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PREPARED FOR:

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Implementation and Maintenance of the Water Reconciliation Strategy for Richards Bay and Surrounding Towns

INCEPTION REPORT

March 2018

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

THE IMPLEMENTATION AND MAINTENANCE OF THE WATER RECONCILIATION STRATEGY FOR RICHARDS BAY AND SURROUNDING TOWNS (WP11180)

INCEPTION REPORT (FINAL)

MARCH 2018

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THE IMPLEMENTATION AND MAINTENANCE OF THE WATER RECONCILIATION STRATEGY FOR RICHARDS BAY AND SURROUNDING TOWNS (WP11180)

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LIST OF ABBREVIATIONS AND ACRONYMS

BJ	Black Jills Engineers Pty Ltd. (BJE)
CAPEX	Capital Expenditure
CBO	Community Based Organisations
COGTA	Department of Cooperative Government and Traditional Affairs
CORDEX	Coordinated Regional Downscaling Experiment
DAFF	Department of Agriculture, Forestry and Fisheries
DM	District Municipality
DMR	Department of Mineral Resources
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EWR	Environmental/Ecological Water Requirements
GT	Graduate Trainee
HDI	Historically Disadvantaged Individual
IAPs	Invasive Alien Plants
IDP	Integrated Development Plan
IWA	International Water Association
iX	iX Engineers Pty Ltd.
JV	Joint Venture
KZN	KwaZulu-Natal
OPEX	Operational Expenditure
MMC	Member of the Mayoral Committee
MWAAS	Mhlathuze Water Availability Assessment Study
NGO	Non-Governmental Organisation
NRW	Non-Revenue Water
NWRP	National Water Resource Planning
PRV	Pressure Reducing Valve
PSP	Professional Service Provider
RBM	Richards Bay Minerals
SAM	Study Administration Meeting
SANParks	South African National Parks
SASRI	South African Sugarcane Research Institute
SAWS	South African Weather Service
SSC	Strategy Steering Committee
ToR	Terms of Reference
TSG	Technical Support Group
URV	Unit Reference Value
VAT	Value Added Tax
WAA	Water Availability Assessment
WCWDM	Water Conservation and Water Demand Management
WfW	Working for Water
WRP	WRP Consulting Engineers Pty Ltd.

WRSM	Water Resource Simulation Model
WRPM	Water Resources Planning Model
WRYM	Water Resources Yield Model
WSA	Water Service Authority
WSS	Water Supply System
WTW	Water Treatment Works
WWTW	Waste Water Treatment Works
WUA	Water User Associations

LIST OF UNITS AND SYMBOLS

km	Kilometre
ℓ//s	Litres per Second
Mℓ/day	Mega Litres per Day
m	Metres
mm	Millimetres
m^3/a	Cubic Metres per Annum
m^3/s	Cubic Metres per Second
%	Percentage
R	Rand
R/h	Rand per Hour
R/km	Rand per Kilometre

1 INTRODUCTION

1.1 Background to the Project

A reconciliation strategy study has been developed for the Richards Bay and its surrounding areas. The main objective of the study was to compile a Reconciliation Strategy that identified and described water resource management interventions that could be grouped and phased to jointly form a solution to reconcile the water requirements with the available water for the period up to the year 2040.

The development of the strategy required reliable information on the water requirements and return flows (wastewater) as well as the available water resources for the current situation and likely future scenarios for a planning horizon of thirty years. The strategy inter alias covered all aspects of monitoring and assessing water requirements, as well as planning and implementation of water use efficiency options, schemes to provide supplementary water, implementation of the Reserve, groundwater utilization, decision making, funding, stakeholder commitment. For more background information about the strategy see Report No P WMA 06/W100/00/3114/5, “Richards Bay Reconciliation study”, dated February 2016. More documents are available on the DWS internet website, with the link *http://www.dwa.gov.za/Projects/RichardsBay/.* For the strategy to be implemented and to remain relevant to properly fulfill its purpose into the future it has to be dynamic, hence the water balance situation needs to be continuously monitored and the strategy has to be regularly updated and maintained. This ensures’ that intervention planning can be implemented taking into account of any changes that may have an impact on the projected water balance.

1.2 Objectives

This Study follows on the Study Water Reconciliation Strategy for Richards Bay and Surrounding Towns (2016). The overall objective of this Study is to ensure that the original Strategy remains dynamic with continuous updates and improvements as changes occur in order for it to remain relevant, technically sound, economically viable and socially acceptable and sustainable. This ensures that intervention planning can be implemented taking into account of any changes that may have an impact on the projected water balance.

1.3 Study Area

The Study Area includes the Mhlathuze catchment as illustrated in **Figure 1-1**. The main focus will be the Richards Bay urban area, and the smaller towns surrounding Richards Bay.

A query was made at the Study Briefing Session in the proposal stage as to why the locality map had included catchments to the south of the Mhlathuze catchment. It was minuted that the small towns in these catchments (Mlalazi and Matigulu rivers) should be addressed on a reconnaissance level of detail. These small towns are Eshowe, Mtunzini, Amatikulu and Gingindlovu. Inter catchment transfers from the Umfolozi and Thukela catchments will also be addressed in the Study, and as a result, these catchments will also form part of the Study Area for specific considerations.

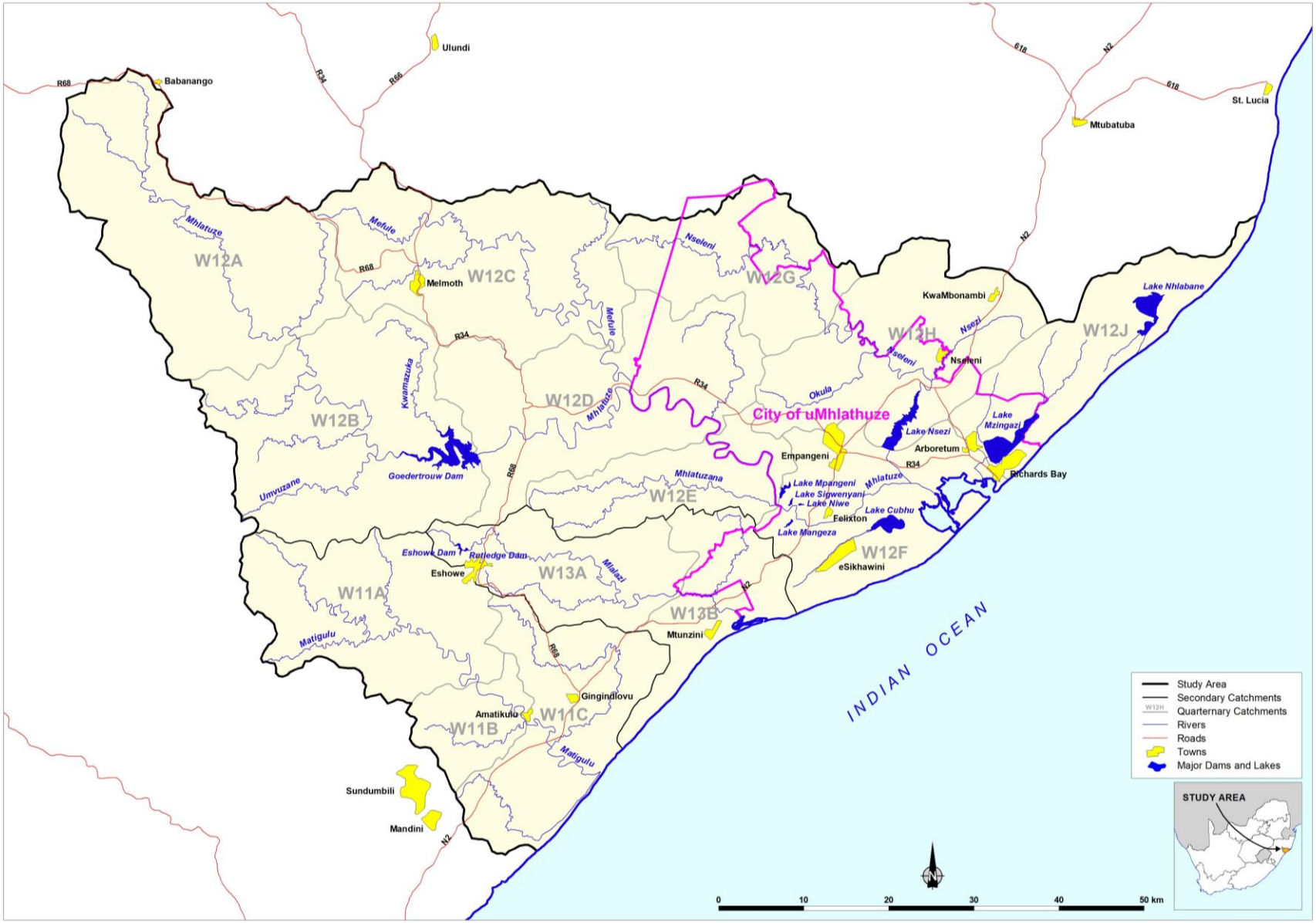

Figure 1-1: Study Area

1.4 Appointment of Consultant

Proposals for the appointment of a Professional Services Provider (PSP) for the *Implementation and Maintenance of the Water Reconciliation Strategy for Richards Bay and Surrounding Towns for a period of 36 Months*, were invited by the Directorate: National Water Resource Planning (NWRP) of the Department of Water and Sanitation (DWS) during June 2017. A Technical and Financial Proposal was submitted for the Study on 13 July 2017 by the BJE/iX/WRP Joint Venture (JV) comprising:

- Black Jills Engineers Pty Ltd. (BJE);
- iX Engineers Pty Ltd. (iX), and
- WRP Engineers Pty Ltd. (WRP) (Now part of the EOH group of companies).

The JV will be supported by the following specialists:

- Kayamandi Development Services (Demographics and Socio Economics);
- Anelle Lotter (Stakeholder Engagement);
- Delana Louw (Environmental Water Requirements (EWR) and the Ecological Reserve);
- Karim Sami (Groundwater Specialist);
- Henriette Anderson (Dam Specialist) and
- Peer Reviewers.

During November 2017, the BJE/iX/WRP JV was notified that it was considered for appointment for the Study, subject to the conclusion of a Professional Services Contract Agreement between the DWS and BJE/iX/WRP JV. A Professional Services Contract Agreement was concluded and signed on 11 December 2017.

1.5 Inception Report

In terms of the technical approach and methodology proposed in the Study Proposal, the proposed work was structured into fourteen (14) tasks of which an Inception Report was one of the deliverables.

This Report comprises the Inception Report and Study Plan in fulfilment of the deliverables of the scope of work.

1.6 Department of Water and Sanitation Study Management

To ensure the successful implementation of the Study, the DWS will facilitate the establishment of a Strategy Steering Committees (SSC) for the Study. For the SSC to achieve its objectives, technical, scientific and administrative support will be required. This

support will be provided by the Technical Support Group (TSG), which will include relevant DWS Directorates (National and Regional Office) and local stakeholders knowledgeable of the particular technical aspects relevant to the Study and the PSP who will be appointed and co-opted into the TSG.

The activities of the PSP will be managed by the DWS Directorate: NWRP.

2 SCOPE OF WORK: PROPOSED APPROACH AND METHODOLOGY

2.1 Revised Scope of Work

Some minor aspects of the BJE/iX/WRP JV Study Proposal were changed based on requests made at the First Study Administration/Management Committee Meeting on 17 January 2018. These proposed changes were considered in more detail, and were confirmed at an Interim Inception Report Meeting between the DWS Study Manager and the Team (1 February 2018). A comparison of BJE/iX/WRP JV Study Proposal and Revised Scope of Work is presented in **Table 2-1**.

The Study Programme was revised to be in line with the Revised Scope of Work. The Revised Study Programme is shown on **Figure A-2** in **Appendix A**.

The total Study Budget will remain unchanged.

Table 2-1: Comparison of BJE/iX/WRP Joint Venture Proposal and Revised Scope

BJE/IX/WRP Joint Venture Proposal	Revised Scope
Site Visit: No provision made	Site Visit: PSP to arrange as required back to back with meetings.
No Preliminary Strategy proposed for	Preliminary Strategy in the form of expanded status report after 12 months
Study Meetings: TSG Meetings x 6 (3 to be held in the Study Area) SSC Meetings x 6 (3 to be held in the Study Area)	Study Meetings: TSG Meetings x 12 (6 to be held in the Study Area) SSC Meetings x 6 (6 to be held in the Study Area)

2.2 Overview of the Revised Study Tasks

The Study tasks are presented in **Table 2-2** below.

Table 2-2: Proposed Study Tasks

TASK NO.	TASK DESCRIPTIONS	DELIVERABLES
1	Inception	Inception Report (Report No. 1)
1.1	Literature Review	Chapter in Inception Report (Report No. 1)
2	Demographics and Socio-Economic Analyses	Updated population figures and growth scenarios Demographics and Socio-Economic Analyses Report (Report No. 2)
3	Water Requirements and Return Flows	Updated current and future water requirement database for different water use sectors Water Requirements and Return Flows Report (Report No. 3)
4	Water Conservation and Water Demand Management	Municipal and water resource monitoring network expansion plan Improved data capturing recommendations Water Conservation and Water Demand Management Report (Report No. 4)
5	Groundwater Assessment / Optimization of Supply from Natural Lakes (Surface Groundwater Interface Assessment	Chapter in Water Resources Report (Report No. 5)
6	Water Quality Assessment	Chapter in Water Resources Report (Report No. 5)
7	Water Resource Analysis	Water Resources Status Quo Assessment Module Water Resource Analysis Module Water Resources Report (Report No. 5)
8	Infrastructure and Cost Assessment	Infrastructure and Cost Assessment Report
8.1	Pre-Feasibility Comparison of Options	Chapter in Infrastructure and Cost Assessment Report (Report No. 6)
8.2	Cost Assessment	Chapter in Infrastructure and Cost Assessment Report (Report No. 6)
8.3	Socio-Economic Impact	Chapter in Infrastructure and Cost Assessment Report (Report No. 6)
9	Updated Reconciliation Strategy	Updated Reconciliation Strategy Report (Report No. 7), including a chapter addressing small towns.
10	Executive Summary: Reconciliation Strategy	Executive Summary: Updated Reconciliation Strategy Report (Report No. 8)
11	Ad Hoc Support	Memos summarizing results
12	Training and Capacity Building	Training Material Training Report (Report No. 9)
13	Stakeholder Engagement	Stakeholder Database Strategy Steering Committee (SSC) (6 Meetings) Possible public meetings (2 Meetings) Newsletters/Media releases Web update and access arrangements

TASK NO.	TASK DESCRIPTIONS	DELIVERABLES
14	Study Management	
	Study Administration Meetings	Reports and Minutes of Meetings (12 meetings)
	Study Technical Support Group	Reports and Minutes of Meetings (12 meetings)
	Quarterly Progress and Annual Status Reports	Quarterly Progress Reports Annual Status Reports
	Financial	Invoices, Budgets, etc.

The Logical Flow Diagram highlighting the broad flow of information between the proposed tasks is provided in **Appendix A (Figure A-1)**. The Study will be undertaken over a period of thirty-six (36) months from the date of appointment (11 December 2017), with a preliminary strategy in the form of an expanded status report being made available after the first 12 months. The Detailed Study Programme, indicating the task duration and specific milestones, is provided in **Appendix A (Figure A-2)**.

3 DETAILED TASK DESCRIPTIONS AND DELIVERABLES

3.1 Task 1: Inception

Task Leader: Ms L Louw

3.1.1 Objectives

A literature review was performed to identify and review all available relevant information. Stakeholders will be identified and confirmed. Agreement and approval were obtained from DWS for the Study tasks approach/methodology, work processes and programmes, budget, Study management and administration functions, as well as individual responsibilities of the key members of the Study Team.

3.1.2 Approach

The following activities were undertaken as part of this task:

- During the previous Water Reconciliation Strategy for Richards Bay and Surrounding Towns Study an indepth Literature Review was undertaken and presented a list of relevant reports/documentation totaling 55 elements. This list was expanded on as part of this Study to include subsequent information available since the completion of the Reconciliation Strategy Report (2016). The updated reports that were obtained and reviewed are presented in **Table 3-1**.
- An exhaustive list of Stakeholders included in the meetings of the Water Reconciliation Strategy for Richards Bay and Surrounding Towns Study was compiled. The list was assessed in terms of individuals still performing a relevant role, and agreement on the TSG and the SSC members was obtained.
- The training structure and the individual/s from the DWS to benefit from skills transfer during the Study were agreed upon.
- Relevant authorities (refer to **Table 3-2**) were contacted as part of the data and information sourcing exercise.
- Agreement and approval were obtained from the DWS for the Study tasks approach/methodology, work processes and programmes, budget, Study management and administration functions, as well as individual responsibilities of the key members of the Study Team.

Table 3-1: Information and Reports Reviewed

Item	Report Name	Owner	Year	Relevance to Study
Water Reconciliation Strategy for Richards Bay and Surrounding Towns				
1	Inception Report (109343/9167)	DWS	2014	Updated Reconciliation Strategy
2	Water Requirements P WMA 06/W100/00/3114/1	DWS	2015	Water Requirements
3	Water Balance P WMA 06/W100/00/3114/2	DWS	2015	Water Resources
4	Screening of Options P WMA 06/W100/00/3114/3	DWS	2015	Infrastructure
5	Scenarios Evaluation P WMA 06/W100/00/3114/4	DWS	2015	Water Resources
6	Reconciliation Strategy P WMA 06/W100/00/3114/5	DWS	2016	Strategy
7	Literature Review Report (109343)	DWS	2014	Background
8	Yield Analysis Report	DWS	2015	Water Resources
9	Water Reuse Report	DWS	2015	Infrastructure
10	Preliminary Reconciliation Strategy	DWS	2015	Strategy
Water Resources				
11	Status Quo of Water Resources in Mhlathuze Catchment	Mondi	2016	Water Resources
Reserve Determination Studies for Selected Surface Water, Groundwater, Estuaries and Wetlands in the Usutu/Mhlatuze Water Management Area				
12	Summary of Relevant EWR Information for Mhlatuze and Nhlabane Estuaries RDM/WMA6/CON/COMP/2013	DWS	2015	Ecological Water Requirements
13	Determination of Water Resource Classes and Associated Resource Quality Objectives in the Usuthu and Mhlathuze Catchment. Terms of Reference, Bid Number: WP 11264	DWS	2017	Ecological Water Requirements
14	Final Allocation Schedule in Terms of Section 47 of the National Water Act, 1998 for the Mhlathuze River Catchment, Government Gazette no. 38599, 25 March 2015	DWS	2015	Water Requirements
Annual Operating Analyses				
15	Water Supply and Drought Operating Rules for Stand-Alone Dams and Schemes Typical of Rural/Small Municipal Water Supply Schemes: Eastern Cluster: The Eshowe Water Supply Scheme: Rutledge and Eshlazi Dams	DWS	2015	Water Resources
16	IWRP Maintenance and support Services: Annual Operating Analysis for the Mhlathuze WSS	DWS	2017	Water Resources
Water Allocations				
17	Final Allocation Schedule in Terms of Section 47 of the National Water Act, 1998 for the Mhlathuze River Catchment, Government Gazette No 38599, 25 March 2015	DWS	2015	Water Requirements
18	Background detailed tables of final schedules per individual user	DWS	2015	Water Requirements

Table 3-2: Consultation and Peer Review

Institution or Specialist	Subject Consulted On	Comment
DWS NWRP	Study related reports and information	Reports and information received
Mhlathuze Water	System layout and updated water use	In process of receiving info
J Schroeder (AECOM)	System Models and annual operating analyses	Reports and model configurations provided
uMhlathuze Water Stewardshiip Partnership	Stakeholder engagement in the catchment	In process of receiving info
Norman Ward (DWS KZN Office)	System Layout, Lake operations and monitoring, Interventions	Information provided
WWF, Farmers	Recent rainfall data	In process of receiving info
City of Mhlathuze LM	System layout and updated water use	In process of receiving info

The outcomes of the information and reports reviewed listed in **Table 3-1** have been consolidated into this Inception Report, which will form the basis for the rest of the execution of the Study and will serve as the baseline against which progress of each task can be monitored and evaluated. This Inception Report becomes the Revised Terms of Reference for the remaining phases and tasks of the Study.

3.1.3 Deliverables: Task 1

- Report No. 1: Inception Report (this report).

3.2 Task 2: Demographics and Socio-Economic Analyses
Task Leader: Ms N Churr

3.2.1 Objectives

Focus on reviewing the population and growth modelling undertaken in the first Reconciliation Strategy based on the latest information available. All existing documents, reports and latest data will be utilised where applicable.

3.2.2 Approach

Identification, sourcing and reviewing background information and base data will be undertaken. Information to be obtained to compile the demographic profile includes population, number of households, household size, income levels, etc. Information will also be obtained on historical trends in the area relating to birth and death rate, migration, urbanisation, etc. A trend analysis will be undertaken to compare the findings with the

demographic scenarios from other recent studies and recommendations will be made regarding further possible updates.

3.2.3 Deliverables: Task 2

- Report No. 2: Demographics and Socio-Economic Analyses Report
- Presentation
- Specialist/Peer Review Report or Summary

3.3 Task 3: Water Requirements and Return Flows
Task Leader: Ms S Barnard

3.3.1 Objectives

Since the completion of the Water Reconciliation Strategy for Richards Bay and Surrounding Towns Study (2016), updated allocations for all users in the Mhlathuze River Catchment have been Gazetted following a Compulsory Licensing Exercise. These new allocations will need to be incorporated as part of the Water Requirements and Return Flows Assessment.

3.3.2 Approach

The following sub-tasks will be undertaken.

3.3.3 Task 3.1: Domestic (Urban/Rural)

A review of the current and future water requirements for the different water use sectors will be undertaken as part of this task. The water requirement and return flows information from the first phase of the DWS *Richards Bay Reconciliation Study* will be used as the starting point. The most recent recorded historical recorded water use and return flow volumes will be sourced, and compared to the existing water requirement and return flow projections for the identified water supply zones and drainage areas.

Information sources will include but are not limited to the following:

- First Phase DWS Richards Bay Reconciliation Study.
- DWS All Towns Reconciliation Strategies for the Eastern Region (Phases 1 and 2).
- DWS Blue Drop Reports.
- DWS Green Drop Reports.
- District and Local Municipalities (liaison and planning documentation).

The results of the comparison together with the outcome of the demographics analysis (Task 2) will be analyzed and will be a key input in updating the water requirement projections based on the difference analysis approach. The water requirement projections will be updated to 2045 for the accepted scenarios. Recommendations regarding the future updating of the water requirement projections will be made.

3.3.4 Task 3.2 Industrial

The industrial water users in the Study Area and their associated actual water use will be confirmed with the industries (Mondi Richards Bay, Tronox, Foskor, Richards Bay Minerals, Hillside and Bayside Aluminum and Richards Bay Coal Terminal). The expected future expansions and associated project water use will be confirmed with the major industries.

3.3.5 Task 3.3 Irrigation and Afforestation

The irrigation and afforestation developments have been well researched and existing information will be sourced from the past studies, including but not limited to the Mhlathuze Water Availability Assessment Study, First Phase DWS Richards Bay Reconciliation Study, Validation and Verification Study etc. The available information will be reviewed and verified with Stakeholders and any possible differences will be quantified.

The latest information from recent and current processes investigating the extent of unlawful irrigation will be sourced, reviewed and updated. The possible implications on the water resources and associated water balance will be investigated.

The possible reduction in illegal commercial afforestation in the immediate vicinity of the lakes will be investigated and the practical measures to curb illegal afforestation will be identified taking cognizance of the commercial value of the developments. The associated impact of the reduction on the water resources will be qualified.

3.3.6 Task 3.4 Invasive Alien Plants

Invasive Alien Plants (IAPs) have an impact on water resources similar to that of exotic forests in that they reduce the runoff that would have flowed in the river under natural conditions. Existing information on the IAPs in the Study Area will be sourced from the past studies, including but not limited to the Mhlathuze Water Availability Assessment Study, First Phase DWS Richards Bay Reconciliation Study etc. The Study Team will also liaise with the Departent of Environmental Affairs Working for Water (WfW) (National Invasive Alien Plant Survey) to source the latest survey information and information sourced from this task will be incorporated into the decision support systems for analysis purposes (Task 7).

3.3.7 Task 3.5 Environmental Water Requirements / Reserve

Activities of this task will include the collection and collation of existing Ecological Water Requirement (EWR) data for use in the Study. The available EWR data will be sourced from the DWS Directorate: Resource Directive Measures and will include the latest information available for the Study Area. The information will be evaluated by the teams EWR specialist and will then be included in the water resource models to be compiled as part of Task 7 where the yield analysis scenarios will be undertaken.

3.3.8 Deliverables: Task 3

- Report No. 3: Water Requirements and Return Flows Report.
- Presentation
- Specialist/Peer Review Report or Summary

3.4 Task 4: Water Conservation and Water Demand Management
Task Leader: Mr N Zondo

3.4.1 Objectives

Review the status quo of water conservation and water demand management (WCWDM) in the respective water supply systems. The review will include the update of each system's water resource and water loss balance diagram, assess the progress made with the implementation of existing WCWDM strategies and business plans and review the savings achieved to date. The water supply systems in the Study Area will be covered.

3.4.2 Approach

The following sub-tasks will be undertaken.

3.4.2.1 Task 4.1 Status Quo Assessment

The relevant Authorities (City of uMhlathuze Local Municipality, Mhathuze Water, and others) in the Study Area will be contacted to collect and collate the latest WCWDM information. This will be followed-up with a meeting to ensure the information is correctly understood and to fill any gaps.

WCWDM information that will be gathered include:

- The International Water Association's (IWA) latest water balance information as prescribed by DWS for each system

- The latest water resource balance diagram for each system which is aligned to the respective reconciliation or all town Study
- The WSA's latest WCWDM strategy and business plan
- Progress and completion reports on WCWDM interventions

3.4.2.2 Task 4.2 Municipal Monitoring Network

A preliminary assessment of the level of water use efficiency and the level of Non-Revenue Water (NRW) in the uMhlathuze WSS carried out in the initial Strategy Phase, indicated that the total system losses are high. It was estimated that the total system losses in the WSS is approximately 31% of the treated water production. This translates to approximately 5.3 million m^3/a (14.7 Mℓ/d).

The uMhlathuze Municipality has implemented some water conservation and water demand management measures (WCWDM) in Richards Bay. Some municipal personnel are dedicated to water loss management, although it has not been formally institutionalised. The current measures include measuring of NRW as well as passive leakage detection based on responding to consumers reporting any leaks. Some of the supply zones also have Pressure Reducing Valves (PRVs) which have fixed outlets with constant head on the downstream of the valves.

Their 5-year Strategic Management Plan for the implementation of WCWDM is in place and has identified that a target of about 19% NRW is the minimum practical achievable goal, as it would become prohibitively expensive to better that target.

The status of previous recommendations regarding monitoring will be confirmed and recommendations made for any additional areas identified for expansion. Recommendations regarding automated near-real-time monitoring and web-based data capturing for simplifying data capturing and sharing will be made.

3.4.2.3 Task 4.3 Assessment of Results

Based on the results from the previous sub-tasks, conclusions and recommendations will be made on the way forward. Conclusions and recommendation will include the following:

- Progress made with the reduction of water losses, non-revenue water and improvement of water use efficiency;
- The impact or potential impact of WCWDM on water security in terms available supply and demand;
- Ensuring the status quo, targets, interventions, budgets and timelines are included in the WCWDM strategy and business;

- Ensuring the WCWDM strategy and business plan are funded and included in the Integrated Development Plan;
- Ensuring the WCWDM strategy and business plan have political support;
- Ensuring the results from projects indicate the savings, cost benefits, lessons learnt, sustainability and way forward.

3.4.2.4 Task 4.4 WSA Feedback

Reconciliation progress meetings are often not attended by WSAs which is a problem in terms of WCWDM. The objective of this task will be to arrange biannual feedback sessions for the WSAs specifically on WCWDM. The project team will ensure the meeting is attended by at least the technical director, MMC for Infrastructure (water), finance department, DWS head office and regional office.

The results from the above-mentioned tasks will be compiled in a single report for each WSA which will be updated biannually with the latest information.

3.4.3 Deliverables: Task 4

- WCWDM Status Quo Assessment Module;
- WCWDM Assessment Module;
- Report No. 4: Updated Water Conservation and Water Demand Management Plan.
- Presentation
- Specialist/Peer Review Report or Summary

3.5 Task 5: Groundwater Assessment

Task Leader: Mr K Sami

3.5.1 Objectives

The WAA Study identified a need to incorporate groundwater features from the groundwater lake module into WRYM to determine a combined system yield. EWRs will also have to be incorporated into the yield analyses. The model will be updated with revised abstraction, lake water level, and inflow and outflow estimates.

3.5.2 Approach

The Zululand coastal plain has groundwater development potential and could be developed for future water supply. However, it is not recommended that this water be used for large groundwater abstraction schemes in the vicinity of the coastal lakes due to the reduction of

inflows into the lakes. The average borehole yield varies between 0.5 and 2.0 ℓ/s in the coastal aquifer, however, much higher yields are obtained from boreholes tapping the underlying Miocene conglomerates/coqina. The groundwater quality is very good but the shallow water level and hydraulic continuity of the coastal aquifer makes the aquifers vulnerable to groundwater contamination.

The Miocene aquifer underlies the coastal sands on the coastal margin and sits above low permeability siltstones of the Zululand Group. It attains a thickness of up to 10 m and yields of over 15 ℓ/s are possible,

On the coastal plain in the vicinity of Richards Bay, surface-groundwater interactions are dominated by a system of lakes. The coastal lakes are lakes Mzingazi, Nhlabane, Nsezi, Cubhu and Mangeza. The hydrology of the lakes is influenced by the regional groundwater system through baseflow into adjacent streams flowing into the lakes, and by direct seepage from the aquifers into the lakes. Consequently, groundwater forms an integral part of the water resources of the catchment.

The coastal lakes Cubhu, Mzingazi and Nhlabane are perceived to be extensions of the local groundwater. They are considered to have a strong interaction with the primary aquifer that underlies the coastal plain. These lakes are fed by direct rainfall interception, limited surface runoff from riparian zones, streamflow and groundwater seepage. As surface runoff is almost non-existent due to the sandy nature of the coastal plain, it is likely that water in streams flowing towards the lakes is also derived from groundwater baseflow; hence groundwater is also a significant component of stream inflows and warrants a specific modelling approach.

The lake water balance model developed during the Mhlatuze WAA Study to simulate lake levels and lake discharges will be updated and utilized as part of this Study. This model is compatible with input data from WRSM2000, and generates outputs that can be incorporated into WRSM2000 or the WRYM. It simulates the impacts of surface and groundwater abstractions on the lake water balance and lake levels, which are calibrated against lake level data and discharges.

3.5.3 Deliverables: Task 5

- Groundwater Assessment Module
- Chapter in Water Resources Report (Report No. 5)
- Presentation
- Specialist/Peer Review Report or Summary

3.6 Task 6: Water Quality Assessment

Task Leader: Mr C Talanda

3.6.1 Objectives

Current status quo and trends will be determined and reported on. Potential problem areas will be highlighted.

3.6.2 Approach

The collection and collation of existing water quality information from recent studies of water quality monitoring programs for each of the water resource systems. This information will be checked against the water quality status information in the original strategies and recommendations will be made accordingly. It has been requested that the following three aspects will be focused on from a water quality perspective microbial, salinization and nutrients. The ability to achieve this will depend on the availability of data.

3.6.3 Deliverables: Task 6

- Water Quality Assessment Module
- Chapter in Water Resources Report (Report No. 5)
- Presentation
- Specialist/Peer Review Report or Summary

3.7 Task 7: Water Resource Analysis

Task Leader: Ms C Seago

3.7.1 Objectives

The WRYM decision support systems will be used to determine the sustainable yields of the Coastal Lakes and also revise and optimize operating rules of the Lakes with the focus of optimizing the yield of the Richards Bay Water Supply System.

Water resource analysis will also be undertaken to support the three prefeasibility infrastructure investigations (Task 8) identified by the Reconciliation Strategy:

3.7.2 Approach

Task 7 will be carried out under a number of sub-tasks.

3.7.2.1 Task 7.1 Water Resource Monitoring Network

Information on the water resource monitoring network will be reviewed from past studies that have been undertaken in the area. Discussions will also be arranged with DWS to confirm the status quo of the monitoring network as well as areas where the network should be expanded for operational and long-term planning purposes. The current status as well as recommendations regarding the expansion of this system will be made.

A brief assessment of the flow and rainfall monitoring stations currently operational in the Study Area has been undertaken. The existing hydrology was derived using a total of 98 rainfall stations and represented the time period from 1920 to 2004 (hydrological years). Of those 98 stations, only 20 were still open and operational in 2004. Of those 20, a further 8 closed between 2004 and 2011. Data for the 12 stations open in 2011 is available from DWS through the Rainfall Management Framework. SAWS was contacted and it appears that rainfall data for approximately half of the 12 stations is available from them for the period between 2011 and 2017. This data would have to be purchased, and the cost has not been provided for in the Study budget. The available rainfall data will first be used to assess the rainfall trend after 2004. The results will be presented to the Client, after which a decision can be made whether it is worthwhile purchasing the additional data.

In terms of streamflow monitoring, the following stations are part of the DWS Real Time Monitoring network:

- W1R001: Mhlatuze at Goedertrou Dam
- W1H028: Outflow from Goedertrou Dam
- W1H029: Left Canal from Goedertrou Dam
- W1H030: Right Canal from Goedertrou Dam

The verified data available indicates the following:

- W1H032: Mhlatuze River @ Umhlatuze Valley, 1993-02-02 to 2017-08-24
- W1H038: Stewards Farm, 2003-07-29 to 2017-08-30
- W1H039: Mfuli , 2006-05-09 to 2016-11-16
- W1L001: Stewards Farm, 2003-07-29 to 2016-06-08
- W1L002: Mfuli, 2006-05-09 to 2016-01-2

3.7.2.2 Task 7.2 Water Resource Analysis

The latest developed hydrology as well as the Water Resources Yield Model (WRYM) configuration from the MWAAS Study (conducted by a member of the Study Team) as well as subsequent WRYM updates from the First Phase DWS Richards Bay Reconciliation

Study and other projects have been sourced. The latest versions of the Water Resources Planning Model (WRPM) from the annual operating analyses and the First Phase DWS Richards Bay Reconciliation Study have been sourced. These will be reviewed and utilized to investigate the current water availability in the Study Area. The Study Team will also liaise with Mhlathuze Water regarding any recent water resource analysis studies undertaken by them for consistency and alignment purposes.

The interaction between surface water and groundwater recharge is an important component of the water availability in the Lakes. This interaction will be investigated as part of the Groundwater Assessment (Task 5) and the results of this assessment will be incorporated into the analysis.

Possible scenarios that may be analyzed may include (but not limited to):

- Implication of alternative EWRs on system yields.
- System yield improvement due to IAP removal.
- Impact of unlawful irrigation and afforestation.

Water resource analysis will also be undertaken to support the three prefeasibility infrastructure investigations (Task 8) identified by the Reconciliation Strategy:

- **Thukela Water Supply Options (Thukela Middledrift Scheme or the Lower Thukela Coastal Pipeline):** The existing Thukela–Mhlatuze Transfer Scheme transfers water from the lower Thukela River into the upper reaches of the Goedertrouw Dam Catchment. The Water Reconciliation Strategy Study for the KZN Coastal Metropolitan Area (KZN Recon Study) estimated the excess/available yield in the Lower Thukela River System. Some of this water has been targeted to address the water requirements in the Illembe DM. The water availability from the Lower Thukela for further identified transfer phases considering existing and planned developments for the transfer to the Vaal River System, frequency of current Thukela transfers to the Vaal and status of current demands in the Thukela will be investigated and analysed.
- **Dam Development on Lower Mfolozi (Mfolozi Off-channel Dam)**: Currently the only transfer to the Study Area is the existing transfer from the Mfolozi River to Lake Sokhulu which is operated by the industrial user Richards Bay Minerals (RBM). The water is abstracted from the Mflolozi River by means of a run-of-river diversion facility. The Mfolozi Off-Channel dam has been identified as an intervention and existing WRYM configuration and hydrology will be reviewed, tested and utilized to conduct yield analysis investigations for the potential development option on the Mfolozi River system. Note that no details on the yield assessment method of the Mfolozi System

could be found in the DWS report "Water Reconciliation Strategy for Richards Bay and Surrounding Towns Yield Analysis Report, April 2015.

- Desalination (no water resource analysis).

3.7.2.3 Task 7.3 Climate Change

Climate change is globally acknowledged as uncertain phenomenon that could impact on the hydrological processes. An improved climate change, vulnerability and qualitative risk assessment may be undertaken for the Study Area pending the availability of the Coordinated Regional Downscaling Experiment (CORDEX) models and the approved future climate change scenarios. An attempt was made to further discuss this task with the Climate Change Section at DWS during the inception phase. It was not possible to obtain a suitable time to meet. Further discussions will take place during the Study.

3.7.3 Deliverables: Task 7

- Water Resources Status Quo Assessment Module
- Water Resources Analyses Module
- Report No. 5: Water Resource Analysis Report
- Presentation
- Specialist/Peer Review Report or Summary

3.8 Task 8: Infrastructure and Cost Assessment
Task Leader: Mr E Serfontein

3.8.1 Objectives

The status quo of relevant existing infrastructure will be established. Key socio-economic and economic issues, concerns and impacts for the proposed intervention options will be identified, as well as the benefits and losses from the proposed development(s) taking into consideration the no-go option.

Cost assessments included in DWS Report No P WMA 06/W100/00/3114/5, "Richards Bay Reconciliation Study", dated February 2016, will be reviewed and updated. The updated CAPEX and OPEX will be used to assess the economic viability of the identified schemes.

3.8.2 Approach

Task 8 will be carried out under a number of sub-tasks.

3.8.2.1 Task 8.1: Pre-Feasibility Comparison of Options

This Study will focus on reviewing, refining and updating the following options identified in DWS Report No P WMA 06/W100/00/3114/5, "Richards Bay Reconciliation Study", dated February 2016, including cost estimates:

- Tugela Water Supply Options (Thukela Middledrift Scheme or the Lower Thukela Coastal Pipeline)
- Dam Development on Lower Mfolozi (Mfolozi Off-channel Dam)
- Desalination of Sea Water
- Re-use of Water

Taking cognizance of the results of Task 7 (Water Resource Analysis) a pre-feasibility comparison of the Tugela water supply options versus dam development on the Lower Mfolozi will be performed. Under the pre-feasibility Study the current availability of Thukela River water and the water available for later transfer phases will be reviewed and the existing and planned developments for transfer to the Vaal River System will be evaluated, including the frequency of Thukela water being transferred to the Vaal System, as well as other water demands from the Thukela River System.

Tugela Water Supply Options (Thukela Middledrift Scheme or the Lower Thukela Coastal Pipeline)

During the drought of 1994 the Thukela emergency transfer scheme was implemented and aimed to deliver 37 million m^3/a (1.2 m^3/s) to the Mvuzane stream, a tributary of the Mhlatuze River, from where the water flows down to Goedertrouw Dam. The scheme includes a run-of-river abstraction works in the Thukela River near Middledrift and a low-lift pump station, a high-lift pump-station (Madungela), a 13.7km long 1.5m diameter pipeline, and a second high-lift pump-station (Mkhalazi) to pump the water over the watershed, through a 3.5km, 800mm diameter rising main pipeline and a 1km, 600mm diameter gravity main pipeline.

Dam Development on Lower Mfolozi (Mfolozi Off-channel Dam)

The mining ponds at RBM's Zulti North mine are currently supplemented by raw water from the Mfolozi River, in addition to the supply from Lake Nhlabane. The RBM run-of-river abstraction works is located close to the Mfolozi estuary. Water is pumped from RBM's Monzi pump station to their mining operation. Their Sokhulu off-stream storage dam has been demolished to allow re-mining but will likely be rebuilt in 2017.

Desalination of Sea Water

Desalination is regarded as the eventual source of water for coastal cities and towns. A desktop evaluation of desalination of sea water was included in DWS Report No P WMA 06/W100/00/3114/5, "Richards Bay Reconciliation Study", dated February 2016. It was identified as an intervention option that can significantly increase the yield of the water supply system. This intervention option identified for further evaluation entails the following:

- Seawater will be fed by an intake in the Richards Bay harbour or a marine intake to a site close to the Alkantstrand pump station, where the reverse osmosis desalination plant will be situated. Subsequent to the issue of the above report, a 10Mℓ/day plant has been constructed. DWS officials have been contacted to source information, since no information is available on DWS website.
- Potable water will be pumped to the Mzingazi WTW for blending and distribution.

The desalination of sea water was also included in the Strategy Implementation Plan.

This reconciliation strategy will focus on reviewing and updating desalination of sea water intervention options, including cost estimates. All existing documents and reports will be utilised wherever possible and the latest available data will be obtained.

Taking cognizance of the recently constructed desalination plant, the desktop evaluation will confirm the capacity of the plant and evaluated storage and distribution infrastructure and intake/outfall arrangements. Aspects to be considered include energy supply, environmental impacts and potential co-location with power plants, wastewater treatment plants and other facilities with water intake or outfall structures.

Re-use of Water

The City of uMhlathuze applies very limited treatment of wastewater before discharge into the sea. The two sea-outfall pipelines are owned and operated by Mhlathuze Water. There is potential for reuse of the treated effluent from the Mondi Richards Bay waste water treatment works, in addition to the effluent from the town, particularly by industries such as Foskor, Bayside and Hillside Aluminium, for cooling purposes. A desktop evaluation of the re-use of treated effluent was included in DWS Report No P WMA 06/W100/00/3114/5, "Richards Bay Reconciliation Study", dated February 2016.

This Study will focus on reviewing and updating re-use of water options, including cost estimates. The WWTW's will be identified in the Study Area and both indirect and direct re-use will be considered as potential options. The use of treated wastewater effluent requires further treatment as well as an understanding of the nature of the sanitation drainage area. Only drainage areas where about 90% of the effluent volume is generated by domestic users

can be considered for re-use. Industrial effluent has health implications and can impact on the membrane treatment processes needed for direct re-use.

The following activities will be undertaken as part of this task:

- The key WWTW in the Study Area that have potential for re-use will be identified.
- Collate/confirm current and future water volumes and expected water qualities from the WWTW.
- The current and future Mondi effluent volumes and qualities will be collated/confirmed.
- Identify industries with the potential to re-use effluent for industrial purposes.
- Provide updated costs of additional treatment required for re-use.

3.8.3 Deliverables: Task 8.1

- Infrastructure Status Quo Assessment Module

3.8.3.1 Task 8.2: Cost Assessment

Subsequent to Task 8.1 the cost assessments included in DWS Report No P WMA 06/W100/00/3114/5, “Richards Bay Reconciliation Study”, dated February 2016, will be reviewed and updated.

The output from this task will be updated capital costs (CAPEX) and an estimate of the operational and maintenance costs (OPEX). The updated CAPEX and OPEX will be used to assess the economic viability of the identified schemes. These costs will then serve as input in to calculation of the unit reference values (URV), i.e. the costs will be discounted at three values for the discount rate and the net present costs and URV’s will be calculated.

The scheme with the lowest URV will be the preferred option from an engineering economic point of view.

3.8.4 Deliverables: Task 8

- Report No. 6: Infrastructure and Cost Assessment Report
- Presentation
- Specialist/Peer Review Report or Summary

3.8.4.1 Task 8.3: Socio-Economic Impact

An evaluation and quantification of itemised issues and concerns will be made with regard to the magnitude of the impacts utilising development criteria, economic multipliers, parameters and various economic techniques. The purpose of which will be to determine the highest

economic use, based on the underlying assumption that the allocation of resources among competing uses in society need to be quantified. In this case this requires an analysis of the role and value of water and improved assurance of supply of water in the economy, vs. no-go and consequent reduced water assurance of supply the various sectors. In other words, the trade-offs of reallocation of for instance water from forestry to downstream use, will be investigated.

The technique(s) to be used to calculate the current value will depend on the nature of the particular element (e.g. gross margin per hectare in the case of forestry land), which will include a high-level analysis of the size of land parcels affected, per type, as well as the cost implications. An input-output table/model will be used to quantify the economic impacts in terms of change in Gross Domestic Product, job creation/losses, new business sales, and return on investment. The multiplier approach takes into account the interdependence between different sectors in the local economy as well as economic flows of goods and services to and from the economy.

The impact of water utilisation and allocation regimes, altered water allocation rights, and resultant altered water use patterns and subsequent economic production changes will be included.

The results of the analyses will be interpreted and expressed as an indication of the size of the potential gains and losses in terms of economic aspects to the affected water user sectors and presented in an impact matrix that takes into consideration household impacts, affordability of water users and water utilization, water resource development options, production changes and opportunities, business development potential, water-using activities, productive use of water, the extent of sectoral linkages (interdependence) and the economy's dependence on the larger sub-region of which it forms part, etc.

3.8.5 Deliverables: Task 8.3

- Infrastructure Status Quo Assessment Module
- Socio-Economic Assessment Module
- Development Options Module
- Chapter in Infrastructure and Cost Assessment Report (Report No. 6)

3.9 Task 9: Updated Reconciliation Strategy

Task Leader: Mr C Talanda

3.9.1 Objectives

The updated information and outcomes of the Study tasks will be used to formulate alternative reconciliations scenarios (scenario and intervention analysis) which will consist of a sequence of interventions that can be implemented to reconcile the water requirements with the water resources up to 2048. Updated water balances with potential augmentation interventions will be the presented.

A reconciliation strategy implementation plan which includes a list of interventions, responsible implementation authorities and implementations status will be developed and included in the Updated Reconciliation Strategy Report.

3.9.2 Deliverables: Task 9

- Report No. 7a: Interim Reconciliation Strategy Status Update
- Report No. 7: Updated Reconciliation Strategy Report.
- Presentation
- Specialist/Peer Review Report or Summary

3.10 Task 10: Executive Summary: Updated Reconciliation Strategy

Task Leader: Mr C Talanda

3.10.1 Objectives

A standalone concise Extended Executive Summary of the Updated Reconciliation Strategy will be drafted for enhanced communication purposes.

3.10.2 Deliverables: Task 10

- Report no. 8: Executive Summary: Updated Reconciliation Strategy Report.

3.11 Task 11: Ad Hoc Support

Task Leader: Mr J van der Mescht

3.11.1 Objectives

During the course of the Study, the Study Team may be requested to undertake any other ad hoc studies and/or investigations as may be required in support of the project. As per the

TOR (support to NWRP (South)) a fixed budget has been allocated to this task. The Study leader will assess the scope of work, the resources and time that will be required to undertake the work and estimate the costs that will be involved. Upon approval by the DWS the work will then be undertaken, and a memo of the finding will be drafted.

3.11.2 Deliverables: Task 11

- Ad Hoc Support Memo 1
- Ad Hoc Support Memo 2
- Ad Hoc Support Memo 3
- Ad Hoc Support Memo 4
- Ad Hoc Support Memo 5

3.12 Task 12: Training and Capacity Building

Task Leader: Ms C Seago

Training and capacity building of staff both from the DWS and other Stakeholders is an important component of the Study. It is understood that other Reconciliation Strategy studies are also underway, and it is recommended that a coordinated approach to Training and Capacity Building be undertaken across all the studies. Budgets will be better utilized if generic aspects of training are divided up amongst all the studies. However, it is also important to train and build capacity on Mhlathuze specific related matters as part of this Study.

3.12.1 Objectives

The objectives of the training task are as follows:

- To capacitate DWS staff (focusing on Graduate Trainees) in the operations and use of the systems models used to produce elements of the strategy;
- To capacitate team members in specialist aspects specifically relating to the Mhathuze Catchment area;
- To transfer knowledge and background information to Stakeholders such that they can better understand the approach to determining the Water Reconciliation Strategy.

3.12.2 Approach and Logistics

Only formal training will take place as part of the training task for this Study. This would be in the form on lecture style training to transfer knowledge as well as specifically designed practical training relating to the operations of the systems models. Three of the four training

modules will take place at a suitable venue selected in Pretoria. The final module, designed to capacitate Stakeholders in the approach to preparation of the Strategy, will take place in Richards Bay, and will be held the day before the final SSC meeting.

During the course of the Study, aspects may arise resulting in the Study team making use of a DWS official to carry out analyses. If this situation arises, a secondment arrangement will be discussed and agreed with the Client. This will occur on an ad hoc basis.

3.12.3 Training Modules

Considering the available budget allocated for training, the following four items have been suggested for training as part of this Study:

- Groundwater-surface water interaction (Mhlathuze Lakes)
- Water Resources Yield Model (Mhlathuze specific)
- Water Resources Planning Model (Mhlathuze specific)
- Approach to Strategy Development (designed for Stakeholders)

The following outlines further details relating to the four modules.

Groundwater:

To be covered:	Groundwater-surface water interaction Lake Dynamics unique to the Mhlathuze area Modelling of groundwater
Trainer:	Karim Sami
Duration:	1 Day, 6 hours lecture, 2 hours practical
Attendees:	Up to a maximum of 10 DWS/other Stakeholders.
Location:	Pretoria

Water Resources Analyses (Yield Model):

To be covered:	Hydrology delineation of Mhlathuze catchment Water Requirements configuration in WRYM WRYM configuration and network diagram Undertaking historic yield analyses Undertaking stochastic yield analyses
Trainer:	Caryn Seago, practical support Sarlet Barnard
Duration:	3 Days, 12 hours lecture, 12 hours practicals
Attendees:	Up to a maximum of 8 DWS/other Stakeholders
Location:	Pretoria

Water Resources Analyses (Planning Model):

To be covered:	Water Requirements configuration in WRPM (growth projections) WRPM configuration Undertaking planning analyses Evaluating planning results Obtaining a system balance Inter catchment transfers
Trainer:	Caryn Seago, practical support Sarlet Barnard
Duration:	2 Days, 4 hours lecture, 12 hours practicals
Attendees:	Up to a maximum of 8 DWS/other Stakeholders.
Location:	Pretoria

Approach to Mhlathuze Strategy Development:

To be covered:	Purpose of the Strategy Role players and Stakeholders Determining water resource availability Existing users and requirements Future growth scenarios Determining future augmentation possibilities
Trainer:	Caryn Seago & support
Duration:	0.5 Day, 4 hours lecture
Attendees:	Up to a maximum of 20 DWS/other Stakeholders.
Location:	Richards Bay

3.12.4 Schedule

The training will be aligned to the tasks to which it specifically deals with. The suggested dates have been included in the Study schedule presented in **Appendix A**.

3.13 Task 13: Stakeholder Engagement

Task Leader: Ms A Lötter

3.13.1 Objectives

The stakeholder engagement activities for this Study will provide stakeholders with meaningful information to assist them to provide useful contributions so that they are a part of the process and its implementation. The stakeholder engagement activities for this Study will feed into the existing public participation engagements of the DWS in the Study Area that are currently being, or will soon be undertaken.

3.13.2 Approach

Task 13 will be carried out under a number of sub-tasks.

3.13.2.1 Task 13.1: Database of Interested and Affected Parties

The stakeholder list for previous studies undertaken by the DWS in the Study Area has been obtained from the DWS and updated. The following sectors of society have been identified / updated so as to afford them the opportunity to comment (the database will be categorised accordingly) and participate on the project.

- National government (e.g. DWS, DMR, DAFF, DEA, COGTA).
- Provincial government.
- Local government (District Municipality and Local Municipalities).
- Water Boards (Mhlathuze Water)
- Reference groups (e.g. WUAs, Irrigation Boards, Forestry SA, SANParks etc.).
- Agriculture and farmers' organisations (e.g. Agri-SA, co-operations, SASRI).
- Regional and local media
- Business and commerce (Mondi, RBM, Foskor etc.).
- Environmental bodies, both as authorities and NGOs.
- Community representatives, CBOs, development bodies.

Relevant stakeholders from previous and existing studies have been included in the stakeholder database. Some additions have also been provided by DWS (uMhlathuze Water Stewardship Partnership, South African Environmental Observation Network).

3.13.2.2 Task 13.2: Announce the Project

The project a will be widely announced. It is recommended that the first Strategy Steering Committee meeting be held as part of the announcement of the project to afford many stakeholders the opportunity to become involved. This is scheduled to take place in May 2018.

3.13.2.3 Task 13.3: Media Releases

Information about the Study will be presented in other formats such as media releases and newsletters. Media releases will be compiled at key milestones of the project to report via the media to the broader stakeholder base. Newsletters will be compiled to coincide, where possible, with each SSC meeting (i.e. 2 per year). The purpose of the newsletters will be to report on progress and to keep the broader body of stakeholders informed of the Study.

3.13.2.4 Task 13.4: Web Access

All public information (minutes of the SSC meetings, presentations delivered, news releases, newsletters) will be made available to DWS to upload on the Department's website, which will be made known to all stakeholders

3.13.3 Deliverables: Task 13

- Stakeholder Database of Interested and Affected Parties
- Strategy Steering Committee Meetings (6 meetings – 2 per annum)
- Possible Public Meetings
- Media Releases
- Web Access Arrangements

3.14 Task 14: Study Management

Task Leader: Ms L Louw

3.14.1 Objectives

The success of the Study of this nature, which requires a short turnaround time, involving a multi-discipline team of professionals preparing specialist reports for the client as well as stakeholders who become part owners of the Strategy to be developed, depends on good communication skills and acknowledged champions in water resource planning having strategic vision with sound technical understanding of the issues at hand.

3.14.2 Approach

3.14.2.1 Study Steering Committee

Liaison with the DWS Study Manager will include the following activities:

- Convening a minimum of twelve (12) Study Administration Meetings (SAMs). Most of these meetings will coincide with the twelve (12) Technical Support Group Meetings (TSGMs). Technical, administrative and financial progress reports will be presented at each of these meetings. The twelve (12) Technical Support Group Meetings will be facilitated by DWS: NWRP (with support from the PSP) and will include relevant DWS Directorates, Municipalities and other stakeholders. The purpose of the Technical Support Group (TSG) is to provide technical, scientific and administrative support to the Study Steering Committee (SSC). Half of the TSGM's will be held at a stakeholder venue to further rejuvenate stakeholder engagement. The other half will be held shortly

prior to the SSC meetings as dry runs for those meetings. These will be held in Pretoria. The Terms of Reference for the TSG and SSC are included in **Appendix C**.

- Attending and facilitate six (6) Study Steering Committee Meetings (SSCM's) including 2 possible Public Meetings (PM's) that may be required.
- Establishing interim communication (between meetings) to advise the Study Manager of, inter alia, important events or problem situations, possible changes to the scope of work, appointment of sub-consultants, etc. The SSCM's will be held at a stakeholder venue to further motivate stakeholder engagement.
- Compiling and updating the "Record of Decisions" and "Record of Requests" and ensuring that all recorded actions are attended to within the specified budget and time limits.
- Motivating the appointment of proposed new members of the consultant team to the Study Manager as and when required.
- Motivating the appointment of sub-consultants and/or co-consultants and specialists to the Study Manager.
- Implementing the appointment of the sub-consultants and/or co-consultants and specialists after approval by the Client.

3.14.2.2 Coordination of Consultant Team

The designated Study management functions will be carried out as follows:

- The Study Leader and Deputy Study Leader will be responsible for providing the direction to the Study Team in the execution of the tasks and interaction with the Client and stakeholders.
- The Deputy Study Leader will be responsible for the day-to-day coordination of the Consultant Study Team and activities will include:
  - Serving as link between DWS Study Manager and Consultant Team on administrative matters.
  - Ensuring that the sub-consultants and/or co-consultants and specialists are properly briefed by the Task Leaders prior to commencing with work.
  - Convene regular meetings with the Task Leaders as dictated by programme and progress.
  - Rendering guidance and assistance to the Task Leaders.
  - Monitoring and control of performance, programming and cost of Study, including revision of the Study Plan if and when necessary.

3.14.2.3 Performance Monitoring

A performance monitoring system will be instituted whereby all key activities under each main Task will be assigned milestone dates against which progress will be monitored. The monitoring system will basically be in bar chart format for ease of reference.

The system will allow for detecting potential problem areas at an early stage to enable remedial measures to be instituted to ensure that the Study remains on course.

3.14.2.4 Financial Control

A budget monitoring system comprising basically an interactive spreadsheet model will be used to monitor and control costs. Budgets will be assigned to the key activities for each main Task. Actual costs incurred will be correlated with completion targets to ensure compliance with progress.

Should deviations from the allocated costs for the key activities become evident, the Study Leader shall assess the reason/s and impact of such deviations and institute corrective action as required.

Where additional work may be required, the Study Leader shall obtain a detailed motivation and budget (both time and costs) from the relevant Task Leader for such additional activities for assessment and submission to the Study Manager for consideration and approval. It is understood that no additional expenses outside the approved budget will be allowed without the prior written approval of the Client.

3.14.2.5 Study Administration

Study administration duties to be performed will include:

- Compiling, certifying and submitting scheduled invoices to the Client from input received from the Task Leaders. The Study Leader will arrange payment to the other members of the Study Team after receiving same from the Client.
- Keeping minutes of meetings with the Client and other stakeholder bodies and distribution thereof to the interested parties.
- Ensuring that all project files are kept up to date and accessible to the Client if and when required.
- Coordinating the “close-out” procedures for the Study that will, inter alia, include compilation and submission of project data for record purposes as required by the Client.

3.14.3 Deliverables: Task 14

- Study Management Meetings (12 meetings);
- Technical Support Group Meetings (12 meetings);
- Study Steering Committee Meetings (6 meetings);
- Quarterly Progress and Annual Status Reports;

Periodic progress and financial reports will be submitted to the Study Manager throughout the duration of the Study. Minutes of meetings as well as lists of administrative and Study decisions will be maintained throughout the duration of the Study.

4 STUDY PROGRAMME AND TEAM

4.1 Study Programme

The Study Programme of the tasks is provided in **Appendix A** on **Figure A-2.**

4.2 Study Team

The names and rates of the Study Team members and further details of the key personnel are presented in **Table 4-1** below. The proposed organogram for the Study is presented in **Annexure A** on **Figure A-3**.

Table 4-1: Study Team

RESOURCE		RATE (R/h)	COMPANY	PROJECT DESIGNATION	HDI	
NAME	ID				STATUS	CATEGORY
Wegelin, W	WW	1250	WRP	Key Support	N	WM
Talanda, C	CT	1300	WRP	Task Leader: Tasks 6, 9 & 10	N	WM
Zondo, N	NZ	750	WRP	Task Leader: Task 4	Y	BM
Barnard, S	SB	750	WRP	Task Leader: Task 3	Y	WF
Cele, S	CS1	400	WRP	Support	Y	BM
Seago, C	CS2	1200	WRP	Deputy Study Leader, Task Leader: Tasks 7 & 12	Y	WF
van Rooyen, P	PvR	1400	WRP	Study Director	N	WM
Serfontein, E	ES	1300	BJ/iX	Task Leader: Task 8.1	N	WM
Louw, L	LL	1300	BJ/iX	Study Leader	Y	WF
Mandaza, R	RM	780	BJ/iX	Key Support	N	BF*
Mkhize, I	IM	510	BJ/iX	Support	Y	BM
Dhlangezwe, I	ID	500	BJ/iX	Key Support	Y	BF
van Schoor, B	BvS	215	BJ/iX	Support	N	WM
Ramashapa, L	LR	560	BJ/iX	Support	Y	BF
Maponya, K	KM	465	BJ/iX	Support	Y	BF
Beeslaar, A	AB	1300	BJ/iX	Task Leader: Task 8.2	N	WM
Aird,R	RA	1050	KM	Task Leader: Task 8.3	N	WM
Maisela, L	LM	750	KM	Key Support	Y	WF
Basson, M	MB	320	KM	Support	Y	WF
Churr, N	NC	550	KM	Task Leader: Task 2	Y	WF
Koen, C	CK	850	KM	Key Support	Y	WF
Tsotetsi, M	MT	450	KM	Support	Y	BF
Kritzinger, A	AK	1000	KM	Key Support	Y	WF
Smit, T	TS	700	KM	Key Support	Y	WF
Louw, D	DL	1000	Specialist: EWR	Key Support	Y	WF

RESOURCE		RATE (R/h)	COMPANY	PROJECT DESIGNATION	HDI	
NAME	ID				STATUS	CATEGORY
Lotter, A	AL	900	Specialist: Stakeholder Facilitation	Task Leader: Task 13	Y	WF
Anderson, H	HA	1200	Specialist: Dam Engineers	Key Support	Y	WF
Sami, K	KS	1200	Specialist: Groundwater	Task Leader: Task 5	Y	WM

APPENDIX A

FIGURE A-1: LOGICAL FLOW DIAGRAM

FIGURE A-2: STUDY PROGRAMME

FIGURE A-3: ORGANOGRAM

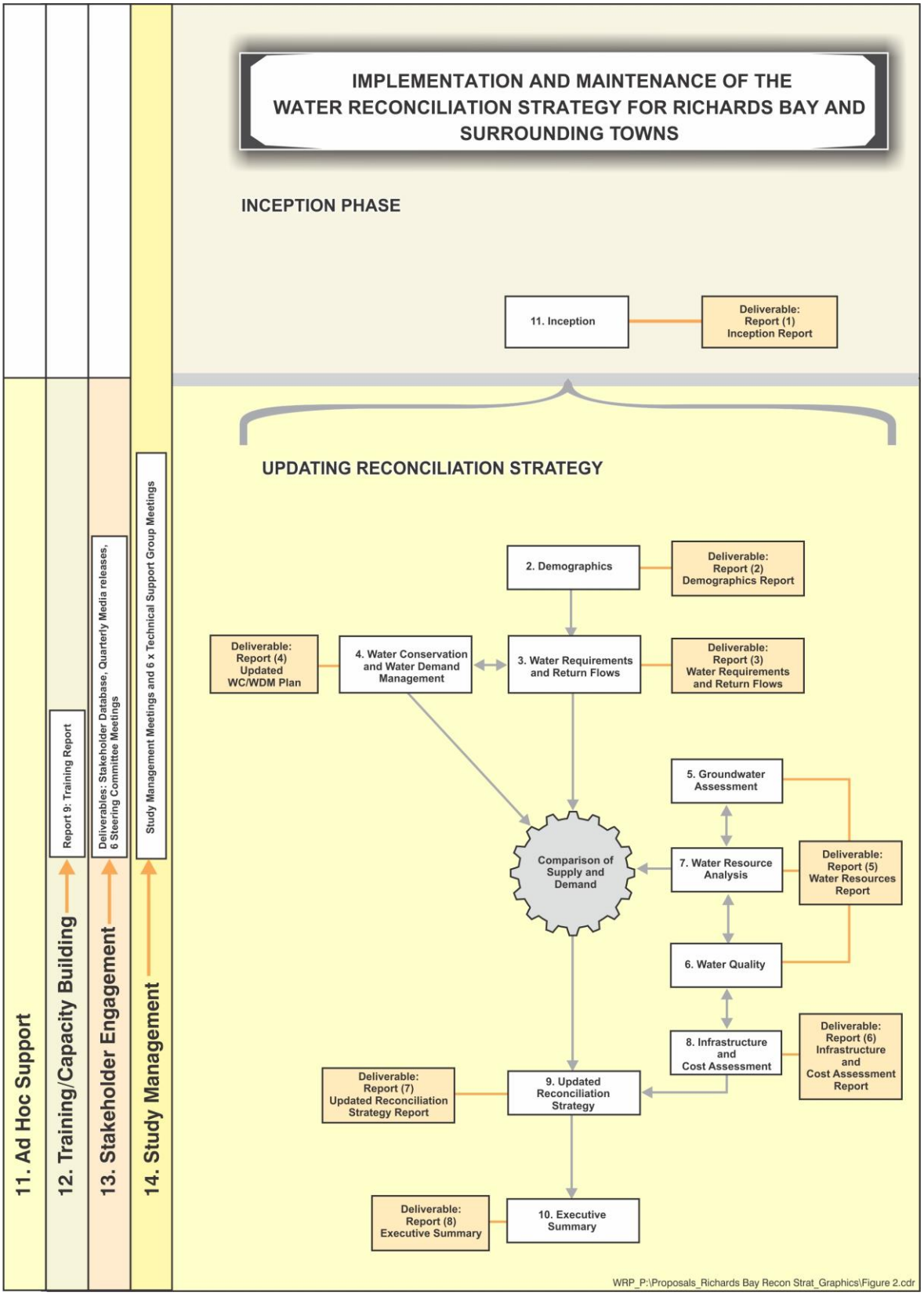

Figure A-1: Logical Flow Diagram

PROGRAMME: IMPLEMENTATION AND MAINTENANCE OF THE WATER RECONCILIATION STRATEGY FOR RICHARDSBAY AND SURROUNDING TOWNS

TASKS		2018												2019												2020											
NO.	DESCRIPTION	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	**Inception**																																				
	Report (1) Inception Report		●																																		
2	**Demographics**																																				
	Report (2) Demographics Report																																				
3	**Water Requirements and Return Flows**																																				
	Report (3): Water Requirements and Return Flows									●																											
4	**Water Conservation and Water Demand Management**																																				
	Report (3): Updated WC/WDM Plan																●																				
5	**Groundwater Assessment**																																				
	Chapter in Water Resources Report (Report 4)																	●																				
6	**Water Quality**																																				
	Chapter in Water Resources Report (Report 4)																				●																
7	**Water Resource Analysis**																																				
	Report (4): Water Resources Report																													●							
8	**Infrastructure and Cost Assessment**																																				
	Report (5): Infrastructure and Cost Assessment Report																													●							
9	**Updated Reconciliation Strategy**																																				
	Report (6): Updated Reconciliation Strategy Report																																		●		
10	**Executive Summary: Updated Reconciliation Strategy**																																				
	Report (7): Execturive Summary: Updated Reconciliation Strategy																																		●		
11	**Ad Hoc Support**																																				
12	**Training/Capacity Building**																	GW					WRPM	WRYM												STR	
13	**Stakeholder Engagement**																																				
	Strategy Steering Committee (SSC) Meetings					●						●						●						●						●						●	
14	**Study Management**																																				
	Study Administration Committee (SAM)	●			●			●			●				●		●			●			●				●		●			●			●		
	Technical Support Groupt (TSG) meetings Richards Bay		●					●							●					●							●					●					
	Technical Support Groupt (TSG) meetings (Pretoria dry run to SSC)				●						●						●						●						●						●		

Figure A-2: Study Programme

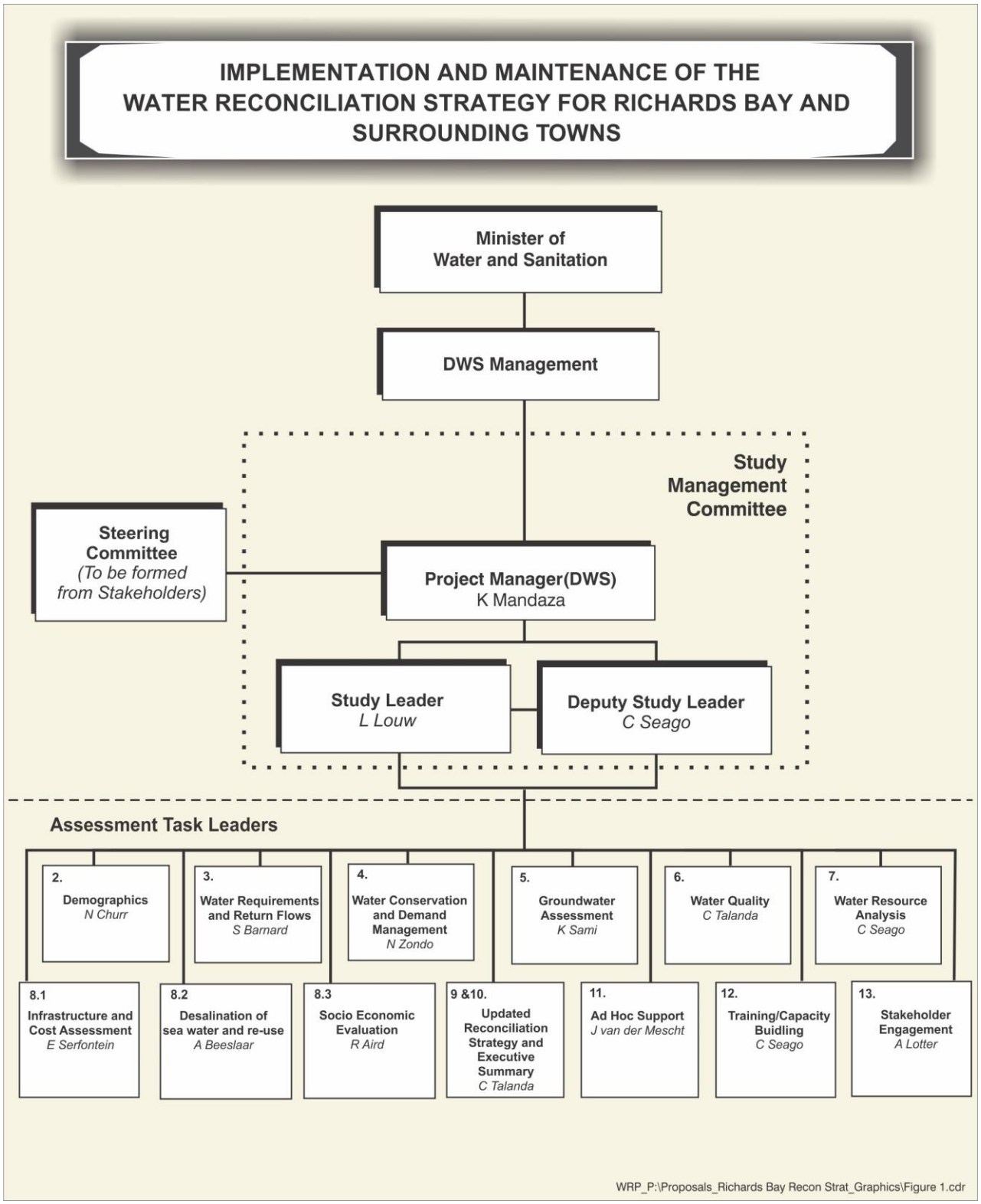

Figure A-3: Organogram

APPENDIX C

TSG TERMS OF REFERENCE

SSC TERMS OF REFERENCE

RICHARDS BAY AND SURROUNDING TOWNS: RECONCILIATION STRATEGY

TECHNICAL SUPPORT GROUP

TERMS OF REFERENCE

Introduction/Preamble

In 2015 the Department of Water Affairs and Sanitation (DWS) and relevant Stakeholders, developed a Strategy to ensure the ongoing reconciliation of supply and requirement for the Richards Bay and surrounding towns receiving their water from the Mhlathuze River. One of the recommendations which came out of the Strategy Study was that a Strategy Steering Committee be formed with a clearly defined mandate and scope of work. The primary function of the Strategy Steering Committee will be to ensure the implementation of the strategy and to make recommendations, on an annual basis, on long-term planning activities required to ensure ongoing reconciliation of requirement and available supply in the Richards Bay area.

For the Strategy Steering Committee to achieve its mandate, technical, scientific and administrative support is required. This support will be facilitated by the DWS Directorate: National Water Resource Planning through a Technical Support Group. The Technical Support Group will consist of stakeholders knowledgeable of the particular technical aspects relevant to the project and will include the relevant DWS directorates (National and Regional Office), Municipalities and other major stakeholders.

Objectives

The objectives of the Technical Support Group are:

- Provide technical inputs to the Study tasks from a local and regional perspective
- Provide administrative, technical and scientific support to the Strategy Steering Committee
- Assist with the implementation of the reconciliation strategy

Functions of the Technical Support Group

The functions of the Technical Support Group are:

- Give technical support to the Project Manager
- Assistance with the implementation of the current Reconciliation Strategy;
- Implementation of revised plans of action, including the models set-up in the Water Availability Assessment Study;
- Periodic review and updating of requirement scenarios based on the latest information from all users;
- Monitoring the effectiveness of the Strategy through the regular comparison of water requirements and water availability and making recommendations to the Strategy Steering Committee regarding maintenance of the Strategy and the way forward;
- Participating in water resource management as it relates to the Strategy, e.g. through support in the further development of the Catchment Management Strategy and the phasing in of the ecological Reserve for existing infrastructure;
- Supporting the Strategy Steering Committee in establishing and maintaining appropriate stakeholder engagement, e.g. keeping the public informed through press releases and public information meetings, regularly providing the latest information on strategy issues and decisions to all local authorities and obtaining stakeholder inputs to those decisions; and
- Assisting the Strategy Steering Committee in all activities that may arise from the execution of its responsibilities, where such activities may require the backing of the Support Group.

Reporting & Meetings

A Technical Support Group will be appointed to support the Strategy Steering Committee. Technical Support Group meetings will be arranged and will be facilitated and chaired by DWS: National Water Resource Planning. It is envisaged that 4 meetings will be held each year. Two of the four meetings will take place prior to the two Strategy Steering Committee meetings each year and act as a dry-run meetings for the SSC Meeting.

Representation

The institutions/agencies to be represented on the Strategy Committee are listed as follows**.**

- DWS National and Provincial
- Mhlathuze Water
- City of uMhlathuze Local Municipality
- King Cetshwayo District Municipality

- Richards Bay Coal Terminal (ZCCI)
- Tronox
- Tongaat-Hulett Sugar
- Mondi Richards Bay
- Richards Bay Minerals
- Foskor
- BHP Billiton
- uMhlathuze Water Stewardship Partnership
- South African Environmental Observation Network
- Richards Bay Industrial Development Zone
- Farmers Associations

RICHARDS BAY AND SURROUNDING TOWNS: RECONCILIATION STRATEGY

STRATEGY STEERING COMMITTEE

TERMS OF REFERENCE

Introduction/Preamble

In 2015 the Department of Water Affairs and Sanitation (DWS) and relevant Stakeholders, developed a Strategy to ensure the ongoing reconciliation of supply and requirement for the Richards Bay and surrounding towns receiving their water from the Mhlathuze River. One of the recommendations which came out of the Strategy Study was that a Strategy Steering Committee be formed with a clearly defined mandate and scope of work. The primary function of the Strategy Steering Committee will be to ensure the implementation of the strategy and to make recommendations, on an annual basis, on long-term planning activities required to ensure ongoing reconciliation of requirement and available supply in the Richards Bay area.

A number of organisations currently own, operate and receive water from the system. The main role-players to date have been the DWS, various Water Service Providers including the Local Municipality and various Water User Associations and other users. Although these organisations will continue to play a significant role in future decisions, other organisations need a forum to ensure that their requirements can be clearly conveyed, that they can make contributions when needed, and that they are continuously informed about the development and decisions regarding the water supply system. Organisations represented on the Steering Committee must ensure that recommendations made in the Strategy document are implemented and assume a collective responsibility for ensuring the ongoing reconciliation of supply and requirement.

Objectives

The objectives of the Strategy Steering Committee are:

- To ensure implementation of the recommendations of the Richards Bay and Surrounding Towns Reconciliation Strategy.
- To update the Strategy to ensure that it is relevant.
- To ensure that the Strategy and its recommendations are appropriately communicated.

1. Implementation of Strategy Recommendations

- Monitor the implementation of the recommendations contained in the first Reconciliation Strategy Study.
- Monitor the progress and compliance with set targets and objectives, e.g.
    - Target dates for initiating and completing studies
    - Water Conservation and Demand Management
    - Implementation of other interventions
- Assess the implications of deviations.
- Make recommendations on mitigation measures and adjustments to ensure the ongoing reconciliation of supply and requirements.

2. Updating of the Strategy

- Review / update and revise the Reconciliation Strategy.
- Monitor and update water requirements on an annual basis.
- Reassess the available resources and the exiting system yield.
- Make recommendations to DWS on additional studies required to update the water requirement and system yield.
- Undertake an annual reconciliation of supply and requirements.
- Update the Scenario Planning Process to cater for changes in water requirements, yield and potential delays in the implementation of selected interventions.
- Finalise the process for the Selection of Interventions for implementation
- Make recommendations to DWS, other WSAs and Water User Associations on the need for further studies and on the need to implement interventions

3. Communication

- Communicate annually and as and when required, progress on the implementation of the recommendations of the Reconciliation Strategy Study to the following Authorities:
    - DWS,
    - City of uMhlathuze Local Municipality,
    - Mhlathuze Water.
- Communicate annually and as and when required, progress on the implementation of the recommendations of the Reconciliation Strategy Study to other Stakeholders, e.g.
    - Organised Agriculture
    - Environmental NGOs
    - Bulk Industrial and mining users

- Communicate progress on the implementation of the recommendations of the Reconciliation Strategy Study to the general public.
- Liaise with Departments involved in producing Provincial Strategies and provide input into Provincial Strategies.
- Brief relevant municipalities on imminent decisions
- Inform politicians of press releases relating to the reconciliation of supply and requirement
- Liaise with the Operation Committee as required.
- Provide information for the DWS websites.

Reporting

The Reconciliation Strategy Steering Committee is a steering committee formed to ensure the ongoing reconciliation of water supply and requirement. Whilst the committee comprises of representatives from national government, provincial government, local government and agriculture, the meetings shall be facilitated and chaired by DWS: National Water Resource Planning. As a Steering Committee, the primary function of the meetings will be to give guidance to DWS: National Water Resource Planning.

Administrative and Technical Support Group

An Administrative and Technical Support Group will be appointed to support the Strategy Steering Committee. The Support Group will provide administrative, scientific and technical support. This support will be facilitated through DWS: National Water Resource Planning.

Representation

The institutions/agencies to be represented on the Strategy Committee are listed as follows.

- DWS National and Provincial
- Mhlathuze Water
- City of uMhlathuze Local Municipality
- King Cetshwayo District Municipality
- Richards Bay Coal Terminal (ZCCI)
- Tronox
- Tongaat-Hulett Sugar
- Mondi Richards Bay
- Richards Bay Minerals
- Foskor
- BHP Billiton
- uMhlathuze Water Stewardship Partnership

- South African Environmental Observation Network
- Richards Bay Industrial Development Zone
- Farmers Associations

Meetings

It is envisaged that 2 meetings will be held each year

Meeting 1:

- To consider / review progress with implementation
- To deal with communications

Meeting 2:

- To consider / review progress with implementation
- To update the Reconciliation Strategy Study
- To deal with communications