

Executive Memo

TERMS OF REFERENCE FOR A SOLICITED WRC PROJECT

KEY STRATEGIC AREA	34 (Nation Siltation Management Programme)
PROGRAMME	National Dam Siltation Management Programme
TITLE	Enhancing dam catchment management; the integration of grey and ecological infrastructure for water security

Background and rationale

The National Dam Siltation Management (NatSilt) Programme is aimed at addressing the loss in storage capacity in dams through effective dam siltation management. The programme seeks to create and produce the required knowledge and insight to mitigate against the effects of dam siltation through deploying engineering, social, ecological and management systems.

Sediment accumulation in dams and reservoirs leads to a loss in water storage capacity, potential contamination, structural stability issues, and progressively reduced assurance of water supply. Siltation of dams is addressed by preventing and reducing the sediment load from an upstream catchment. Holistic decision-making tools enable a systematic approach to siltation management, focusing on the complementarity of built and ecological infrastructure. Ecological Infrastructure (EI) in South Africa's catchments is of critical importance for ensuring water security, and its effective management has been shown to be the most cost-effective and sustainable solution to maintaining water supply. In terms of water storage, effective EI management is key as South Africa is running out of space for future storage reservoirs, while current dams are seeing constant increases in siltation.

Through the first phase of the NatSilt Programme, decision support tools were developed to improve the management of dams across South Africa through an inclusive dam catchment management approach. The dam storage sustainability scoring system (SSS) tool is among these tools, and it enables a systematic approach for effective decision-making in addressing siltation at the dam and within the catchment. The SSS tool provides a dam classification protocol with suitable guidelines for the subsequent management of siltation in dams based on their classification. It provides a screening method to assess the level of sustainability at any particular dam regarding sedimentation risk, which results in a score assigned to each sub-component of the sedimentation process within a dam's catchment, i.e., the source zone, the transfer zone and the sink zone. The tool demonstrates which of the sub-components could be of concern and scores a dam on a scale ranging from non-sustainable to sustainable. The tool enables users to determine the priority ranking of dams and their sustainability.

There is a further need to build on the work already done through the developed national siltation management strategy and its associated tools and models and expand on the lessons learnt during this programme, especially regarding the links between siltation and catchment management. The overall aim of this project is thus to bring into focus the interface between water-related Ecological Infrastructure and Grey Infrastructure as crucial in ensuring sustained water security in South Africa.

Objectives:

The objectives of the project will be to:

- Review and analyse past Water Research Commission (WRC) and other relevant research outputs on siltation in relation to ecological infrastructure maintenance to identify gaps in the

research and map a way forward. This should also inform the necessary considerations for embedding siltation-related and ecological infrastructure research within the WRC, DWS, and other relevant institutions;

- Develop a state of dam siltation in South Africa report using the 2016 - to - date siltation data and provide projections for the next decade on the impact on water security;
- Design and produce a Digital Siltation Dashboard for South Africa's major dams, including the NatSilt programme's pilot sites; and
- Propose appropriate "Living Lab" locations for implementation and monitoring of Ecological Infrastructure interventions to improve siltation management

Deliverables:

1. Literature review on Ecological Infrastructure and Siltation research
2. State of siltation report depicting the change in sedimentation levels since 2016 to date and setting a baseline for monitoring
3. Digital Siltation Dashboard showing business as usual and scenarios on the impact of implementing siltation management (modelling and extrapolation into the next decade)
4. Guiding Framework (criteria) on site selection with the assistance of the SSS tool and other tools in the market
5. Recommendation for further research and implementation

Please note: These terms of reference call for a multidisciplinary team consisting of team members with experience in the fields of hydrogeology, ecology, modelling, and resource economics etc.

Project duration: 15 months

Time Frame: 1 August 2023 – 1 November 2024

Total Funds Available: R 2 000 000.00

The supporting documents can be found in the link below, under TOR reports to provide context: <https://wrc.microsoftcrmportals.com/call-for-proposals-info/tor-reports/>