

In terms of Regulation 22(2)(i) of GN R.543 of the NEMA Environmental Impact Assessment Regulations, 2014, the impact assessment for the proposed bulk water supply scheme is as follows:

Construction phase:

<p><b>Potential impacts on geographical and physical aspects:</b></p>	
<p><b>Nature of impact:</b></p>	<p><b>Potential impact on freshwater ecosystems</b></p> <ul style="list-style-type: none"> <li>- Construction activities would include the removal of vegetation to obtain access to the abstraction point and pipeline route. The excavation of the trenches to install the abstraction pipes and back filling the trenches.</li> <li>- Activities during the construction phase of the project could thus be expected to result in <b>disturbance of vegetation cover</b> in the riparian zones of the Orange River and possible disturbance of the area. There would also be disturbance along the ephemeral streams where the pipeline will be installed.</li> </ul>
<p><b>Extent and duration of impact:</b></p>	<p>Local, during construction phase (short-term)</p>
<p><b>Probability of occurrence:</b></p>	<p>Probable</p>
<p><b>Degree to which the impact can be reversed:</b></p>	<p>Likely</p>
<p><b>Degree to which the impact may cause irreplaceable loss of resources:</b></p>	<p>Medium negative</p>
<p><b>Cumulative impact prior to mitigation:</b></p>	<p>Moderate to High negative</p>
<p><b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b></p>	<p>Medium to high negative (localised, short-term) and Low negative overall</p>
<p><b>Degree to which the impact can be mitigated:</b></p>	<p>High</p>
<p><b>Proposed mitigation:</b></p>	<ul style="list-style-type: none"> <li>- Construction activities should be kept to a minimum within the Phragmites zone of the riparian area.</li> <li>- Material (infill) should not be sourced from the riparian zones;</li> <li>- Excess excavated material should not be dumped into the riparian zones;</li> <li>- Existing dumped material along the maintenance road should be removed and placed back into the trench as backfilling. This should be done in such a way as not to bulldoze non disturbed areas or to widen the existing road;</li> <li>- The exotic trees currently growing in the riparian zones should be cut and the stumps treated with herbicide to prevent re-growth;</li> <li>- Where possible the ephemeral streams previously cut off from the Orange River by the trench should be reconnected with the river; and</li> <li>- Appropriate construction methods should be deployed to ensure the prevention of erosion of the filled-in trenches during flood events which would prevent the need to undertake repetitive infilling of eroded areas once construction is completed.</li> <li>- The riparian zone areas should be re-planted with Phragmites in the areas where Phragmites has been removed. This can be done to digging sods out and replanting it in the affected area.</li> <li>- The design of the pump house and inlet pipes must be done in such a way as to minimize the amount of infrastructure that needs to be placed in the rocky river banks. This could be achieved by the creation of a sump area for the inlets with a</li> </ul>

	pump house some distance away from the actual inlet and riparian zone.
<b>Cumulative impact post mitigation:</b>	Low - negative
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low - negative

<b>Potential impact on biological aspects:</b>	
Nature of impact:	<p><b>Loss of vegetation</b></p> <p>The further upgrades to the proposed Onseepkans bulk water supply system entails the placement construction of a new extraction point, a reservoir for water storage and a solar site to supply electricity for the management of the system (pumps etc.). The footprint is well defined and located in areas already impacted or even degraded as a result of agriculture, grazing and urban creep.</p> <p>The construction of the new solar- and reservoir site entails the establishment of an additional permanent footprint of &lt;6 ha in total (a very small area in terms of its surroundings). The construction of these features is thus seen as localised and small scale.</p>
Extent and duration of impact:	Local, temporary
Probability of occurrence:	Probable
Degree to which the impact can be reversed:	Likely
Degree to which the impact may cause irreplaceable loss of resources:	Unlikely
Cumulative impact prior to mitigation:	Medium negative
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium negative
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	<ul style="list-style-type: none"> <li>- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must be developed by a suitably experienced Environmental Assessment Practitioner.</li> <li>- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and the Biodiversity study recommendations as well as any other conditions which might be required by the Department of Environmental Affairs.</li> <li>- An integrated waste management system must be implemented during the construction phase. All rubble and rubbish (if applicable) must be collected and removed from the site to a Municipal approved waste disposal site.</li> <li>- All invasive alien vegetation should be removed from all associated footprints within the various construction sites.</li> <li>- All efforts must be made to protect mature indigenous trees within the proposed final footprint (and any other protected species that might be encountered on site).</li> <li>- Permits must be obtained for the removal of any protected species which might be encountered.</li> <li>- Indiscriminate clearing of areas must be avoided (all remaining areas to remain as natural as possible).</li> <li>- All topsoil (the top 15-20 cm at all excavation sites), must be removed and stored separately for re-use for rehabilitation purposes. The topsoil and vegetation should be replaced over the disturbed soil to provide a source of seed and a seed bed to</li> </ul>

	<p>encourage re-growth of the species removed during construction.</p> <p>- Once the construction is completed rehabilitation must be implemented.</p>
Cumulative impact post mitigation:	Low – Medium negative
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	<p>Threatened or protected ecosystems – <b>Very Low negative</b></p> <p>Special Habitats – <b>Low-Medium negative</b></p> <p>Corridors and or conservancy networks – <b>Very low negative</b></p> <p>Protected Species – <b>Medium-low negative</b></p> <p>Direct impacts – <b><u>Low Negative</u></b></p>

<b>Potential impacts on socio-economic aspects:</b>	
Nature of impact:	<b>Temporary jobs will be created in the construction industry during the construction phase.</b>
Extent and duration of impact:	Local. During the construction phase of the activity
Probability of occurrence:	Definite
Degree to which the impact can be reversed:	NA. This is a positive impact
Degree to which the impact may cause irreplaceable loss of resources:	NA
Cumulative impact prior to mitigation:	Low - positive
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low - positive
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	<p>No mitigation measures are required.</p> <p>Temporary jobs will be created during the construction phase</p>
Cumulative impact post mitigation:	Low - positive
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low - positive

<b>Potential impacts on cultural-historical aspects:</b>	
Nature of impact:	<b>The loss of Archaeological heritage during construction</b>
Extent and duration of impact:	Local, during construction phase
Probability of occurrence:	Unlikely,
Degree to which the impact can be reversed:	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Unlikely
Cumulative impact prior to mitigation:	Low - Negative
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low - Negative
Degree to which the impact can be mitigated:	Limited
Proposed mitigation:	<p>In the event that indicator(s) of heritage resources are identified, the following actions should be taken immediately:</p> <ul style="list-style-type: none"> <li>• All construction within a radius of at least 20m of the indicator should cease. This distance should be increased at the discretion of supervisory staff if heavy machinery or explosives could cause further disturbance to the suspected heritage resource.</li> <li>• This area must be marked using clearly visible means, such as barrier tape, and all personnel should be informed that it is a no-go area.</li> <li>• A guard should be appointed to enforce this no-go area if there is any possibility that it could be violated, whether</li> </ul>

	<p>intentionally or inadvertently, by construction staff or members of the public.</p> <ul style="list-style-type: none"> <li>• No measures should be taken to cover up the suspected heritage resource with soil, or to collect any remains such as bone, ceramics or stone.</li> <li>• If a heritage practitioner has been appointed to monitor the project, s/he should be contacted and a site inspection arranged as soon as possible.</li> <li>• If no heritage practitioner has been appointed to monitor the project, SAHRA or Dr. D. Morris must be contacted at the SAHRA head office or at the McGregor museum.</li> <li>• The South African Police Services should be notified by a SAHRA staff member or an independent heritage practitioner if human remains are identified. No SAPS official may disturb or exhume such remains, whether of recent origin or not.</li> <li>• All parties concerned should respect the potentially sensitive and confidential nature of the heritage resources, particularly human remains, and refrain from making public statements until a mutually agreed time.</li> <li>• Any extension of the project beyond its current footprint involving vegetation and/or earth clearance should be subject to prior assessment by a qualified heritage practitioner, taking into account all information gathered during this initial heritage impact assessment.</li> <li>• We recommend the appointment of a Stone Age Specialist if any large finds of stone tools are discovered during construction.</li> </ul>
Cumulative impact post mitigation:	Negligible
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low - Negative

<b>Potential noise impacts:</b>	
Nature of impact:	<b>Noise impact from machinery and plant during construction</b>
Extent and duration of impact:	Local, Duration of construction phase
Probability of occurrence:	Probable
Degree to which the impact can be reversed:	Medium
Degree to which the impact may cause irreplaceable loss of resources:	Negligible
Cumulative impact prior to mitigation:	Negligible
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Negligible
Degree to which the impact can be mitigated:	Probable
Proposed mitigation:	Noise mitigation measures are dealt with in the EMP.
Cumulative impact post mitigation:	Negligible
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Negligible

<b>Potential visual impacts:</b>	
Nature of impact:	<b>Unsightly views due to construction site.</b>
Extent and duration of impact:	Local, during duration of construction
Probability of occurrence:	Probable
Degree to which the impact can be reversed:	Possible
Degree to which the impact may cause irreplaceable loss of resources:	N/A

Cumulative impact prior to mitigation:	Low - negative
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium - negative
Degree to which the impact can be mitigated:	Probable
Proposed mitigation:	Mitigation measures are dealt with in the EMP.
Cumulative impact post mitigation:	Very low - negative
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low - negative

Operational phase:

<b>Potential impacts on the geographical and physical aspects:</b>	<p><b>Potential impact on freshwater ecosystems</b></p> <ul style="list-style-type: none"> <li>• Use of the maintenance roads and repairs to infrastructure in the riparian zone;</li> <li>• Dredging inlet sump; and</li> <li>• The operation of the reservoir and pipeline system.</li> </ul>
Nature of impact:	<p>The creation of truck turning circles and widening of the maintenance road may occur during regular use of the road and servicing the inlet pipes and inlet structure.</p> <p>The dredging of inlet sump to prevent that water with a high sediment load is abstracted.</p> <p>The disposal of excess material from the road and other maintenance activities into the riparian zone may take place during this phase. The establishment of alien vegetation in the riparian zones and ephemeral stream bed and banks will also most likely occur.</p>
Extent and duration of impact:	Localised, long-term
Probability of occurrence:	Probable
Degree to which the impact can be reversed:	Medium
Degree to which the impact may cause irreplaceable loss of resources:	Medium-low
Cumulative impact prior to mitigation:	Low
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low - negative
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	<ul style="list-style-type: none"> <li>- The design of the inlet sump should be such that an attempt is made to prevent the siltation of the sump and therefore minimise the need to clean the inlet sump.</li> <li>- Alien vegetation should be removed from the disturbed areas along the pipeline and road that are within or adjacent to the riparian zone and the areas should be kept clear of alien invasive vegetation. No material should be disposed into the riparian zone. The maintenance road should not be widened into the riparian zones. Erosion should be prevented especially in the upper reaches of the pipeline where steep slopes down to the river occur.</li> </ul>
Cumulative impact post mitigation:	Low - negative
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low - negative

<b>Potential impact biological aspects:</b>	
Nature of impact:	The operational phase of the project is expected to pose little to no direct threat to any biodiversity aspects (vegetation), other than in the event of malfunction, when it is possible that sections of the pipeline might be exposed for repair or replacement. In this event, the impacts are likely to be the same as in the construction phase.
Extent and duration of impact:	
Probability of occurrence:	
Degree to which the impact can be reversed:	
Degree to which the impact may cause irreplaceable loss of resources:	

Cumulative impact prior to mitigation:	
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	
Degree to which the impact can be mitigated:	
Proposed mitigation:	
Cumulative impact post mitigation:	
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	

<b>Potential impacts on the socio-economic aspects:</b>	
Nature of impact:	<ul style="list-style-type: none"> <li>Water provided under pressure, supporting more efficient irrigation systems such as micro and drip irrigation, leading to better water conservation.</li> <li>Possibilities for further expansions. This system will supply water for 370ha, but have surplus capacity in the pump station, rising main pipeline and dam to supply water for an additional 200ha.</li> <li>The system should not have additional operational cost (electricity, etc) compared to the current canal system. The 1MW SPV generator will generate enough electricity to drive the pump and filterstation.</li> </ul>
Extent and duration of impact:	Local, Permanent
Probability of occurrence:	Definite
Degree to which the impact can be reversed:	NA
Degree to which the impact may cause irreplaceable loss of resources:	NA, the impact is a positive impact
Cumulative impact prior to mitigation:	NA
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	NA
Degree to which the impact can be mitigated:	NA, the impact is a positive impact
Proposed mitigation:	No mitigation measures are required
Cumulative impact post mitigation:	Medium - Positive
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium - Positive

<b>Potential impacts on the cultural-historical aspects:</b>	
Nature of impact:	No cultural or historic impacts are expected during the operational phase of this activity.
Extent and duration of impact:	
Probability of occurrence:	
Degree to which the impact can be reversed:	
Degree to which the impact may cause irreplaceable loss of resources:	
Cumulative impact prior to mitigation:	
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	
Degree to which the impact can be mitigated:	
Proposed mitigation:	
Cumulative impact post mitigation:	

Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	
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<b>Potential noise impacts:</b>	
Nature of impact:	No significant noise impacts are expected during the operational phase for this activity. The pumpstation is not near any residential buildings, churches etc.
Extent and duration of impact:	
Probability of occurrence:	
Degree to which the impact can be reversed:	
Degree to which the impact may cause irreplaceable loss of resources:	
Cumulative impact prior to mitigation:	
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	
Degree to which the impact can be mitigated:	
Proposed mitigation:	
Cumulative impact post mitigation:	
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	

<b>Potential visual impacts:</b>	
Nature of impact:	The proposed SPV system, earth dam, overhead electrical cables and pumpstation are expected to have some visual impacts
Extent and duration of impact:	Local, permanent
Probability of occurrence:	Highly probable
Degree to which the impact can be reversed:	Very low
Degree to which the impact may cause irreplaceable loss of resources:	Low, negative
Cumulative impact prior to mitigation:	Low - Negative
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium - Negative
Degree to which the impact can be mitigated:	Very low
Proposed mitigation:	No mitigation measures are proposed. However, the design and placement of these features must take the surrounding community into account. Areas of disturbance, existing roads etc, should be used to place these features.
Cumulative impact post mitigation:	Low - Negative
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium - Low - Negative

#### Decommissioning:

The project as proposed does not require 'decommissioning' or 'closure', as such the potential impacts thereof is considered irrelevant.