur; Pipeline route Alt D to remain within road reserve and attach to existing brige to cross the N12.	The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; linspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines, All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.
		With Mitigation Score (Impact		** T		4
	z	Receiving Environment		7	7-	7
	WITH MITIGATION	Magnitude	1	7	্য	7
	MITIG	Duration		ņ	7	9
	IH!	frent]	ņ	7	4
	5	Probability		7	7-	9
		Without Mitigation Score (Baseline)		3.8	-6,4	8.8
	NOI	Receiving Environment		7	4	7
	HOUT MITIGATION	Magnitude		7	4	?
	TMI	Duration		4	4	4
	HOH	£xtent		4	4	4
	WIT	Probability		φ	-16	φ
Construction: Pipeline Route Alternative B_Not preferred		Objective		1.1.1 Limit the risk of soil erosion	1.1.2 Limit risk of soil erosion on banks of the Sand River	1.2.2 Prevent spillage of water potentially contaminated by cement/ chemicals/ fuel & oil from construction vehicles/ machines
Construction: Pipel B_Not _I		IMPACT		Clearing of vegetation during earthworks might make the site susceptible to soil erosion in case of rains	Clearing of vegetation during earthworks may impact banks of Sand River	Soil contamination from construction activities
Impact Rating: Site Establishment & Construction		ASPECT	Soils	Soil Erosion		Soil Contamination
- 3, 3		No.	-	<u> </u>		2.2

				1	-										_
2.1 Water Quality (Surface water)	(Surface ound water)	Possible leakage or spillage of sewage from portable toilets during construction, or contamination of water by runoff containing construction-related substances such as cement/ paint/ oil/ fuel	Possible leakage or spillage of sewage from portable toilets during construction of water potentially containing etc construction-related substances such as cement/ paint/ oil/ fuel	4	4	4	?	-2-	7	7	7	7	? ?	The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.	1
2.2 Storm water		Storm water may cause soil erosion on cleared construction site	2.2.1 Minimize water- related soil erosion	4	4	4	7	88	7	çı	7	7	- 1	Construction should ideally take place in dry winter months; stormwater should be channelled away from the exposed area. Implement Storm Water Management Plan	
3 Flora & Fauna	æ				1	-	1				1	+			
3.1 Fauna		Possible killing of fauna e.g. killing of 3.1.1. snakes/ spiders out of fauna fear	Prevent killing of	4	4	4- C-	7	-3.2	?	7	7	7	25.	Environmental Awareness training to be conducted with all labourers, educating the importance of not simply killing fauna that is perceived as dangerous; Keep contact details in the site office for someone who can be called if catching and relocation of fauna is required, no hunting/ snaring allowed on site.	

Potential loss 3.2.1 Prevent Vegetation Vege	Temporary impact on disturbed Prince Albert Succulent Karoo Vegetation. A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads. Pipeline RouteC/D preferred alternative as no impact or loss of habitat willin the road reserve	Pipeline RouteC/D preferred alternative as no impact or loss of aquatic habitat will occur; Minimise the construction footrpint; Pipeline route Alt D to remain within road reserve and attach to existing brige to cross the N12.	Pipeline Route Alternative C/D is the preferred alternative as no impact or loss of habitat will occur. A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads
3.2.1. Prevent unnecessary loss of -16 -4 -2 -1 -5.4 -8 -1 -1 -1 -1 aquatic vegetation 3.2.2 Prevent the unnecessary loss of -16 -4 -4 -4 -4 -4 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1			₹
3.2.1. Prevent unnecessary loss of -16 -4 -2 -1 -5.4 -8 -1 -1 -1 -1 -1 aquatic vegetation 3.2.2 Prevent the unnecessary loss of -16 -4 -4 -4 -4 -4 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	7	7	
3.2.1. Prevent unrecessary loss of -16 -4 -4 -2 -1 -5 -4 -8 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1			
3.2.1. Prevent unnecessary loss of -16 -4 -4 -2 -1 -5.4 -8 -1 vegetation 3.2.2 Prevent the unnecessary loss of -16 -4 -4 -4 -6.4 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	٣		
3.2.1. Prevent unnecessary loss of vegetation -16 -4 -4 -2 -1 -5.4 aquatic vegetation -16 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4	Υ	7	
3.2.1. Prevent unnecessary loss of vegetation aquatic vegetation aquatic vegetation -16 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4	φ	7	7
3.2.1. Prevent unnecessary loss of vegetation aquatic vegetation aquatic vegetation -16 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4	***	-6,4	-6,4 4.
3.2.1. Prevent unnecessary loss of -16 -4 -4 vegetation -16 -4 -4 aquatic vegetation -16 -4 -4 aquatic vegetation -16 -4 -4 cBAs	7	4	4
3.2.1. Prevent unnecessary loss of vegetation -16 4 aqualto vegetation aqualto vegetation -16 -4 acressary loss of -16 -4 acressary loss of -16 -4 CBAs	?	4	4
3.2.1. Prevent unnecessary loss of vegetation aquatic vegetation aquatic vegetation 3.2.3. Prevent the unnecessary loss of CBAs.	4	4	4
3.2.1. Prevent unnecessary loss of vegetation 3.2.2 Prevent the unnecessary loss of aquatic vegetation 3.2.3. Prevent the unnecessary loss of CBAs		4	4
		-16	-16
	3.2.1. Prevent unnecessary loss of vegetation	3.2.2 Prevent the unneccessary loss of aquatic vegetation	3.2.3. Prevent the unnecessary loss of CBAs
Tempo and/or of disturble Albert. Karoo and/or of aqua associa Sand/ (Temporary impact and/or potential loss of disturbed Prince Albert Succulent Karoo Vegetation	Temporary impact and/or potential loss of aquatic vegetation associates with the Sand/ Groot River	Loss of Critical Biodiversity Areas
Flora		Flora	
3.2		3.2	

4.1 Heritage Rasources Polential bos of 4.1.1. Provent the 4.2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	4	4 Heritage Resources														
Air quality Potentially high dust evels during establishment establishment Waste Management Waste Management Solid waste management Government disposal or general solid waste or all solid waste. Solid waste management Waste management Air quality Air quality Air 1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	.4	1 Heritage Resources	Potential loss of Heritage Resources	4.1.1. Prevent the unnecessary loss of heritage resources	ņ			-		<u>.</u>			7	7		It is recommended that the HWC Fossil Finds Procedure be implemented throughout the development phase; In the case of any significant new fossil finds exposed during construction, these should be safeguarded - preferably in situ - and reported by the ECO as soon as possible to Heritage Western Cape.
Possible air pollution in form of emissions from construction but the form of emissions from construction from con	2							-								
Air quality Potentially high dust levels of earthworks and site establishment Waste Management Incorrect disposal of generated during construction Wisual Impacts And quality Potentially high dust fevels of levels of levels of airborne dust earthworks and site airborne dust And and are an an site establishment And an are an			Possible air pollution in form of emissions from construction vehicles and equipment	5.1.1 Limit air pollution	4	4				7	7	7		7	#	All vehicles and machinery on the construction site must be in good working condition to prevent unnecessary emissions; Vehicles should not be allowed to idle for unnecessary long periods of time
Waste Management Incorrect disposal of general solid waste generated during construction Visual Impacts	ro,		Potentially high dust levels during earthworks and site establishment	5.1.2 Limit levels of airborne dust			7	7	ń	5	7	7	<u></u>	7	쪽	If necessary, exposed soil must be watered down at regular intervals to reduce levels of airborne dust; The Contractor must take all reasonable measures to minimise the generation of dust resulting from construction activities; Where possible stockpiles should be located in areas where they are not exposed to the erosive effects of the wind.
Solid waste management general solid waste of all solid waste. Solid waste management generated during of all solid waste.	ဖ					1	-	-								
	6.1		Incorrect dispoal of general solid waste generated during construction	6.1.1. Safety dispose of all solid waste.	φ	4				77			7	7	2	All solid waste to be disposed of at a licensed landfill/waste disposal site; No dumping or burning on near the site, any soil contaminated during construction (e.g. by cement) to be disposed off at a suitable disposal site; If hazardous waste is generated, this must be contained and disposed of by suitably licensed hazardous waste contractors at a suitable site; Sufficient refuse bins are to be provided on site for disposal of general waste; refuse bins to be emptied regularly; Conduct environmental awareness training with all staff and discourage littering.
	1				1	1	+									

7	Visual Impacts of construction site	Untidy construction site	7.1.1. The construction site must be kept as neat and tidy as possible	4	2	7	7	W.	7	7	<u>+</u>	7	- 7	Conduct environmental awareness training with all staff and discourage littering: Sufficient waste binds must be provided on site and must be emptied regularly; Litter picked up where necessary. Building rubble not allowed to accumulate on site, but must be removed at regular intervals and disposed of at a licensed disposal site; Stockpiles of soil or excavated material should be used for backfilling, rehabilitation or landscaping.
∞	Noise					1					1	$\frac{1}{2}$		
8.1	Noise caused by construction activities on site	Construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials	8.1.1 Minimise disturbance to neighbours	4	7	7	7	87-	?	7	7	7	- 4	Construction activities should be limited to daylight hours; a complaints register should be maintained in which any complaints about noise is noted.
20	9 Traffic				1	-				1	1	1		
		Impedance of normal traffic flow due to		4	4	7	,	•	C					Traffic management plan in place. Comply with legislative requirements. If necessary, use traffic controllers
9.1	Impedance of normal 9.1 traffic flow	e	9.1.1. Minimise	•				ŧ	7	γ	y	T T	0	
		וודב סוב נוור מוותפר	וווווווווור חוווווווווווווווווווווווווו	_	-					-	-	_		

	T		Т	v or	T \$	Т	v				
		Short Description of Mitigation Measures		Pipeline Route C/D is the preferred alternative. Visual inspection of the pipeline route for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage; perhaps streamline leakage detection through mobilising the community to report any leakages along the pipeline route. A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered.	Treatment of waste water must take place strictly according to engineers' prescriptions in order to meet wastewater quality standards as set out by DWS; Treated water to be monitored on a regular basis to verify water quality. Treated water should be chlorinated to ensure that any remaining pathogens are eliminated before effluent is released; Hand screens & grid channels must be cleaned regularly and waste disposed of at in a suitable manner.		Visual inspection of the pipeline route for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage; perhaps streamline leakage detection through mobilising the community to report any leakages along the pipeline route; A water monitoring programme must be in place to detect any contamination linked to the plant; immediately institute appropriate mitigation measures if contamination is discovered;				
		With Mitigation Score (Impact		9.	99		*				
	z	Receiving nvironment	1	7	7		*				
	ATIO	Magnitude		7	çı	1	7				
	WITH MITIGATION	Duration		ņ	7	1	2				
	/TH	frent		ņ	7	1					
	5	Probability		Ċ.	7	1	-2				
		Without Mitigation Score (Baseline)		-6,4	း ဆို		4, 2i				
	UT MITIGATION	Receiving Environment	nagani rieseR rorivn3	4	7	1	-				
		Magnitude		4	φ	1	4 				
		Duration								4	4
	일	Extent		4	4	1	4				
	WITHO	Probability		7-	-16	1	φ				
Operations: Pipeline Route Alternative B_Not preferred		OBJECTIVE		1.1 Potential leakage or spillage Maintain a closed system of waste water from to prevent leakage or pipelines into the spillage river	Treated effluent used for irrigation must comply with the standards set by DWS.		Maintain a closed system to prevent leakage or spillage/ Monitor pipeline for signes of leakage				
Operations: Pi		IMPACT		1.1 Potential leakage or spillage of waste water from pipelines into the river	1.2 Contamination of surface waster from irrigation from inadequately treated wastewater		Leakage or spillage of semi-treated sewage may result in pollution of surrounding soil				
Impact Rating: Operations		ASPECT	Water	Water rus lite	Guark cons	Soils	Soil contamination				
ம்		ė.	-	-		7	2.1				

Air Quality Release of unpleasant odours associated with raw sewage and sludge odours. Air Quality sewage and sludge odours. Sulphide Noise Impact Potential visual Impact from operations Nisual	2.2	2.2 Soil erosion	Soil erosion	Prevent soil erosion	φ	4	4	7	8.55	ņ	7	· 'I		₹	It must be ensured that storm water does not reach excessive speeds, as that would increase the potential for soil erosion; storm water runoff must not be concentrated in any one place or channel where it flows over unpaved (erodible) surfaces; Should any signs of erosion be found, remedial action such as backfilling, compaction and re-vegetation should be taken immediately to avoid exacerbation of the erosion; Monthly monitoring for erosion should take place, especially after heavy rainfall,
unpleasant odours associated with raw sewage and sludge cause by methane and hydrogen sulphide Potential Noise Reduce noise impact from Potential visual impact from operations Potential visual Potential visual impact From operations Fro		Air Quality				1	1	-							
Potential Noise Reduce noise impact from -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1		Air Quality	Release of unpleasant odours associated with raw sewage and sludge cause by methane and hydrogen sulphide	Reduce unpleasant odours.	φ					4					
Potential Noise Reduce noise impact from -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1		Noise				1		-				7	1		
Potential visual Polential visual impact -1 -1 -1 -1 -1 -1 -1 -1 -1 -	4	Noise		Reduce noise impact from operations	7		_	_	+	7				- **	No noise expected during operations
Potential visual Polential visual impact 1 -1 -1 -1 -1 1 1 1 1 1 1		Visual				1	1	+				1	+		
	2	Visual		Potential visual impact from operations	_				- T	7	7	+	-	7	No visual impact expected during operations as the

	T MITIGATION	Without Mitgation Score (Baseline)		4 -2 -1 -3.4 -2	4 -2 -1 -3.8				
Decommisioning: Pipeline Route Alternative B_Not preferred	WITHOUT MIT	Extent							
	WITHOL	Duration Magnitude Receiving Environment		φ	4				
	WITHOUT MITIGATION	Extent Duration Magnitude Receiving		-2 -4 -2	4 5.				
	ON	Extent Duration Magnitude Receiving Environment Baseline	-						
	WITH MITIGATION	Probability Extent onestion onestion butation		2 2	5- 4- 5- 7-				
	NO	Receiving Mitigation Score (Impact		7	tree sys site term term that the term term term term term term term ter				
		Short Description of Mitigation Measures		If structures are to be demolished and cleared, this is to take place during the drier winter season: Storm water to be channelled away from the exposed area for the duration of construction; soil stockpiles (if any) not to be placed in drainage lines and must be protected from erosion as stated in the EMPr; erosion should be remediated if erosion does take place as per the EMPr. Refer to decommissioning section in the EMPr.	All waste water contained in the system must be treated and discharged before dismantling of the system commences. If the system is no longer fully functional , the waste water still in the system must be reomed to an appropriate licensed treatment facility for treatment before work commences on the site. No pit toilets on site, workers to be provided with temporary chemical toilets; toilets not to be placed within the drainage lines on site, workers and should be established in a suitable manner that environment is not polluted any soil contamination on site must be remediated and disposed of in a responsible manner. In case of a spillage spills should be reported to the ECO so that he/she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation.				

II .

e A a a		>		Т	
Waste water or any parts of the system which were in direct contact with the sewage must be disposed of by a suitably licensed waste contractor at a suitable, registered waste disposal site as agreed upon between the local authority's waste division and the ECO.		All waste water contained in the system must be treated and discharged before dismantling of the system commences. If the system is no longer fully functional , the waste water still in the system must be removed to an appropriate licensed treatment facility for treatment before work commences on the site. The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc.; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that hef she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil/ water.	Construction should ideally take place in dry winter months; stormwater should be channelled away from the exposed area.		Prepare soil for re-vegetation, e.g. by removing [potentially contaminated soil (for disposal at a suitable site), ripping compacted soil and adding organic material; Re-establish locally indigenous vegetation under the guidance of an ecologist.
# # # # # # # # # # # # # # # # # # #					7
7] [Υ	7		7
(4)] [7	7	7	T
7	4	?	7		ņ
7	-	₹	7]	7
7		7	7		7
58			*		8,5
7		Ċ.	7	1	7
7	1 1	?	7	1	ņ
ý	1	4	7	1	4
-5	1	4	.5		4
φ	1 F	φ	-2		φ
1.2.2 Safely dispose of contaminated waste		2.1.2 Prevent spillage of water potentially contaminated by cement, paint, oil, fuel, etc	2.2.1 Minimize water- related soil erosion		3.1.1. Rehabilitation of the site to a state approximating the pre- development state or a condition similar to undeveloped areas nearby.
		Possible leakage or spillage of semitreated sewage from pipelines and portable toilets during construction, or contamination of water by runoff construction-related substances such as cement/ paint/ oil/ fuel	Storm water may cause soil erosion on cleared construction site		No rehabilitationof the site
	Water	2.1 Water quality	2.2 Storm water	Flora & Fauna	Flora
	7	2.1	2.2	6	3.2

4 Vesto timensenion of alian Colonisation of	site site f growth		general site; s fill at n/ at a l other y in	ontact ably red ie local		oins ilding uust be	T	is sis	
Waste Management Waste generated a fine management Solid waste management Solid waste management Waste generated at a fine management Solid waste beneared to a recovered to a rec	/ be established on a alien vegetation on s s seeding/ planting o onitor the site for re-		be disposed of at a classed waste disposal litton can be used a litton can be used a cCO will have to be sposal of linings and which where directl rage. Water not to b as	ich were in direct co lisposed of by a suit at a suitable, registe sed upon between th ind the ECO.		areness training with Sufficient waste to and must be emptied where necessary; Burnulate on site, but mulate on site, but messary sand disposed of at		tivities should be lirr s register should be mplaints about noise	
Waste Management Waste generated a fine management Solid waste management Solid waste management Waste generated at a fine management Solid waste beneared to a recovered to a rec	alien plan species maring rehabilitation; Any st be eradicated before igenous vegetation; Mregetation.		neral solid waste must drill site or another lice and read rubble from demo ruby construction sites. Insed landfill site. The Issulted regarding the di nponents of the system fact with untreated sev nped on or near the sit	parts of the system w the sewage must be or nsed waste contractor te disposal site as agra nority's waste division s		duct environmental aw f and discourage litterir it be provided on site a liarly; Litter picked up v ble not allowed to accur oved at regular interva rsed disposal site.		struction/ demolition ac ight hours; a complaint trained in which any co d.	
Waste Management Waste Management Waste process Waste processor of alim contribution to failth contribution to alim through the contribution on site authorition related more through throwed in construction related more through through throwed in construction whiches the construction and delivery of materials and delivery of materials.	2 9 1 1 5		Ger Ger Ger Con Con Con dun	Any with lice was auth		Staff muss regulated in the staff regulated i		Constant despliance main mote	
Waste Management Solid waste to a large management Solid waste management Solid waste to a large management Solid	7		* *	8.		7 -		<u>8</u>	
Weste Management Waste generated at solid waste in a land limpacts Weste Management Solid waste management Solid vaste management Solid vaste management Waste generated at solid waste to a landfill -8 -4 -4 -2 -1 -3.8 -2 -1 -2 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	7		2	7		7		7	П
Waste Management Colonisation of alien 32.2 Pervent and the process invasive species invasive invasive invasive species in a factorial waste invasive of invasive or struction site invasive species in a factorial waste invasive invasive in a factorial waste in			শ					7	П
Waste Management Colonisation of alian (a) 2.2.2. Prevent of alian invasive species (a) 21 -3.4 -2 -1 -3.4 -2 -1 -3.4 -2 -1 -3.4 -2 -1 -3.4 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3		4				7			П
Waste Management Waste management Waste generated at a suitable incosed of at a suitable incos		-				7			
Waste Management Solid waste management Solid waste management Weste generated at a suitable disposal site disposal site a suitable disposal site demolition on site monition site most be kept as possible disposal site a suitable disposal site demolition site a suitable disposal site demolition site a suitable disposal site demolition site a suitable disposal site a suitable disposal site demolition site demolition site demolition site demolition site and delivery of materials and mate	7		-2	7		Ċ.		-5	Ш
Waste Management Solid waste populate Solid waste popu	4.6		86.84	5,		8,4		*	
Waste Management Solid waste management site a wilably licensed demolition on site demolition related noises caused by construction activities on materials Noise caused by construction whiles a construction activities on materials Colonisation of alien old invasive species species invasive species species invasive species invasive species s	7		7	7		7		7	H
Waste Management Solid waste management Solid waste management Weste generated at site of the part	-7		-5					7	Н
Waste Management Solid waste management Solid waste management Solid waste management Waste generated at a suitably licensed of at a suitably licensed disposal site a suitable disposa di disposa di disposa di disposa di disposa di disposa di dis			4				1	ņ	П
Waste Management Solid waste management a suitably licensed disposed of at a suitably licensed disposal site a suitably licensed disposal site suitably location waste at suitable disposal site suitable disposal site suitable disposal site suitably location waste at suitable disposal site demolition on site demolition site mostly to construction related in onicies is expected to noices a expected to noices and machinery file materials Noise caused by construction related machinery and delivery of materials	-		4					7	
Waste Management Solid waste management a site not disposed of at a suitably licensed disposal site demolition on site a construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials	-	-						4	
Waste Management Solid waste management a site not disposed of at a suitably licensed disposal site demolition on site a construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials	 Prevent onisation by alien asive species 		1. Remove general	2 Dispose of ardous waste at able disposal site		i. The construction must be kept as and tidy as ible		Minimise rbance to nbours	
Waste Management Solid waste management Visual Impacts of demolition on site Noise caused by construction activities on site		-		4.1. haza suita		7.1.7 site neat poss		8.1.1 distu neigh	
Waste Management Solid waste management Visual Impacts of demolition on site Noise caused by construction activities on site	Colonisation of alier invasive species		Waste generated at site not disposed of a suitably licensed	disposal site		Untidy construction/ demolition site		Construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials	
		Waste Management	Solid waste management		Visual Impacts		Voise		
			4.1			7.1		7 0 is	\dashv

Appendix J2.4:

Environmental impacts and risk assessment/Impact Risk Matrix – Pipeline Route Alt C (Most Preferred)

2	1.2	<u>:</u>		N _O	Τ	P
Water	1.2 Soil contamination	Soil Erosion	Soits	ASPECT		Impact Rating: Site Establishment & Construction
	Soil contamination from construction activities	Clearing of vegetation during earthworks might make the site susceptible to soil erosion in case of rains		IMPACT		Construction: Pipeli (Most
	1.2.1 Prevent spillage of water potentially contaminated by cement/ chemicals/ fuel & oil from construction vehicles/ machines	1.1.1 Limit the risk of soil erosion		Objective		Construction: Pipeline Route_Alternative C (Most Preferred)
	å	ço	ĺ	Probability	8	
	4	4		Extent	ᇹ	
	4	4		Duration	WITHOUT MITIGATION	
	^ن	'n		Magnitude	GAT	
L	7	<u> </u>		Receiving Environment	ğ	
	-3.8	.3. e		Without Mitigation Score (Baseline)		
	'n	r/s	Ī	Probability		
L	4	7		Extent	WITH MITIGATION	
	'n	'n		Duration	Ĭ	
	4	7		Magnitude	GATIC	
L	7	7		Receiving Environment	ĭ	
	War - I - I	-1,4		With Mitigation Score (Impact		
	The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.	Earth works and site preparation to take place during the drier winter season; Storm water to be channelled away from the exposed area for the duration of construction; soil stockpiles (if any) not to be placed in drainage lines and must be protected from erosion as stated in the EMPr; erosion should be remediated if erosion does take place as per the EMPr.Implement Stormwater Management Plan.		Short Description of Mitigation Measures		

-

- ω	_		
3.1	ω π	2.2	27
Fauna	Flora & Fauna	Storm water	Water Quality (Surface and ground water)
Possible killing of fauna e.g. killing of s.1.1. snakes/ spiders out of fauna fear		Storm water may cause soil erosion on cleared construction site	Possible contamination of water by runoff containing construction-related substances such as cement/ paint/ oil/ fuel
3.1.1. Prevent killing of fauna		2.2.1 Minimize water- related soil erosion	2.1.1 Prevent spillage of water potentially contaminated by cement, paint, oil, fuel, etc
4		4	4
4		4	4
4		4	4
i,	i,		ю
-2		'n	ю
<u>ئ</u> نې		-3.2	33.2
'n		7	-2
		κ'n	4
<u> </u>		7	<u> </u>
7		1,	7
<u> </u>		7	7
<u>1)</u> 10		<u>.</u>	i k
Environmental Awareness training to be conducted with all labourers, educating the importance of not simply killing fauna that is perceived as dangerous; Keep contact details in the site office for someone who can be called if catching and relocation of fauna is required, no hunting/ snaring allowed on site.		Construction should ideally take place in dry winter months; stormwater should be channelled away from the exposed area. Implement Storm Water Management Plan	The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.

-

.

υ ₀	4.1	4		స స
Air q		Heri		N
Air quality	Heritage Resources	Heritage Resources		
	Resou	Resor		Flora
	rces	urces		ω
	Poter Herit	1	Bic	Terr and of di Albe Karc
	Potential loss of Heritage Resources		Loss of Critical Biodiversity Areas	Temporary impact and/or potential loss of disturbed Prince Albert Succulent Karoo Vegetation
	ss of esoun		sity A	y imp: d Pritial getatic
	ces		reas	act loss
	4.1.1. Prevent the unnecessary loss of heritage resources		3.2.2. unned CBAs	3.2.1 unne vege
	. Prev cessa ge re		3.2.2. Prevent the unnecessary loss of CBAs	3.2.1. Prevent unnecessary loss of vegetation
	ent th ry loss		ry los	ary los
	s of		s of	ss of
	2		ά	ώ
	7		4	4
-	7		4	4
-			'n	й
	77			7
	i. ko			
	13			\$ & & & & & & & & & & & & & & & & & & &
	7	Ī	-2	7
	4		7	7
	-		7	7
	7	1	7	7
	7		7	٢
			ä	
	It is Proc deve In th durit prefi as p		A si more EM spe to b don mus ECO minus cons distring vehi	A s Suu A S Suu A A S Suu A S Suu A S Spe to to t
	It is recommended the Procedure be implen development phase; In the case of any siduring construction, preferably in situ - ar as possible to Herita		uitably nitor to hitor hito	mporacculer utitable manufacture of the control of
1	nmen e be in ent pl ent a e of a nstruc in sit		y qual he conhe co	ary im nt Kar it
	ded th nplem nase; ny sig ny sig ny sig ny sig ny sig ny sig		ified Enstruction of ther other of with displaying the with displaying the manner of t	pact of cooking the pact of cooking the pact of cooking the parties of the pact of the pac
	nat the nented priffical p		A suitably qualified ECO must monitor the construction of pha EMPr and any other conditions specialist studies; Environmen to be conducted with all worker done, the development footprin must be clearly demarcated an ECO. Demarcation must incluencessary to execute the work minimum disturbance; Lay-dow construction sites must be local disturbed areas or areas of low must be pre-approved by the Edearing of any area outside of must be avoided; Access roads single circular route in and out, vehicles stay on existing roads	Temporary impact on disturbed Succulent Karoo Vegetation.: A suitably qualified ECO must monitor the construction of pha EMPr and any other conditions specialist studies; Environment to be conducted with all worker done, the development footprir must be clearly demarcated an ECO. Demarcation must includ necessary to execute the work, minimum disturbance; Lay-dow construction sites must be loca disturbed areas or areas of low must be pre-approved by the Eclearing of any area outside of must be avoided; Access roads single circular route in and out. vehicles stay on existing roads,
	HW0 d throu int new shoul orted orted sstern		nust I f phasitions itions orkers orkers otpring an anciude work, work, work f low if low f locat f low the E() le of coads	turbecton.: must lon.: must lon.: must loft phabilitions includ worker order includ work. Y-dow work loca of low the Et de de for lond the Et de de for order order included in lond included includ
	It is recommended that the HWC Fossil Finds Procedure be implemented throughout the development phase; In the case of any significant new fossil finds of during construction, these should be safeguar preferably in situ - and reported by the ECO as as possible to Heritage Western Cape.		A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness tratio be conducted with all workers; Before any wo done, the development footprint and access rounust be clearly demarcated and approved by the ECO. Demarcation must include the total footprin eccessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value must be pre-approved by the ECO; Indiscriminal dearing of any area outside of construction footprin the avoided; Access roads should be limite single circular route in and out. Ensure constructor vehicles stay on existing roads	Temporary impact on disturbed Prince Albert Succulent Karoo Vegetation.: A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness trato be conducted with all workers; Before any wo done, the development footprint and access rounds be clearly demarcated and approved by the ECO. Demarcation must include the total footprin necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value must be pre-approved by the ECO; Indiscrimina clearing of any area outside of construction foot must be avoided; Access roads should be limite single circular route in and out. Ensure construction vehicles stay on existing roads.
	sil Fin It the sil find safegu		oointe berms ining tarener or arces oved fotal fotal fotal fotal fotal within all gical viction discriuction id be I	pointe terms ining acces acces for total f total f thin a so or thin a so or ust a so or ust a so or thin a so or discr
	It is recommended that the HWC Fossil Finds Procedure be implemented throughout the development phase; In the case of any significant new fossil finds exposed during construction, these should be safeguarded - preferably in situ - and reported by the ECO as soon as possible to Heritage Western Cape.		A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads	Temporary impact on disturbed Prince Albert Succulent Karoo Vegetation: A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads.
	osed y -		ining kis kis kis kis and and and lito a	e withing rik is tes e e nt and te animit to a liton

-

8.1	_	T	_		_		
	ω Z	7.1	7	6.1	6	5.1	
Noise caused by construction activities on site	Noise	Visual Impacts of construction site	Visual Impacts	Solid waste management	Waste Management	Air quality	
Construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials		Untidy construction site		Incorrect dispoal of general solid waste generated during construction		Potentially high dust levels during earthworks and site establishment	Possible air pollution in form of emissions from construction vehicles and equipment
8.1.1 Minimise disturbance to neighbours		7.1.1. The construction site must be kept as neat and tidy as possible		6.1.1. Safety dispose of all solid waste.		5.1.2 Limit levels of airborne dust	5.1.1 Limit air pollution -4
4		-4		4		4	
	-	7		4		72	4
<u>+</u>	-	<u> </u>	-	4			4
—— ;	ŀ	7	-	'n		7	-2 -1
<u> </u>		1 =		7		_	
<u>1</u>		\$		ယ်		ю	ža
		<i>i</i> >		'n		-2	7
	-			4		<u> </u>	7
	-	7	-	7		7	7
	-	7	-	7		7	7
<u> </u>		-7	L	7		7	7
- 1 N		N S		6		± 53	2
Construction activities should be limited to daylight hours; a complaints register should be maintained in which any complaints about noise is noted.		Conduct environmental awareness training with all staff and discourage littering; Sufficient waste binds must be provided on site and must be emptied regularly; Litter picked up where necessary; Building rubble not allowed to accumulate on site, but must be removed at regular intervals and disposed of at a licensed disposal site; Stockpiles of soil or excavated material should be used for backfilling, rehabilitation or landscaping.		All solid waste to be disposed of at a licensed landfill/ waste disposal site; No dumping or burning on near the site; any soil contaminated during construction (e.g. by cement) to be disposed off at a suitable disposal site; If hazardous waste is generated, this must be contained and disposed of by suitably licensed hazardous waste contractors at a suitable site; Sufficient refuse bins are to be provided on site for disposal of general waste; refuse bins to be emptied regularly; Conduct environmental awareness training with all staff and discourage littering.		If necessary, exposed soil must be watered down at regular intervals to reduce levels of airborne dust; The Contractor must take all reasonable measures to minimise the generation of dust resulting from construction activities; Where possible stockpiles should be located in areas where they are not exposed to the erosive effects of the wind.	All vehicles and machinery on the construction site must be in good working condition to prevent unnecessary emissions; Vehicles should not be allowed to idle for unnecessary long periods of time

S I Famic				
Impedance of normal traffic flow due to				Road crossing via Horizontal Directional Drilling;Traffic management plan in place. Comply
Impedance of normal pipeline crossing the 9.1.1. Minimise -8 -4 9.1 traffic flow N12 impedence of traffic	4 -4 -2 -1 -3.8 -4	2 -1 -1	ks	with legislative requirements. If necessary, use traffic controllers.

171

S	_		-	N.O.	T	1	D .
50.	Wat		Water		t	1	9 3
n	Water quality		ter	ASPECT		e de la como	Impact Rating:
	i.2 Contamination of surface waster from irrigation from inadequately treated wastewater	1.1 Potential leakage or spillage of waste water from pipelines		IMPACT			Operations: Pip
	irreated effluent used for irrigation must comply with the standards set by DWS.	1.1 Potential Maintain a closed system leakage or spillage to prevent leakage or of waste water from spillage/ Monitor pipeline for signes of leakage		OBJECTIVE			Operations: Pipeline Route Aternative C (Most Preferred)
	-16	å	Ì	Probability	8	T	
-	4	4		Extent	WITHOUT MITIGATION		
-	4	4		Duration	IMI		
ŀ	φ	4		Magnitude]GAT		
ŀ	'n	2		Receiving Environment	<u>S</u>		
	6,6 6,7	44		Without Mitigation Score (Baseline)			
L	'n	-2		Probability	<		
L	'n	'n		Extent	WITH MITIGATION		
L	'n	i,		Duration	PILIM		
L	ю	'n		Magnitude	ATIO		
	7	7		Receiving Environment	z		
	ä	<u></u>		With Mitigation Score (Impact			
	Treatment of waste water must take place strictly according to engineers' prescriptions in order to meet wastewater quality standards as set out by DWS; Treated water to be monitored on a regular basis to verify water quality. Treated water should be chlorinated to ensure that any remaining pathogens are eliminated before effluent is released; Hand screens & grid channels must be cleaned regularly and waste disposed of at in a suitable manner. A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered;	Visual inspection of the pipeline route for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage; perhaps streamline leakage detection through mobilising the community to report any leakages along the pipeline route. A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered;		Short Description of Mitigation Measures			

OI	O1	4	4	ω	w	2.2	!2
Visual	Visual	Noise	Noise	Air	₽	Soi	S _O
	ual		Se	Air Quality	Air Quality	Soil erosion	Soil contamination
Potential visual Impact		Potential Noise Impact		Release of unpleasant odours associated with raw sewage and sludge cause by methane and hydrogen sulphide		Soil erosion causing exposure of the pipeline	Leakage of semi- treated sewage may result in pollution of surrounding soil
Potential visual impact from operations		Reduce noise impact from operations		Reduce unpleasant odours.		Prevent soil erosion	Maintain a closed system to prevent leakage or spillage/ Monitor pipeline for signes of leakage
7		ᅩ		ç		&	œ
-				4		4	4
<u> </u>		<u> </u>		4		4	4
7				'n		<i>\</i> \cdots	4
<u> </u>		7		7		7	7
L		4		3.8 8		-3,8	4.2
느		7		4		'n	r's
		<u>-</u>		2		7	'n
<u>-</u>	-	-		7		7	'n
	-		-	7		7	ь.
<u>-</u>		그		7		7	<u>"</u>
4		2		<u></u>		<u>5</u>	4
No visual impact expected during operations as the site was previously used as a WWTD		No noise expected during operations		Ensure that all components of the treatment plant & pipeline are in good working order at all times. If the plant is functioning properly, the generation of odours should be minimised,		It must be ensured that storm water does not reach excessive speeds, as that would increase the potential for soil erosion; storm water runoff must not be concentrated in any one place or channel where it flows over unpaved (erodible) surfaces; Should any signs of erosion be found, remedial action such as backfilling, compaction and re-vegetation should be taken immediately to avoid exacerbation of the erosion; Monthly monitoring for erosion should take place, especially after heavy rainfall,	Visual inspection of the pipeline route for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage; perhaps streamline leakage detection through mobilising the community to report any leakages along the pipeline route; A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered;

1.2 Ξ No. ဂ Soil contamination Soil Erosion Soils Decommissioning Impact Rating: ASPECT demolition activities construction/ contamination from Possible soil susceptible to soil erosion in case of cleared, the site If structures are to be demolished and Decommissioning: Pipeline Route IMPACT Alternative C (Most Preferred) waste water to soil treated sewage or sewage or semiinfiltration of raw soil erosion 1.2.1 Prevent spillage/ 1.1.1 Limit the risk of Objective ۵ φ **Probability** WITHOUT MITIGATION 4 'n **Extent** 4 4 Duration 'n 'n Magnitude Receiving ㅗ ㅗ Environment Mitigation Baseline Without Score 3.8 3.4 'n ń **Probability** WITH MITIGATION 4 7 **Extent** 'n 'n Duration 4 1 Magnitude Receiving 4 <u>_</u> Environment assessment) Mitigation (Impact Score With to recommend appropriate mitigation. of Water and Sanitation who may conduct a site visit significant spills must be reported to the Department ECO so that he/ she can investigate the incident and In case of a spillage spills should be reported to the remediated and disposed of in a responsible manner; is not polluted any soil contamination on site must be be established in a suitable manner that environment facilitates must be proved for the workers and should the veld for sanitary purposes; suitable washing within the drainage lines on site; workers not to use temporary chemical toilets; toilets not to be placed site. No pit toilets on site, workers to be provided with facility for treatment before work commences on the be removed to an appropriate licensed treatment system commences. if the system is no longer fully treated and discharged before dismantling of the All waste water contained in the system must be should be remediated if erosion does take place as protected from erosion as stated in the EMPr; erosion to take place during the drier winter season; Storm ecommend the appropriate mitigation; Any functional , the waste water still in the system must the EMPr. per the EMPr. Refer to decommissioning section in not to be placed in drainage lines and must be for the duration of construction; soil stockpiles (if any) water to be channelled away from the exposed area If structures are to be demolished and cleared, this is **Short Description of Mitigation Measures**

ω		l N			
3.2	3	2.2 S	2.1 V	N	
Flora	Flora & Fauna	Storm water	Water quality	Water	
No rehabilitation of the site		Storm water may cause soil erosion on cleared construction site	Possible leakage or spillage of semitreated sewage, or contamination of water by runoff containing construction-related substances such as cement/ paint/ oil/ fuel		
3.1.1. Rehabilitation of the site to a state approximating the predevelopment state or a condition similar to undeveloped areas nearby.		2.2.1 Minimize water- related soil erosion	2.1.2 Prevent spillage of water potentially contaminated by waste water/ sewage, cement, paint, oil, fuel, etc		1.2.2 Safely dispose of contaminated waste
		'n	å		å
4	-	2	4		'n
4		<u> </u>	4		۵.
70		<u> </u>	'n		<u> </u>
7		7	ź		7
3.8		14.4			-2,8
'n		7	-2	Ī	-2
7		7	7		7
'n	-	7	'n		7
7		7	7		7
7		7	7		7
¢		= ; Δ. :			is in the second
Prepare soil for re-vegetation, e.g. by removing [potentially contaminated soil (for disposal at a suitable site), ripping compacted soil and adding organic material; Re-establish locally indigenous vegetation under the guidance of an ecologist.		Decommissioning should ideally take place in dry winter months; stormwater should be channelled away from the exposed area. Implement Storm Water Management Plan.	All waste water contained in the system must be treated and discharged before dismantling of the system commences. If the system is no longer fully functional, the waste water still in the system must be removed to an appropriate licensed treatment facility for treatment before work commences on the site The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil/ water.		Waste water or any parts of the system which were in direct contact with the sewage must be disposed of by a suitably licensed waste contractor at a suitable, registered waste disposal site as agreed upon between the local authority's waste division and the ECO.

The state of the s

Γ	8.1	00	7.1	7		4	Τ.	
H		Noise					4 2	
	se caused by struction activities on	ise	Visual Impacts of demolition on site	Visual Impacts		Solid waste management	Waste Management	
	Construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials		Untidy construction/ demolition site		disposal site	site %		Colonisation of alien invasive species
	8.1.1 Minimise disturbance to neighbours		7.1.1. The construction site must be kept as neat and tidy as possible		4.1.2 Dispose of hazardous waste at suitable disposal site	4.1.1. Remove general solid waste to a landfill site		3.2.2. Prevent colonisation by alien invasive species
4	4		4		ф	ώ		φ.
+	7	-	-2		4	4		'n
+	, b	ŀ	7		4	4		4
+	<u>.</u>	ŀ	7	-	4	٨		<u>'</u>
+	7	H			<u> </u>	7		
	2. 30		<u></u>		4 22	-3.8		-3,4
4	'n	-	l\(\)		'n	ż		<i>\</i> 2
+		-	7		'n	'n		7
+	-	-	7	-	'n	7		<u>ن</u>
+		-		-	'n	7	-	7
ł				L	7	7		7
	₹.		ž.		± bo	*		- <u>1</u>
	Construction/ demolition activities should be limited to daylight hours; a complaints register should be maintained in which any complaints about noise is noted.		Conduct environmental awareness training with all staff and discourage littering; Sufficient waste bins must be provided on site and must be emptied regularly; Litter picked up where necessary; Building rubble not allowed to accumulate on site, but must be removed at regular intervals and disposed of at a licensed disposal site.		Any parts of the system which were in direct contact with the sewage must be disposed of by a suitably licensed waste contractor at a suitable, registered waste disposal site as agreed upon between the local authority's waste division and the ECO.	General solid waste must be disposed of at a general landfill site or another licensed waste disposal site; General rubble from demolition can be used as fill at nearby construction sites (if any) or disposed of at a licensed landfill site. The ECO will have to be consulted regarding the disposal of linings and other components of the system which where directly in contact with untreated sewage. Water not to be dumped on or near the site.		No alien plan species may be established on site during rehabilitation; Any alien vegetation on site must be eradicated before seeding/ planting of indigenous vegetation; Monitor the site for re-growth of vegetation.

Appendix J2.5:

Environmental impacts and risk assessment/Impact Risk Matrix – Pipeline Route Alt D (Preferred)

		Short Description of Mitigation Measures		Earth works and site preparation to take place during the drier winter season; Storm water to be channelled away from the exposed area for the duration of construction; soil stockpiles (if any) not to be placed in drainage lines and must be protected from erosion as stated in the EMPr; erosion should be remediated if erosion does take place as per the EMPr.	Minimise construction footprint and remain out of the No-go area; Remain within road reserve and attach to existing brige to cross the N12.	The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.			
		With Mitigation Score (Impact		9	¥	Ŋ			
	z	Receiving Environment		7	7	7			
	ATIO	əbutingsM		7	7	7			
	WITH MITIGATION	Duration		7	7	7			
	/ITH	Extent		-5	7	4			
	5	Probability		7	ņ	7			
		Receiving Without Score (Baseline)	8,8	4.8	3.8				
	HOUT MITIGATION						7	4	7
	IIGA1	Magnitude		?	4	?			
	Σ	Duration			4	4	4		
		frent							4
	WITH	Probability		φ	φ	φ			
Construction: Pipeline Route Alternative D (Preferred)		Objective		1.1.1 Limit the risk of soil erosion	1.1.2 Limit risk of soil erosion on banks of the Sand River	1.2.2 Prevent spillage of water potentially contaminated by cement/ chemicals/ fuel & oil from construction vehicles/ machines			
Construction: Pipeli (Pre		IMPACT		Clearing of vegetation during earthworks might make the site susceptible to soil erosion in case of rains	Clearing of vegetation during earthworks may impact banks of Sand River	Soil contamination from construction activities			
Impact Rating: Site Establishment & Construction	ioi					Soil Contamination			
- 0, 0	1	ò	-	7:		2.2			

	y or learly to learl learl learl visit ust how ords not to	io iii	T	t sign
	The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECD so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site. Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.	Construction should ideally take place in dry winter months; stormwater should be channelled away from the exposed area. Implement Storm Water Management Plan		Environmental Awareness training to be conducted with all labourers, educating the importance of not simply killing fauria that is perceived as dangerous; Keep contact details in the site office for someone who can be called if catching and relocation of fauria is required, no hunting/ snaring allowed on site.
	The Contractor must prevent the discharge pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspeconstruction vehicles/ machinery daily for edetection of deterior on facterioration or leaks; The Conshould ensure drip trays are placed under syehicles/ machines; All spills should be rep the ECO so that he/ she can investigate the and recommend the appropriate mitigation; significant spills must be reported to the De of Water and Sanitation who may conduct at to recommend appropriate mitigation; Spill be available on site & workers should be trate to use spill kits to rectify a spill immediately of spills should be kept on site. Mixing of ce to take place on impermeable surfaces; Por contaminated water may not be allowed to furninge lines or infiltrate into the soil.	Construction should ideally take place in dimonths; stormwater should be channelled, the exposed area. Implement Storm Water Management Plan		to be as a dice for relocat
	at the concrater, earlier, ear	take ple cha		aining the im erceive ite offi g and r
	The Contractor must prevent the disc pollutants, such as cement, concrete, chemicals, fuel, oil, waste water, etc; construction vehicles/ machinery daily detection of deterioration or leaks; The should ensure drip trays are placed us vehicles/ machines; All spills should be the ECO so that he/ she can investigate and recommend the appropriate mitigation; be available on site & workers should to use spill kits to rectify a spill immed of spills should be kept on site; Mixing to take place on impermeable surface contaminated water may not be allowed drainage lines or infiltrate into the soil.	feally thould		cating cating the string the string atching
	must nas ce, oil, w hicles, oil, w hicles, drip tra the s is must the s is must appropriate be kep to reciple be kep in infilit.	ould ic rater s sa. Imp		Awarei s, edu ina thi stails ii ed if ci
	rractor rractor s, s, such s, s, such so of det of det of det machine record machine record r	Construction shou months; stormwate the exposed area. Management Plan		ental / bourer ling far tact de se calli d, no h
	llutants amical amical amical amical amical antical struct tection buld er incles/ incoming amical available speciments and available speciments amical amic	nstruci nths; s expos nagen		vironm vironm all la ply kill pp con can l equire
	the pool of the po	M the G		with with Kee Is r who
	2	0 <u>4</u>		2
	7	7		7
	7	7		7
	<u>τ</u>	7		7
	· ·	- - -		
		Service of the		
	9 .	-3.2		3.2
			١,	
	-5	-7		7
		7		7
	4	4		4
	4	4		4
	spillaç tially by oil, fu	water		killing
	event poten nated paint,	nimize oil erc		event
	2.1.1 Prevent spillage of water potentially contaminated by cement, paint, oil, fuel, etc	2.2.1 Minimize water- related soil erosion		3.1.1. Prevent killing of fauna
	o la			Possible killing of fauna e.g. killing of 3.1.1. snakes/ spiders out of fauna fear
	age or wage to tollets tollets or collets ff	nay sion o uctior		g of ng of rs out
	e leak of ser rrable constri ination / runo / runo / gion	rater n oil ero consti		g. killing spide
	Possible leakage or spillage of sewage from portable toilets during construction, or contamination of water by runoff containing construction-related substances such as cement/ paint/ oil/ fuel	Storm water may cause soil erosion on cleared construction site		Possible killing of fauna e.g. killing of snakes/ spiders out fear
		<u>v q q </u>		ក្នេសក្
	water			
	ity (Sr	_	ına	
L.	Water Quality (Surface water and ground water)	wate	Flora & Fauna	_
Water	Wate	2.2 Storm water	Flora	Fauna
7	2.7	2.2	ო	3.1

Minimise the construction footprint and keep out of No-go areas. Remain within road reserve and attach to existing brige to cross the N12.	Remain wintin the road reserve and out of No-go areas A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint encessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads
- =	7
7	7
7	7
7	7
7	7
7	7
8,4	8,4
4	4
4	4
4	4
	4
φ	φ
3.2.2 Prevent the unneccessary loss of aquatic vegetation	3.2.3. Prevent the unnecessary loss of CBAs
Temporary impact and/or potential loss of aquatic vegetation associates with the Sand/ Groot River	Loss of Critical Biodiversity Areas
Flora	
	Temporary impact and/or potential loss 3.2.2 Prevent the of aquatic vegetation unneccessary loss of associates with the Sand/ Groot River

4	Heritage Resources														
4.	4.1 Heritage Resources	Potential loss of Heritage Resources	4.1.1. Prevent the unnecessary loss of heritage resources	?	7	7	7	7	4.2	7	7	<u>,</u>	7	- 	It is recommended that the HWC Fossil Finds Procedure be implemented throughout the development phase; In the case of any significant new fossil finds exposed during construction, these should be safeguarded - preferably in situ - and reported by the ECO as soon as possible to Heritage Western Cape.
ın	Air quality														
		Possible air pollution in form of emissions from construction vehicles and equipment	5.1.1 Limit air pollution -4		4	4 5	7	<u> </u>	62	7	7	7	7	- √	All vehicles and machinery on the construction site must be in good working condition to prevent unnecessary emissions; Vehicles should not be allowed to idle for unnecessary long periods of time
.c.	Air quality	Potentially high dust levels during earthworks and site establishment	5.1.2 Limit levels of airborne dust	4	-5	-2	7		d	7	7	7	7	- 2	If necessary, exposed soil must be watered down at regular intervals to reduce levels of airborne dust; The Contractor must take all reasonable measures to minimise the generation of dust resulting from construction activities; Where possible stockpiles should be located in areas where they are not exposed to the erosive effects of the wind.
ဖ	Waste Management														
7.	Solid waste management	Incorrect dispoal of general solid waste generated during construction	6.1.1. Safety dispose of all solid waste.	φ	4	4	ņ	<u> </u>	8'6'	9	4	₹	4	9	All solid waste to be disposed of at a licensed landfill waste disposal site; No dumping or burning on near the site; any soil contaminated during construction (e.g. by cement) to be disposed off at a suitable disposal site; if hazardous waste is generated, this must be contained and disposed of by suitably licensed hazardous waste contractors at a suitable site; Sufficient refuse bins are to be provided on site for disposal of general waste; refuse bins to be emptited regularly; Conduct environmental awareness training with all staff and discourage littering.
^	Visual Impacts]	1	1	1								

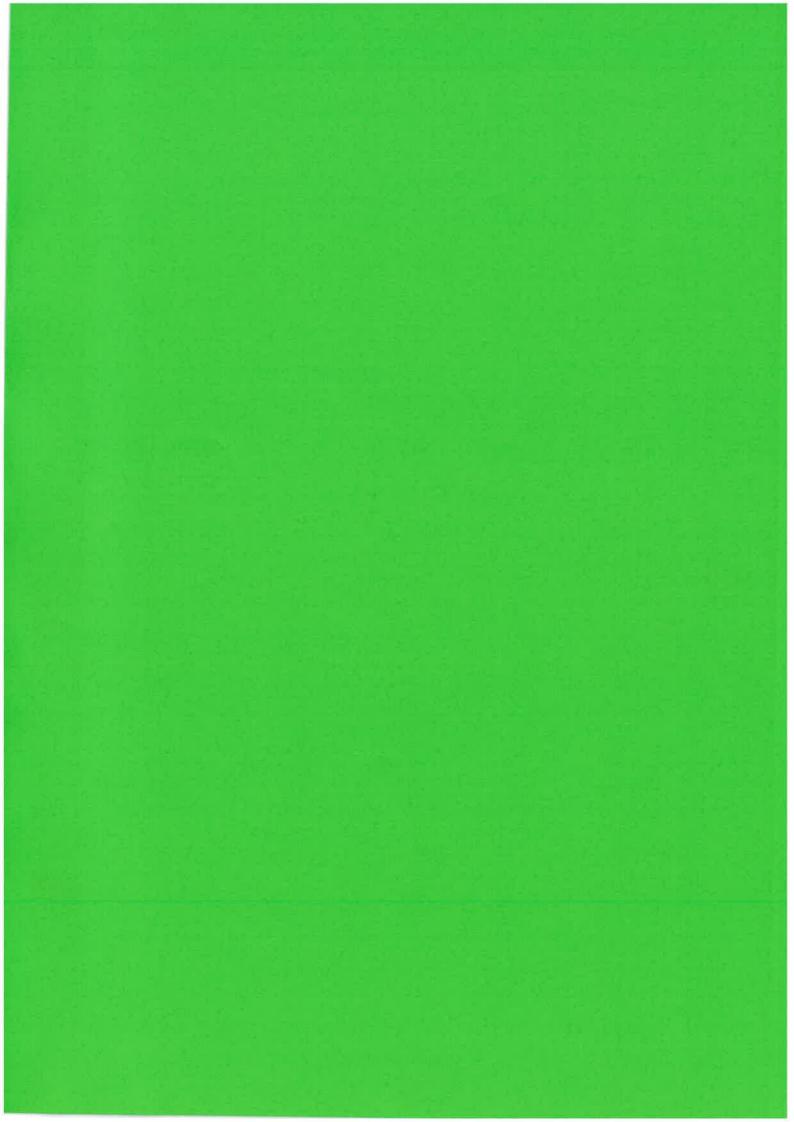
7.1	7.1 Visual Impacts of construction site	Untidy construction site	7.1.1. The construction site must be kept as neat and tidy as possible	4	7	7	7	9%	ņ	7	÷	7		2	Conduct environmental awareness training with all staff and discourage littering; Sufficient waste binds must be provided on site and must be emptied regularly; Litter picked up where necessary; Building rubble not allowed to accumulate on site, but must be removed at regular intervals and disposed of at a licensed disposal site; Stockpiles of soil or excavated material should be used for backfilling, rehabilitation or landscaping.
œ	Noise														
6.7	Noise caused by construction activities on site	Construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials	8.1.1 Minimise disturbance to neighbours	4	7	7	7	6	٧		7	7	+	25	Construction activities should be limited to daylight hours; a complaints register should be maintained in which any complaints about noise is noted.
6	9 Traffic											1			
9.1	Impedance of normal traffic flow	Impedance of normal traffic flow due to pipeline crossing the N12 over the bridge	9.1.1. Minimise impedence of traffic	4	4	4	-1	模	-5	7	-7-	7	77	9	Traffic management plan in place. Comply with legislative requirements. If necessary, use traffic controllers.

		Measures		emative. Virtue of the control of th	lace strictly n order to m ut by DWS; gular basis t uld be ug pathogen ed; Hand ned regularly		for signs of it in certain to certain nobilising the pipelir guest be in wet be in vid to the plausion measu
		Short Description of Mitigation Measures		Pipeline Route C/D is the preferred alternative. Visual inspection of the pipeline route for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage; perhaps streamline leakage detection through mobilising the community to report any leakages along the pipeline route. A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered;	Treatment of waste water must take place strictly according to engineers' prescriptions in order to meet wastewater quality standards as set out by DWS; Treated water to be monitored on a regular basis to verify water quality. Treated water should be chlorinated to ensure that any remaining pathogens are eliminated before effluent is released; Hand screens & grid channels must be cleaned regularly and waste disposed of at in a suitable manner.		Visual inspection of the pipeline route for signs of leakage or particular greening of grass in certain areas which may be indicative of leakage; perhaps streamline leakage detection through mobilising the community to report any leakages along the pipeline route; A water monitoring programme must be in place to detect any contamination linked to the plant; Immediately institute appropriate mitigation measures if contamination is discovered;
		With Mittgation Score (Impact		97	7		<u>100.</u>
	Z	Receiving Environment		7	7		Υ
	WITH MITIGATION	Magnitude		۲	?		7
	Ĕ	Duration		7	7		ņ
	WITH	Extent		7	ņ		ç,
		Probability		ç,	7		?
		Without Mitigation Score (Baseline)		-6,4	8°6-		4,2
	ION	Receiving Environment		4	٩		7
	WITHOUT MITIGATION	ebutingsM		4	φ		4
	TMI	Duration		4	4		4-
	THOU	Extent		4	4		4-
	Ņ	Probability		-16	7-		φ
Operations: Pipeline Route Alternative D (Preferred)		OBJECTIVE			Treated effluent used for irrigation must comply with the standards set by DWS.		Maintain a closed system to prevent leakage or spillage/ Monitor pipeline for signes of leakage
Operations: Pip		IMPACT		1.1 Potential leakage or spillage of waste water from pipelines into the river	1.2 Contamination of surface waster from irrigation from inadequately treated wastewater		Leakage or spillage of semi-treated sewage may result in pollution of surrounding soil
Impact Rating: Operations		ASPECT	Water	MA Action and lift.	vvater quality	Soils	Soil contamination
ю		No.	-	7	-	2	2.1

2.2	2.2 Soil erosion	Soil erosion	Prevent soil erosion	φ	4		7	80	Ċ	7	7	7	7		It must be ensured that storm water does not reach excessive speeds, as that would increase the potential for soil erosion; storm water runoff must not be concentrated in any one place or channel where it flows over unpaved (erodible) surfaces; Should any signs of erosion be found, remedial action such as backfilling, compaction and re-vegetation should be taken immediately to avoid exacerbation of the erosion; Monthly monitoring for erosion should take place, especially after heavy rainfall,
က	Air Quality				1					-	-	-			
m	Air Quality	Release of unpleasant odours associated with raw sewage and sludge cause by methane and hydrogen sulphide	Release of unpleasant odours associated with raw Reduce unpleasant sewage and sludge odours. and hydrogen sulphite	φ	4	4	7	-4.88	7	4- 2-	7	7	7	8	Ensure that all components of the treatment plant are in good working order at all times. If the plant is functioning properly, the generation of odours should be minimised,
4	Noise														
4	Noise	Potential Noise Impact	Reduce noise impact from operations	7	7	-	7	<u>-</u>		7	7	7	7	7	No noise expected during operations
ເດ	Visual														
υ	5 Visual	Potential visual Impact	Potential visual impact from operations	-	7	<u>-</u>	1-	7		7 7	7	7	7	4	No visual impact expected during operations as the site was previously used as a WWTP

ن	Impact Rating: Decommissioning	Decommisionir. Alternative	Decommisioning: Pipeline Route Alternative D (Preferred)												
				MIH	HOUT MITIGATION	ATTIG	ATION			WITH	MITIG	WITH MITIGATION			
, O	ASPECT	IMPACT	Objective	Probability	Extent	nothernG Magnitude	Receiving	Without Mitigation Score (Baseline)	Probability	Extent	Duration	Magnitude	Environment	With Mitigation Score (Impact assessment)	Short Description of Mitigation Measures
-	Soils														
. .	Soil Erosion	If structures are to be demolished and cleared, the site susceptible to soil erosion in case of rains	1.1.1 Limit the risk of soil erosion	φ	7	- 5-	7	3.4	-5	7	7	7	7	4.	If structures are to be demolished and cleared, this is to take place during the drier winter season; Storm water to be channelled away from the exposed area for the duration of construction; soil stockpiles (if any) not to be placed in drainage lines and must be protected from erosion as stated in the EMPr; erosion should be remediated if erosion does take place as per the EMPr. Refer to decommissioning section in the EMPr.
2.	1.2 Soil contamination	Possible soil contamination from construction/ demolition activities	1.2.1 Prevent spillage/ infiltration of raw sewage or semi- treated sewage or waste water to soil	φ	4	2-	7	8.8.	Ÿ	4	?	7	₹	7	All waste water contained in the system must be treated and discharged before dismantling of the system commences. If the system is no longer fully functional , the waste water still in the system must be reomed to an appropriate licensed treatment facility for treatment before work commences on the site. No pit toilets on site, workers to be provided with temporary chemical foilets; toilets not to be placed within the drainage lines on site, workers not to use the veld for sanitary purposes; suitable washing facilitates must be proved for the workers and should be established in a suitable manner that environment is not polluted any soil contamination on site must be remediated and disposed of in a responsible manner, in case of a spillage spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation.

ite ite rowth		eneral site; fill at f at a other	ntact bly ed ed	T	all ins iding sa	T	is is	T
No alien plan species may be established on site during rehabilitation; Any alien vegetation on site must be eradicated before seeding/ planting of indigenous vegetation; Monitor the site for re-growth of vegetation.		General solid waste must be disposed of at a general landfill site or another licensed waste disposal site; General tubble from demolition can be used as fill at nearby construction sites (if any) or disposed of at a licensed landfill site. The ECO will have to be consulted regarding the disposal of linings and other components of the system which where directly in contact with untreated sewage. Water not to be dumped on or near the site.	Any parts of the system which were in direct contact with the sewage must be disposed of by a suitably licensed waste contractor at a suitable, registered waste disposal site as agreed upon between the local authority's waste division and the ECO.		Conduct environmental awareness training with all staff and discourage littering: Sufficient waste bins must be provided on site and must be emptied regularly; Litter picked up where necessary; Building rubble not allowed to accumulate on site, but must be removed at regular intervals and disposed of at a licensed disposal site.		Construction/ demolition activities should be limited to daylight hours; a complaints register should be maintained in which any complaints about noise is noted.	
ZDEEO		0 2 0 5 5 9 8 8 4			Q # E 5 5 5 5			+
- ₹		- 1	#		7		· *	ı
7		V	7		7		7	-
7	1	۲	7		7		7	T
	-	7	-5		7		7	
	-	-5	7	\perp	7	4		L
					ņ	=	77	L
,		33.8	5.4		6 2		# #	
7		7	7		7		7	
		?	4		7		7	
4		4	4		-75		-7-	
		4	δ 4	4	7		-	
		<u>e</u> =	T	-	4		4	
3.2.2. Prevent colonisation by alien invasive species		4.1.1. Remove general solid waste to a landfill site	4.1.2 Dispose of hazardous waste at suitable disposal site		7.1.1. The construction site must be kept as neat and tidy as possible		8.1.1 Minimise disturbance to neighbours	
Colonisation of alien invasive species		Waste generated at site not disposed of at a suitably licensed	disposal site		Untidy construction/ demolition site		Construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials	
	Waste Management	Solid waste management		Visual Impacts	Visual Impacts of demolition on site	Noise	Noise caused by construction activities on a site in	
	4	7.		-	7,1	∞	8.1	



150	No.		,			
	'n	.4		N _O		Þ
	Soil contamination	Soil Erosion	Soils	ASPECT		Impact Rating: Site Establishment & Construction
	Soil contamination from construction vehicles on site	Clearing of vegetation demolition of existing inlet works and septic tank might make the site susceptible to soil erosion in case of rains		IMPACT		Construction: Disposal of existing sludge from decommissioning of existing ponds
	1.2.1 Prevent spillage of oil and fuel from construction vehicles	1.1.1 Limit the risk of soil erosion		Objective		sal of existing sludge ng of existing ponds
	&	φ.		Probability	WIT.	
	4	4		Extent	TUOH	
		4		Duration Receiving	WITHOUT MITIGATION	
		الله الله الله الله الله الله الله الله		Environment	GATIC	
	38	-1 -2 -8		Toxicity Without Score (Baseline)	Ž	
	4	'n		Probability	٤	
	, i	7		Extent	VITH MITIGATION	
	, is	<u> </u>		Duration Receiving	AITIG/	
		7	-	Environment	NOIT	
	7	7	-	Toxicity	4	
	№ 1 - № 1	- <u>i</u>		With Mitigation Score (Impact		
	The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspects all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.	Earth works/ demolition and site preparation to take place during the drier winter season; Storm water to be channelled away from the exposed area for the duration of construction; soil stockpiles (if any) not to be placed in drainage lines and must be protected from erosion as stated in the EMPr; erosion should be remediated if erosion does take place as per the EMPr. Implementation of the Storm Water Management Plan .		Short Description of Mitigation Measures		

	N	
Water Quality (Surface/ ground water)	Water	
Possible contamination of water from construction vehicles on site		Soil contamination from decomissioning of exisiting inlet works & septic tank
2.1.2 Prevent spillage of water potentially contaminated by , oil, fuel, etc		1.2.2 Prevent spillage of water potentially contaminated by sewage
4		-16
K		ń
Ń		Ós
ĸ		4
7		7
\$		-6. ₂
7		ю
7		ń
7		7
7		7
7		7
		<u>.</u>
The Contractor must prevent the discharge of any pollutants, such as cement, concrete, lime, chemicals, fuel, oil, waste water, etc; Inspect all construction vehicles/ machinery daily for early detection of deterioration or leaks; The Contractor should ensure drip trays are placed under stationary vehicles/ machines; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Mixing of cement not to take place on impermeable surfaces; Potentially contaminated water may not be allowed to flow into drainage lines or infiltrate into the soil.		The Contractor must prevent the discharge of any pollutants, waste water, etc; All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site;Ensure waste/ waste water from the septic tank/ inlet works is contained before demolition of the works. Waste/ waste water/ concrete from the decomissioning of the workd to be disposed of in designated approved area for disposal as per the Operations Manual.

.2	ω	2.2	
		2 Sto	
Fauna	Flora & Fauna	Storm water	
Possible killing of fauna e.g. killing of snakes/ spiders out of fear		Storm water may cause soil erosion on cleared construction site	Possible contamination of water with sewage from decomissioning of existing inlet works & septic tank &
3.1.1. Prevent killing of fauna		2.2.1 Minimize water- related soil erosion	2.2.2 Prevent spillage of water potentially contaminated by sewage
'n		4	-10
'n		ż	4
7		<u>.</u>	ά
<u> </u>		7	4
<u> </u>		ᅩ	7
<u> </u>		-1,8	<mark>.</mark> ნ თ
7		7	ю
<u> </u>		-2	ю
<u>t.</u>		7	ю
<u> </u>		-1	ю
<u> </u>		7	7
<u>.</u>		12	
Environmental Awareness training to be conducted with all labourers, educating the importance of not simply killing fauna that is perceived as dangerous; Keep contact details in the site office for someone who can be called if catching and relocation of fauna is required, no hunting/ snaring allowed on site.		Construction should ideally take place in dry winter months; stormwater should be channelled away from the exposed area. Implement Storm Water Management Plan. Remain out of No-go areas.	The Contractor must prevent the discharge of any pollutants, waste water, etc;All spills should be reported to the ECO so that he/ she can investigate the incident and recommend the appropriate mitigation; Any significant spills must be reported to the Department of Water and Sanitation who may conduct a site visit to recommend appropriate mitigation; Spill kits must be available on site & workers should be trained how to use spill kits to rectify a spill immediately; Records of spills should be kept on site; Ensure waste/ waste water from the septic tank/ inlet works is contained before demolition of the works. Waste/ waste water/ concrete from the decomissioning of the works to be disposed of in designated approved area for disposal as per the Operations Manual. Implement Storm Water Management Plan.

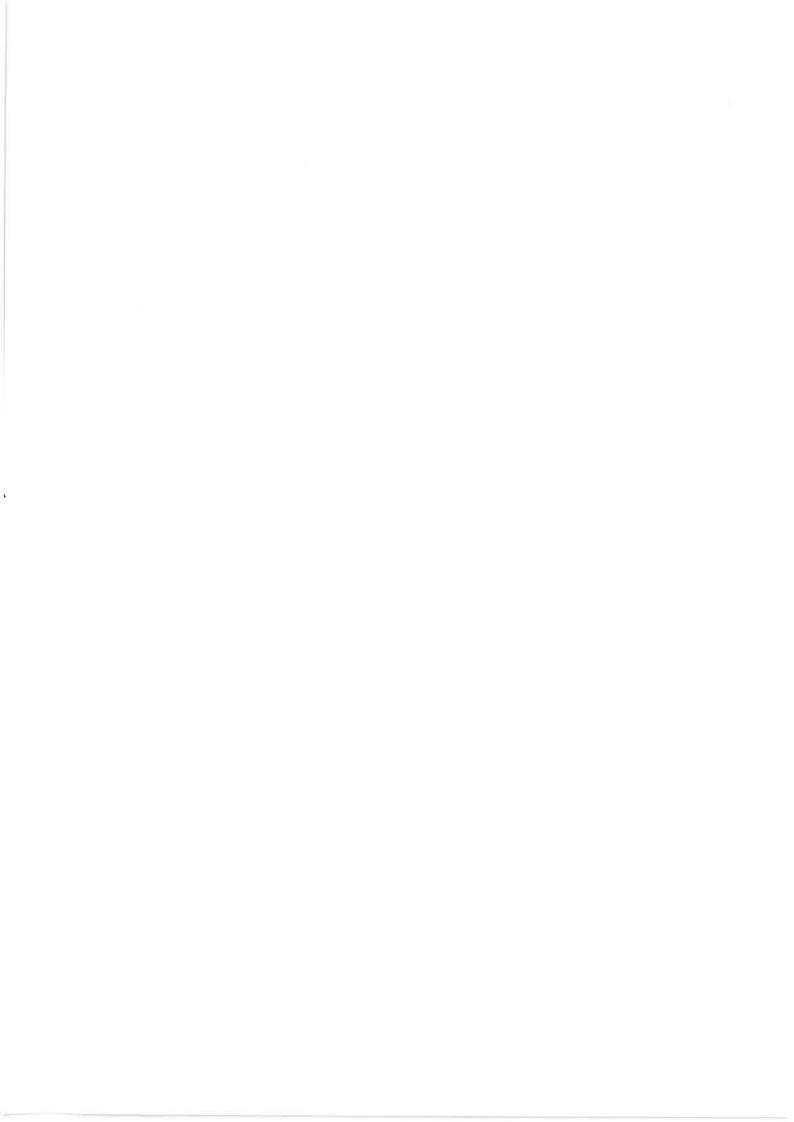
4.	T.		t _Δ
	4 <u>∓</u>		ω >>
Heritage Resources	Heritage Resources		Flora
Potential loss of Heritage Resources		Loss of Critical Biodiversity Areas	Temporary impact and/or potential loss of disturbed Prince Albert Succulent Karoo Vegetation
4.1.1. Prevent the unnecessary loss of heritage resources		3.2.2. Prevent the unnecessary loss of CBAs	3.2.1. Prevent unnecessary loss of vegetation
'n		4	7
7		7	7
7	-	'n	7
7	-	-2	7
7		7	<u> </u>
4 2		ls.	Δ.
7		<i>\</i> 2	7
7	L	7	7
7		7	7
7		7	<u> </u>
7		7	7
à		in the second se	w
No impact hertiage resources expected. It is recommended that the HWC Fossil Finds Procedure be implemented throughout the development phase; In the case of any significant new fossil finds exposed during construction, these should be safeguarded - preferably in situ - and reported by the ECO as soon as possible to Heritage Western Cape.		A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction existing roads	with no natural vegetation remaining. A suitably qualified ECO must be appointed to monitor the construction of phase in terms of the EMPr and any other conditions pertaining to specialist studies; Environmental Awareness training to be conducted with all workers; Before any work is done, the development footprint and access routes must be clearly demarcated and approved by the ECO. Demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance; Disposal site must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO; Indiscriminate clearing of any area outside of construction footprint must be avoided; Access roads should be limited to a single circular route in and out. Ensure construction vehicles stay on existing roads.

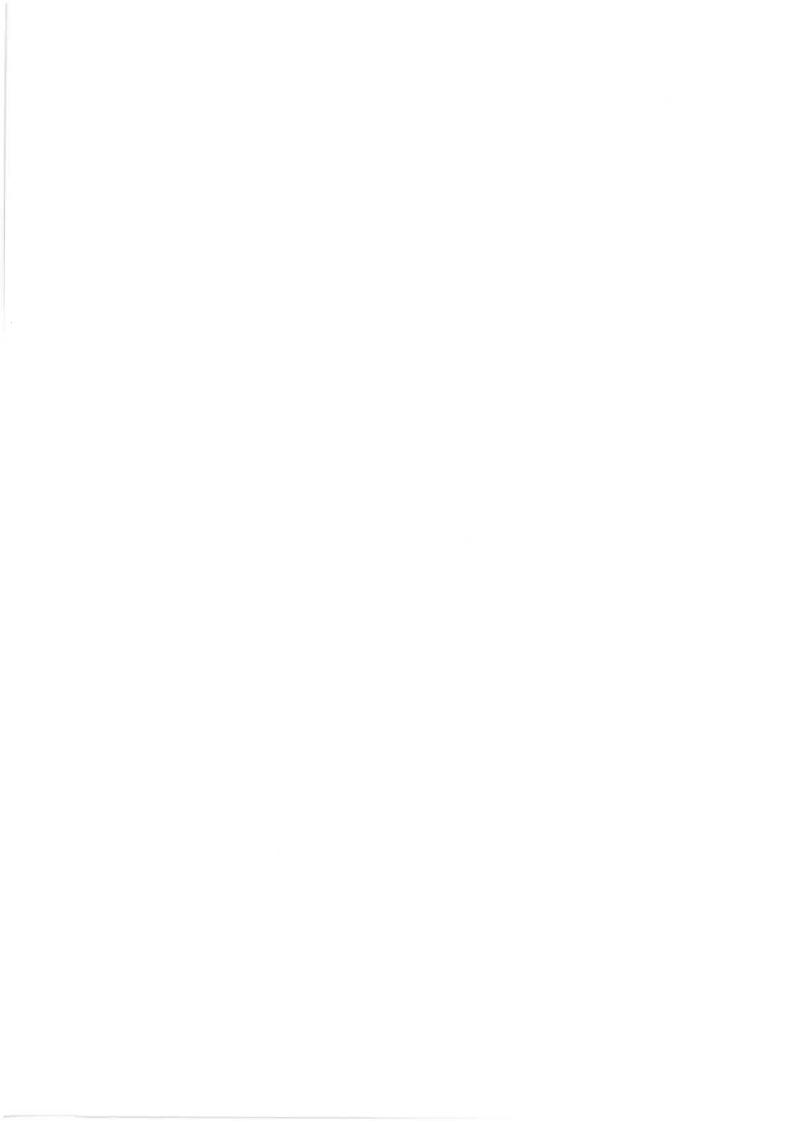
7.1	7	 0	6 Visual Impacts	<u> </u>	7	T
Noise caused by demolision activities on site	Noise	Visual Impacts of construction site		Air quality		
Construction related noise is expected to relate mostly to construction vehicles and machinery involved in earthworks and delivery of materials		Untidy construction site		Potentially high dust levels during earthworks and site establishment	Possible air pollution in form of emissions from construction vehicles and equipment	
8.1.1 Minimise disturbance to neighbours		6.1.1. The construction site must be kept as neat and tidy as possible		5.1.2 Limit levels of airborne dust	5.1.1 Limit air pollution -2	
4		4		4	'n	
7		7		7	7	
7	-	7		7	7	
7	-	<u>.</u>		7	7	
7		_		-	7	
ä		÷		Ë	4.2	
ż		ŕ		2	7	
7		7		7	7	
		7		<u> </u>	7	
<u>.</u>	L	7		7	77	
7		7		7	7	
- <u>1</u>		d. No		100	-4	
Construction activities should be limited to daylight hours; a complaints register should be maintained in which any complaints about noise is noted.		Conduct environmental awareness training with all staff and discourage littering; Sufficient waste binds must be provided on site and must be emptied regularly; Litter picked up where necessary; Building rubble not allowed to accumulate on site, but must be removed at regular intervals and disposed of at a licensed disposal site; Stockpiles of soil or excavated material should be used for backfilling, rehabilitation or landscaping.		If necessary, exposed soil must be watered down at regular intervals to reduce levels of airborne dust; The Contractor must take all reasonable measures to minimise the generation of dust resulting from construction activities; Where possible stockpiles should be located in areas where they are not exposed to the erosive effects of the wind.	All vehicles and machinery on the construction site must be in good working condition to prevent unnecessary emissions; Vehicles should not be allowed to idle for unnecessary long periods of time	

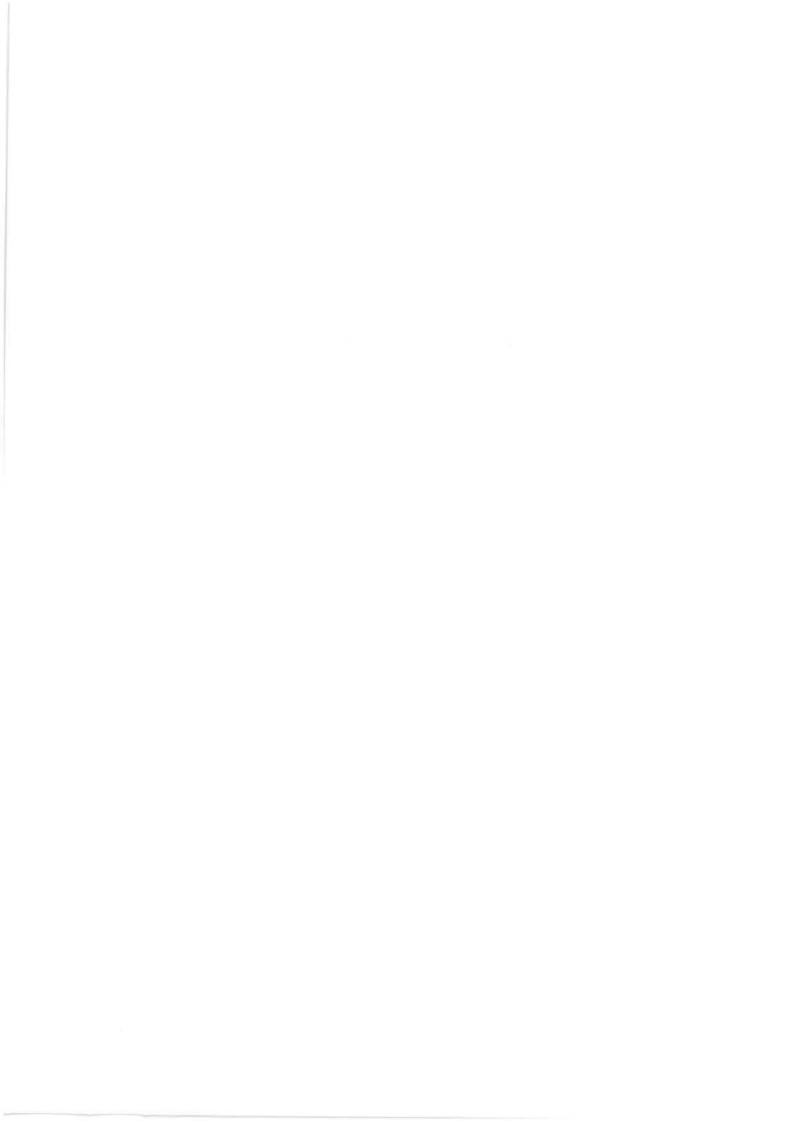
2.1 |Soil contamination NO. W Soils Water ground water) Decommissioning (surface water & Operations & Water Quality Impact Rating: ASPECT earth from facultative pond to of existing decommissioning existing sludge from disposal of surrounding soil Contamination of facultative pond to of existing decommissioning sludge from disposal of existing ground water from surface water & Contamination of Operations & Decommissioning: Disposal of existing sludge from decommissioning of IMPACT existing ponds Prevent contamination of surrounding soil surface water Prevent contamination of **OBJECTIVE** -16 6 Probability WITHOUT MITIGATION 4 4 Extent 4 4 Duration Receiving ထ် å **Environment** 2 <u>.</u> **Toxicity** Mitigation (Baseline) Without Score 6,8 ე ი 'n 'n **Probability** WITH MITIGATION 'n 'n Extent 걍 'n Duration <u>2</u> Receiving 'n **Environment** 7 7 **Toxicity** assessment) Mitigation (Impact Score With disposal site. Borehole testing to be done to evaluate disposed of. No new sludge to be added to the be fenced off; Sludge to be covered with soil once area for disposal; sludge to be mixed with soil make it only to be buried within the designated, approved impact on ground water. near any drainage lines or the river; Disposal area to more stable and easier to handle; Sludge not allowed from decommissioning the existing facultative pond done to evaluate impact on ground water. only to be buried within the designated, approved Implement the Operations Manual; Existing sludge added to the disposal site. Borehole testing to be disposed of, area to be leveled. No new sludge to be be fenced off; Sludge to be covered with soil once near any drainage lines or the river; Disposal area to more stable and easier to handle; Sludge not allowed area for disposal; sludge to be mixed with soil make it from decommissioning the existing facultative pond Implement the Operations Manual; Existing sludge Short Description of Mitigation Measures

45	45		4			N
5 <	5 Vi	4 N	Z	3 ≥	3 Ai	2.2 Sc
Visual	Visual	Noise	Noise	Air Quality	Air Quality	Soil erosion
Potential visual Impact		Potential Noise Impact		Release of unpleasant odours associated with		Soil erosion
Potential visual impact from operations		Reduce noise impact from operations		Reduce unpleasant odours.		Prevent soil erosion
7		7		⊹		-2
7		7		-4		-2
7		7		4		7
7		<u> </u>		-2		7
7		7		7	İ	7
4		4		-3,8		€
7		7		4		-2
7		7		-2		77
7		7		<u> </u>		7
7	İ	7		7		7
7	ı	7		7		7
4		4		-1,8		<u> </u>
Existing sludge from decommissioning the existing facultative pond only to be buried within the designated, approved area for disposal; sludge to be mixed with soil make it more stable and easier to handle; Sludge not allowed near any drainage lines or the river; Disposal area to be fenced off; Sludge to be covered with soil once disposed of. No new sludge to be added to the disposal site. Borehole testing to be done to evaluate impact on ground water. Implement the Operations Manual		No noise expected during operations. No mitigation proposed.		Sludge to be covered with soil once disposed of. Implement Operations Manual.		It must be ensured that storm water does not reach excessive speeds, as that would increase the potential for soil erosion; storm water runoff must not be concentrated in any one place or channel where it flows over unpaved (erodible) surfaces; Should any signs of erosion be found, remedial action such as backfilling, compaction and re-vegetation should be taken immediately to avoid exacerbation of the erosion; Monthly monitoring for erosion should take place, especially after heavy rainfall, Implement the Operations Manual & Storm water Managment Plan

. . .







Appendix J2.7:

Environmental impacts and risk assessment/Impact Risk Matrix – Sludge disposal from decommissioning of existing ponds

2.2 Storm water -1 1.2 No cu N Fauna Flora & Fauna Soil contamination form Soil Erosion Water construction activities Solls Impact Rating: Site Establishment & Construction water & ground water) Water quality (surface ASPECT snakes/ spiders out of fauna tauna e.g. killing of Possible killing of site constuction activities might make the site susceptible to soil construction fear during cleared construction cause soil erosion on Storm water may quality from Impact of water form construction Soil contamination erosion in case of during earthworks Clearing of vegetation Construction: No-go Alternative IMPACT 2.2.1 Minimize water-2.1.1 Prevent spillage of water potentially related soil erosion construction acitvities contaminated by cement/ chemicals/ contaminated by of water potentially soil erosion 1.1.1 Limit the risk of fuel & oil from 1.2.2 Prevent spillage Objective __ 4 <u>__</u> Probability <u>_</u> <u>_</u> WITHOUT MITIGATION <u>_</u> <u>.</u> <u>.</u> 4 <u>__</u> **Extent** 7 7 <u>.</u> 4 4 Duration 4 7 <u>.</u> <u>+</u> <u>__</u> Magnitude Receiving 4 _ 4 스 <u>.</u> Environment Mitigation (Baseline) Score Without Probability HTIM Extent MITIGATION Duration Magnitude Receiving Environment assessment) Mitigation Score (Impact ¥ Eh and flora will remain unchanged. the status quo of the environment in terms of fauna The implementation of the no-go option would mean stormwater will remain unchanged. the status quo of the environment in terms of the environment would remain unchanged. that no construction will take place, the status quo of The implementation of the no-go option would mean the environment would remain unchanged. that no construction will take place, the status quo of The implementation of the no-go option would mean erosion will remain the same. the status quo of the environment in term of soil The implementation of the no-go option would mean The implementation of the no-go option would mean Short Description of Mitigation Measures

6.1 5 3.2 4.1 Heritage Resources 6 4 Solid waste management |Visual Impacts |Waste Management Heritage Resources Air quality Air quality Flora general solid waste construction generated during earthworks and site Potentially high dust from construction Temporary impact and/or potential loss levels during equipment vehicles and in form of emissions Possible air pollution Heritage Resources Potential loss of of disturbed Prince Incorrect dispoal of Albert Succulent Karoo Vegetation Biodiversity Areas Loss of Critical 6.1.1. Safety dispose of all solid waste. 5.1.1 Limit air pollution airborne dust CBAs 5.1.2 Limit levels of heritage resources unnecessary loss of 4.1.1. Prevent the unnecessary loss of 3.2.1. Prevent 3.2.2. Prevent the vegetation unnecessary loss of 스 __ <u>.</u> <u>.</u> 스 4 ㅗ 4 7 <u>.</u> <u>__</u> 7 <u>.</u> <u>.</u> <u>.</u> <u>.</u> 5 ㅗ 7 7 <u>.</u> <u>۔</u> 7 <u>.</u> <u>_</u> <u>.</u> 7 스 0 the status quo of the environment in terms of solid The implementation of the no-go option would mean the status quo of the environment in terms of air will remain unchanged. mitigation measures recommended. waste management will remain unchanged. No quality will remain unchanged. No mitigation quality will remain unchanged. No mitigation measures recommended. the status quo of the environment in terms of air the status quo of the environment in terms of heritage measures recommended The implementation of the no-go option would mean The implementation of the no-go option would mean The implementation of the no-go option would mean and flora will remain unchanged. the status quo of the environment in terms of fauna The implementation of the no-go option would mean and flora will remain unchanged. the status quo of the environment in terms of fauna The implementation of the no-go option would mean

8.1 construction activities on 7.1 Visual Impacts of construction site 00 Noise Noise caused by and machinery involved in earthworks neighbours and delivery of Untidy construction site relate mostly to construction vehicles noise is expected to Construction related 7.1.1. The construction site must be kept as neat and tidy as possible 8.1.1 Minimise disturbance to 스 <u>.</u> 7 7 <u>__</u> 그 7 7 <u>۔</u> The implementation of the no-go option would mean the status quo of the environment in terms of visual impact will remain unchanged. No mitigation the status quo of the environment in terms of visual impact will remain unchanged. No mitigation measures recommended. measures recommended. The implementation of the no-go option would mean

No ≟ 1.2 N Soil Erosion Decommissioning Soil contamination Impact Rating: Water ASPECT contamination from susceptible to soil cleared, the site construction activities Possible soil erosion in case of demolished and f structures are to be Decommissioning: No-go Alternative IMPACT soil erosion 1.1.1 Limit the risk of sewage or semicontaminated waste waste water to soil treated sewage or infiltration of raw 1.2.2 Safely dispose of I.2.1 Prevent spillage/ Objective Probability 7 7 스 WITHOUT MITIGATION 4 Extent <u>.</u> <u>_</u> 7 <u>.</u> **Duration** 7 <u>.</u> 7 Magnitude ㅗ Receiving <u>.</u> <u>__</u> <u>_</u> **Environment** Mitigation (Baseline) Without Score **Probability** WITH MITIGATION **Extent** Duration Magnitude Receiving Environment assessment) Mitigation Score (Impact With the Klaarstroom WWTP. of the environment will remain unchanged. This could no decommissioning to take place and the status quo the Klaarstroom WWTP. (flow) and organically (chemical load) overloaded. existing Klaarstroom WWTP is both hydraulically have a negative impact on the environment as the of the environment will remain unchanged. This could no decommissioning to take place and the status quo The implementation of the no-go option would mean existing Klaarstroom WWTP is both hydraulically have a negative impact on the environment as the of the environment will remain unchanged. This could no decommissioning to take place and the status quo The implementation of the no-go option would mean existing Klaarstroom WWTP is both hydraulically have a negative impact on the environment as the Mitigation measures include the proposed upgrade of the Klaarstroom WWTP. (flow) and organically (chemical load) overloaded. Mitigation measures include the proposed upgrade of (flow) and organically (chemical load) overloaded. The implementation of the no-go option would mean Mitigation measures include the proposed upgrade of Short Description of Mitigation Measures

The second secon

The second secon

4	ω .ν		w	2.2	2.1
	N		Flora & Fauna	2 Sto	Wat
Waste Management	Flora			Storm water	2.1 Water quality
	Colonisation of alien invasive species	No rehabilitationof the site Colonisation of alien invasive species		Storm water may cause soil erosion on cleared construction site	Possible leakage or spillage of sewage and portable toilets during construction, or contamination of water by runoff containing construction-related substances such as cement/ paint/ oil/ fuel
	3.2.2. Prevent colonisation by alien invasive species	3.1.1. Rehabilitation of the site to a state approximating the predevelopment state or a condition similar to undeveloped areas		2.2.1 Minimize water- related soil erosion	2.1.2 Prevent spillage of water potentially contaminated by cement, paint, oil, fuel, etc
	-16	-16		7	7
	4	4		77	7
	ά	6		7	7
	7	7		7	7
	Ţ	그		7	7
	ტ	Ö		4	Δ.
	I he im no dec of the have a existin (flow) Mitigat the Kia	no dec of the	1	The im no dec of the chave a existing (flow) a Mitigat the Kla	The im no deco of the e have a existing (flow) a Mitigati the Kla
	In the implementation of the no-go option would mean no decommissioning to take place and the status quo of the environment will remain unchanged. This could have a negative impact on the environment as the existing Klaarstroom WWTP is both hydraulically (flow) and organically (chemical load) overloaded. Mitigation measures include the proposed upgrade of the Klaarstroom WWTP.	The implementation of the no-go option would illean no decommissioning to take place and the status quo of the environment will remain unchanged.	1	The implementation of the no-go option would mean no decommissioning to take place and the status quo of the environment will remain unchanged. This could have a negative impact on the environment as the existing Klaarstroom WWTP is both hydraulically (flow) and organically (chemical load) overloaded. Mitigation measures include the proposed upgrade of the Klaarstroom WWTP.	The implementation of the no-go option would mean no decommissioning to take place and the status quo of the environment will remain unchanged. This could have a negative impact on the environment as the existing Klaarstroom WWTP is both hydraulically (flow) and organically (chemical load) overloaded. Mitigation measures include the proposed upgrade of the Klaarstroom WWTP.

7.1 Visual Impacts of <u>...</u> 7 Visual Impacts construction activities on Noise Solid waste management demolition on site Noise caused by site not disposed of at demolition site Untidy construction/ a suitably licensed and machinery construction vehicles noise is expected to Construction related Waste generated at relate mostly to and delivery of involved in earthworks disposal site solid waste to a landfill site 4.1.1. Remove general suitable disposal site 4.1.2 Dispose of site must be kept as hazardous waste at neighbours possible neat and tidy as disturbance to 8.1.1 Minimise 7.1.1. The construction 그 _ <u>.</u> <u>.</u> 스 <u>.</u> 7 7 7 <u>.</u> of the environment will remain unchanged. This could no decommissioning to take place and the status quo The implementation of the no-go option would mean of the environment will remain unchanged. This could existing Klaarstroom WWTP is both hydraulically of the environment will remain unchanged. This could no decommissioning to take place and the status quo the Klaarstroom WWTP. Mitigation measures include the proposed upgrade of existing Klaarstroom WWTP is both hydraulically have a negative impact on the environment as the the Klaarstroom WWTP have a negative impact on the environment as the no decommissioning to take place and the status quo have a negative impact on the environment as the The implementation of the no-go option would mean (flow) and organically (chemical load) overloaded. existing Klaarstroom WWTP is both hydraulically The implementation of the no-go option would mean the Klaarstroom WWTP Mitigation measures include the proposed upgrade of (flow) and organically (chemical load) overloaded the Klaarstroom WWTP have a negative impact on the environment as the no decommissioning to take place and the status quo (flow) and organically (chemical load) overloaded. existing Klaarstroom WWTP is both hydraulically of the environment will remain unchanged. This could The implementation of the no-go option would mean Mitigation measures include the proposed upgrade of Mitigation measures include the proposed upgrade of (flow) and organically (chemical load) overloaded

Appendix J2.8:

Environmental impacts and risk assessment/Impact Risk
Matrix – No-Go Alternative