

TERMS OF REFERENCE FOR A DIRECTED WRC PROJECT

KEY STRATEGIC AREA	KSA 3
THRUST	4 – SANITI
PROGRAMME	2 – Municipal Sludge Valorisation
TITLE	Understanding the current trends and advances in municipal sludge technology and innovative options related to sludge management

Objectives:

General:

Municipal wastewater sludges are produced in large quantities from wastewater treatment works. Generally, sludge treatment and disposal can account for half of the operating cost of sewage treatment plants. According to the State of Waste Report (SoWR, 2018), there are 824 large-scale municipal and private wastewater treatment works generating around 632,749 tonnes of wastewater sludge. Municipal wastewater sludge production will continue to increase as more people move to urbanized areas, new treatment works are implemented and environmental standards become more stringent. With some traditional disposal routes coming under pressure, the challenge is to find cost-effective and innovative solutions whilst responding to environmental, regulatory and public pressures. The continuous advancement of sludge treatment processes is therefore critical to municipal wastewater treatment operations and the healthy development of the sewage treatment industry.

Municipal wastewater sludges represents a major operational cost for wastewater treatment plants. With some traditional disposal routes coming under pressure, there is need to develop cost-effective and innovative solutions for municipal wastewater sludge whilst responding to increasing environmental, regulatory and public pressures.

Municipal wastewater sludges can contain a variety of pollutants, including non-toxic and toxic organic compounds, inorganic pollutants and microbial pathogens. The complexity of sludge quality determines the complexity for the requirements of the treatment and management processes. If not properly managed, it decreases the effect of treatment facilities and can bring about negative public health and environmental impact. Furthermore, there are potential technical challenges of odour, detritus and high water content.

The research and development of sustainable sludge treatment and management methods have always been key focus globally with numerous conferences and coordinated research and scientific committees focusing on sludge management.

This study scope is to undertake an analysis of the latest trends and development in wastewater sludge management research, development and innovation, and should cover shifts in technology, practice aligned to climate agenda and legislation, sludges as a resource, breakthrough innovations and management processes. This study will provide high-level strategic pathway for research investment in wastewater sludge treatment. The continuous advancement of sludge treatment processes is critical to municipal wastewater treatment operations and the healthy development of the sewage treatment industry.

Specific Aims:

The specific aims of the project are:

- 1. Comprehensive literature review of the latest trends in wastewater sludge management, research, development and innovation.
- 2. Identify key issues, strategic trends and priorities.
- 3. Develop a high-level research strategy responding to short, medium and long-terms issues identified.

Deliverables:

- 1. Reports on key aspects researched as per specific objectives
- 2. Workshop to disseminate findings
- 3. Journal article(s)
- 4. Final Report

Budget Limits

Total budget = R700,000 (VAT Inclusive); Year 1: R400,000; Year 2: R300,000

Time Frame: Two(2)-Years

Lighthouse:

- Water-Energy-Food
- The Green Village

Knowledge Tree

- Sustainable Development Solutions
- HCD in water and science sectors

Additional notes

The following information may be useful in developing an appropriate methodology:

- Emerging Technologies for Wastewater Treatment and In-Plant Wet Weather Management (epa.gov)
- Historical development of wastewater and sewage sludge treatment technologies in Japan An analysis of patent data from the past 50 years - ScienceDirect
- Sludge management future issues and trends | Water Science & Technology | IWA Publishing (iwaponline.com)