

IMPACT ASSESSMENT & PROPOSED MITIGATION MEASURES

1. Planning & Construction phase impacts

Concerns are likely to range around the impacts caused by;

- destruction of habitat/bio-diversity,
- construction traffic in and around the construction site (e.g. heavy vehicles delivering materials for construction),
- noise and air pollution,
- impact on heritage or archaeological sites/resources/graves
- the security of adjacent properties (e.g. children).

Predicted Planning & Construction phase impacts

a)

Primary impact component:	<i>Natural environment</i>
Secondary impact component:	<i>Biological environment (vegetation)</i>
Potential impact:	<i>The destruction of natural vegetation during <u>initial investigations</u>, due to induced vehicular traffic e.g. surveyors vehicles etc.</i>
Significance/certainty:	<i>Low, Probable.</i>
Spatial influence:	<i>The site.</i>
Duration:	<i>Short to medium term.</i>
Mitigation / Optimisation:	<i>Existing tracks/roads should be used when accessing the site for planning purposes. Sampling rather than removal of existing plant material should take place (and then only if essential).</i>
Discussion:	<i>The immediate proximity of other available habitat means that this impact is of low significance.</i>

b)

Primary impact component:	<i>Existing pollution, risks and/or hazards and health & safety</i>
Secondary impact component:	<i>Risks & hazards – Effects in the workplace</i>
Potential impact:	<i>Potential injury to construction workers</i>
Significance/certainty:	<i>Moderate, Possible</i>
Spatial influence:	<i>Local</i>
Duration:	<i>Short term</i>
Mitigation / Optimisation:	<i>The implementation of an Occupational Health and Safety management system should be required of all contractors. Safety measures and work procedures/instructions should be communicated to all construction workers. First aid facilities shall be on hand at all times. Medical screening of employees shall take place. The contractor shall implement adequate and mandatory safety precautions relating to all aspects of</i>

	<i>the operation. Warning and advisory signage should also be implemented (also with regards to vehicular movement along public roads).</i>
Discussion:	<i>Enforce the wearing of PPE (Personal Protection Equipment) for the labourers on site</i>

c)

Primary impact component:	<i>Social environment</i>
Secondary impact component:	<i>Direct project inputs – Public safety</i>
Potential impact:	<i>Unsocial activities at construction site (e.g. crime)</i>
Significance/certainty:	<i>Moderate, Possible</i>
Spatial influence:	<i>Site and immediate surrounding properties</i>
Duration:	<i>Short term</i>
Mitigation / Optimisation:	<i>Appointed contractors should be required to implement security measures at construction camps/material laydown areas. Security gate control measures should be implemented in order that only labourers and authorised persons obtain access to the construction camps/material laydown areas.</i>
Discussion:	<i>Unfenced construction camps/material laydown areas may present a greater security risk – such sites should be fenced/secured.</i>

d)

Primary impact component:	<i>Infrastructure and community services</i>
Secondary impact component:	<i>Infrastructure services – transport (local roads)</i>
Potential impact:	<i>Construction traffic and access (increase in traffic volumes and traffic congestion caused by construction vehicles)</i>
Significance/certainty:	<i>Moderate, Probable.</i>
Spatial influence:	<i>Local.</i>
Duration:	<i>Medium term.</i>
Mitigation / Optimisation:	<i>Damping down of un-surfaced roads should take place. Trucks should avoid travelling unnecessarily through residential areas or private land. Construction routes to be clearly defined and sign posted. Relevant traffic signage should be posted at major road crossings where the construction vehicles may cross or turn into major roads. Working hours to be controlled by site engineer. Working hours should be limited to 6h00 and 17h00 (Mondays to Saturdays only). Adequate parking shall be provided on site, to accommodate construction vehicles - no vehicles should be parked in any public road reserve, at any time.</i>
Discussion:	<i>Adverse impacts from construction traffic can be minimised by good planning by the contractor and by effectively controlling site activities.</i>

e)

Primary impact component:	Existing pollution, risks and/or hazards and health & safety
Secondary impact component:	Existing pollution/environmental degradation – impact of noise
Potential impact:	Impact of construction noise on adjacent properties.
Significance/certainty:	<i>Moderate, Possible.</i>
Spatial influence:	<i>Construction site and immediate adjacent</i>
Duration:	<i>Short term.</i>
Mitigation / Optimisation:	<i>Vehicles on the site will be equipped with noise suppressing measures and kept in proper working order. Where working at the site, noise levels must be within ambient noise level. Excessive noise from the labour force should be avoided, as this may cause a nuisance to adjacent areas of residence. Keep residents of surrounding properties informed if any unusually noisy activities are planned. Working hours should be limited to 6h00 and 17h00 (Mondays to Saturdays only).</i>
Discussion:	<i>Noise impacts are reduced over distance at a rate of 1db (decibel) per 13 metres.</i>

f)

Primary impact component:	Natural environment
Secondary impact component:	Earth/land – compressive strength of soils
Potential impact:	Construction impacts on soils (upsetting of soil horizons through ground works and/or compaction by vehicles)
Significance/certainty:	<i>Low to moderate, Definite.</i>
Spatial influence:	<i>Construction site and immediate adjacent areas</i>
Duration:	<i>Long term.</i>
Mitigation / Optimisation:	<i>Selective stripping of topsoil, subsoil and overburden should take place. Stockpiling of removed earth (separately) should take place and be returned for back filling in the correct soil horizon order. In all construction areas (e.g. material laydown areas), topsoil and sub-soils should be protected from contamination/pollution (e.g. by fuel etc.). Stockpiling of removed earth should not occur in drainage lines or impede surface water runoff. Potential contaminants such as fuel stores should be carefully sited with adequate spillage containment measures. Soils compacted by construction activity shall be deep ripped to loosen compacted layers and graded evenly. Topsoil shall be re-spread upon completion of construction activities.</i>
Discussion:	<i>Replacement and rehabilitation should be progressive with construction and not left until the end.</i>

g)

Primary impact component:	<i>Natural environment</i>
Secondary impact component:	<i>Water (surface) – quality of surface water</i>
Potential impact:	<i>Surface water contamination</i>
Significance/certainty:	<i>Low to moderate, Unlikely</i>
Spatial influence:	<i>Local drainage areas</i>
Duration:	<i>Short term.</i>
Mitigation / Optimisation:	<i>Development activities close to the bank of any water course should be undertaken with care, so as not to cause any degradation and/or pollution. Adequate sanitary facilities and ablutions must be provided for construction workers (to avoid them using the bush).</i>
Discussion:	<i>Portable chemical toilets should be maintained in a working order and any spillages should be avoided.</i>

h)

Primary impact component:	<i>Natural environment</i>
Secondary impact component:	<i>Water underground – quality of groundwater</i>
Potential impact:	<i>Pollution of groundwater (subterranean aquifer)</i>
Significance/certainty:	<i>Low, Unlikely</i>
Spatial influence:	<i>Local.</i>
Duration:	<i>Long term</i>
Mitigation / Optimisation:	<i>Controlled use and or storage of all fuels, chemicals & cement during construction are advised. Due to very limited amounts of the aforementioned substances being used during construction, leaching thereof into the underground water is highly unlikely. Adequate fuel containment facilities should however be used. Servicing of construction vehicles/equipment is not allowed on site. Drip trays should be used to prevent any spillages. Adequate sanitary facilities and ablutions must be provided for construction workers.</i>
Discussion:	<i>The potential degradation of groundwater is unlikely to result from construction activities.</i>

i)

Primary impact component:	Natural environment
Secondary impact component:	Earth/land - erosion
Potential impact:	Soil erosion due to vegetation clearance.
Significance/certainty:	<i>Low to moderate, Possible.</i>
Spatial influence:	<i>Construction site and adjacent areas.</i>
Duration:	<i>Medium to long term.</i>
Mitigation / Optimisation:	<i>When soil is cleared of vegetation, management techniques to prevent water erosion should be employed (e.g. reduction of water velocity and diversion of surface water runoff down slope). Congregation of storm water should be avoided.</i>
Discussion:	<i>Development activities close to the bank of any water course should be undertaken with care, so as not to cause any degradation and/or pollution. Banks of water courses should be stabilized and erosion thereof prevented and subsequent sediment loading of the stream avoided. Special care must also be taken to prevent erosion where vegetation has been cleared on steep slopes.</i>

j)

Primary impact component:	Natural environment
Secondary impact component:	Biological environment - vegetation
Potential impact:	Damage to flora due to veldt and site clearing
Significance/certainty:	<i>Moderate to high/Definite.</i>
Spatial influence:	<i>Site and immediate adjacent areas.</i>
Duration:	<i>Short term threat, but damage permanent.</i>
Mitigation / Optimisation:	<i>Existing indigenous trees should be retained where possible. An Environmental Control Officer should mark protected or vulnerable species in the immediate proximity of construction areas and permission must be obtained prior to damaging or pruning these species. Succulents and aloes should be removed and re-established, where possible. Excessive loss of vegetation should be avoided. Vehicular access should be restricted to essential areas only. Grass occurring on and near the (construction) site should be retained where possible, to assist in retarding erosion and limiting dust creation. During construction, the area that is disturbed should be kept as small as possible, so as to minimise disturbances to the environment.</i>
Discussion:	<i>The National Forests Act No 84 of 1998 (in terms of removal of Protected trees) should be adhered to. Protected trees that occur in the project area is the Marula tree (<i>Sclerocarya birrea</i>), Sheppard's tree</i>

	<i>(Boscia albitrunca)</i> and Leadwood tree (<i>Combretum imberbe</i>).
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k)

Primary impact component:	<i>Natural environment</i>
Secondary impact component:	<i>Biological environment - vegetation</i>
Potential impact:	<i>Plant collection, utilising of trees for firewood, etc.</i>
Significance/certainty:	<i>Moderate, Possible</i>
Spatial influence:	<i>Construction site and immediate surrounding areas.</i>
Duration:	<i>Short term</i>
Mitigation / Optimisation:	<i>Effective site control and monitoring by site engineer should take place.</i>
Discussion:	<p><i>No fires should be allowed on site except in designated areas.</i></p> <p><i>Access to the site should be controlled - local disadvantaged residents should be allowed to collect firewood but only at indicated times when there is no danger for them to be injured by the construction activities on site and only the areas where bush is to be cleared.</i></p>

l)

Primary impact component:	<i>Natural environment</i>
Secondary impact component:	<i>Biological environment – vegetation</i>
Potential impact:	<i>Proliferation of alien plant species during and after construction</i>
Significance/certainty:	<i>Low to moderate, Possible.</i>
Spatial influence:	<i>Construction site and immediate surrounding areas.</i>
Duration:	<i>Short to medium term.</i>
Mitigation / Optimisation:	<p><i>Invasive species are controlled by the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) - Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014. The AIS Regulations list 4 different categories of invasive species that must be managed, controlled or eradicated from areas where they may cause harm to the environment, or that are prohibited to be brought into South Africa.</i></p> <p><i>Regulation 15 of the Act on the Conservation of Agricultural Resources (as amended), Act No. 43 of 1983, also determines that the establishment of declared weeds and invasive plants during and after development should be prohibited.</i></p> <p><i>It is recommended that invasive species be removed and destroyed before commencement of construction</i></p>

	<i>activities and managed/controlled after construction activities have concluded.</i>
Discussion:	<i>The removal of exotic plants including declared weeds and invaders, could be a positive result of the proposed development.</i>

m)

Primary impact component:	<i>Natural environment</i>
Secondary impact component:	<i>Biological environment – fauna</i>
Potential impact:	<i>Replacement of fauna due to bush and site clearing & hunting and capture of birds and other fauna by construction workers</i>
Significance/certainty:	<i>Moderate/Definite.</i>
Spatial influence:	<i>Site.</i>
Duration:	<i>Short term threat, but damage permanent.</i>
Mitigation / Optimisation:	<i>Capture or snaring of birds or other fauna must be strictly prohibited on site - especially with regard to contractor's employees. Reptiles and small mammals should not be killed unnecessarily during site clearing activities.</i>
Discussion:	<i>Fauna (especially avifauna) may be temporarily displaced from the area during construction due to the noise and activity. The immediate proximity of other available habitat in the surrounding environment means that this impact is of moderate significance. Birds (e.g. guinea fowl and francolin etc.) might be snared - this must be prevented. Animals and reptiles that fall into trenches should not be killed unnecessarily. Exit ramps must be constructed in the trenched areas to allow animals, which might have fallen into the trenches to get out. Corridors (open areas) must also be left between the trenched areas to allow animals access to cross the pipeline route during construction.</i>

n)

Primary impact component:	<i>Natural environment</i>
Secondary impact component:	<i>Biological environment – natural watercourses</i>
Potential impact:	<i>Development within floodline area: pipeline-stream crossings</i>
Significance/certainty:	<i>High, Likely</i>
Spatial influence:	<i>Site</i>
Duration:	<i>Short to medium term.</i>
Mitigation / Optimisation:	<i>Limit access of construction vehicles. Limit the amount of vegetation that will be cleared. Do not place construction materials and soil heaps in or near the watercourse. Construction of the stream crossings should be planned for the drier months of the construction period.</i>

	<p><i>In case of unexpected heavy rainfall, provision should be made to divert any water that flows down the stream(s). No damming up of water is allowed. Special protection measures should be implemented along the steep slopes of the banks of the streams to prevent erosion caused by surface water runoff for example:</i></p> <ul style="list-style-type: none"> • <i>Re-vegetate the exposed soil as soon as possible</i> • <i>Create berms along the contour lines</i> • <i>Place cleared vegetation over the exposed soil to stabilize it (branches, dead trees etc.)</i>
Discussion:	<p><i>Reinstate the banks and beds of the streams to the original profiles. Maximum effort should be made to not change the characteristics of the watercourses or influence the flow regimes. Water Use License applications must be submitted to the Department of Water & Sanitation in terms of the National Water Act, Act No 36 of 1998, for:</i></p> <p><i>Section 21(c) ~ Impeding or diverting the flow of water in a watercourse &</i></p> <p><i>Section 21(i) Altering the bed, banks, course or characteristic of a watercourse</i></p>

o)

Primary impact component:	<i>Land use and landscape character</i>
Secondary impact component:	<i>General – aesthetic quality</i>
Potential impact:	<i>Visual impact of construction activities</i>
Significance/certainty:	<i>Moderate, Possible.</i>
Spatial influence:	<i>Local.</i>
Duration:	<i>Short term.</i>
Mitigation / Optimisation:	<p><i>Retain as many existing trees as possible to screen construction works. Construction activities should be kept clustered on site at all times.</i></p> <p><i>Material should not be brought onto a site prematurely, which could result in additional areas being cleared or affected.</i></p>
Discussion:	<i>Change of land use from natural (disturbed) veldt to a construction site will occur. This must however be seen in the context of the fairly short duration of the construction phase.</i>

p)

Primary impact component:	<i>Existing pollution, risks and/or hazards and health & safety</i>
Secondary impact component:	<i>Pollution/environmental degradation</i>
Potential impact:	<i>Impact of nuisances resulting from construction (e.g. dust, smoke & noise).</i>
Significance/certainty:	<i>Moderate, Possible.</i>
Spatial influence:	<i>Construction site and areas immediately adjacent to the site.</i>
Duration:	<i>Short term.</i>
Mitigation / Optimisation:	<p><i>Vehicles and equipment shall be maintained in proper working order, in order to limit gaseous emissions, pollution and should be free from oil and hydraulic fluid leaks, etc.</i></p> <p><i>Damping down of access roads and cleared areas should take place.</i></p> <p><i>As much natural vegetation should be retained as is possible.</i></p> <p><i>Careful pre-planning of trees that should be retained should be done.</i></p> <p><i>Construction to be restricted to normal working hours (6h00 to 17h00). No work to be conducted on Sundays.</i></p> <p><i>Adjacent residents to be informed of unusually noisy activities that will be undertaken.</i></p> <p><i>Works instructions to be issued regarding minimisation of noise to all workers (especially those using noisy equipment).</i></p>
Discussion:	<i>Construction activities could create larger amounts of atmospheric dust, thus causing a nuisance when it settles on adjacent properties</i>

q)

Primary impact component:	<i>Social environment</i>
Secondary impact component:	<i>Historic/cultural characteristics</i>
Potential impact:	<i>Uncovering of heritage or archaeological sites/resources/graves</i>
Significance/certainty:	<i>Moderate-High, Possible.</i>
Spatial influence:	<i>Construction site</i>
Duration:	<i>Short to medium term.</i>
Mitigation / Optimisation:	<p><i>In the case of an archaeological/heritage resources "find", all excavation work should be halted and a heritage resources practitioner should be consulted (or alternatively the nearest SAHRA office).</i></p> <p><i>If required, graves shall be relocated in accordance with the stipulations of the South African Heritage Resources Act and its relevant regulations pertaining to graves.</i></p> <p><i>A safety zone of at least 20 meters around heritage sites should be adhered to.</i></p>
Discussion:	<i>An archaeological/heritage resources survey has been conducted. It was found that, from a cultural heritage perspective construction can continue, provided that the</i>

	<p>recommendations outlined in the Heritage Impact Assessment report (See Appendix D), are adhered to.</p> <p>The recommendations of the Heritage Assessment Practitioner have been taken into account and the pipeline route has been diverted to exclude the heritage significant areas.</p>
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r)

Primary impact component:	Social environment
Secondary impact component:	Community social organisation - Distribution of resources
Potential impact:	Expectations regarding employment opportunities & income generation
Significance/certainty:	<i>Moderate, Definite.</i>
Spatial influence:	<i>Sub-regional</i>
Duration:	<i>Short to medium term.</i>
Mitigation / Optimisation:	<p><i>Local employment and procurement should receive priority when embarking upon planning and construction activities.</i></p> <p><i>Contractors should be required to make use of local labour and suppliers where possible.</i></p> <p><i>Where appropriate, labour intensive construction methods should be used.</i></p> <p><i>Where possible training of labour should take place to improve benefits to individuals well beyond this project.</i></p> <p><i>Use of emerging contractors should take place where possible.</i></p> <p><i>Appointed contractors should be required to implement security in order that only authorised persons obtain access to the construction area(s).</i></p>
Discussion:	<p><i>The social implications of the proposed development are of a positive and negative nature;</i></p> <p><u><i>Positive:</i></u></p> <ul style="list-style-type: none"> <i>• Creation of additional employment opportunities (directly) e.g. during construction, and indirectly e.g. by requiring maintenance services, etc.</i> <i>• Through local employment the development could have a significant impact on the wealth base of the population of the area.</i> <p><u><i>Negative:</i></u></p> <ul style="list-style-type: none"> <i>• Through local employment the development could have a significant impact on the wealth base of the population of the area however, this impact can however be offset by the same jobs attracting external jobseekers into the area.</i> <i>• The implications of an induced labour force may be to create competition for social and environmental resources in the area.</i>

s)

Primary impact component:	<i>Existing pollution, risks and/or hazards and health & safety</i>
Secondary impact component:	<i>Existing pollution/environmental degradation – generation of waste</i>
Potential impact:	<i>Generation of waste by the proposed development</i>
Significance/certainty:	<i>Low, Definite</i>
Spatial influence:	<i>Site</i>
Duration:	<i>Short term</i>
Mitigation / Optimisation:	<i>Disposal of waste at a licensed solid waste disposal site shall take place. Burning of any waste shall be prohibited.</i>
Discussion:	<i>The refuse will be disposed of at the nearest municipal refuse site.</i>

2. Operational phase impacts

Limited impacts will result during the operational phase of the pipeline. The main impact will be from maintenance teams inspecting the pipeline route by driving on the maintenance route.

Basic requirements (considerations) for minimising the above include:

- Identifying potential impacts and already providing for them at an early stage,
- Appropriate site planning (considering factors such as sensitive biological communities/areas, catchments, drainage lines etc.),
- Early hazard assessment (heavy rains, floods, earthquakes, etc.),
- Selection of appropriate mitigation measures (e.g. through implementation of adequate engineering and/or other measures),
- Consideration of long-term measures that would contribute towards (environmental) sustainability of the proposed development,
- Regular monitoring of potential environmental threats (e.g. the introduction of alien plants, access to biologically sensitive areas, erosion control etc.).

Predicted operational phase impacts

a)

Primary impact component:	<i>Socio Economic environment</i>
Secondary impact component:	<i>Land use potential</i>
Potential impact:	<i>The proposed development project could impact on the potential to utilise the application property for other purposes (e.g. agriculture).</i>
Significance/certainty:	<i>Low to Moderate, Possible</i>
Spatial influence:	<i>The site.</i>
Duration:	<i>Long term.</i>
Mitigation / Optimisation:	-
Discussion:	<i>The proposed development project will have a fairly small footprint. Only a two track maintenance road will be used after the pipeline has been installed. The proposed development will therefor have a minimal impact on the current land uses.</i>

b)

Primary impact component:	<i>Infrastructure and community services</i>
Secondary impact component:	<i>Infrastructure services – water supply</i>
Potential impact:	<i>The proposed water supply pipelines will connect to existing pipelines (from future Water Treatment Works) from where purified water will be distributed through the Greater Mokopane area. Communities will have sufficient water supply up to the year 2030.</i>
Significance/certainty:	<i>High, Definite.</i>
Spatial influence:	<i>Local.</i>
Duration:	<i>Long term.</i>
Mitigation / Optimisation:	-
Discussion:	<i>The project will ensure that sufficient water supply is available to those people relying on the municipality for service delivery.</i>

c)

Primary component:	impact	<i>Socio-Economic environment</i>
Secondary component:	impact	<i>Direct project inputs - employment</i>
Potential impact:		<i>Employment creation</i>
Significance/certainty:		<i>High, Definite.</i>
Spatial influence:		<i>Local.</i>
Duration:		<i>Long term.</i>
Mitigation / Optimisation:		-
Discussion:		<i>Inspection and maintenance of the pipeline will be required.</i>

3. Decommissioning phase

Should the site for any reason be closed, an environmental rehabilitation plan shall be submitted to the Department of Economic Development, Environment & Tourism (Limpopo) for approval. All infrastructure should be removed and any pollution encountered should be removed and the entire site be rehabilitated.

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PROPOSED MANAGEMENT OF IMPACTS AND MITIGATION

- The proponent should appoint an Environmental Control Officer (ECO) to monitor compliance with the EMP - especially the following shall be monitored:
 - Limiting of disturbance caused by construction activities (geographical area),
 - Effective waste management;
 - Disturbance of biota,
 - Legal compliance (including the stipulations of the Environmental Authorisation, as issued by DEDET).
- The proponent shall conduct inspections of the construction site on a weekly basis. The following persons shall attend such inspections - the site engineer, the contractor & the proponent.
- The ECO shall document the findings of his monitoring actions.
- The ECO shall report to DEDET on a monthly basis (or as stipulated in the Environmental Authorization).
- The proponent contractor shall keep a documented complaints register.
- For the purposes of receiving complaints, the contact details of the proponent and contractor shall be clearly displayed at the main entrance to the site.
- The nature of complaints that are received shall be brought to the attention of DEDET and all contractor(s).
- A suitable written response shall be given, by the proponent to complainants, where required.
- In an instance where an "environmental incident" is recorded, the proponent shall take appropriate action to correct the "environmental incident". Such action shall be in accordance with the nature and scale of the recorded incident. Such corrective action shall be implemented as soon as possible after the occurrence of the incident. "Corrective action" undertaken by the proponent shall also include the rehabilitation of secondary environmental disturbance/damage resulting from undertaking corrective action.
- The re-occurrence of an environmental incident shall be avoided through the implementing of suitable precautionary measures to prevent the recurrence of such.
- The proponent contractor shall document "environmental incidents" on an "Environmental Incident Report Sheet" (EIRS) within 1 day (24 hours) from the time that the incident has occurred. Supplementary documentation can be attached to the EIRS.
- Environmental incidents shall be reported to the proponent by contractors during the weekly site visits. A course of action shall then be decided upon jointly (as a precautionary measure to avoid the re-occurrence of these types of incidents

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