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TERMS OF REFERENCE FOR A SOLICITED WRC PROJECT

KEY STRATEGIC AREA	KSA 3: Water Use, Wastewater Resources and Sanitation Futures
THRUST	Thrust 2: Water Quality Futures
PROGRAMME	Programme 3: Risk assessment for environmental water quality management
TITLE	Characterisation of bioaerosol, volatile organic compounds, odour emissions in wastewater treatment plants and assessment of the associated emerging epidemiological, occupational, and public health risks

Background and Rationale

More and more wastewater treatment works are using bubble technologies as a standard in their processes based on the efficiency in treatment offered. However, these processes tend to generate higher than normal bioaerosols, volatile organic compounds and unpleasant odours, which can pose health risks to workers, or dwellers in other buildings within the vicinity of a wastewater treatment facility. Bioaerosols are defined as aerosols, aeroallergens, or particulate matter of microbiological, plant or animal origin.

Over the last few years, there has been a growing body of evidence suggesting that exposure to wastewater process bioaerosols can result in a range of human health effects, including chronic respiratory conditions, gastrointestinal illness and cancer. On the other hand, odour emissions for both unpleasant and volatile organic compounds of concern from wastewater treatment plants (WWTPs) are considered to be the main causes of disturbance noticed by the exposed population and can have relevant impacts on both tourism economy and land costs. This concern is further raised by the issue of emerging pathogens and contaminants and their fate in bioaerosol processes.

As a result, both aerosolization and odour control and prevention in wastewater facilities has become an important consideration both in the management of existing facilities and in the design of new ones. The objective of this study is to characterise bioaerosol and odour emissions in wastewater treatments plants and assess the epidemiological, occupational, and public health risks of wastewater management.

Objectives:
The objectives of the project are to:

- To provide a comprehensive literature on emissions generated from wastewater treatment facilities, with emphasis on the public health risks associated with bioaerosols, volatile organic compounds and odours
- To conduct a series of case studies to characterise bioaerosols, volatile organic compounds and odour emissions in different wastewater management scenarios; providing strong evidence of source apportionment, emission concentration variations (spatial and temporal) and emission release principle
- To assess the epidemiological, occupational, and public health risks of wastewater management
- To formulate recommendations for management and monitoring of existing wastewater facilities, design and siting of new wastewater management facilities and monitoring requirements for existing sites.

Specific:

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- Project scope – Both chemical and biological contaminants should be considered in the study
- Site selection – Case studies must be conducted in all nine provinces

Deliverables:

- Inception report
- Annual progress report
- Final report

The deliverables above may be sub-divided by the proposers, if desired, into not more three deliverables per financial year. The final deliverable of the print-ready final report should be valued at R 400 000.

Time Frame: 01 January 2022 – 31 March 2025

Total Funds Available:
R 2 000 000 over 3 years with R 300 000 available in year 1.