DESCRIPTION:	FEASIBILITY STUDY TO INFORM A BUSINESS CASE FOR THE PROVISION OF ACCREDITED LABORATORY SERVICES AND OTHER RELATED SCIENTIFIC SERVICES TO SERVE A CLIENT BASE IN THE MPUMALANGA PROVINCE

1 SCOPE OF WORK

1.1 DESCRIPTION

1.1.1 Background

World-wide, maintaining the quality of water for its intended use (i.e. for drinking, to maintain ecosystems and to support economic activities) is regarded as an imperative. Water quality refers to the acceptable content of chemical, physical, and biological characteristics of water. Environmental water is regarded unpolluted when the water remains fit for its intended purposes, and can sustain life. Similarly, water is deemed acceptable and safe for drinking, when it looks clear, with no taste or odour, has a low chemical composition and has no microorganisms present as would be defined in the SANS 241 standard (latest edition).

In South Africa, water quality is monitored from catchment (environmental source) to tap for various reasons. One is to confirm that drinking water is safe for human consumption, another is to ensure protection of the environment and preservation of environmental ecosystems for which water plays a crucial role. Water is also monitored, amongst others, to ensure compliance to water use licenses / authorisations issued under the National Water Act, Act 36 of 1998 and the Water Services Act, Act 108 of 1997.

The monitoring of drinking water is prescribed in the drinking water standard of South Africa (SANS 241: latest edition), while the monitoring requirements for environmental - and other discharged waters are detailed in the respective license or authorisation. Ideally, the monitoring of water quality and the generation of information needed to confirm the safety of drinking water, and / or compliance of water to legislative requirements, should be done in water testing laboratories that follow the accreditation system of the ISO 17025 (latest edition) standard.

Rand Water's vision is to be a "provider of sustainable, universally competitive water and sanitation solutions for Africa". After high level assessments and through its endorsed Growth Strategy, Rand Water identified a need for a suitably located, well resourced (financial, human and the service offering) accredited Scientific Services Laboratory in the Mpumalanga Province. The purpose of the establishment would be to offer an unparalleled cost effective one stop scientific services for the water sector in the Province. The anticipated services will include a monitoring function for testing water quality (analysing for predefined parameters), checking compliance to statutory limits, providing scientific advice and interpretation of information. The range of clients will include water boards, municipalities, consulting service providers, mining houses etc.

To this end an appropriately qualified and competent service provider, demonstrated through the composition of the project team to lead this assignment, is required to:

- Analyse and engage all relevant stakeholders e.g. Industries, Utilities, National and Provincial Departments, Water Services Institutions etc… to ascertain and quantify a client base to determine total market value, barriers to entry, viability & sustainability of the market and appropriate pricing;
- Establish and ascertain the status quo on existing laboratory services in Mpumalanga;
- Establish the extent of services offered by accredited and non-accredited laboratories;
- Execute a needs analysis identifying gaps in current laboratory and scientific services rendered;
- Identify the most optimal options including location (e.g. on existing Rand Water land or other) for the establishment of the accredited laboratory service, albeit a standalone facility or any other viable alternative;
- Estimate the cost of establishing an accredited laboratory facility in Mpumalanga, including location cost, personnel requirements and equipment cost;
- Identify the appropriate business delivery models;
- Assess and quantify the legal implications, environmental authorisations, roles and responsibilities; and
- Produce a comprehensive bankable business case based on the study, encompassing all aspects of feasibility to seamlessly exploit the opportunity to establish accredited laboratory services and scientific services in Mpumalanga.

This business venture will be supported by Rand Water's innovation driven risk based strategy to transform the overall management of water in the province of Mpumalanga. Furthermore, aiming to improve the ability of water services authorities (WSA's) to achieve compliance to water quality monitoring requirements and

prioritise improvements in Blue Drop and / or Green Drop scores. WSA's are accountable for service delivery, both drinking water and wastewater services. The list of WSA's in Mpumalanga which could benefit from a Scientific Services Laboratory, is shown in Figure 1.

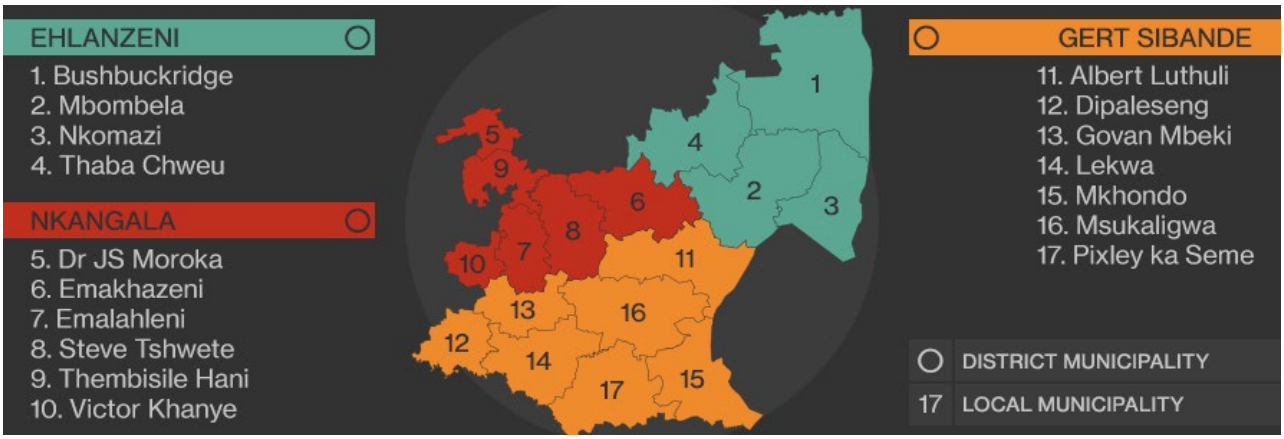

Figure 1: The following map illustrates the municipal governance makeup of the region

There are four large rivers that run through Mpumalanga, namely Usutu, Crocodile, the Sabie-Sand and the Komati Rivers. In addition, from these rivers, there are also tributary free-flowing rivers that include the Elands, Mbyamiti and Nwanedzi-Sweni. Moreover, catchment areas such as Olifants, Nkomazi, Usutu and Upper Vaal (Figure 2) support major industries in the province, like agriculture, forestry, mining, synfuel production and power generation. While all of these activities use large volumes of water, they also pose a significant risk to pollute water resources if not managed well. Water pollution could have a disproportionately large negative effect on the functioning of downstream ecosystems and the overall sustainability of growth and development in the regions they support. The mining and energy industries are known polluters of the highveld region in the Mpumalanga province. Therefore, the quality of water decanted or discharged by mining houses require regular water quality monitoring as these water discharge activities are regulated.

Catchment Management Agencies (CMA), government and other non-profit organisations entrusted with the responsibility to protect the water sources of the province, need information against which to take decisions and manage water quality. The proposed Scientific Services Laboratory should be able to meet the needs of these institutions allotted to protect the water sources.

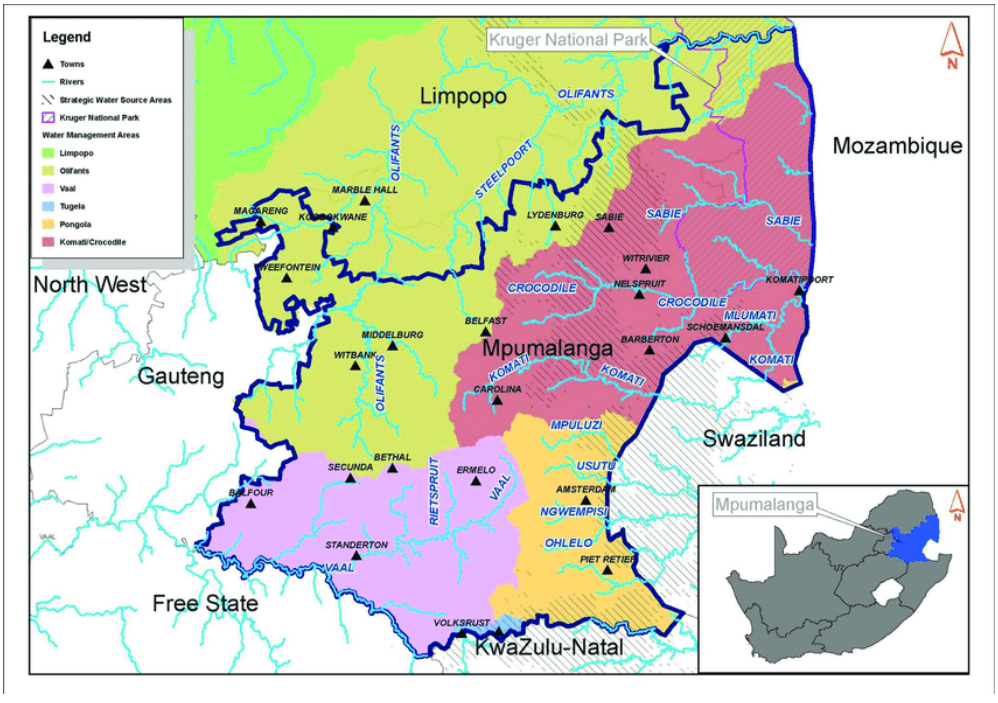

Figure 2: Catchment areas in Mpumalanga

An ISO 17025 (latest edition) accredited Scientific Services Laboratory capable of testing for a variety of water quality parameters, could potentially satisfy the water quality monitoring needs of various potential clients in Mpumalanga. Services could also be offered to clients near Mpumalanga. The testing capability of the laboratory should include, but not be limited to:

- **Parameters to confirm that drinking water quality comply with statutory limits**
  - ***Physical and aesthetic parameters*** – pH, conductivity, salinity, turbidity and colour.
  - ***Chemical parameters*** – Anionic compounds, dissolve metals and nutrients.
  - ***Organic parameters*** – Total organic compounds, phenolic compounds, disinfection by-products, industrial chemicals and pesticides.
  - ***Microbiological parameters*** – Faecal contamination (*E. coli* or faecal coliforms), protozoan parasite (*Cryptosporidium* and *Giardia* species), Total coliforms, Heterotrophic plate count and Somatic Coliphages.
- **Parameters to confirm that environmental water and related discharges (i.e. wastewater discharge) comply with statutory limits** – pH, conductivity, turbidity, dissolved oxygen, phosphates, nitrates, etcetera.
- **Parameters of interest to, and to confirm compliance by industry, i.e. mineral & mining** – Mineral tests to determine if the content present, poses a risk to health, or the aesthetic and cleaning capacities of water being investigated. The test may include minerals such as calcium, magnesium, manganese, iron, copper, zinc, etcetera.
- **Parameters needed for commercial and private water testing –** parameters analysis on other types of water, i.e. bottled water, borehole water, etcetera, will be as defined by the customer.

1.1.2 Objectives

The main objective of the study is to produce a comprehensive bankable business plan to improve the management and monitoring of water in the province of Mpumalanga through the establishment of a Scientific Services Laboratory. According to the preliminary assessments, these services are desperately required by WSA's for the monitoring of drinking and wastewater. In addition, water quality testing is a key activity required to assess the quality of the environment during benchmarking studies before the possibility of disturbing the environment could occur; or after a hazardous event, where evaluation is undertaken to establish whether the event could have potentially threatened an ecosystem.

The study should critically assess the status quo regarding existing services offered, with conclusive evidence of opportunities that exit to establish a viable business option for the region. The value add of such services to the region must be clearly defined in a quality and quantified research format giving credence to the business case.

1.1.3 Scope of Work

The scope of work gives some direction as to the approach to developing the business case for the establishment of accredited laboratory services for the Mpumalanga region.

- Analyse and engage all relevant stakeholders **BUT NOT LIMITED TO**, e.g. Mineral Resources and Energy, DWS, WRC, Water Boards, Municipalities (refer to map above), TCTA, Agricultural bodies, mining houses, consulting firms, other laboratories etc. to ascertain and quantify a client base to determine total market value, barriers to entry, viability & sustainability of the market and appropriate pricing;
- Establish and ascertain the status quo related to the above entities capability to use and pay for these services or establish possible funding models to ensure sustainability of proposed facility (public pr private assistance programmes);
- Establish and ascertain the status quo on existing laboratory facilities in Mpumalanga;
- Establish the extent of services offered by existing accredited and non-accredited laboratories;
- Establish the extent to which water analyses services are insourced and outsourced to other provinces;
- Execute a needs analysis identifying gaps in current laboratory and scientific services rendered;
- Identify the most optimal location (e.g. on existing Rand Water land or other) for the establishment of the accredited laboratory service;
- Estimate the cost of establishing an accredited laboratory facility in Mpumalanga, including location cost (fixed or mobile), personnel requirements and equipment cost;
- Identify the appropriate business delivery models (mergers and acquisitions and / or fixed / mobile lab

etc.);
- Assess and quantify the legal implications, environmental authorizations, roles and responsibilities; and
- Produce a comprehensive bankable business case based on the study, encompassing all aspects of feasibility to seamlessly exploit the opportunity to establish accredited laboratory services and scientific services in Mpumalanga.

PHASE 1: Initiation
The objective of the Initiation Phase is to determine the approach, establish and vet the implementation team. Understand the extent of the service offering and the need for such scientific services in the region. Legal, political, inter-governmental and environmental considerations to be included.

PHASE 2: Pre-feasibility
The purpose of this phase is to understand and describe the current status and the environment for laboratory services in Mpumalanga. Identify the more feasible options, on the basis of technical feasibility, social and environmental acceptability and cost effectiveness to establish in Mpumalanga. Interrogate future growth plans in Mpumalanga, hence stakeholder engagements, and quantify the apparent need for such services.

The objectives of the Pre-feasibility Phase were to:
- Understand the status quo;
- Define the need;
- Quantify the need;
- Identify and quantify client base for services and the capability to pay for the service with possible cross funding proposals (either inter-governmental or through aid associations);
- Identify required technologies required for testing to meet the expectations of clients;
- Understand the residues (or waste products) produced by each process and how they can be managed;
- Define a wide range of options for possible solutions by combining alternatives for the establishment of standalone Scientific services i.e. mergers and acquisitions, partnerships taking into consideration PFMA regulation, and
- Carry out pre-feasibility costing of the most viable options and identify the most appropriate option to be used as the preferred project.

These outcomes are then considered in more detail, and the most feasible options investigated and considered in the Feasibility Phase.

PHASE 3: Feasibility
The main objective of this phase is to carry out intensive feasibility level investigations and optimization of the most feasible project option. The requirements for implementation must be considered and evaluated. The Feasibility Phase comprises a number of components that build on the results of the Prefeasibility Phase; the results of the various components are reported separately and then integrated into a Feasibility Report for the solution.

The components in this Phase comprise:

1. Conduct Concept Development;
2. Conduct Options Analyses;
3. Financial Modelling;
4. Institution Procurement and Finance options; and
5. Provide a high level design / layout.

The approach should include a detailed risk-adjusted value assessment of the PSC and PPP models for the preferred Project. The possible institutional arrangements need to be assessed in terms of the roles and responsibilities of the responsible organizations. A due diligence assessment should be conducted to establish the legal mandates of the institutions, as well as ownership of the land required for the preferred Projects.

These assessments should be highlighted under the following categories: “Institutional, Procurement and Financing Options”.

1. Implementation Strategy and Action Plan: Throughout the Study, the requirements for implementation are to be considered in developing an Implementation Plan. This shall include a high level strategy and programme plan.

2. Key Stakeholder Engagement and Public Communication: Engagement with key stakeholders and public communication are very important components of the Study shall be on-going from the

commencement of the Study to the completion of the work.

The Phased components that lead to recommendations for appropriate institutional, financial and procurement models for implementation, particularly the assessment of the options for procurement, are as important for a sustainable solution as all the technical components combined.

1.1.4 Duration

The anticipated duration of the project deliverable is within 8 (eight) months.

2. INVENTORY OF EXISTING DATA

In order to plan and implement the study, it is necessary to gather available knowledge of the laboratory service user collective, occurrence and conditions.

3. LAND OWNERSHIP

Engagement with the local stakeholders/community is critical. Identify suitable premises, preferably vacant within the vicinity of the study for future negotiations and acquisition for the expansion of the project.

Site selection must take into account other critical factors deemed necessary.

Consideration can be given to Rand Water owned land if the location is suitable for the establishment of the Laboratory.

4. BUSINESS PLAN

The business plan should be drawn up once the feasibility phase has been completed. Focus should be on the strengths and viability of the business model preferred Project.

In addition, and at a minimum, due consideration must be given to the following:
1. Executive summary;
2. The industry and market;
3. Financial projections and assumptions;
4. Business Model;
5. Project Delivery Model;
6. The extent and nature of finance required by Rand Water and the existence of possible cross subsidy/funding of the payment of these services by provincial or national government to ensure sustainability of the operation; and
7. Implementation and milestones.

5. PLANNING

The locality map below highlights the area of concern for the study.

5.1 Financial and Viability analysis

The business case should present a detailed description of all input impacting on the financial viability of the project. Each input item must be verifiable or at least supported by readily available information. Input data should be articulated as follows:

CAPEX
- Itemise the required components of the infrastructure with costs;
- Give details of preconstruction expenditure;
- Indicate expected lifespan of major components and major refurbishments within the first 20 years of the investment horizon (indicate expected cost for replacement or refurbishment of the relevant items); and

- Highlight any other factors that might impact on the cost of the infrastructure /instrumentation/ equipment/management system.

OPEX
- Staff requirements - number of employees per shift, level of skill, remuneration, etc.;
- Energy consumption in kWh and cost;
- Operational equipment that is not part of the bigger infrastructure; and
- Any other consumables (provision should be made for running costs (consumables) to be adequate for a period of three years).

BENEFITS
- Quantify expected revenue from each service offering (e.g., samples to be tested and price); and
- Growth in demand for services must be aligned to OPEX and CAPEX requirements.

FINANCIAL MODELING
Give annualized project cash flows over a twenty-year investment horizon comparing INFLOWS (Benefits) to OUTFLOWS(Costs). A monthly distribution on the first year can be presented if deemed necessary.

Evaluation of results:
- A discount rate and hurdle rate of 14% is used as per the Rand Water Investment Framework;
- NPV greater than zero;
- IRR higher than 14% preferred – but scenarios yielding IRR that is above 10% will be looked into;
- Payback period;
- Any other evaluation metric that you find very relevant for this kind of an investment will be appreciated;
- Scenario and sensitivity analysis, highlight issues that can impact the viability of each scheme such as potential demand trends, input price fluctuations, etc. and
- A discussion on qualitative benefits that need to be considered for each scenario. A scenario might not be financially viable but might be advantageous considering other factors.

BENCHMARKING, ACQUISITIONS & FUNDING
- Rand Water would like to explore several options in line with local and international benchmarks for best-fit model and practice. If the companies are listed, please indicate their net worth;
- Are there any opportunities for acquisitions? Evaluate the option of acquiring versus starting from scratch; and
- Recommend funding options and identify the sources.

DELIVERABLES
The business case shall include a chapter on financial viability detailing the assessment undertaken and a MS-Excel model to validate the results presented in the report.

5.2 Applicable legislation and standards

- National Water Act, Act 36 of 1998;
- Water Services Act, Act 108 of 1997;
- Water use licenses and authorization issued under the applicable Water Law;
- The South African National Standard for Drinking Water (SANS 241 – latest edition) as issued by SABS;
- National Environmental Management Act (NEMA), Act 107 of 1998; and
- ISO 17025:2017.

6. LIST OF REFERENCE DRAWINGS

Item No	Drawing No	Description
1		
2		
