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)

Extended Executive Summary

FINAL
April 2021

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Introduction & Background

This document is an extended executive summary for the detailed report *"IMPLEMENTATION AND MAINTENANCE OF THE WATER RECONCILIATION STRATEGY FOR RICHARDS BAY AND SURROUNDING TOWNS"* (DWS, 2021). The continuation followed on from the Reconciliation Strategy for Richards Bay and Surrounding Towns (DWS, 2015). The overall objective of this Study was to systematically update, improve, and extend the Water Resource Reconciliation Strategy, in order for the Strategy to remain relevant, technically sound, economically viable, socially acceptable and sustainable. This document provides an extended Executive Summary of the Reconciliation Strategy. A number of supporting reports have been prepared in the update of the Strategy, namely:

- **Demographic and Socio Economic**
- **Water Requirements**
- **Water Conservation and Water Demand Management**
- **Water Resources**
- **Infrastructure and Cost Assessment**

In addition to the update of the Strategy, part of the Study has included the monitoring of progress of implementation of the original Strategy interventions. This has been undertaken in the form of Strategy Steering Committee Meetings whereby responsible Institutions have provided feedback on progress.

What is a Strategy Steering Committee (StraSC)?

The primary function of the StraSC is 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 requirements and available supply in the Study area.

The Committee includes representative members of all main organisations using the water resources, for example, the DWS National and Regional Office, Mhlathuze Water, irrigators, Municipalities, Industry etc.

The objectives of the StraSC are to:

- Ensure implementation of the recommendations of the Reconciliation Strategy.
- Update the Strategy to ensure that it is relevant.
- Ensure that the Strategy and its recommendations are appropriately communicated.

Value add of this Update

The Strategy (2015) was completed prior to the finalization of Compulsory Licensing that took place in the catchment. In addition, just after its completion, the area was hit by a drought, causing emergency augmentation interventions. This Study enhances the previous Strategy as it incorporates the final allocation schedule of the catchment, as well as a more focussed review of the water requirement projections. Furthermore, the options for augmentation priorities are considered based on the emergency scheme intervention.

Study Area

Whilst this Study focusses on the update of the Richards Bay Strategy (DWS, 2015), the southern catchments including the Mlalazi and Amatigulu rivers have also been considered.

The main focus of this Study was the Richards Bay Water Supply System (RBWSS). The RBWSS supplies water to the City of uMhlathuze Local Municipality (CoMLM), which comprises the towns of Richards Bay, Empangeni, Ngwelezane and Esikhaweni, as well as a number of rural villages. Furthermore, the RBWSS also supplies large well-developed industries, commercial areas and business centres within the Study Area. The RBWSS's supply area is within the Mhlathuze River Catchment, which is the major water resource. Water is, however, also sourced from various natural lakes within the Catchment such as Lake Nhlabane, Lake Mzingazi and Lake Cubhu. The Catchment also serves as the resource for agriculture, both irrigated and dryland, afforestation, as well as ecological requirements.

The Study Area includes the Mhlathuze River Catchment as illustrated in **Figure 1**. The Mhlathuze River Catchment receives inter-catchment transfers from the Umfolozi River and Thukela (Tugela) River Catchments and, as a result, these Catchments are also part of the Water Supply System/Study Area. Additional smaller towns not incorporated in the Strategy (2015), namely, Eshowe, Mtunzini, Melmoth, Gingindlovu and Amatikulu, were included in this Study. As a result of this, the catchments south of the Mhlathuze, namely the Mlalazi and Amatikulu were also considered as part of this Study.

Goedertrouw Dam

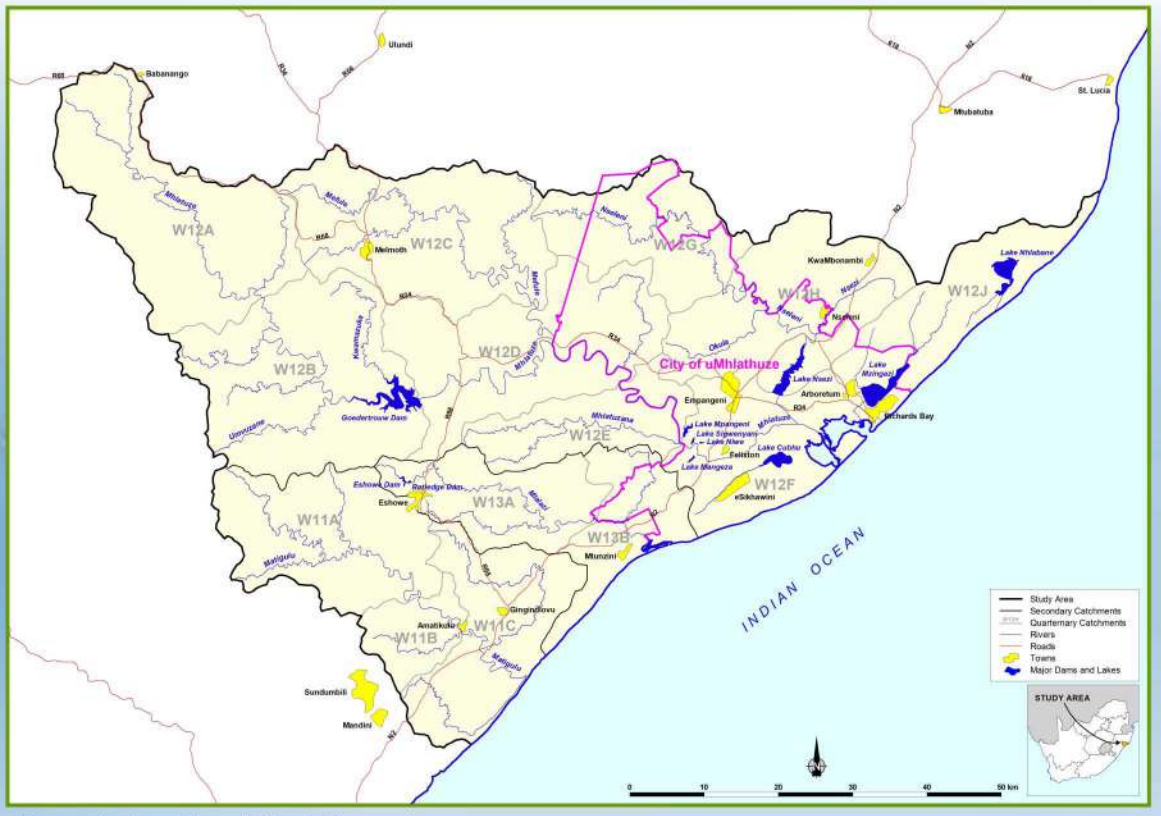


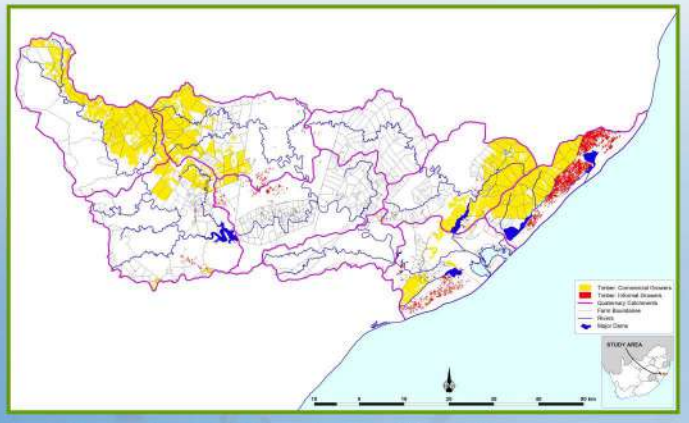
Figure 1: Locality of Study Area

Environmental Water Requirements (EWRs)

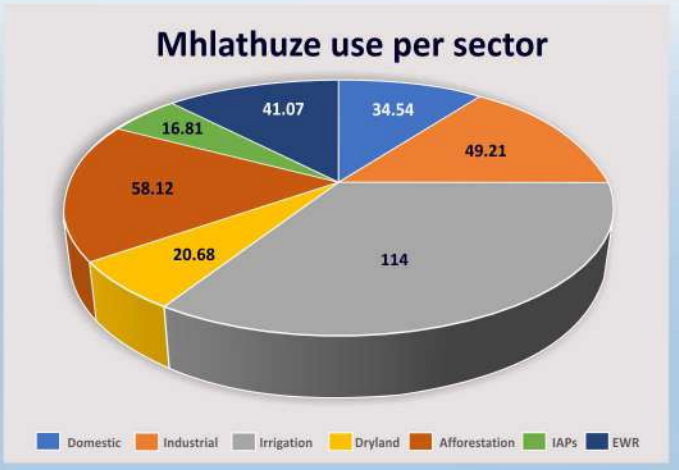
The National Water Act (Act 36 of 1998) (NWA) requires that sufficient water must be left in rivers in order to sustain their ecological functioning. This water is referred to in the NWA as the Ecological Reserve. A preliminary reserve was considered during Compulsory Licensing, and was again incorporated as part of this Reconciliation Strategy. To date, Classification has not yet taken place, and a final Reserve has therefore not been Gazetted.

EWR Site	Position	Volume (million m^3/a)
1	W12A Outlet	16.97
2	Downstream Goedertrouw Outlet of W12B	41.07
4	W12C Outlet	7.06
5	W12D downstream of Mhlathuze-Mfuli Confluence	32.61
6	W12D Outlet	31.81
7	W12E Outlet, not including Mhlathuzana river contribution	32.19
8	Upstream of Mhlathuze-Nsezi Confluence	37.19
9	W12G Outlet	3.40
10	W12H Outlet	10.22
11	Mhlathuze Mouth	10.85
12	W12J2 Mouth	0.76

Water Requirements



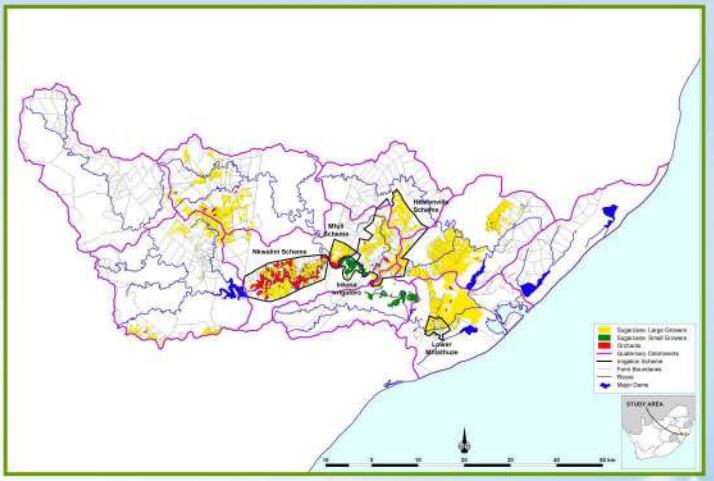
Afforestation: 55 971 ha using 58 million m^3/annum



Alien Invasive Plants: 140 km^2 using 17 million m^3/annum

Dryland Sugarcane

Dryland sugarcane uses approximately 21 million m^3/annum. Whilst not an official streamflow reduction activity, the water use has been considered and accounted for.

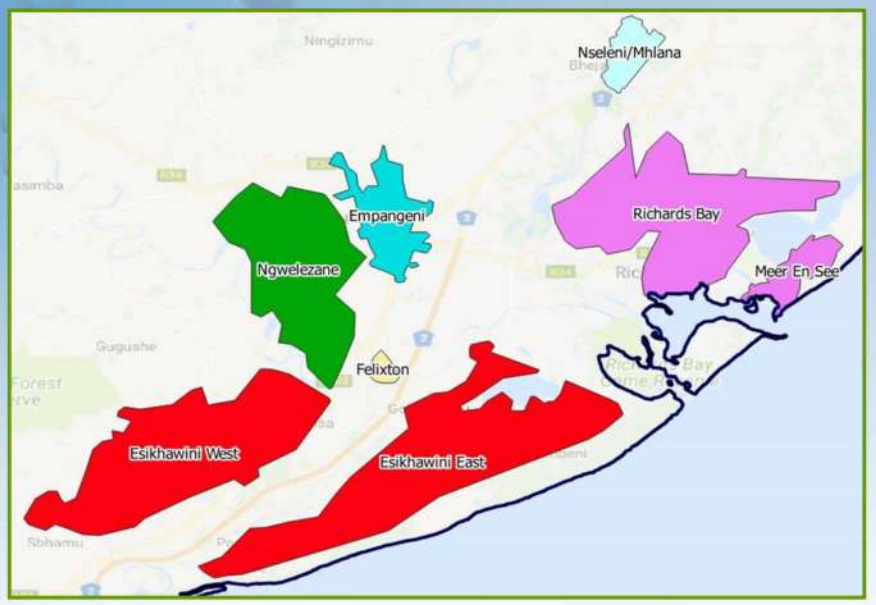


Irrigation Sector

Irrigation is the largest user of water in the study area, particularly in the Mhlathuze catchment. Sugarcane is the most commonly found crop grown and citrus also makes up a large percentage. Various irrigation Boards are located along the river, all sharing the water resources of the Goedertrouw Dam.

Location	Allocation (million m^3/a)
1) Heatonville	43.62
2) Lower Mhlathuze	7.73
3) Mfuli	5.55
4) Nkwaleni	57.00
5) Other-irrigation	8.93
c) Existing licenses under NWA	4.18
b) Applications for new water uses	1.54
Total	128.54*

Domestic Sector



The definition of the urban water use sector includes water requirements for both residential and light industrial purposes. The CoMLM consists of the main urban demand centres of Richards Bay, Empangeni, Esikhaweni (east and west), Ngwelezane and Nseleni.

Population growth estimations and the related economic growth characteristics within the study area formed the basis for the calculation of the domestic water requirement calculations. An increase in service levels over time was introduced resulting in an increase in the per capita water uses, specifically in those areas with currently low service levels.

Demand	Requirement (Mm^3/annum)					
	2018	2025	2030	2035	2040	2045
Richards Bay	17.12	20.3	22.91	25.79	29.06	32.78
Nseleni	4.74	5.78	6.56	7.37	8.2	9.3
Ngwelezane	2.47	2.95	3.32	3.74	4.18	4.72
Esikhaweni	10.86	12.51	13.84	15.29	16.87	18.65
Empangeni	8.55	10.57	12.29	14.19	16.36	18.97
Goedertrouw direct (Phobane WTW)	1.39	11.16	13.95	13.95	13.95	13.95
Eshowe	2.23	2.43	2.64	2.85	3.07	3.33
Mtunzini	0.49	0.52	0.56	0.60	0.65	0.70
Gingindlovu	0.34	0.36	0.37	0.39	0.41	0.43
Melmoth	0.92	1.00	1.09	1.17	1.26	1.36
New Users	0.77	6.12	7.65	7.65	7.65	7.65
Total	49.88	73.70	85.18	92.99	101.66	111.84

Town	Growth Scenario	2016	2020	2025	2030	2035	2040	2045
		million m^3/a						
Eshowe	Moderate	2.08	2.15	2.24	2.33	2.43	2.53	2.64
	High	2.08	2.23	2.43	2.64	2.85	3.07	3.33
Gingindlovu (incl. Amatikulu)	Moderate	0.33	0.34	0.35	0.36	0.37	0.38	0.39
	High	0.33	0.34	0.36	0.37	0.39	0.41	0.43
Melmoth	Moderate	0.86	0.89	0.92	0.96	1.00	1.05	1.09
	High	0.86	0.92	1.00	1.09	1.17	1.26	1.36
Mtunzini	Moderate	0.46	0.47	0.49	0.50	0.52	0.54	0.56
	High	0.46	0.49	0.52	0.56	0.60	0.65	0.70

Bulk Industrial Sector

The main bulk industrial water users sharing the resources of the Study Area are as follows:

- Mondi processes pulp and paper, which is used to make a number of products such as Baycel and a premier grade bleached hardwood pulp. These processes require large amounts of potable water. Effluent that is recycled for process purposes has to be treated to a high standard. Mondi is supplied with water by Mhlathuze Water from Lake Nsezi.
- Foskor produces fertiliser, sulphuric and phosphoric acid. Foskor makes use of potable and clarified (semi-purified) water. The clarified water is supplied from the Nsezi WTW by MW and the potable water supplied from the Mzingazi WTW by the CoMLM.
- The Hillside (South 32) Aluminium smelter, which produces ingots is supplied by potable water from Mzingazi WTW. South 32 has its own desalination plant which supplies an average of 2 Mℓ/day (0.73 million m3/annum).
- The Bayside Aluminium smelters process Aluminium. They are supplied with potable water from the Mzingazi WTW by the CoMLM. The plant was planned to close down due to low commodity prices in 2016. This, however, did not materialise, and the plant is still operating.
- The Richards Bay Coal Terminal and harbour are supplied with potable water from the Mzingazi WTW. Furthermore, the RBCT also has an effective storm water reuse plan, which drastically reduced the water requirements from the RBWSS in recent years.
- Tongaat Hulett Sugar Mill was constructed in 1970 and processes harvested sugarcane from the surrounding area. Water is abstracted from the Mhlathuze River and is treated at the Tongaat Hulett WTW.
- Mpact Felixton, previously Mondi Felixton, is a paper mill in the town of Felixton which demerged from the Mondi Group in 2011. A major portion of the raw material for the paper mill manufacturing process is obtained from the nearby Tongaat Hulett Sugar Mill bagasse, a dry pulpy residue left after the extraction of juice from the sugarcane.
- The Industrial Development Zone (IDZ) is an industrial estate in Richards Bay, which consists of various phases to be implemented in future. The current focus is on Phase 1F.
- The Richards Bay Minerals mines sand dunes in Richards Bay for heavy minerals, including Ilmenite. Zircon and Rutile. Their mining operations consist of two areas; namely the Tsand/Zulti North area, which is to the North of Richards Bay, and Zulti South area, which is close to eSikhaweni. The Zulti South area is not yet active.
- Tronox mines dunes to the South of Richards Bay for heavy minerals, such as Ilmenite and Zircon. Rutile is mined at Tronox's Fairbreeze Mine, south of Mtunzini. Tronox has a heavy minerals refinery and smelter plant North-West of Empangeni. The central processing plant receives water from the Nsezi WTW. Water for the mining operation is abstracted at the Mhlathuze Weir. It was initially envisaged that water would be obtained from the Thukela transfer from Mandini, however, this has not yet materialised.

Demand	Requirement (Mm^3/annum)					
	2018	2025	2030	2035	2040	2045
RBM smelter	5.6	8.1	8.1	8.1	8.1	8.1
RBM ponds	14.4	20.7	20.7	20.7	20.7	20.7
Foskor potable	4	5.6	5.6	5.6	5.6	5.6
Foskor clarified	3	4.4	4.4	4.4	4.4	4.4
Tronox	5.80	17.83	17.83	20.26	20.26	20.26
Mondi	20.1	20.1	20.1	20.1	20.1	20.1
Bayside	0.11	0.21	0.21	0.21	0.21	0.21
Mpact	2.48	2.48	2.48	2.48	2.48	2.48
Tongaat	1.9	1.9	1.9	1.9	1.9	1.9
Small Industry	0.03	0.03	0.03	0.03	0.03	0.03
IDZ	0.00	6.57	6.57	6.57	6.57	6.57
Total	57.42	87.92	87.92	90.35	90.35	90.35

Water Resource Availability

The main water resources of the supplying the RWSS are the Goedertrouw Dam, the Coastal Lakes of Nsezi, Mzingazi, Cubhu and Nhlabane and the transfer from the Thukela River.

Hydrology

Surface water runoff is the main source of water for users within the Mhlathuze.

Major River	Tertiary Catchment	Quaternary Catchment	Quinary Catchments	Contributing Area (km^2)	MWAAS MAR (Mm^3/annum)
		W12A	W12A1	624	64.81
		W12B	W12B1	657	91.88
		W12C	W12C1	227	26.88
			W12C2	344	23.92
		W12D	W12D1	278	29.33
			W12D2	293	29.02
		W12E	W12E1	76	8.81
Mhlathuze	W12		W12E2	172	23.13
			W12F1	177	40.55
		W12F	W12F2	71	18.04
			W12F3	101	25.02
		W12G	W12G1	326	26.77
		W12H	W12H1	485	61.93
		W12J	W12J1	110	52.47
			W12J2	168	33.18
		W11A	W11A1	445	55.17
		W11B	W11B1	127	17.53
Amatigulu	W11		W11C1	102	14.98
		W11C	W11C2	109	22.03
			W11C3	172	31.47
			W13A1	36	9.60*
Mlalazi	W13	W13A	W13A2	166	44.69*
			W13A3	74	20.24*
		W13B	W13B1	171	44.80
Umfolozi	W21				571.88

The water availability in the Mhlathuze system is determined as a system yield (which also includes the groundwater contribution) and not just the yield of the Goedertrouw Dam and relevant Lake resources added together. This is because of the large amount of tributary runoff that occurs between the Goedertrouw Dam and the point of abstractions of the various users. In order to determine the yield, the individual abstractions at their relative locations are withdrawn from the system and combined together in a single yield node. The excess yield (over and above the total use) is abstracted from the point in the system representing the Mhlathuze weir.

Using this approach, the historic firm yield (HFY) determined for the Mhlathuze system in the MWAAS, including the current available transfer from the Thukela was determined to be 245 million m^3/a.

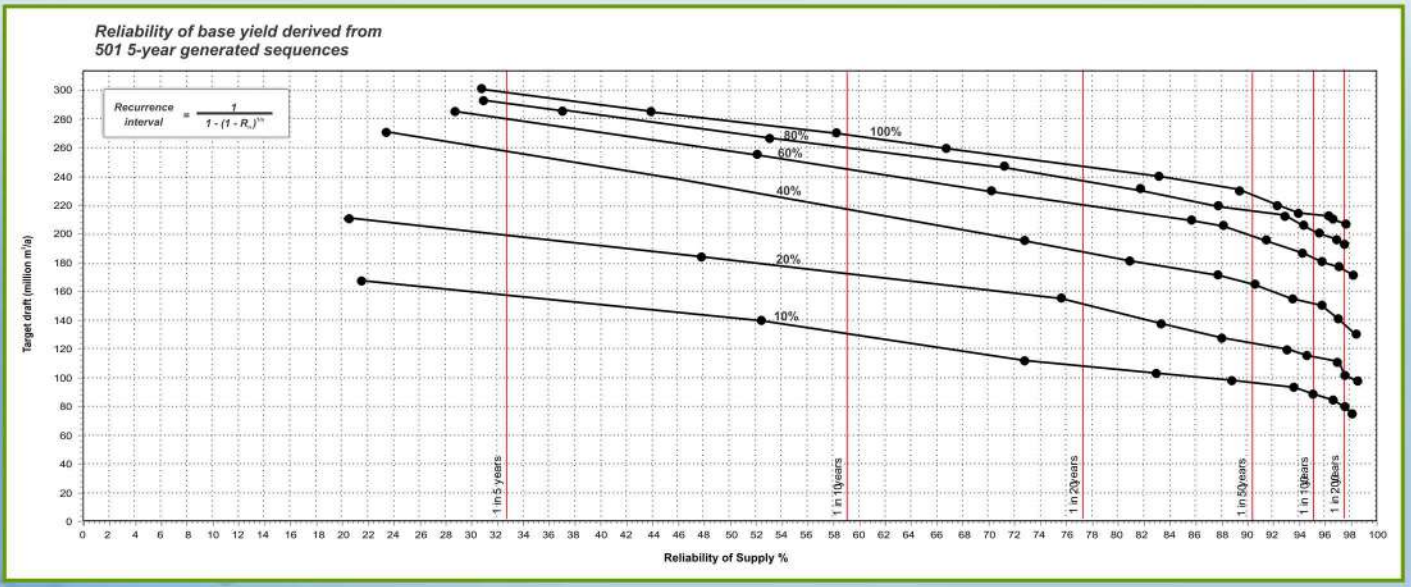
Overview of "Yield"

Historic Firm Yield: The maximum volume of water that can be abstracted from a resource over the historical observed time period (1920-2004) such that the resource is able to provide the abstracted volume in full each and every year.

Long Term Yield at various Recurrence Intervals: 201 natural hydrological time series' (known as stochastic sequences) of 85 year record length are analysed in order to determine the system behavior under different hydrological conditions. The analyses allow for some sequences to fail (not supply the abstraction in full) and the results are quoted in assurance of supply depending on how many sequences fail.

Short Term Yield at various Recurrence Intervals: 501 natural hydrological time series' (known as stochastic sequences) of 5 year record length are analysed in order to determine the system behavior under different hydrological conditions. In this case the resource's starting storage condition is considered as additional yield is available when the storage volume is high compared with when it volume in storage is lower.

Water Resource Availability



Long Term Stochastic firm yield at levels of assurance in supply (M m³/annum)			
99.5 %	99.0 %	98.0 %	95.0 %
1:200 years	1:100 years	1:50 years	1:20 years
243.3	251.6	260.0	272.3

Lake	Quinary	MAR Groundwater (net) (Mm^3/a)	MAR Surface portion (Mm^3/a)	Total MAR (Mm^3/a)
Mzingazi	W12J1	12.45	39.98	52.43
Nhlabane	W12J2	4.69	25.71	30.40
Cubhu	W12F2	3.49	18.09	21.58

Lake Nsezi

Groundwater

The hydrology of the coastal lakes, in particular, is influenced by the groundwater system through baseflow from inflowing rivers and direct seepage from the aquifers into the lakes. The coastal lakes that are controlled by subsurface conditions include Lake Nhlabane, Lake Mzingazi and Lake Cubhu, which are characterised by a very shallow water table intersected by the lakes. They are therefore very sensitive to landuse and large-scale groundwater abstraction that may impact on the water table.

The coastal lakes Cubhu, Mzingazi and Nhlabane are extensions of the local groundwater and have a strong interaction with the aquifer, hence determining their yield requires accounting for surface and groundwater inflows and outflows to the lakes.

Water Conservation/ Water Demand Management (WCWDM)

Status quo assessment

Review the status quo of the municipalities concerning their institutional, financial, legal, social and technical pillars. The assessments were undertaken to gain a complete understanding of the existing municipal water business, their operations and current key challenges.

Assessment Overview of Individual Demand Centres

To allow for the concise assessment of the water situation, the individual demand centres the individual LM's were assessed and visited to gather information and to gain a better understanding of the status quo. The WCWDM key performance indicators (KPI's) were assessed for each demand centre.

Strategy

Based on the results of the assessments a WCWDM strategy was developed, which was broken down into institutional, financial, social and technical strategy components.

Business Plan

A business plan (targets and budgets) was developed for the CoM LM and the assumptions were documented.

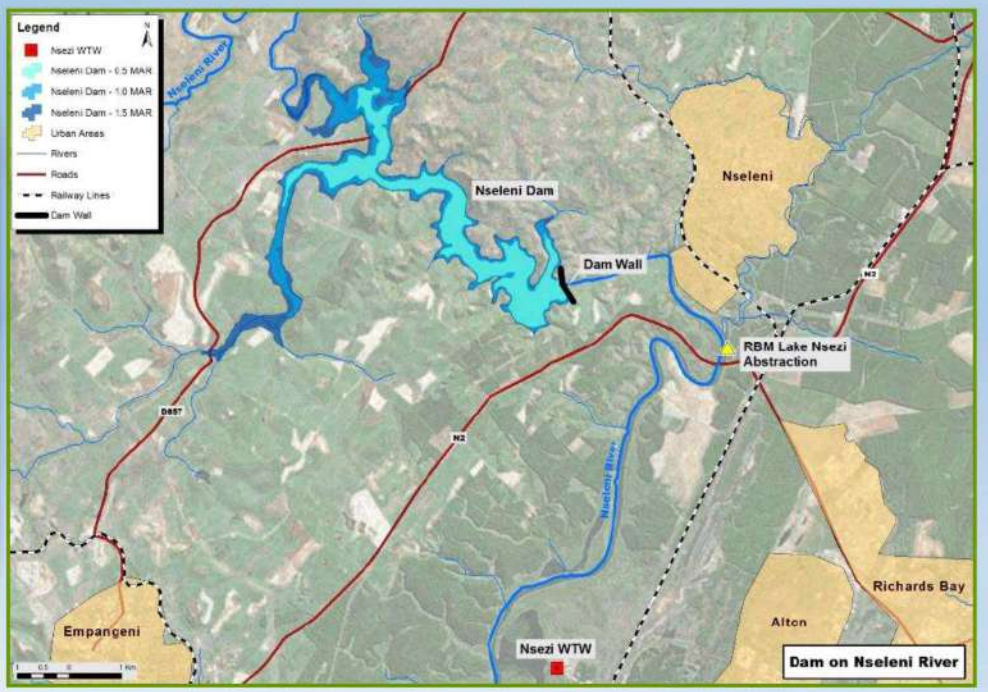
CoM LM

Indicator	Current Value	Realistic Target value 10% Reduction	Optimistic Target Value 20% Reduction
System Input volume (million m^3/a)	39,15	34.89	32.23
System Input volume (Mℓ / day)	107,19	95.54	88.24
Billed Authorised Consumption (million m^3/a)	30,00	24.32	23.89
Unbilled Authorised Consumption (million m^3/a)	1,95	4.52	4.47
Water Losses (million m^3/a)	7,20	6.06	3.87
Non-revenue Water (million m^3/a)	9,15	10.57	8.34
% Non-revenue water	43%	30%	26%
% Water Losses	24%	17%	12%
Input Volume (litres / capita / day)	277	246	228
Input Volume (m^3 / household / month)	35	31	29
Authorised Consumption (litres / capita / day)	226	204	200
Authorised Consumption (m^3 / household / month)	29	26	26

Infrastructure

The infrastructure options that remain listed for further consideration are as follows:

- Completion of Thukela Transfer upgrade
- Raising Goedertrouw Dam;
- New Dam on the Nseleni River.

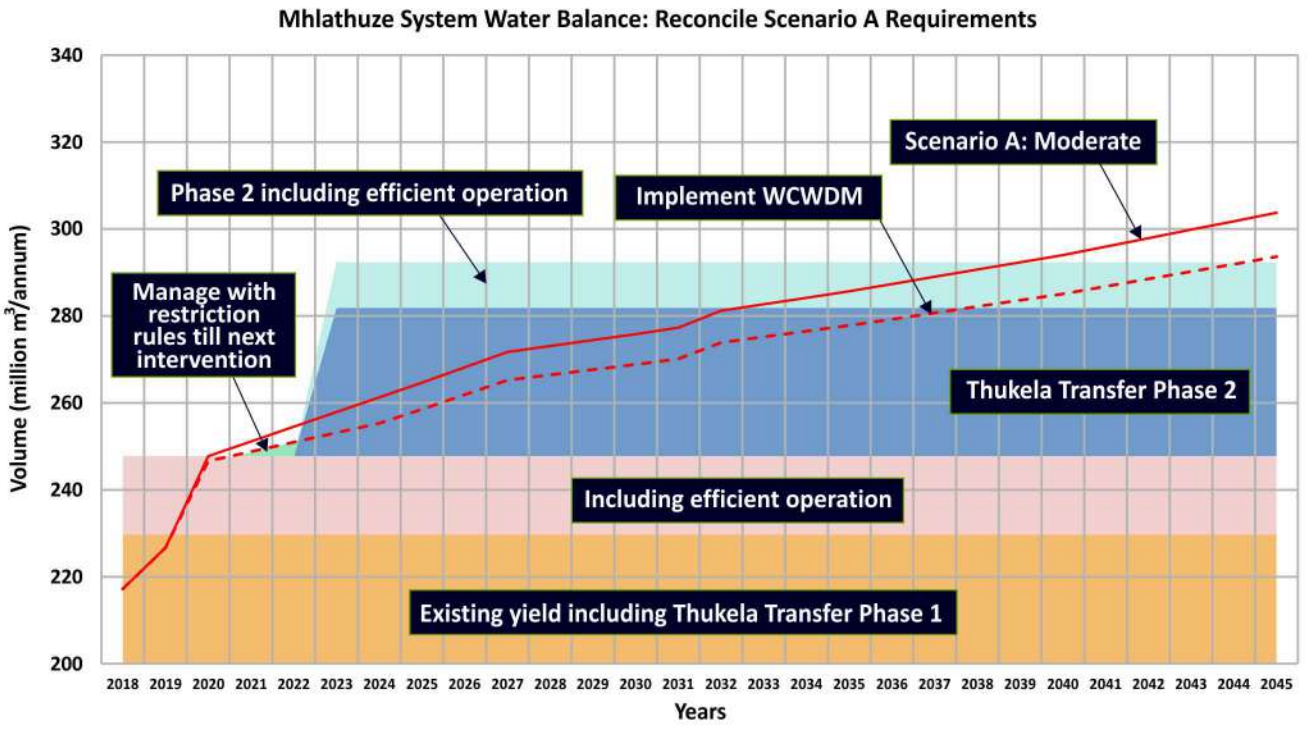


Item		1 MAR Dam on the Nseleni River	1 MAR Dam on the Nseleni River and New WTW at Lake Nsezi	1 MAR Dam on the Nseleni River, Pipeline and New WTW at Lake Nsezi
Total Capital Cost	(R million)	299.91	699.36	960.42
Annual Operating Cost	(R million/annum)	1.95	13.11	14.29
Dam Yield	(Mm^3/a)	12.0	12.0	12.0
NPV Cost	(R million)	283.06	722.95	969.52
NPV Supply of Water	(million m^3)	110.38	110.38	110.38
Unit Reference Value	(R/m^3)	2.56	6.54	8.77

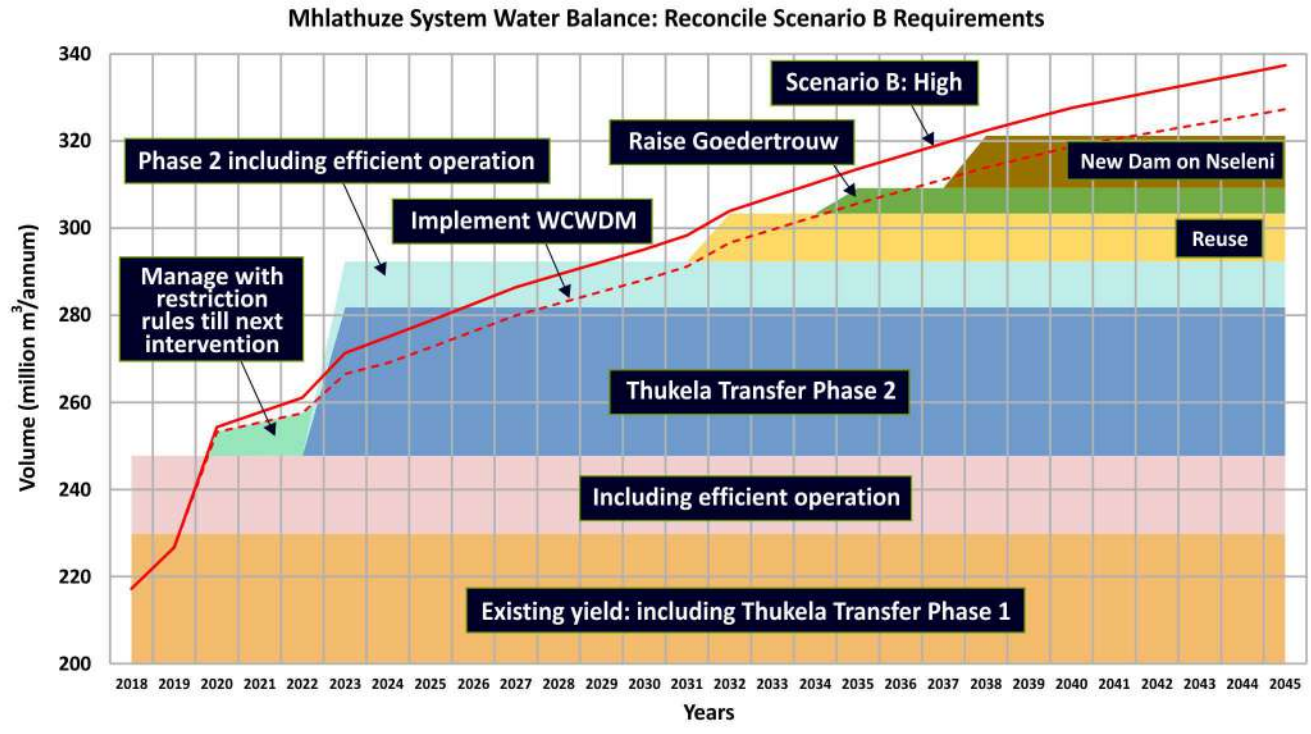
Previous Options Considered, lower priority interventions for RWSS

- Desalination of Seawater: R15 < URV < R25 makes this an expensive option comparatively
- Coastal Pipeline transfer from Lower Thukela: this remains an option for KCDM, however, the allocation of Mhlathuze Water for this transfer was used for the Middledrift transfer upgrade. Further investigation required on excess available from Thukela.
- Umfolozi off channel dam: this remains a high priority intervention for areas north of the Mhlathuze, however is unlikely to be required for the RBWSS

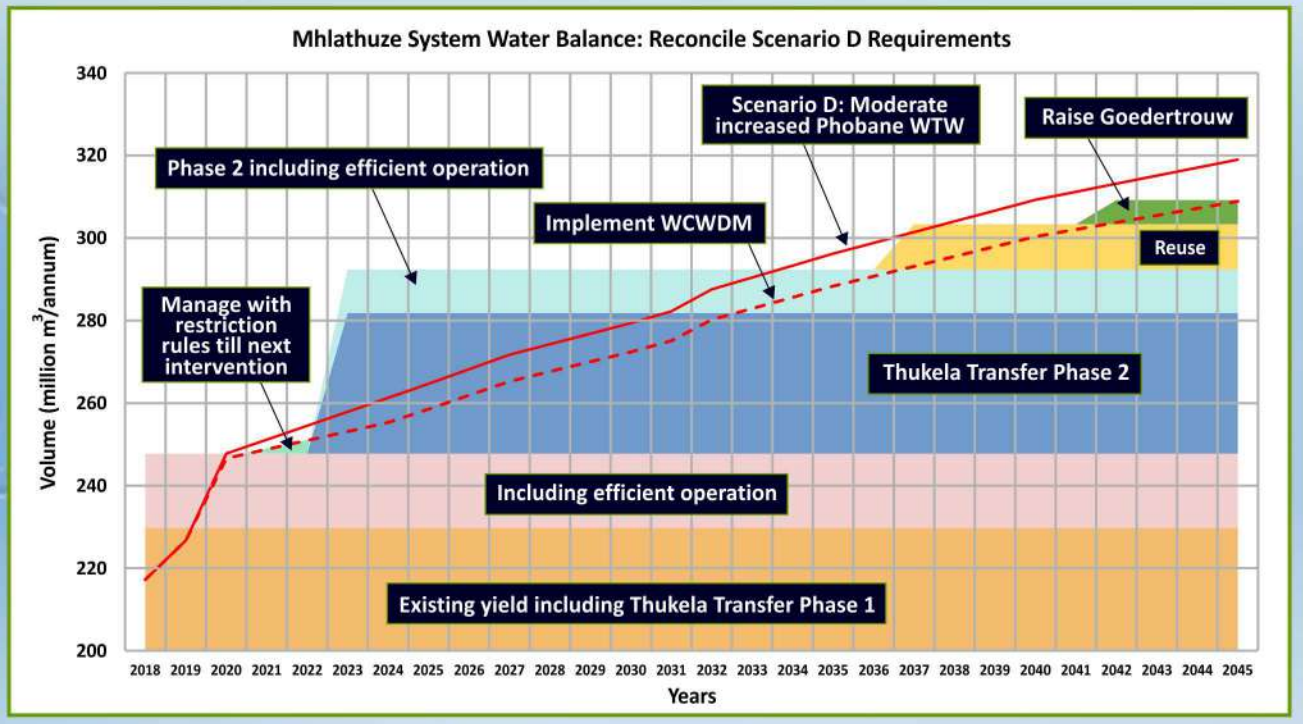
Moderate water requirement projection water reconciliation balance



High water requirement projection water reconciliation balance



Moderate water requirement projection water reconciliation balance



- From 2021, the projected requirements start to exceed the long term yield of the available resources;
- The earliest date for the increased transfer from Thukela Middeldrift to be operational is 2023.
- In the short term future, until the time that the upgraded scheme is operational, the system should be managed with restriction rules determined under the operating rules study with the approach to restrict lower priority users and protect higher priority users. It should be noted that the recent rains and current higher dam level should allow for greater short term yield in the upcoming year that could delay the requirement for restrictions.
- Under all scenarios it is important to continue to manage the system efficiently, and to make full use of tributary water at the Mhlathuze weir prior to making releases from Goedertrouw Dam.

- **Figure 7-1** is the reconciled water balance under the Scenario A water requirement projection. The assumption for Scenario A is the normal future growth determined for the users, without any additional transfers to Mtubatuba / Mpukunyoni, or further supply to Eskom, the IDZ or the increased capacity of Phobane WTW. Under the condition of this water requirement projection, only the increased Thukela transfer and the implementation of WCWDM is required in the planning horizon until the year 2045
- **Figure 7-2** is the reconciled water balance under the Scenario B water requirement projection, which is the highest projection considered. The assumption for Scenario B is the normal future growth determined for the users, as well as additional transfers to Mtubatuba / Mpukunyoni, further supply to Eskom, the IDZ and the increased capacity of Phobane WTW. Under the condition of this water requirement projection, a few further interventions are required as follows:
  - the implementation of WCWDM is required.
  - Reuse of 11 million m^3/annum (30 Ml/d) should start from 2032.
  - Raising of Goedertrouw Dam would be required from 2042.
  - New Dam on the Nseleni would be required from 2038.
  - The above would be sufficient to satisfy requirements up till 2041 afterwhich another intervention would be required. There is sufficient time to determine the next intervention and it is important to carefully monitor the actual growth projection in order to determine if the high anticipated growth relating to the high projection scenario occurs.
- **Figure 7-3** is the reconciled water balance under the Scenario D water requirement projection, which is an alternative projection considered. The assumption for Scenario D is the normal future growth determined for the users, and the increased capacity of Phobane WTW. The additional transfers to Mtubatuba / Mpukunyoni, further supply to Eskom and the IDZ are not included in this scenario. Under the condition of this water requirement projection, a few further interventions are required as follows:
  - the implementation of WCWDM is required.
  - Reuse of 11 million m^3/annum (30 Ml/d) should start from 2037.
- Raising of Goedertrouw Dam would be required from 2042.

Action Plan

Intervention	Description of Actions	Primary Responsibility	Comments	Target Date (priority)
WCWDM	Implementation of proposed WCWDM plan: Institutional: Improved political backing, capacity building Financial: Enhance revenue collection, improved tariff structure Social: Raise public awareness Technical: reduce water wastage, pressure management, bulk metering	Local Municipalities: City of Mhlathuze LM, KCDM,	CoMLM & KCDM to continue with existing WCWDM programmes	High priority, implementation to continue/start immediately CoM: 10% savings, reduction in growth by 2025 (6.3 million m^3) KCDM: 15% savings, reduction in growth by 2025 (0.6 million m^3)
Maintain existing Thukela Transfer scheme	Ongoing maintenance of existing transfer scheme to ensure transfer can take place as and when required	MW DWS: RO: NWRI		Immediate and ongoing (34 million m^3/annum)
Complete Thukela Transfer upgrade from Middeldrift	Minister to sign directive for Mhlathuze Water to complete the work MW to finalise the construction and implement the scheme	DWS: RO MW	The scheme was originally initiated as an emergency scheme. The initial urgency to implement should be maintained	High priority (December 2023) (34 million m^3/annum)
Water Reuse	Continue with existing PPP efforts to implement intervention, including establishing takers	CoM LM	This intervention has been started.	Medium priority level (2032) 11 million m^3/annum (30 Ml/d)
Interim Restriction Rule to Benefit Priority (Primary) Users	Carry out annual operating analyses to determine level of restrictions to be imposed on users on an annual basis, water requirement dependent Implement restrictions on lower priority users according to priority classification table Continuously monitor water use of large users to confirm actual growth is in line with projections	DWS: Directorate Water Resources Planning Systems	This study is underway	Immediate and ongoing

Action Plan

Intervention	Description of Actions	Primary Responsibility	Comments	Target Date (priority)
Efficient system operation	Continuous maintenance of real time flow monitoring system, both data capture (measurement) and data sharing (cloud based) Enhancement of real time system based on pre-determined strategic monitoring points	DWS RO	The existing system should not be allowed to fail, and should be expanded to additional key flow monitoring points throughout the catchments. It is specifically important to improve the flow monitoring in the tributary catchments upstream of the Mhlathuze weir in order to forewarn of water coming.	Immediate and ongoing (28 million m^3/annum)
Existing Dam Raising	Feasibility Study and detailed design of raising Goedertrouw Dam	DWS: OA		Low priority (2035) (6 million m^3/annum)
New Dam Construction	Feasibility Study on new dam on the Nseleni River	MW	Tendering to be undertaken by implementing agent, Construction to be outsourced.	Low priority (dam construction) (2038) Medium priority (feasibility study) (12 million m^3/annum)
Lower Thukela Transfer to KCDM	Feasibility study into utilizing Umgeni Water's lower Thukela allocation for supply to KCDM	Umgeni Water	This study has been initiated and communication with the study team should be ongoing	High priority
Remove alien vegetation	Implement programme to systematically clear alien vegetation and continuously maintain cleared areas Rehabilitate land and re-establish indigenous vegetation	Department of Environmental Affairs, Mhlathuze CMF	Focus on areas upstream of Dams and Lakes	Immediate and ongoing
Groundwater use	Promote development of Groundwater resources on a local level	Municipalities	Determine groundwater resources for local water supply schemes. Consider impacts of abstractions on existing lakes.	As and when required

For more information refer to the following report

This report is to be referred to in bibliographies as:
Department of Water and Sanitation, South Africa, March 2021.
IMPLEMENTATION AND MAINTENANCE OF THE
WATER RECONCILIATION STRATEGY FOR RICHARDS BAY
AND SURROUNDING TOWNS: WATER RECONCILIATION STRATEGY.
P WMA 04/W100/00/9218/7

Or the suite of detailed reports as listed:

Report Name	Report Number	DWS Report Number
Inception	1	P WMA 04/W100/00/9118
Economic Growth and Demographic Analysis for the Richards Bay Reconciliation Strategy	2	P WMA 04/W100/00/9218
Water Requirements and Return Flows Report	3	P WMA 04/W100/00/9318
Water Conservation / Water Demand Management	4	P WMA 04/W100/00/9218/4
Water Resources	5	P WMA 04/W100/00/9218/5
Infrastructure and Cost Assessment	6	P WMA 04/W100/00/9218/5
Updated Reconciliation Strategy	7	P WMA 04/W100/00/9218/7
Executive Summary: Updated Reconciliation Strategy	8	This document