



## TERMS OF REFERENCE FOR A DIRECTED WRC PROJECT

### THEMATIC AREA

**Water Use**

### TITLE

**National sludge quality survey to determine changes in sludge quality since the 2000s**

### Background and Rationale

A national survey of sludge quality in South Africa is urgently needed, as the last comprehensive study was conducted in the early 2000s. Over the past two decades, changes in urban growth, and wastewater treatment technologies and practices have likely altered the composition of sewage sludge, including the possible emergence of new contaminants such as microplastics, pharmaceuticals, and heavy metals. Without updated data, it is impossible to accurately assess the risks or opportunities associated with sludge reuse or disposal. Critically, the current guidelines are still informed by the findings of the 2004 survey and may no longer reflect present-day realities. A new national study would provide the evidence base required to revise these guidelines, ensuring they are scientifically robust, environmentally protective, and aligned with international best practice in sustainable sludge management.

### Objectives

#### *General:*

The broad objectives for a new national study on sludge quality in South Africa is to provide national baseline data of sludge quality. WRC Reports 1283/1/04 (metal content) and 1339/1/05 (organic pollutants) were the last to provide such analysis; this was over 20 years ago. Further, there exists the possibility of new, more sensitive analytical methods that can detect these pollutants and these should be included in the revision of the guidelines. Although contaminants of emerging concern will be addressed through a separate funded programme under the WRC strategy, the inclusion of preliminary analyses or existing data by the research team—where feasible—would be welcomed and could provide valuable early insights. Similarly, if the research team can access sludge classification data in the last decade, this would add value to the project.

#### *Specific Aims:*

- **Update National Baseline Data:** To establish a current and comprehensive national profile of sludge quality, including chemical, microbiological, and physical characteristics across diverse geographic and operational contexts.
- **Assess Compliance and Risk:** To evaluate the compliance of current sludge quality with national and international guidelines, and assess associated environmental and public health risks in reuse or disposal pathways.
- **Support Regulatory Revision:** To generate robust, evidence-based data that can inform the revision of national sludge management guidelines, ensuring alignment with current science, best practices, and sustainability goals.
- **Laboratory Testing Capacity and Costs:** Provide and compare compliance testing (including methods) and cost comparisons across sites. Include recommendations for new analytical methods where possible. WRC Project C2022/2023-00867 by the University of Cape Town has



established a virtual platform was established and catalogued 212 water quality laboratories in South Africa by type, location, and equipment.

#### **Scope of Work**

The scope of work follows the objectives with additional aspects of knowledge dissemination, including peer reviewed journals and an edited Final Report (20% of the total project budget).

#### **4. Deliverables**

Deliverables should match the objectives of the study.

Not more than three deliverables per financial year.

The first-year deliverables may NOT include an advance.

The final deliverable of the print-ready final report, valued at 20% of the Budget is required.

#### **Total Funds Available:**

R3 million over 3 years.

**Year 1: R600,000.00**

**Year 2: R1 400 000.00**

**Year 3: R1 000 000.00**

#### **Key Background Sources:**

<https://www.wrc.org.za/wp-content/uploads/mdocs/1283-1-041.pdf>

<https://wrcwebsite.azurewebsites.net/wp-content/uploads/mdocs/2893%20final.pdf>

<https://wrcwebsite.azurewebsites.net/wp-content/uploads/mdocs/TT%20872%20final%20web.pdf>

WRC Project C2022/2023-00867: Towards Data-Driven Digital-Twins for Integrated Wastewater Reclamation and Reuse