

INFORMATION ON THE METHODOLOGY ADOPTED IN THE ASSESSMENT OF IDENTIFIED IMPACTS

The methodology adopted for the assessment of identified impacts is the Impact Rating Matrix, which is explained below.

NATURE: The character of the impact			
EXTENT	DURATION	PROBABILITY	MAGNITUDE
Area	Time Frame	Likelihood	Intensity of impact to destroy or alter the environment.
IRREPLACEABLE LOSS OF RESOURCES	This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
REVERSIBILITY	This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity		
SIGNIFICANCE: Implication of the impact both with or without mitigation			
TYPE: Description as to whether the impact is negative or positive or neutral.			
MITIGATION: Possible impact management, minimization, and mitigation of the identified impacts.			

Nature of Impact

Nature of impact describes the character of the impact in terms of the effect on the relevant environmental aspect.

Spatial Extent of Impact

Measures the area extent, physical and spatial scale over which the impact will occur. This implies the scale limited to the Project Site (footprint) - including adjacent areas, or the town and neighbouring areas (localized), or the Local Municipality area (regional) or the entire Province (Provincial), or the entire country (National) or beyond the borders of South Africa.

Criteria	Footprint/ Surroundings (F)	Site/Local (S-L)	Regional (R)	Provincial (P)	National and Beyond (International) (N)
Rating	1	2	3	4	5

Duration of Impact

Duration measures the timeframe of the impact in relation to the lifetime of the project. It gives an assessment of whether the impact can be eliminated by mitigation immediately (0-1 year) after a short time (1-5 years), medium term (5-10 years), long term (11- 30 years of the Project activities), or permanent (persists beyond life) due to the Project activities.

Criteria	Temporary (T)	Short Term (ST)	Medium Term (MT)	Long Term (LT)	Permanent (P)
Rating	1	2	3	4	5

Magnitude/Intensity of Impact

Magnitude or intensity of the impact measures whether the impact is destructive or benign, whether it destroys, alters the functioning of the environment, or alters the environment itself. It is rated as insignificant, low, medium, high or very high.

Criteria	Very Low (VL)	Low (L)	Medium (M)	High (H)	Very High (VH)
Rating	2	4	6	8	10

Irreplaceability of Natural Resources being impacted upon

This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.

Criteria	Very Low (VL)	Low (L)	Moderate (M)	High (H)	Definite (D)
Rating	1	2	3	4	5

Reversibility of Impact

This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity

Criteria	Reversible (R)	High Reversibility (HR)	Moderate Reversibility (MR)	Low Reversibility (LR)	Irreversible (IR)
Rating	1	2	3	4	5

Probability of Impact

Probability measures the probability or likelihood of the impact occurring, as either probable, possible, likely, highly likely or definite (impact will occur regardless of preventative measures).

Criteria	Probable (PR) (0-10%)	Possible (PO) (10-25%)	Likely (L) (25-50%)	Highly Likely (HL) (50-75%)	Definite (D) (75-100%)
Rating	1	2	3	4	5

Significance of Impact

Significance measures the foreseeable significance of the impacts of the Project both with and without mitigation measures. The significance on the aspects of the environment is classified as:

Significance Score (SS) =	(Extent + Duration + Magnitude + Irreplaceability + Reversibility) x Probability
----------------------------------	--

The Significance Score is then used to rate the Environmental Significance of each potential environmental impact with or without mitigation.

Significance Score	Significance Rating	Description/ Criteria
125-150	Very High	the impact will result in large, permanent and severe impacts, such as local species extinction, minor human migrations or the local economy collapses; even projects with major benefits may not go ahead with this level of impact; project alternatives which are substantially different should be looked at, otherwise, the project should not be approved.
100-124	High	the impact will affect the environment to such an extent that permanent damage is likely, and recovery will be slow and difficult; the impact is unacceptable without significant mitigation efforts or reversal plans; project benefits must be proven to be very substantial; the approval of the project will be in jeopardy if this impact cannot be addressed.
75-99	Medium-High	the impact is significant and will affect the integrity of the environment; effort must be made to mitigate and reverse this impact; in addition, the project benefits must be clearly shown as outweighing the negative impact.
50-74	Medium	the impact will be noticeable but should be localised or occur over a limited time period and not cause permanent or unacceptable changes; it should be addressed in the EMP and managed appropriately.
<50	Low	the impact should cause no real damage to the environment, except where it could contribute to cumulative impacts.
+	Positive Impact	A positive impact is likely to result in a beneficial consequences/effect and should therefore be viewed as a motivation for the development

IMPACT ASSESSMENT

PLANNING AND DESIGN PHASE

ASPECT: WASTEWATER TREATMENT DESIGN		
NATURE OF IMPACT: Poor design of the oxidation ponds could result in poorly treated wastewater being discharged into Val River thus affecting the water quality.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Local (2)
Duration	Long term (4)	Medium Term (3)
Magnitude	Very High (10)	Very Low (2)
Irreplaceable loss of resources?	Definite (5)	Low (2)
Reversibility	Low (4)	Moderate (3)
Probability	Definite (5)	Possible (2)
Significance	Very High (130)	Low (24)
Can impacts be mitigated or augmented	Yes	
Mitigation: ◇ The design will be constructed and installed according to the required Nketoana Local Municipality standards and the latest edition of the “Red Book”. ◇ The design must be able to meet the applicable engineering standards for oxidation ponds. ◇ The engineers responsible for the design must have the necessary skills and expertise.		
Cumulative impacts: High		
Residual Impacts: Limited		
Discussion: The design of the oxidation ponds must meet applicable engineering standards to ensure that the treated wastewater, effluent meets the effluent discharge standards, to ensure that untreated water will not be discharged into the Vals River resulting in microbial contamination.		

ASPECT: Non-Compliance to applicable Environmental Legislation		
NATURE OF IMPACT: Continuation of the project without obtaining the necessary authorisation, licenses of permits in terms of the applicable legislation would be non-compliance that would result in a penalty or jail term.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Temporary (1)
Magnitude	Very High (4)	Low (4)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Low (4)	Reversible (1)
Probability	Definite (5)	Probable (1)
Significance	High (95)	Low (11)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ Application is in process for Environmental Authorisation and Water Use License in terms of National Environmental Management Act (Act 107 of 1998) and National Water Act (Act 36 of 1998), the applicant has been advised not to commence with construction prior to obtaining authorisation. ◇ Borrow pits that will be used to source construction material must have a Mining Permit/ Right in terms of Mineral Petroleum Resources Development Act (28 of 2002) and Environmental Authorisation in terms of NEMA, 1998 as amended or alternatively, material must be obtained from a commercial quarry. 		
Cumulative impacts:		
None		
Residual Impacts:		
High		
Discussion:		
Should the municipality go ahead with the construction of the proposed development without obtaining the necessary approvals from competent authorities, they will be in contravention of the applicable environmental legislation, and this could result in an administrative fine or jail term in terms of Section 24G of NEMA. Therefore, it is imperative that the commencement of construction activities is undertaken when all the necessary authorisation, licenses and permits are obtained to avoid.		

CONSTRUCTION PHASE:

ASPECT: SOCIO-ECONOMIC		
NATURE OF IMPACT: Employment opportunities for the local community during construction phase (economic impact)		
Status (positive or negative)	Positive	
	Without Mitigation	With Mitigation
Extent	Provincial (4)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Low (4)	Low (4)
Irreplaceable loss of resources?	Very Low (1)	Very Low (1)
Reversibility	Irreversible (5)	Irreversible (5)
Probability	Probable (2)	Highly Likely (4)
Significance	Low (32)	Medium (70)
Can impacts be mitigated or augmented	Yes	
<p>Mitigation: No mitigation is required because it is a positive impact, however, it can be augmented by the following:</p> <ul style="list-style-type: none"> ◇ Local labourers, especially from the Ward 3 and, local sub-contractors and SMMEs should be utilized to a greater extent and recruitment should consider gender equality in mind. ◇ Work force should include youth, women and disabled. Expanded Public Works Programme targets should be met. ◇ Labour intensive construction methods should be adopted where possible. ◇ Community Liaison Officer should be appointed, and Project Steering Committee established prior to construction to ensure that all social issues are resolved, and the project does not result in any delays due to unresolved social issues, e.g., recruitment of local labourers. ◇ Appropriate training should be provided as well as skills development for the local sub-contractors to improve their CIBD grading level. 		
<p>Cumulative impacts: None expected</p>		
<p>Residual impacts: The general workers would have gained experience and skill to work in similar projects in the future and CIBD grading of sub-contractors will improve.</p>		
<p>Discussion: It is important to involve the councillor of the Ward during labour recruitment and a skills audit must be undertaken to determine training that could be offered to the general workers. It is important that the contractor only uses skilled labourers from other areas if they are not available in the Lindley/Ntha area. There should be a database of local sub-contractors that will be empowered from this project and a skills audit be undertaken to identify required empowerment in the area.</p>		

ASPECT: FLORA		
NATURE OF IMPACT: Clearance of indigenous vegetation for the site preparation and establishment of the site camp resulting in the destruction of Red Data Listed, Nationally and/or Provincially protected species.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Site (2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Low (4)	Very Low (2)
Irreplaceable loss of resources?	Moderate (3)	Low (2)
Reversibility	Low (4)	High (2)
Probability	Highly Likely (4)	Likely (1)
Significance	Medium (72)	Low (12)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ No site construction basecamps may be established within the surrounding undeveloped landscape. An approval must be obtained for the location of the site camp and it should not be located within 100m of the Vals River or the watercourse on the east of the proposed site and outside the protective buffer of the wetland. ◇ A Provincial Flora Permit must be obtained from Free State DESTEA, prior to commencement of any construction activities subsequent to the potential removal/destruction of and identified provincially protected species individuals. It is however, recommended that the identified provincial protected species <i>Boophone disticha</i> as well as any other individual of this species potentially found to be present during construction, must be adequately relocated to another suitable and similar area as to where they were removed from. This relocation process must be completed prior to the commencement of any vegetation clearance- and/or construction activities. A Plant Species Relocation Plan must be compiled by a suitably qualified and experienced Ecologist. ◇ Vegetation clearance must be limited to the development footprint. ◇ Adequately cordon-off the proposed development construction footprint area and to ensure that the construction machinery and equipment is within the proposed construction footprint area and to ensure environmentally responsible construction practices and activities. The identified seepage wetland must be cordoned off and regarded as a no-go area for the duration of the construction. ◇ Adequate operational procedures for construction machinery and equipment must be developed in order to strictly govern and restrict movement of machinery only within the proposed development construction footprint areas. ◇ No unnecessary/unauthorised footprint expansion into the surrounding undeveloped areas must take place. ◇ No new temporary roads or tracks may be constructed or implemented outside the construction footprint as the existing access road will be used. ◇ Disturbed areas within and immediately surrounding the portion of the proposed access road and pipeline which transverse the watercourse and associated floodplain, must be adequately rehabilitated concurrently with the construction process. 		

Cumulative impacts: Low
Residual Impacts: Limited
Discussion: Although there are no Red Data Listed and nationally protected species, the contractor must ensure that the construction activities including movement of the construction machinery and vehicles are confined to the development footprint to lessen impact on the ecological characteristics of the site and surroundings to minimise indiscriminate destruction of vegetation. The concurrent rehabilitation of the disturbed areas surrounding the portion of the proposed pipeline and access road during construction must be followed to ensure that there is continued surface water flow through the watercourse and associated floodplain. No vegetation clearance may commence without a Flora Permit being obtained for the removal of the identified provincially protected species as this will be an unlawful activity.

ASPECT: SOIL		
NATURE OF IMPACT: Clearing of vegetation and earthmoving activities could result in accelerated soil erosion due to increased stormwater runoff.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long Term (4)	Medium Term (3)
Magnitude	Medium (6)	Very Low (2)
Irreplaceable loss of resources?	Low (2)	Very Low (1)
Reversibility	High (2)	High (2)
Probability	High (4)	Probable (1)
Significance	Medium (64)	Low (11)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ Vegetation clearance must be done in phases to minimize the exposure of bare soil. ◇ Adequate Stormwater and Erosion Management measures must be implemented in order to sufficiently manage stormwater runoff to prevent any significant erosion from occurring. ◇ No clearance of any riparian vegetation along the banks of Vals River must take place, in order to maintain the ecological functionality and integrity of the riparian and aquatic habitat. ◇ All cut and fill slopes must be safe and in line with the slope specifications. ◇ All excavations must be filled and rehabilitated before construction moves off site to abate channel and gully formation. ◇ ECO must routinely inspect erosion management features for functionality. 		
Cumulative impacts:		

Low
Residual Impacts: Limited
Discussion: Clearance of vegetation will leave the soil exposed and this could result in increased stormwater runoff that would increase the possible risk of erosion. Therefore, routine inspection of the construction area must be done to ensure that any signs of erosion are attended to timeously.

ASPECT: SOIL		
NATURE OF IMPACT: Potential compaction from heavy construction machinery and contamination of soil from oil leaks and spills of construction vehicles, machinery and equipment.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Short Term (2)
Magnitude	Very High (10)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Low (4)	High (2)
Probability	High (4)	Possible (2)
Significance	High (104)	Low (20)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ Construction vehicles and equipment must be parked in designated areas. ◇ Movement of construction vehicles and machinery must be control and confined to the construction footprint. ◇ Vehicles must be kept in good working condition and regularly maintained, and spill kits must always be kept available for when spills have occurred. ◇ Any emergency repairs must be done on an impermeable surface. ◇ Machinery and vehicles must be serviced in designated areas outside the no-go area. ◇ Workers must be trained to use the spill kits to rectify any spills immediately and the importance of reporting a leaking vehicle or machinery timeously so that it can be scheduled for repairs. ◇ Records must be kept of any spills. ◇ All hazardous substances must be stored and handled on impervious substrates and bunded areas that are able to contain spillage. 		

◇ Contaminated soil is hazardous waste thus should be stored in a suitable container and contents to be disposed of at a Hazardous landfill site by a registered service provider.
Cumulative impacts: Low
Residual Impacts: Limited
Discussion: Regular checking of vehicles and machinery is important as well as the proper reporting channel that must be followed by the workforce in case of a spill or a leak. No servicing of any construction equipment within 100m of Vals River. It is important that the toolbox talks include detailed instruction of what must be done in case of accidental spillages or leaks and record keeping. To ensure that the soil on site is free of contamination.

ASPECT: ALIEN INVASIVE SPECIES		
NATURE OF IMPACT: Spread of alien invasive species		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Site (2)
Duration	Long Term (4)	Short Term (3)
Magnitude	High (8)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Very Low (1)
Reversibility	Low (4)	High (2)
Probability	High (4)	Probable (1)
Significance	Medium-High (92)	Low (10)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
◇ Construction activities must be limited to the development footprint.		
◇ All the identified alien invasive species individuals must be actively eradicated from the assessment area and adequately disposed of in accordance with the National Environmental Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014.		
◇ Adequate Alien Invasive Species Establishment Management and Prevention Plan compiled by a suitably qualified and experienced Ecologist must be implemented during the construction and operational phase.		
◇ Areas within and immediately surrounding the proposed development footprint must be adequately rehabilitated as soon as practicably possible after construction in order to prevent		

<p>significant alien invasive species establishment.</p> <p>◇ Routine monitoring must be undertaken to control the spread of invasive species.</p>
<p>Cumulative impacts: Low</p>
<p>Residual Impacts: Limited</p>
<p>Discussion: The disturbance of soils will enhance the growth and recruitment of exotic and pioneering vegetation; therefore, the construction site must be kept weed and alien-free because if there is an infestation, it could spread to the surrounding undeveloped areas, and this could affect the neighbouring farmlands as well as displace indigenous vegetation.</p>

ASPECT: WATER QUALITY OF THE VALS RIVER		
NATURE OF IMPACT: Contamination of Vals River due to contaminated runoff from the construction site.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Short Term (2)	Short Term (2)
Magnitude	High (8)	Medium (6)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Moderate (3)	Medium (3)
Probability	High (4)	Possible (2)
Significance	Medium-High (80)	Low (32)
Can impacts be mitigated or augmented	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> ◇ If hydrocarbons or other chemicals are to be stored on site during the construction phase, the storage areas must be situated as far away as practicably possible from the watercourses. ◇ The storage areas must be adequately bunded in order to be able to contain a minimum of 150% of the capacity of the storage tanks/units and they should be fenced off with access control in place. ◇ Adequate hydrocarbon and other chemical storage, handling, usage, and emergency spill procedures must be developed, and accidental spills must be reported and cleaned immediately. ◇ All relevant construction personnel must be sufficiently trained on- and apply these spill procedures during the entire construction phase. ◇ Erosion control of maintained and serviced disturbed areas must be implemented to avoid silts entering into aquatic habitats and impacting water quality downstream of the site. ◇ Adequate stormwater and erosion management measures must be implemented for the entire assessment area during the construction and operational phase. This must be done to 		

<p>ensure and sufficiently manage stormwater runoff and clean/dirty water separation towards the Vals River in order to ensure the ecological integrity of the watercourses.</p> <ul style="list-style-type: none"> ◇ If ready-mix concrete is not to be used, concrete mixing must be done on impermeable surfaces at designated areas and no concrete mixing would be allowed within the watercourses. All visible remains of concrete must be physically removed as soon as possible and disposed to a suitable site. All used cement bags should be properly disposed of after use or stored at a designated area before. ◇ No chemical toilets must be placed within 100m of the watercourse, and they must be serviced and maintained regularly.
<p>Cumulative impacts: Low</p>
<p>Residual Impacts: Limited</p>
<p>Discussion: Water quality degradation as a result of siltation of the watercourse through erosional features, fluid leaks, poor waste management, is a common issue for construction projects taking place within watercourses, therefore, the contractor must ensure that workforce including sub-contractor are trained on measures to be implemented to lessen the impact. Good construction practices must be in place.</p>

ASPECT: IMPACT ON THE FLOW REGIME-WATERCOURSE		
NATURE OF IMPACT: Impeding and Diverting water flow of the watercourse during construction of the outfall sewer and the pipeline		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Site (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	High (8)	Low (4)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Low (4)	Moderate (3)
Probability	High (4)	Likely (3)
Significance	Medium-High (84)	Low (39)
Can impacts be mitigated or augmented	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> ◇ An adequately sized culvert must be implemented at the proposed access road crossing in order to ensure continued surface water flow through the watercourse and associated floodplain. ◇ Adequate stormwater measures must be implemented during the construction and operation phase to ensure continued flow of the watercourse. ◇ Construction should be done during low flows as much as possible so that there is minimal disturbance on the flow. ◇ The construction footprint through all these portions must also be adequately rehabilitated as soon as practicably possible after construction in order to ensure the continued flow and subsequent ecological functionality and integrity of the watercourse and wetland. 		

◇ Water Use License Application must be obtained from the Department of Water and Sanitation in accordance with the National Water Act (Act 36 of 1998).
◇ A Rehabilitation Management Plan must be developed for this by a suitably qualified and experienced Ecologist.
Cumulative impacts: Low
Residual Impacts: Limited
Discussion: Stormwater management must be in place during the construction and subsequent operational phase of the proposed development. The disturbed areas within and immediately surrounding the portion of the proposed access road and outfall sewer, which transverses the watercourse and associated floodplain, must be adequately rehabilitated concurrently with the construction activities to ensure continued surface water flow through the watercourse and floodplain.

ASPECT: IMPACT ON THE SEEPAGE WETLAND		
NATURE OF IMPACT: Destruction of the seepage wetland.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Site (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	High (8)	Low (4)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Low (4)	Moderate (3)
Probability	High (4)	Likely (3)
Significance	Medium-High (84)	Low (39)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
◇ The seepage wetland must be adequately buffered out of the proposed development footprint area. A minimum of approximately 20m buffer distance is recommended to be implemented around the wetland. No current or future development is allowed to take place within this buffered zone.		
◇ The seepage wetland must be adequately cordoned off prior to commencement of construction activity.		
◇ No chemical toilets may be placed within the protective buffer.		
◇ No storage of construction material may be stored within the protective buffer.		
Cumulative impacts: Low		

Residual Impacts: Limited
Discussion: The identified seepage wetland must be regarded as a no-go area during the construction phase because it provides locally distinct and important semi-aquatic habitat, which could possibly be utilised by limited common and habitat-specific aquatic bird-, amphibian- and other aquatic faunal species as refuge and for breeding, foraging and/or persistence purposes.

ASPECT: WASTE MANAGEMENT		
NATURE OF IMPACT: Inadequate handling, storage of waste prior to disposal resulting in contamination of the environment.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Footprint (1)
Duration	Short Term (2)	Short Term (2)
Magnitude	High (8)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Very Low (1)
Reversibility	Moderate (3)	High (2)
Probability	High (4)	Possible (2)
Significance	Medium-High (76)	Low (16)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ Adequate number of refuse bins with lids must be provided. ◇ General waste must be collected daily and stored in refuse bins and disposed weekly or when full at the local registered solid waste site. ◇ Temporary storage site for waste must not be within 1000m of the watercourse. ◇ No dumping of rubble or excess material must take place within the watercourses. ◇ All visible remains of concrete must be physically removed as soon as possible and disposed to a suitable site. All used cement bags should be properly disposed after use. ◇ Waste management measures must be implemented to prevent litter and debris from entering the watercourse. ◇ No burning or burying of waste is allowed. ◇ Designated eating area should have a refuse bin in the vicinity. 		
Cumulative impacts: Low		
Residual Impacts:		

Limited
Discussion: Waste management is crucial aspect during construction whereby if the site is not kept litter free, then windblown litter may end up in Vals River. Therefore, it is important that suitable and conveniently located refuse bins are provided and there is designated storage area for temporary storage. Cleaning up of the site should be a daily activity, therefore, littering even by the workforce is prohibited.

ASPECT: HEALTH AND SAFETY		
NATURE OF IMPACT: Impact on the health and safety of the workers and neighbouring land users		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Temporary (1)	Temporary (1)
Magnitude	Medium (6)	Low (4)
Irreplaceable loss of resources?	Low (2)	Low (2)
Reversibility	Low (4)	Moderate (3)
Probability	Highly Likely (4)	Possible (1)
Significance	Medium-High (76)	Low (12)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ The construction site must adhere to the Occupational Health and Safety Act (Act 85 of 1993) ◇ The Contractor must provide employees with suitable equipment to protect them from hazards being presented and that will allow them to work without risk to their health in a hazardous environment, e.g., hard hats, gloves, boots, etc. ◇ An emergency preparedness plan should be compiled and approved by the resident engineer and ECO before construction commences. A list of all emergency telephone numbers, i.e., fire, ambulance, safety officer, etc. should be available all the time at the construction site. ◇ A medical first aid kit should be available on site for the duration of the project. ◇ Safety nets/danger tapes must be placed around excavations. ◇ Warning signage must be in place to alert the neighbouring land users of the dangers of undergoing construction activities. ◇ Construction site must be secured against unauthorized access to prevent accidents or injuries. 		
Cumulative impacts:		
None		
Residual Impacts:		
None		

Discussion:
 Workforce must be provided with PPE and wearing thereof enforced as well as toolbox talks, which would assist in ensuring that they are familiar with the different safe work practices in place aimed at keeping the construction site safe.

ASPECT: LOSS OF AGRICULTURAL LAND		
NATURE OF IMPACT: Loss of agricultural land with high potential soil thus impacting food security.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Site (2)
Duration	Long term (1)	Long term (1)
Magnitude	Medium (6)	Very Low (2)
Irreplaceable loss of resources?	Moderate (3)	Moderate (3)
Reversibility	Low (4)	Low (4)
Probability	Highly Likely (4)	Possible (2)
Significance	Medium-High (64)	Low (24)
Can impacts be mitigated or augmented	Yes	
Mitigation: <ul style="list-style-type: none"> ◇ Construction must be limited to the development footprint. ◇ Turning of soil must be avoided. ◇ Topsoil should be placed separately from the subsoil during excavations and during backfilling, the subsoil should be returned first and then covered by the topsoil. This is to prevent crust formation. 		
Cumulative impacts: None		
Residual Impacts: None		
Discussion: Due to the small footprint and low impacts on existing agricultural activities, the proposed development will not have a significant impact on agriculture in the area, thus it poses no threat to food security.		

OPERATIONAL PHASE

ASPECT: GROUNDWATER		
NATURE OF IMPACT: Contamination of groundwater from overflows, or seepage or leakages from the ponds		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long Term (4)	Medium Term (3)
Magnitude	Very High (10)	Medium (6)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Low (4)	Moderate (3)
Probability	Definite (5)	Possible (2)
Significance	High (120)	Low (32)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ The design specifications and size parameters of the proposed sewage ponds will ensure adequate containment and subsequent evaporation of the required maximum potential volumes of general final effluent, even during significant rainfall events. ◇ The sewage ponds must be sufficiently lined, in accordance with the relevant minimum norms and standards, in order to prevent undesired seepages or leakages into the groundwater resources. ◇ The integrity of the lining must be inspected on a minimum annual basis in order to ensure its continued functionality and prevent leakages. ◇ Adequate leakage detection and prevention system must be installed for the WWTW in order to detect any potential leakages and subsequent contamination of groundwater resources. ◇ Monitoring controlling and regulating inflow into the WWTW must be in place. ◇ If any leakages or overflows of the WWTW occur, the competent authority must be immediately notified and the necessary steps must be followed by the applicant to locate and remediate the source of contamination, as soon as practicably possible/feasible. ◇ LS1 (downstream) and LLS 3 (upstream at the WWTW outflow) must be incorporated into the water monitoring program and drilling of additional groundwater monitoring sites as indicated in the Groundwater report. ◇ Removal of sediments must be done atleast once a year to prevent overflow due to the thick layer settling at the bottom of the tanks reducing the capacity of the ponds. 		
Cumulative impacts:		
High		
Residual Impacts:		
Limited		

Discussion:
 Although this impact occurs during operation, it will be mitigated by the design during the planning and design phase thus the lining should be done in such a way that it won't fail during operation and meet the required standards. Failure to properly design the planned liners for the ponds would mean the continuation of wastewater infiltration into the groundwater thus deteriorating the quality. Therefore, there should be regular maintenance of the ponds to ensure that they are functioning optimally. Groundwater and surface water monitoring should be implemented so as to observe any ongoing contamination so that it can be attended to immediately.

ASPECT: SURFACE WATER-OUTFALL SEWER		
NATURE OF IMPACT: Contamination of the watercourse due to blockages, and leakages from the pipeline.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Medium Term (2)	Temporary (2)
Magnitude	High (8)	Low (4)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Low (4)	High (2)
Probability	Highly Likely (4)	Possible (2)
Significance	Medium-High (80)	Low (24)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ The integrity of the established pipeline must be inspected on a minimum weekly basis in order to ensure continued functionality and prevent leakages or ruptures. ◇ Adequate leakage detection and prevention system must be installed for the pipeline in order to detect any potential leakages and subsequent contamination of the watercourse and associated floodplain. ◇ If any leakages occur, the competent authority must immediately be notified, and the necessary steps must be followed by the applicant to locate and remediate the source of contamination, as soon as practicably possible/feasible. ◇ Community awareness must be implemented whereby residents are informed about the materials that should not be flushed down the toilets, e.g., rugs because they will cause blockages. They should be informed that any blockages must be reported to the municipality so that they can respond immediately. 		
Cumulative impacts:		
High		
Residual Impacts:		
Limited		
Discussion:		

Regular inspection and maintenance of the pipeline must be in place as per operation and maintenance plan to avoid any contamination of the watercourse. Immediate steps must be taken by the Nketoana Local Municipality to locate and remediate the sources of the raw sewage discharge into the watercourse by the township. This must be done in order to prevent continued pollution and degradation of the watercourse and associated floodplain.

ASPECT: SURFACE WATER-OXIDATION PONDS		
NATURE OF IMPACT: Contamination of Vals River due to the discharge of untreated wastewater.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Local (2)
Duration	Long Term (4)	Short Term (2)
Magnitude	Very High (10)	Low (4)
Irreplaceable loss of resources?	Definite (5)	Low (2)
Reversibility	Low (4)	Moderate (3)
Probability	Definite (5)	Possible (2)
Significance	Very High (130)	Low (26)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ All wastewater must go through the treatment process before being released into the environment. ◇ Final treated effluent to be discharged must be chemically and biologically tested by an accredited laboratory on a minimum weekly basis. This must be done to ensure that such effluents are of sufficient quality and standards for lawful discharge. ◇ The established WWTW must at all times ensure lawful conduct and operations, in accordance with the relevant legislation. ◇ Surface and Groundwater Monitoring must be in place. ◇ Measures to limit nutrient discharge should be in place by using denitrification filters or applying the wastewater to land for irrigation so as to help prevent eutrophication. 		
Cumulative impacts:		
High		
Residual Impacts:		
Limited		
Discussion:		
It should be noted that the if oxidation ponds are operating effectively, then it is able to remove pollutants and contaminants from wastewater, particularly organic matter, and nutrients. It is important that the municipality have sufficient support, capacity and resources for the operation and maintenance of the wastewater treatment works. Immediate steps must be taken by		

the Nketoana Local Municipality to locate and remediate the sources of the raw sewage discharge into the watercourse by the township.

ASPECT: ODOUR		
NATURE OF IMPACT: Generation of unpleasant odours from the WWTW.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Site (2)	Footprint (1)
Duration	Long Term (2)	Short Term (2)
Magnitude	Medium (6)	Low (4)
Irreplaceable loss of resources?	Low (2)	Low (2)
Reversibility	Moderate (3)	High (2)
Probability	Highly Likely (4)	Possible (2)
Significance	Medium (56)	Low (22)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ The screens must be removed and disposed of at the landfill site and chemicals may be used to help reduce the odour emissions and promote settling of solids. ◇ Proper maintenance including the removal of accumulated solids and monitoring pH and dissolved oxygen levels could minimize obnoxious emissions. 		
Cumulative impacts:		
Low		
Residual Impacts:		
Limited		
Discussion:		
As the sewage enters the wastewater treatment plant, before the screening process, foul smell will be produced, which will reduce as the treatment process continues. The decomposition of organic matter in the wastewater can produce sulphurous gases, which can cause, strong unpleasant odour. The removed particles during screening process must be disposed of at the land fill site. To ensure that the people working at the plant aren't exposed to offensive odour, measures must be in place to reduce the odours. The distance between the proposed site and residential development is adequate, thus there will be minimal exposure to the nuisance.		

No-Go Option

ASPECT: SERVICE DELIVERY		
NATURE OF IMPACT: The existing WWTW not able to accommodate additional sewage flows from the eradication of bucket system in Ntha.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Local (2)
Duration	Long term (2)	Short term (2)
Magnitude	Very High (10)	Low (4)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	N/A	N/A
Probability	Definite (5)	Possible (2)
Significance	Medium-High (95)	Low (20)
Can impacts be mitigated or augmented	Yes	
Mitigation: ◇ The proposed construction of the wastewater treatment plant must go ahead as planned.		
Cumulative impacts: Low		
Residual Impacts: Limited		
Discussion: The existing WWTW that is vandalised and does not have adequate capacity to accommodate additional loads from the eradication of buckets will have to be used by the municipality and this will end up in the collapse of the system resulting in pollution of the environment from overflowing sewage, thus creating unhealthy living conditions as there entire sewer system including reticulation will collapse. It is important to note that uncontrolled and uncontained wastewater does not only pose a risk to the site soils and vegetation but also to groundwater whereby potentially dangerous chemicals in the wastewater could pollute water resources. The municipality will be unable to handle sewage in the Lindley/Ntha area as required by the constitution, thus the health and wellbeing of the residents will be affected and this could result in service delivery protests		