

MACASSAR WWTW

Macassar Wastewater Treatment Works – Defence Compliance Statement

City of Cape Town

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1 Introduction

The existing Macassar Wastewater Treatment Works (WWTW) is located on Erf 1205 Macassar, at the Eerste River Estuary, approximately 600m south of the town of Macassar. The existing WWTW was constructed in ±1977, and receives sewage from Strand, Somerset West and Macassar via the Macassar and Helderberg pump stations.

The WWTW receives and treats domestic and commercial/business sewage only (no industrial sewage). The existing Macassar WWTW utilises Conventional Activated Sludge technology and has an estimated hydraulic capacity of 48Ml/day Average Dry Weather Flow (ADWF). However, the effective treatment capacity of the works is currently limited to 30Ml/day due to suboptimal performance of the works, as a result of insufficient aeration at the existing reactors.

The site is approximately 62.1 hectares in extent and the current treatment infrastructure comprises of an inlet works (screening and grit removal), two carousal ditch activated sludge reactors, six circular settling tanks, a chlorine disinfection facility (gas), maturation ponds, a sludge dewatering facility (linear screens and belt presses) and dewatered sludge silos. The works currently receives domestic wastewater, for the most part, and has a hydraulic capacity of approximately 48Ml/day in terms of average dry weather flow (ADWF). However, the biological process treatment capacity is estimated at approximately 21.6 Ml/day based on the existing aeration capacity. Treated effluent from the plant is discharged into the Eerste River and a small portion is also recycled for both off-site and on-site use.

Due to rapid urbanisation and a sustained population growth in the False Bay region, a shortfall in treatment capacity is experienced at the Macassar WWTW. The Macassar WWTW is also experiencing a number of operational problems. Both of these factors have led to the Macassar WWTW not being able to treat wastewater adequately, this has resulted in a poor effluent quality being discharged into the Eerste River. These challenges have prompted the City of Cape Town (CoCT) to prioritise the upgrade of the Macassar WWTW.

The overall aim of this project includes the upgrade and capacity extension of the existing WWTW, which will include the refurbishment of selected infrastructure and an extension to the treatment capacity such that the ultimate design capacity is increased to 80 Ml/day (ADWF). The upgrade will remove capacity limitations on the existing process, reduce energy demand, optimise operation and maintenance and prevent further pollution of the Eerste River.

The purpose of this report is to provide Site Sensitivity Verification and Compliance Statement in terms of the Defence Protocol of the *Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(a) and (h) and 44 of the NEMA, when applying for Environmental Authorisation*, as set out in GN320 of 20 March 2020.

GN 320 specifically includes a protocol that provides the criteria for the specialist assessment and minimum report content requirements for impacts on defence installations for activities requiring EA. This protocol replaces the requirements of Appendix 6 of the 2014 NEMA Environmental Impact Assessment (EIA) Regulations (as amended). When the National Web-Based Environmental Screening Tool (Screening Tool) of the Department of Forestry, Fisheries and the Environment (DFFE) identifies a site as Low sensitivity in terms of the Defence Protocol, as is the case with this proposed development, no further assessment is required, however a Site Sensitivity Verification is required due to the proximity of Denel (Figure 2).

2 Details of the Environmental Assessment Practitioner

This site sensitivity verification and compliance statement was undertaken by Silindile Sibiya, an Environmental Assessment Practitioner (EAP) at Zutari with over 5 years of experience in Environmental Management. The declaration of the EAP is provided in Appendix B. Note the EAP does not carry “expertise in radar” as specified by the protocol, however, since the project is for typical wastewater related infrastructure (e.g., pumpstations, bioreactor units, clarifiers, pipelines and upgrades to existing infrastructure), Zutari does not foresee a change to the *status quo*, and thus the expertise is not required.

3 Methodology

This Site Sensitivity Verification Report and impact statement has been compiled based on the following methodology:

- ▶ The proposed project site and its various components were plotted on the Screening Tool to identify the sensitivity allocated;
- ▶ Additional observational and desktop research was undertaken to substantiate the site sensitivity verification process; and
- ▶ A Defence compliance statement (this statement) was compiled as per the defence theme protocols which permits an EAP to perform this task.

This statement specifically deals with the areas of low sensitivity as indicated on the DFFE screening tool report. Although the site is located within an area with low sensitivity (protocol states that no further actions are required), it was decided to compile a statement due to the proximity to Denel.

Table 1: Information sources considered supplementary to the site inspection.

Information	Source	Date	Description
National Web-Based Environmental Screening Tool (Screening Tool)	Department of Forestry and Fisheries and the Environment, (DFFE)	2021	The Screening Tool is a geographically based web-enabled application which allows a proponent intending to submit an Application for EA in terms of the 2014 NEMA EIA Regulations (as amended) to screen the proposed site for any environmental sensitivity

4 Project Description

The proposed design of the refurbishment of the existing Macassar WWTW has changed since the current EA of 2016. The proposed design will achieve improved treatment of the wastewater and improved operation of the works for the liquid and sludge process streams. These works are comprised of the construction of a new inlet works, primary settling tanks, biological reactors, secondary settling tanks, associated pipework, primary sludge screening, sludge pumping, gravity thickeners, anaerobic digesters, gas holding tanks, dewatering building, sludge facility and storage, phosphorus dosing, chlorine dosing, odour control, extension of the disinfection system (including ultra violet disinfection), wash water pump station, maturation ponds (modifications), new outlet to the river, smaller ancillary structures, new buildings on site (including new administration building, new workshop and store, new guardhouse and new electrical infrastructure buildings), civil infrastructure (including roads, fencing, paved areas).

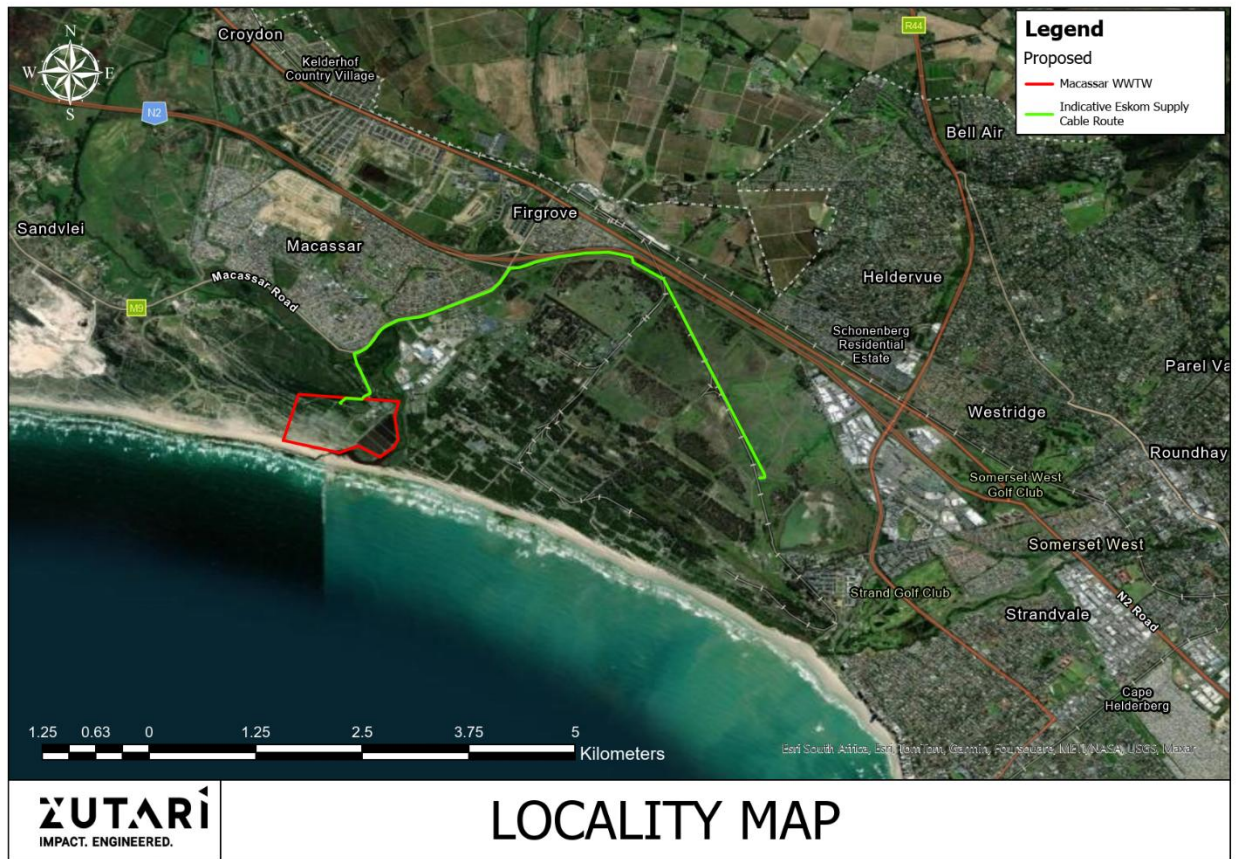


Figure 1: Macassar WWTW

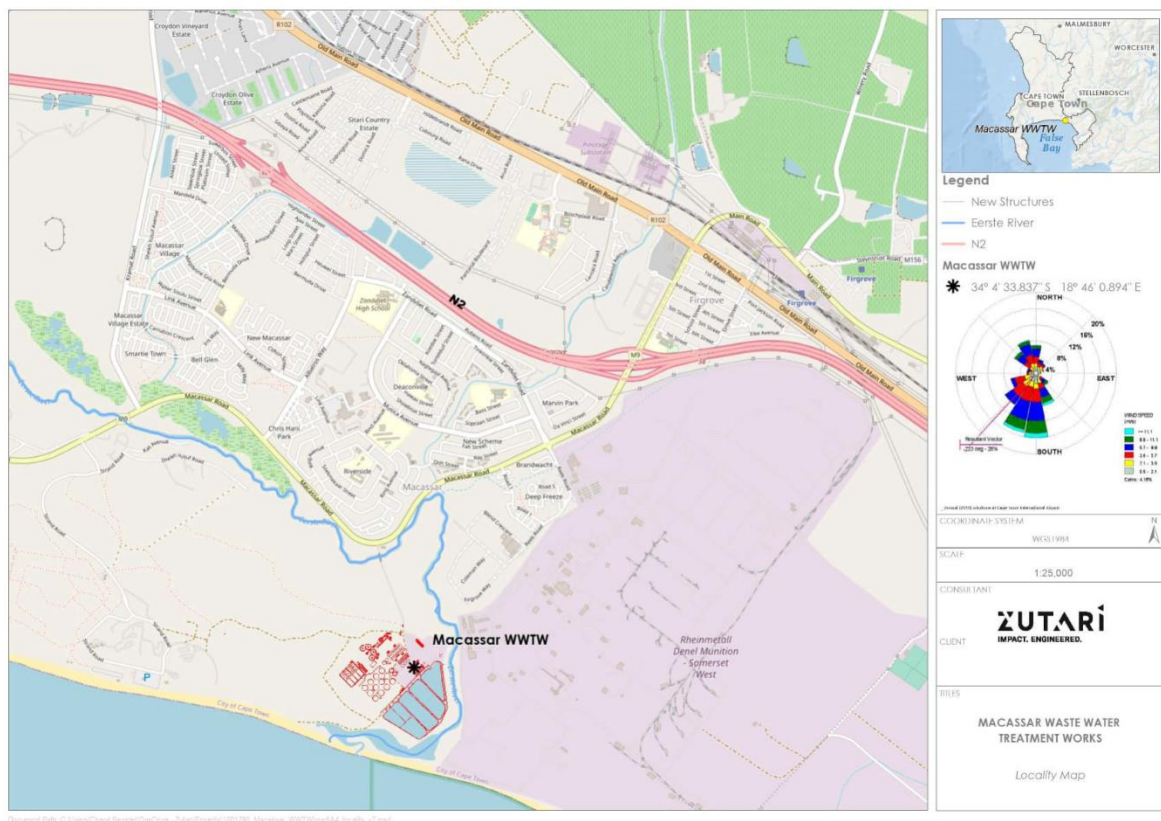


Figure 2: Showing the Macassar WWTW and its proximity to Denel (light purple) located on the Eastern side of the Eerste River.

4.1 Scope of Works

4.1.1 Refurbishment of Macassar WWTW

The scope of the current proposal is to refurbish and improve the process units and facilities of the existing Macassar WWTW as follows:

- 1. Inlet Works:** New elevated inlet works and a primary sludge handling facility will be constructed
- 2. Primary Settling Tank Splitter:** A new primary settlement tank splitter to split the flow to the new primary settling tanks
- 3. Primary Settling Tanks (PSTs):** New PSTs
- 4. Reactor Flow Splitter:** A new reactor flow splitter to split the flow to new biological reactors. The structure will also contain a controlled and passive overflow outlet which will convey flow to the offline balancing tank.
- 5. Biological Reactors:** New reactor modules with the UCT process as the base configuration and the option to switch to a Modified Ludzack-Ettinger (MLE) process
- 6. Offline Balancing Tank:** Modifying and refurbishing the existing biological reactor into an offline balancing tank. Flows coming into the works which are in excess of the PWWF and will include a passive overflow from the Inlet Works or the Reactor
- 7. Secondary Settling Tanks Splitter:** New secondary settling tank splitters to split the flow into the new secondary settling tanks
- 8. Secondary Settling Tanks (SSTs):** New secondary settlement tanks
- 9. Effluent Conveyance Channels:** Will comprise of an outlet channel to collect the treated effluent from the SST's and direct the flow into the disinfection system. It also comprises of channels from the disinfection system to the river and a series of bypass channels and outlets to the maturation ponds
- 10. Disinfection:** A hybrid system of gas chlorination and UV disinfection. Effluent passing through the disinfection system will pass back into the effluent conveyance channel
- 11. Primary Sludge Screening Facility:** New primary sludge screening facilities will be constructed.
- 12. Gravity Thickeners:** Primary sludge will be treated through thickening in new gravity thickeners
- 13. Anaerobic Digesters:** New mesophilic anaerobic digesters
- 14. Waste Activated Sludge (WAS) Holding Tanks:** New WAS holding tanks to store waste activated sludge
- 15. Primary Sludge (PS) Holding Tanks:** New PS holding tanks to store primary sludge
- 16. Dewatering Building:** PS will be thickened on linear screens followed by the PS and the WAS being dewatered via belt presses
- 17. Sludge Silos:** Sludge silos to store the primary and secondary sludge cake before disposal off site
- 18. Main Sludge Transfer Pump Station:** This building will host three types of pump systems, namely, to pump primary sludge from the primary sludge screening facility to the gravity thickeners, pump thickened sludge from the gravity thickeners to the anaerobic digesters and pump waste activated sludge from the bioreactors to the WAS holding tanks
- 19. Return Activated Sludge (RAS) Pump Station:** A RAS pumpstation to pump sludge from the under flow of SSTs back into the biological reactors
- 20. Scum Pump Station:** A scum pumpstation to pump scum from PST's, Reactors and the SST's to the Anaerobic Digesters
- 21. Return Flow Pump Station:** A return flow pumpstation to pump sewage back to the inlet works.

- 22. Blower Building:** A new blower facility to house the aeration equipment, including blowers, compressors and other necessary equipment required for aeration.
- 23. Boiler House Facility:** A new boiler house facility, with a steam boiler system
- 24. Gas Holding Tanks:** New gas storage tanks, with gas cleaning facility
- 25. Chlorination building:** A new chlorination building will be required for operation of the chlorine disinfection facilities
- 26. Service water pump station:** A new service water pumpstation for treated effluent reticulation network (wash water) to be used for mechanical equipment and on-site requirements
- 27. Treated sewage effluent (TSE) infrastructure:** Will comprise a new TSE pump station and filter building, used to pump treated effluent to off-site users
- 28. Ancillary Structures:** The construction of small concrete structures including flow diversion, flow division, flow measurement, collection chambers and outlet structures
- 29. MV Substation:** A new MV substation for onsite MV electrical requirements
- 30. Centralised Generator Building:** A new centralised Generator building which will house diesel generators
- 31. Electrical Buildings:** New MCC buildings housing all MCC and energy generation and electrical infrastructure for process units on site. This will comprise of several buildings across the site. Some of the other electrical infrastructure will be incorporated into the footprint of the process unit or process building.
- 32. Combined Heat and Power Building:** New building housing an internal combustion engine which generates electricity from the Biogas for onsite use. The infrastructure also includes a gas engine collector substation.
- 33. Weighbridge:** A new weighbridge with a facility to house the control needed for the weigh bridge
- 34. Process Operations Building:** A new two storey administration building which will comprise of a reception area, laboratory, offices, control room, canteen and kitchenette, board rooms and laundry on the ground floor. The second floor will include offices, storage, kitchenette and eating area, ablutions, boardroom and a braai area.
- 35. Workshop and store Building:** A new two storey workshop and store facility which will have storage area, workshop area, kitchenette and eating area and ablutions on the ground floor. The second floor will include offices and ablution facilities
- 36. Guard House:** A new guard house facility which will house security personnel, the facility will include ablution facilities
- 37. Security Hut:** A new security hut located at the entrance of the WWTW main access road
- 38. Site Clearance and Bulk Earthworks:** Site to be cleared to make provision for the construction of new buildings, process structures, roads and other civil infrastructure. Bulk earthworks will be required for certain areas to level out dunes and to create platforms.
- 39. Flow Diversions and Demolition:** Flow to be diverted to keep the existing plant in operation during construction of the upgrade. Flow to be diverted to the new infrastructure after completion. Decommissioning and demolition of older process units and older buildings, namely inlet works, secondary settling tanks and associated ancillary structures, 1 x biological reactor, 2 x RAS pumpstation buildings, associated ancillary structures, chlorine contact tank, dewatering building, sludge silo, guard house, inlet works MCC, administration building, workshop building, board rooms, chlorine building, wash water building and generator building.
- 40. Interconnecting Pipework:** The interconnecting pipework associated with directing flow through the new structures and connecting to the existing structures. It will also include the pipelines which will serve as overflow or emergency bypass pipelines.

- 41. Roadworks:** Main access road (tarred), internal roads (paved and gravel) and public road to beach (gravel)
- 42. Stormwater Drainage:** New stormwater drainage systems that includes pipes, channels, inlet catchments and head walls to direct surface water off site
- 43. Potable Water Reticulation:** New potable water network for onsite requirements
- 44. Service Water Reticulation:** New service water reticulation network for onsite use, which includes use by mechanical equipment and on-site irrigation
- 45. Onsite sewage Reticulation:** New onsite sewage reticulation network to return sewage the inlet works
46. Fencing: A new access road fence and on-site fence
- 47. Maturation Pond Refurbishment:** Cleaning and minor modifications to the existing ponds including the concrete lining of one of the ponds. The ponds modification will also include a new effluent channel and internal modifications to allow flow in the ponds to be diverted through each of the respective ponds.
- 48. Fire Design:** All new buildings and site to have fire designs depending on the building and site requirements
- 49. Ventilation:** New buildings to have adequate ventilation measures in place, suited to the buildings use.

The City of Cape Town proposes the following electrical infrastructure as part of the refurbishment of the WWTW, the proposed electrical infrastructure will supply the WWTW with power sourcing it from the nearest Eskom substation:

2x 11kV MV Cable with a length of 6,941m and a distance of 300mm apart between these cables. The construction of the cables will require a trench depth and width of approximately 1m with a buffer of 500mm on either side of the proposed route. The route of the cables follows the previous Eskom overhead line/cable route and then follow the existing roads heading up to the WWTW. Some sections of the proposed cable route fall within a road servitude. The crossing at Eerste River will either be in the form of a road/pipe bridge crossing or drilling underneath the river.

5 Findings of the DFFE Screening Tool

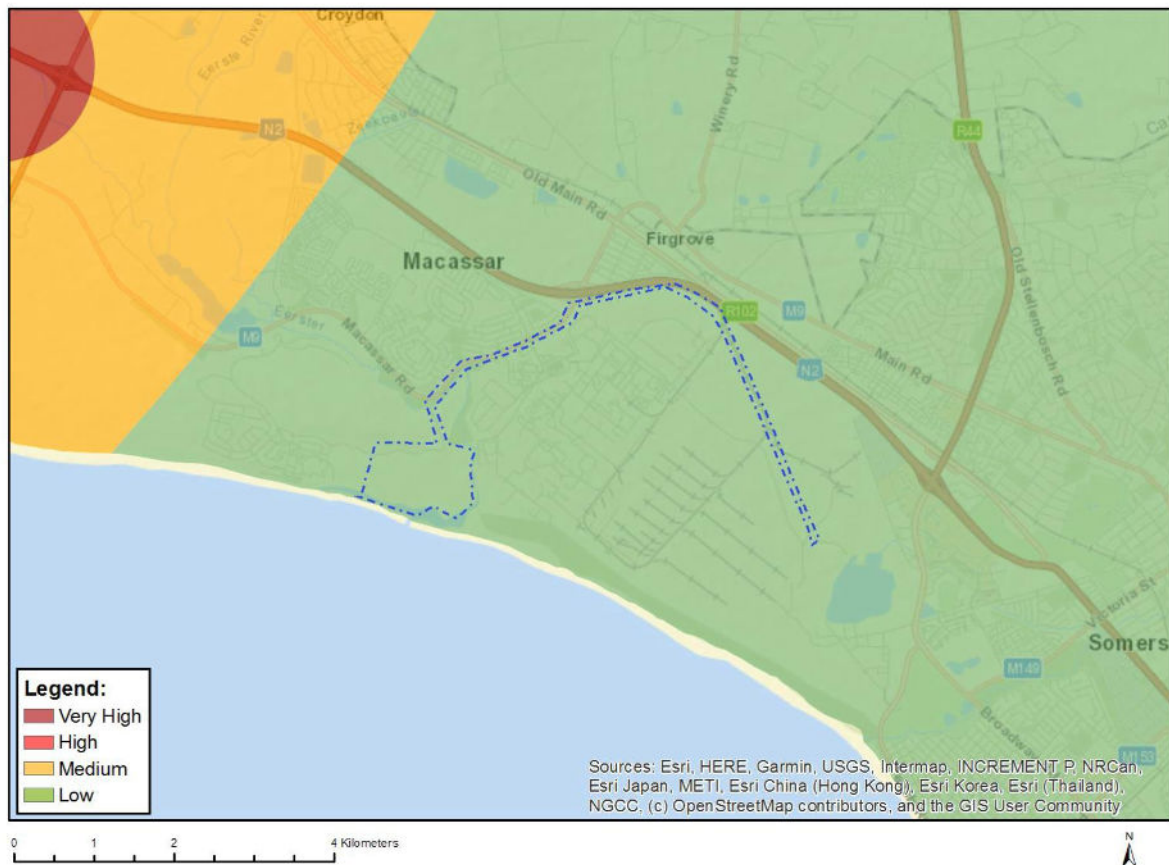
A DFFE Screening Tool Report was generated for each component of the project on the website:

<https://screening.environment.gov.za/screeningtool/#/pages/welcome>.

The maps of Relative Defence Theme Sensitivity generated by the Screening Tool indicated that the proposed project only transects low sensitivity areas from a defence perspective.



Figure 3: Macassar WWTW- Map of relative defence sensitivity



6 Findings

The DFFE Screening Tool identified the area as of low sensitivity for the Defence theme, however due to the proximity of Denel to Macassar WWTW a compliance statement has been prepared.

The Macassar WWTW has a low sensitivity ratings as identified by the screening tool.

There is nothing on the site that would change this therefore the EAP confirms the sensitivity finding of the Screening tool, which defines low sensitivity rating as follows:

- *Low potential for negative impacts on the defence installation, and if there are impacts there is a high likelihood of mitigation. Further assessment of the potential impacts is not required.*

The project involves the development of both above ground and below ground infrastructure as described in the project description and scope above. The proposed new infrastructure would be typical service delivery WWTW infrastructure i.e. that would not introduce any new components to the character of the site where such components pose a new or unknown risk from a defence perspective.

This should therefore be seen as a mitigating circumstance in that the *status quo* will largely remain and any potential negative impacts have a high likelihood for mitigation and therefore no further assessment of the impacts are required.

The general character of the site is depicted in the figures below.

Appendix C – Photographs of Site



Inlet Works



Inlet Works



Reactor



Reactor



Reactor



Reactor



Reactor



Screw Lift Pump Station



Pump Station



Flow Splitter



Secondary Settling Tank



Secondary Settling Tank



Chlorine Contact Tank



Maturation Ponds



Belt Presses - Dewatering



Sludge Storage



Old Sludge Lagoon



Dune Vegetation

7 Conclusion

Using the DFFE Screening tool the proposed project was found to transect low sensitivities with regard to defence installations. Although the protocols for defence installation in terms of NEMA does not require a statement for projects located in low sensitive areas, it was decided to compile a statement due to the proximity of Denel to the site.

This compliance statement includes the requisite information to satisfy the regulatory requirements as per the Defence protocol in GN 320.

The project involves the typical wastewater management infrastructure, and that the *status quo* of the existing WWTW will remain. The 'low' defence theme rating as per the screening tool report is therefore confirmed and no further action is required.

1. EAP CV



2. EAP's Declaration



3. Comment by the Department of Defence (awaited)



Ultimately, the only wealth that can sustain any community, economy or nation is derived from the photosynthetic process - green plants growing on regenerating soil.

ALLAN SAVORY

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