

TERMS OF REFERENCE FOR A SOLICITED WRC PROJECT

KEY STRATEGIC AREA THRUST	1&2 (Water resources and ecosystems) Thrust 3: Water Resources and Ecosystem Protection. Water Security, and Water Utilization
TITLE	Piloting the siltation management model in the Hazelmere Dam and Welbedacht Dam catchments

Background and Rationale

The National Dam Siltation Management Programme is implemented by the Water Research Commission (WRC) and funded by the Department of Water and Sanitation (DWS). The Programme's overarching aim is to develop a strategy that will guide, advise, and ensure effective siltation management and related improved storage capacity of the large dams in South Africa.

The programme is being implemented over 3 phases:

Phase 1. Development of a Siltation Management Strategy and related tools for Large State Dams

Phase 2. Piloting of the draft Strategy, Models and Tools for finalisation

Phase 3. Review and revision towards a final strategy, with relevant models and tools

Phase 1 entails the development of the siltation management strategy as well as relevant tools, models, frameworks, protocols, guides and plans to assist with the implementation of the strategy. Four sub projects are currently underway in the 1st phase to develop approaches for siltation management for pilot implementation—they are:

- Sub-project 1: Strategy development
- Sub-project 2: Dam Engineering and socio-ecological systems
- Sub-project 3: Large Dam Sustainable Dredging
- Sub-project 4: Training and Capacity Development

Phase 1 is almost complete and Phase 2 (Piloting), is due to start in the new financial year - April 2022.

Reports developed during phase 1 can be found in the link below, under TOR reports to provide context on phase:

https://wrc.microsoftcrmportals.com/call-for-proposals-info/tor-reports/

The National Dam Siltation Management Programme has developed a draft strategy with tools and models, protocols and guidelines that guide and ensure effective siltation management. The strategy also contributes to improved soil conservation and approaches to stimulate local economies and improve cost-recovery through the selection of appropriate siltation management methodologies for dams.

Dam siltation is caused by both natural and anthropogenic activities which accelerate erosion. A loss of storage capacity as siltation accumulates in dams reduces water security and potentially undermines soil fertility in source areas, while the actual movement of silt damages riparian infrastructure during flooding. Both engineering and ecological infrastructure should be part of siltation management and interventions

and should also maintain and improve the livelihoods of the local population.

Phase 1 of the National Dam Siltation Programme has developed a draft strategy, tools and models that enable a systematic approach to managing water resources in a more sustainable manner and for effective decision making in addressing siltation. These approaches include both engineering and socio-ecological aspects.

Phase 2 of the program will pilot the implementation of appropriate ecosystem rehabilitation interventions at the source zones to reduce siltation in these catchments, as well as incorporating relevant maintenance measures in the catchment management plans.

The catchments areas where the dam pilot sites are located are:

- Hazelmere Dam Umdloti River Catchment
- Welbedacht Dam Caledon Modder River catchment

Overview of proposed approach

The approach to this phase is to implement practical and sustainable solutions to dam siltation reduction and ecosystem rehabilitation that will stimulate socio-economic development in communities within the catchment areas and to capacitate communities to enable them to be involved in siltation management activities. The approach will incorporate long-term implementation and maintenance plans for catchment management by key stakeholders, such as DFFE, DWS and citizen scientists. The plans will detail the cooperative governance structures critical for sustaining the interventions beyond the study period.

A needs analysis must be done with the communities in the catchment areas to identify their needs to complement the work that this project will undertake.

This project will be strengthened by a monitoring and evaluation project that will take place in Phase 3. However, the relevant monitoring key performance indicators will be developed during this phase.

Objectives:

The primary objective of the project is to test and refine the draft siltation management models and tools developed for rehabilitation of ecosystems, stabilization of riverbanks, protection of the biodiversity and prevention of further siltation in the Hazelmere Dam and Welbedacht Dam catchment areas, to restore and conserve the agricultural production potential of the soil and improve the livelihoods of local communities.

The secondary objectives are:

- > To improve vegetation cover.
- > To improve resilience of ecosystems to climate change.
- > To identify the most suitable plant species to re-vegetate the catchment.
- To empower youth in the catchment areas to collect water resource quality data and remove invasive alien plants following established methods.
- To identify feasible beneficiation models for the alien invasive plant species & implement them.
- Establish community forums to build the necessary capacity on how to manage resources, manage siltation and maintain healthy catchments.

Outputs and Outcomes:

The output of this project will be creating socio-economic development opportunities in the catchment areas which will be measured against the following key performance indicators:

- > New green jobs created
- Records of alien invasive plants removed
- Alien invasive plants used as biomass
- Number of plants planted for revegetation
- Catchment management and monitoring plans
- Recommendations on sustainable provision of seedlings

A key outcome of the project will be the reduction of siltation, improved soil quality, improved water security, economic development in the dam catchment areas, carbon sequestration and sustainable ecosystems. These actions may not be realized immediately since restoration will depend on extent of degradation. Monitoring and Evaluation will therefore be critical throughout the program.

Deliverables:

- 1. An inception report, including a needs analysis of the dam catchment areas
- 2. A methodology report including the implementation plan
- 3. Key performance monitoring indicators with restoration guideline report
- 4. Dam catchment area maintenance plans
- 5. Capacity development and training reports
- 6. A training report
- 7. A draft final report for peer-review, which has been workshopped with project participants
- 8. A print ready final report

Time Frame: April 2022 – April 2024

Total Funds Available:

R3 million over 2 years

Year 1: R1 500 000 Year 2: R1 500 000