

IMPACT ASSESSMENT

PLANNING AND DESIGN PHASE

ASPECT: SEWER INFRASTRUCTURE DESIGN		
NATURE OF IMPACT: Poor design of the sanitation infrastructure that could result in structural defects or collapse of the sanitation system could negatively affect the receiving environment.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (4)	Regional (2)
Duration	Long term (2)	Temporary (1)
Magnitude	Very High (10)	Very Low (2)
Irreplaceable loss of resources?	High (4)	Very Low (1)
Reversibility	Low (4)	Moderate (3)
Probability	Highly Likely (4)	Possible (2)
Significance	High (96)	Low (18)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ The existing wastewater treatment works must be able to accommodate the additional loads from the new Extension 5 residential development. ◇ The appropriate pipeline sizing, gradient and material to be used must be considered and meet the applicable engineering standards. ◇ The engineers responsible for the design must have the necessary skills and expertise. 		
Cumulative impacts:		
None		
Residual Impacts:		
Limited		
Discussion:		
The sewer design must meet applicable engineering standards to ensure that the sanitation does not collapse because if there are any leaks in the pipeline, it will result with contamination of watercourses and soil.		

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 could result in continuation of illegal activities.		
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)	Highly Likely (1)
Significance	High (95)	Medium (11)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ Application 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 application is in progress. ◇ 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 sanitation infrastructure without obtaining the necessary approvals from competent authorities, they will be in contravention of the applicable environmental legislation and this could result in an administration fine or jail term.		

CONSTRUCTION PHASE:

ASPECT: SOCIO-ECONOMIC		
NATURE OF IMPACT: Employment opportunities for the local community during construction phase due to the current unemployment rate (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 17 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 Ward 17 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 Paul Roux/Fateng tse Ntsho area. There should be a database of local sub-contractors that will be empowered from this project.</p>		

ASPECT: FLORA-PIPELINE		
NATURE OF IMPACT: Destruction/Damage of Red Data Listed Species, Nationally or Provincially protected species due to clearance of vegetation		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Very Low (2)	Very Low (2)
Irreplaceable loss of resources?	Moderate (3)	Low (2)
Reversibility	Low (4)	Low (4)
Probability	Possible (2)	Probable (1)
Significance	Low (30)	Low (14)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ The proposed pipeline must be constructed as close as possible to the National Road N5 national highway in order to restrict and prevent significant impact on the relevant vegetation type, the broader continuous wetland area to the south. ◇ A Provincial Flora Permit must be obtained from DESTEA for the removal/destruction of all the provincially protected species <i>Helichrysum rugulosum</i> individuals, prior to commencement of any construction activities. ◇ The degree and duration of the construction impacts of the proposed development on the remaining undisturbed relatively natural terrestrial grassland portions, the broader continuous wetland area to the south as far as practicably possible in order to minimise the negative ecological impact. ◇ Exposure of bare ground should be minimized by limiting grubbing and soil stripping to areas where excavation is to begin within 30 days. ◇ Topsoil stripping 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. ◇ No unnecessary/unauthorised footprint expansion into the surrounding undeveloped areas must take place. ◇ No site construction basecamps may be established within the surrounding undeveloped areas and outside the proposed development footprint, specifically not within the broader continuous wetland area to the south. ◇ No new temporary roads or tracks may be constructed or implemented within the surrounding undeveloped areas and specifically not within the broader wetland area to the south. 		
Cumulative impacts:		
Low		

<p>Residual Impacts: Limited</p>
<p>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.</p>

ASPECT: FLORA-SEWER PIPE BRIDGE		
NATURE OF IMPACT: Destruction riparian of vegetation due to clearance of vegetation on the Sand River.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Very Low (2)	Very Low (2)
Irreplaceable loss of resources?	Moderate (3)	Low (2)
Reversibility	Low (4)	Low (4)
Probability	Possible (2)	Probable (1)
Significance	Low (30)	Low (14)
Can impacts be mitigated or augmented	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> ◇ Construction must take place during the dry season. ◇ The degree and duration of the construction impacts of the proposed development on the small portion of Sand River must be minimised as far as practically possible. ◇ 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. ◇ 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 development footprint. 		
Cumulative impacts:		
Low		

Residual Impacts: Limited
Discussion: Although there are no Red Data Listed, Nationally or Provincially 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 riparian vegetation. Indiscriminate destruction of the riparian vegetation must be avoided.

ASPECT: TRANSFORMATION OF VEGETATION ALONG THE PIPELINE ROUTE		
NATURE OF IMPACT: Transformation of vegetation along the pipeline route associated with the Eastern Free State Clay Grassland Vegetation Type (Gm3)		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Footprint (1)	Footprint (1)
Duration	Long Term (4)	Short Term (3)
Magnitude	Low (4)	Very Low (2)
Irreplaceable loss of resources?	Moderate (3)	Very Low (1)
Reversibility	Low (4)	Moderate (3)
Probability	High (4)	Likely (3)
Significance	Medium (64)	Low (30)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ Construction must be as close as possible to the N5 national highway in order to restrict impact and prevent significant impact on the relevant vegetation type, the broader wetland area to the south. ◇ The degree and duration of the construction impacts of the proposed development on the remaining undisturbed relatively natural terrestrial grassland portions be minimised as far as practically possible. ◇ Adequately cordon-off the proposed development construction footprint area and to ensure that the construction machinery and equipment movement is within the proposed construction footprint area and to ensure environmentally responsible construction practices and activities. ◇ 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 development footprint. ◇ The construction footprint must be adequately rehabilitated as soon as practically possible after construction in order to ensure continued ecological functionality and integrity of the terrestrial grassland. 		

◇ A Rehabilitation Management Plan must be developed by a suitably qualified and experienced ecologist.
Cumulative impacts: Medium
Residual Impacts: Limited
Discussion: The proposed pipeline route will be underground except at the section where it crosses the Sand River, therefore, with adequate implementation of outlined mitigation measures, natural plant succession would take place.

ASPECT: TRANSFORMATION OF VEGETATION ALONG THE SEWER PIPE BRIDGE		
NATURE OF IMPACT: Transformation of vegetation along the sewer pipe bridge development footprint associated with the Eastern Free State Clay Grassland Vegetation Type (Gm3)		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Footprint (1)
Duration	Long Term (4)	Short Term (3)
Magnitude	Very Low (2)	Very Low (2)
Irreplaceable loss of resources?	Moderate (3)	Very Low (1)
Reversibility	Low (4)	Low (4)
Probability	Likely (3)	Likely (3)
Significance	Low (45)	Low (33)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ The degree and duration of the construction impacts of the proposed development on the small portion of Sand river be minimised as far as practically possible. ◇ Adequately cordon-off the proposed development construction footprint area and to ensure that construction machinery and equipment operate only within the footprint and not outside the cordoned off area. ◇ Adequate operational procedures for machinery and equipment must be developed in order to strictly govern movement of machinery within the project footprint areas and ensure environmentally responsible construction practices and activities. ◇ 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 development footprint. ◇ The construction footprint must be adequately rehabilitated as soon as practically possible after construction in order to ensure continued ecological 		

<p>functionality and integrity of the terrestrial grassland.</p> <p>◇ A Rehabilitation Management Plan must be developed by a suitably qualified and experienced ecologist.</p>
<p>Cumulative impacts: Low</p>
<p>Residual Impacts: Limited</p>
<p>Discussion: The proposed sewer bridge will be used to carry the proposed sewer pipeline, therefore riparian vegetation along the sewer pipe bridge will be transformed and contractor must put effort in place not to extent construction activities within the surrounding area not included in the footprint. Rehabilitation must be followed immediately when construction activities ceases.</p>

ASPECT: SOIL EROSION		
NATURE OF IMPACT: Clearing of vegetation and earthmoving activities could result in accelerated soil erosion.		
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 for the proposed sewer bridge area in order to sufficiently manage stormwater runoff to prevent any significant erosion from occurring. These include measures to stabilize riverbanks within disturbed areas as well as areas subject to perpetual present erosional features making use of geotextiles, silt traps or silt fences along areas with steep slopes and gabions in areas that suffer greater erosional impacts. ◇ ECO must routinely inspect erosion management features for functionality. ◇ All excavations must be filled and rehabilitated before construction moves off site to abate channel and gully formation. 		

Cumulative impacts: Medium
Residual Impacts: Limited
Discussion: Routine inspection of the construction area must be done to ensure that any signs of erosion are attended to.

ASPECT: ALIEN INVASIVE SPECIES		
NATURE OF IMPACT: Spread of alien invasive species		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Local (2)
Duration	Long Term (4)	Medium Term (3)
Magnitude	Low (4)	Very Low (2)
Irreplaceable loss of resources?	Medium (3)	Low (2)
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"> ◇ 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 significant alien invasive species establishment. ◇ Routine monitoring must be undertaken to control the spread of invasive species. 		
Cumulative impacts: Low		
Residual Impacts:		

Limited
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.

ASPECT: WATER QUALITY OF THE WATERCOURSES		
NATURE OF IMPACT: Contamination of the Sand River, wetland, and small drainage ephemeral drainage line.		
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	
Mitigation:		
<ul style="list-style-type: none"> ◇ A comprehensive South African Scoring System 5 (SASS 5) aquatic biomonitoring must be conducted of the Sand River directly downstream of the proposed project area prior to commencement of the construction phase. This information will serve as baseline watercourse health data to be used for subsequent monitoring assessment to be conducted. Such an assessment must be conducted by a suitably qualified and experienced ecologist. ◇ Water samples of the Sand River must be collected directly downstream of the proposed project area prior to commencement of the construction phase by a suitably qualified specialist. The quality of these samples must be chemically and biologically analysed at an accredited laboratory in order to serve as baseline water quality data to be used for subsequent monitoring assessment to be conducted. ◇ 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. ◇ Adequate hydrocarbon and other chemical storage, handling, usage, and emergency spill procedures must be developed, and Accidental spills must be reported and cleaned immediately. Contaminated soils must be removed and disposed of at a registered disposal site. All relevant construction personnel must be sufficiently trained on- and apply these procedures during the entire construction phase. ◇ The construction equipment and machinery must be properly maintained and serviced 		

- ◇ Erosion control of 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 ensure and sufficiently manage stormwater runoff, clean/dirty water separation towards the Sand River, wetland, and small ephemeral water drainage line in order to ensure ecological integrity of the watercourses and wetland.
- ◇ No dumping of rubble or excess material must take place within the watercourses.
- ◇ General waste must be collected in drum containers and disposed weekly or when full at the Paul Roux solid waste site. No dumping of waste is allowed within the construction site including watercourses.
- ◇ 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 after use.

Cumulative impacts:

Low

Residual Impacts:

Limited

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.

ASPECT: DISTURBANCE TO THE SAND RIVER CHARACTERISTICS		
NATURE OF IMPACT: Impeding and diverting water flow of the Sand River.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Short Term (2)	Short Term (2)
Magnitude	Medium (6)	Medium (6)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	Medium (3)	High (2)
Probability	High (4)	Possible (2)
Significance	Medium (72)	Low (30)
Can impacts be mitigated or augmented	Yes	
Mitigation:		

<ul style="list-style-type: none"> ◇ Adequate stormwater measures must be implemented during the construction and operation phase to ensure continued flow of the watercourse. ◇ The pipeline must be placed over the watercourse on aboveground elevated concrete slabs in order to ensure the continued flow and ecological integrity of the watercourse. ◇ Any material used to impede or divert the water flow must be removed immediately when construction of the sewer pipe bridge is completed. ◇ No dumping of rubble or excess building material should take place within the watercourse including the riparian zones. ◇ 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. ◇ A Rehabilitation Management Plan must be developed for this by a suitably qualified and experienced Ecologist.
<p>Cumulative impacts: Low</p>
<p>Residual Impacts: Limited</p>
<p>Discussion: There should be no hinderance to the water flow post construction. Therefore, all the material that was introduced to impede or divert the water flow must be removed. Continuation of construction without a Water Use License is a transgression to the National Water Act, 1998.</p>

ASPECT: DESTRUCTION OF WETLAND FUNCTIONALITY		
NATURE OF IMPACT: Inhibiting of the ecological services provided by the wetland.		
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	Medium (3)	High (2)
Probability	High (4)	Possible (2)
Significance	Medium-High (80)	Low (30)
Can impacts be mitigated or augmented	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> ◇ Adequate stormwater and erosion measures must be implemented for the entire assessment area during the construction and operation phase to ensure sufficiently maintained stormwater runOff, in order to ensure subsequent ecological functionality and integrity of the wetland. ◇ No dumping of rubble or excess building material should take place within the wetland area. ◇ Storage of machinery & surplus materials to be only allowed outside of wetland area. 		

<ul style="list-style-type: none"> ◇ Entrenching the pipeline deep enough below the watercourse with proper reinstatement of soil layering to retain soil structure and therefore abate erosion through scouring. ◇ Limit the construction footprint which is to remain within designated access roads. ◇ 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. ◇ The movement of heavy machinery within wetland zones should be limited to only single access roadways; ◇ Upon completion of the construction phase, this roadway should be ripped and/or disk ploughed to loosen the compacted soils and to allow for the establishment of vegetation within the affected areas. ◇ Guideline procedures on trenching on wetlands outlined in the Environmental Management Programme should be followed ◇ A Rehabilitation Management Plan must be developed for this by a suitably qualified and experienced Ecologist.
<p>Cumulative impacts: Low</p>
<p>Residual Impacts: Limited</p>
<p>Discussion: The contractor must ensure that wetland are sensitive areas and good environmental practise must be in place for the duration of the construction and rehabilitation measures implemented immediately when construction activities ceases.</p>

ASPECT: CONSTRUCTION MATERIAL		
NATURE OF IMPACT: Use of material that is not suitable for bedding, backfilling, and/or blanket material.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Temporary (1)	Temporary (1)
Magnitude	High (8)	Low (4)
Irreplaceable loss of resources?	Very Low (1)	Moderate (3)
Reversibility	Low (4)	Moderate (3)
Probability	Highly Likely (4)	Possible (2)
Significance	Medium (64)	Low (26)
Can impacts be mitigated or augmented	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> ◇ Clayey material removed from the trenches must not be used, it must be cut to spoil in so far as economically possible. No spoil material must be stored within the watercourses including riparian zone. 		

◇ Control testing must be conducted to exercise process control on the materials used for backfilling.
Cumulative impacts: Low
Residual Impacts: None
Discussion: The material on site is clayey thus not suitable for backfilling, bedding, or blanket materials. Therefore, suitable material must be obtained from a commercial quarry or a permitted borrow pit.

ASPECT: TRAFFIC IMPACT		
NATURE OF IMPACT: Impact on the traffic flow on the N5 National Road		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Temporary (1)	Temporary (1)
Magnitude	High (8)	Low (4)
Irreplaceable loss of resources?	Very Low (1)	Very Low (1)
Reversibility	Reversible (1)	Reversible (1)
Probability	Likely (3)	Possible (2)
Significance	Low (39)	Low (18)
Can impacts be mitigated or augmented	Yes	
Mitigation:		
<ul style="list-style-type: none"> ◇ Traffic management plan should be compiled prior to construction activities. ◇ Compliance with traffic control regulations should be mandatory. ◇ Only drivers with valid licenses must be allowed to drive on the construction site and operate equipment they are licensed for. ◇ Road users must be notified timeously of any delays. ◇ In the event of abnormal vehicles, the local Department of Traffic must be notified timeously. 		
Cumulative impacts: Low		
Residual Impacts: None		
Discussion: The movement of construction vehicles must be effectively managed in a way that other road users are alerted of any impact on the traffic flow so as to avoid		

any incidences/accidents.

ASPECT: HERITAGE ARTEFACTS		
NATURE OF IMPACT: Destruction of Heritage Artefacts during by construction activities.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Temporary (1)
Magnitude	High (8)	Low (4)
Irreplaceable loss of resources?	Definite (5)	Low (2)
Reversibility	Irreversible (5)	High (2)
Probability	Highly Likely (4)	Possible (2)
Significance	High (104)	Low (22)
Can impacts be mitigated or augmented	Yes	
<ul style="list-style-type: none"> ◇ An Archaeologist must be appointed to monitor excavations at the Sand River crossing as well as 10m wide sections of alluvium flanking both sides of the river at the bridge. ◇ A Chance Finds Procedures outlined in the EMPr must be followed should any heritage and/or fossil resources be uncovered during all phases of the project. The procedure must be included in the toolbox talks. ◇ Should the contractors make any archaeological, geological, or paleontological findings, it must be reported to the RE and an archaeologist and/or archaeologist should confirm the findings. SAHRA should be informed of the findings within 24 hours. Construction work must not proceed if it will cause damage to such findings. Unauthorized persons may not remove artefacts or cultural or historical importance from the site. 		
Cumulative impacts:		
Low		
Residual Impacts:		
Limited		
Discussion:		
The contractor must work diligently and train the workforce so that the understand the process that needs to be followed in case there is unearthing of Archaeological, Palaeontological Artefacts or human remains during earthmoving activities.		

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 Contactor 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 duration of the project. ◇ Safety nets/danger tapes must be placed around excavations. ◇ Pedestrian management measures must be in place to ensure free flowing of movement between Paul Roux and Fateng tse Ntsho. ◇ Warning signage must be in place to alert the public of the dangers of undergoing construction activities. ◇ Construction site must be secured against unauthorized access. 		
Cumulative impacts:		
None		
Residual Impacts:		
None		
Discussion:		
There is constant movement of people between Paul Roux and Fateng tse Ntsho, therefore, good construction practices must be in place to ensure the safety of the public and also not subjecting the workers to working conditions that are harmful to their health and well-being.		

Operational Phase

ASPECT: INFRASTRUCTURE MAINTENANCE		
NATURE OF IMPACT: Potential leaks of the infrastructure that could result in soil and water pollution.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (3)	Local (3)
Duration	Medium Term (3)	Short Term (2)
Magnitude	High (8)	Low (4)
Irreplaceable loss of resources?	High (4)	Moderate (3)
Reversibility	Low (4)	Moderate (3)
Probability	Likely (3)	Probable (1)
Significance	Medium (66)	Low (15)
Can impacts be mitigated or augmented	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> ◇ Operation and Maintenance Plan must be in place and regular inspection followed. ◇ An Emergency Response Procedure must be developed. ◇ Adequate leakage detection and prevention measures must be implemented for the pipeline in order to detect any potential leakages and subsequent contamination of underground water, the Sand River, or the Wetland. ◇ The integrity of the pipeline must be inspected on a minimum biannual basis (twice a year) in order to ensure there is no risk of leakage or overflows occurring. If any leakages or compromises to the integrity of the pipeline are detected, these issues must immediately be resolved, and the leakages repaired. The competent authority must be notified of any such leakages. ◇ Contaminated areas must also be rehabilitated as soon as possible after detection. A suitably qualified and experienced ecologist must be appointed to advise on and oversee the rehabilitation process. ◇ SASS 5 aquatic bio-monitoring assessment must be conducted of the Sand River directly downstream of the proposed project area on a minimum annual basis in order to ensure that the ecological functionality and integrity of the watercourse is maintained. This information must be compared to the baseline data collected during the initial assessment prior to the commencement of the operational phase. Such an assessment must be conducted by a suitably qualified and experienced ecologist. ◇ Water samples of the Sand River must be collected directly downstream of the proposed project area on a minimum annual basis. The quality of these samples must be chemically and biologically analysed by an accredited laboratory and compared to the baseline data collected during the initial assessment prior to the commencement of the operational phase. ◇ If any reduction in SASS 5 scores (watercourse health) or chemical and biological water quality is determined due to the project, 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/health reduction as soon as practically possible. 		

Cumulative impacts: Low
Residual Impacts: Limited
Discussion: To ensure optimal functioning of the infrastructure, effective maintenance of the sewerage system must be in place and the municipality is responsible to immediately address any accidental leaks or blockages during the operational phase.

No-Go Option

ASPECT: NO PROVISION OF SANITATION FACILITIES TO EXTENSION 5, FATENG TSE NTSO DEVELOPMENT		
NATURE OF IMPACT: Inability for the municipality to provide basic sanitation services to the new Extension 5 Development could result in social unrests and use of poor sanitation facilities that are detrimental to the health and well-being of the residents.		
Status (positive or negative)	Negative	
	Without Mitigation	With Mitigation
Extent	Regional (4)	Local (2)
Duration	Long term (2)	Short term (2)
Magnitude	High (8)	Low (4)
Irreplaceable loss of resources?	High (4)	Low (2)
Reversibility	N/A	N/A
Probability	Definite (5)	Possible (2)
Significance	Medium-High (90)	Medium (20)
Can impacts be mitigated or augmented	Yes	
Mitigation: ◇ The proposed development of the sanitation infrastructure should go ahead as planned to enable the municipality to provide basic sanitation services.		
Cumulative impacts: High		
Residual Impacts: Limited		
Discussion: Should the proposed project not go ahead as planned, the municipality would not be able to provide basic sanitation services to the new Extension 5, Fateng tse Ntsho Development. Therefore, this is deemed as not a feasible option as the additional loads from the development has been catered for in the development of the Paul Roux wastewater treatment works.		