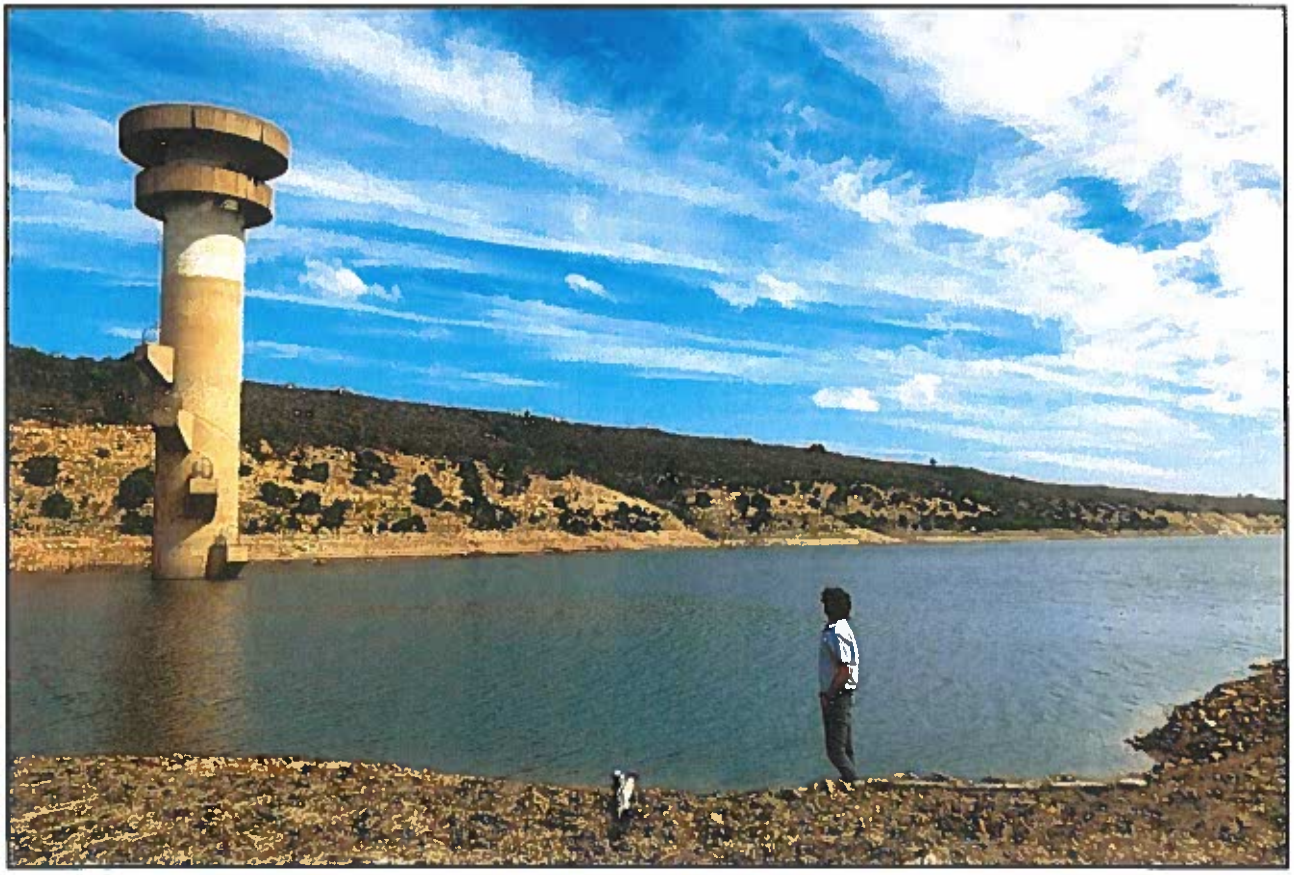
nelson mandela bay
MUNICIPALITY



DROUGHT MITIGATION PLAN

FEBRUARY 2026 – REVISION 10

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Glossary

Acronyms	Description
AC	Asbestos Cement
AMI	Advanced Metering Infrastructure
BAC	Bid Adjudication Committee
CDE	Commercial Data Evaluation
CDC	Coega Development Corporation
CoGTA	Cooperative Governance and Traditional Affairs
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DMA	District Metered Area
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
ENSO	El Niño-Southern Oscillation
EWR	Ecological Water Requirements
FDS	Functional Design Specification
GMA	Greater Metered Area
GUI	Graphical User Interface
ICI	Industrial, Commercial & Institutional consumers
KLM	Kouga Local Municipality
Mℓ	Megalitre (million litres)
MNF	Minimum Night Flow
NCLLS	Nooitgedagt/Coega Low Level Scheme
NDMC	National Disaster Management Centre
NGL	Natural Ground Level
NHLS	Nooitgedagt High Level Scheme
NMB	Nelson Mandela Bay
NMBM	Nelson Mandela Bay Municipality
NMU	Nelson Mandela University
NRW	Non-Revenue Water
NRW%	Non-Revenue Water Percentage
PRV	Pressure Reducing Valve
PSP	Professional Service Provider
ROD	Record of Decision
RE	Reclaimed Effluent
SAWS	South African Weather Services
SCADA	Supervisor Control and Data Acquisition
SEZ	Special Economic Zone
TWL	Top Water Level
WRP	Water Reclamation Plant
WSS	Water Supply Scheme
WTW	Water Treatment Works

1. INTRODUCTION

1.1 BACKGROUND TO THE REPORT

The Nelson Mandela Bay Municipality (NMBM) is located along Algoa Bay in the Eastern Cape Province and comprises Gqeberha (formerly known as Port Elizabeth), Kariega (formerly known as Uitenhage), Despatch, as well as the Colchester, Blue Horizon Bay, and the Seaview areas. The Municipality, covering an area of 1,959 km^2, is a Category A municipality, established in 2000 as per the provisions of Section 12 of the Local Government: Municipal Structures Act 117 of 1998. It is a major seaport and automotive manufacturing centre and is the economic powerhouse of the Eastern Cape Province. The figure below indicates the extent of the NMBM's jurisdiction.

Figure 1-1: NMBM Boundaries

The Nelson Mandela Bay Municipality (NMBM) is currently experiencing a severe drought which has seen some of the worst (lowest) rainfall figures in recorded history, with November 2022 being the driest November since the year 1945. Although there has been a slight recovery with high rainfall events in March 2023, July 2023 and October 2024, the catchment areas of the western dams have recently experienced persistent below average monthly rainfall since July 2025. The prediction is that these dry conditions will prevail until May 2026 and possibly beyond. This is the longest duration drought which has affected the NMBM's water supply system.

Climate scientists, hydrologists and disaster management specialists have traditionally distinguished between three different kinds of drought, i.e.:

1. A **meteorological drought** occurs when rainfall is less than average over a specific period, often measured over a month,
2. An **agricultural drought** is considered to be taking place when a lack of rainfall leads to a decline in soil moisture affecting pastures and rain-fed crops. A good way to visualise an agricultural drought is to show rainfall records and vegetation conditions on maps.

3. A **hydrological drought** occurs when a lack of rainfall persists long enough to deplete surface water, i.e.: rivers, reservoirs, or streams—and groundwater supplies.

Taking the above into account, climate scientist and specialists have indicated that the NMBM and other parts of the Eastern Cape are wedged in the middle of a **hydrological drought**. It must be noted that since November 2015 the NMBM has been experiencing a dry period of below average rainfall, resulting in declining dam levels and water storages. In September 2018 good rains occurred in very specific catchments and the average dam levels increased from 17.82% to 53.03%. This rainfall created a false sense of security as certain catchment areas did not receive significant rainfall. Since then, the average dam levels have continued to drop at a consistent rate up to a combined extreme low level of 11.63% measured on 18 November 2021. Some catchments received good rains during the month of December 2022 (measured as the wettest December since the year 2015), which brought slight relief to the average combined dam levels which measured at 12.06% on 28 February 2023. The current combined dam levels are at 45.78% (as measured on 28 January 2026) which includes dead storage of 8.99%. Actual availability is therefore only 36.79%.

The large dams, located to the Western side of Gqeberha (discussed later in the report), that supplies water to the NMBM (amongst other consumers) is very dependant form rainfall run-off water from the Langkloof and Patensie/Baviaans catchments. They rely on cut-off low weather systems that produce rainfall events of greater than 50 mm in 24 hours. These should then be followed up by regular falls of more than 10 mm in 24 hours in order to provide significant run off. The concern is that there have been no significant (more than 50 mm) rainfall events during the last seven months, which has resulted in a drop in dam levels. Taking this into account, it is highly likely that (1) with the continued high water demand (abstraction volumes exceeded 400 Mℓ/day in December 2025) and (2) without any above-normal rainfall events in the catchment areas the NMBM's supply dams could run dry soon.

With approximately half of the residents of the NMBM being supplied from these dams, one can only imagine what the potential disastrous and far-reaching negative implications would be, should these dams run dry. The result would be that certain zones will not be able to be supplied with potable running water. In this case, it is estimated that around 500 000 residents, ranging between domestic households, businesses, schools & hospitals will be negatively affected. This scenario must be avoided and prevented as it will result in increasing unemployment rates and poverty levels which will certainly have a significant negative impact on the NMBM's economy. Prevalent water borne diseases, additional health related matters and increasing crime statistics will also emerge and this possible scenario should be prevented.

Due to the severe drought currently being experienced as from 2015, the NMBM's Executive Mayor (at the time) first declared a Local State of Disaster on 22 May 2017. Additional declarations, each valid for a period of three months, were subsequently made on 19 June 2018, 21 November 2019, and 04 May 2020. The latest local declaration by the NMBM was gazetted on 07 September 2020 (EC Gazette # 4442) and was valid until 07 December 2020.

In addition to above, the Eastern Cape was declared a provincial state of disaster on 04 December 2017 and again on 24 October 2019, due to the drought. The Head of the National Disaster Management Centre (NDMC) also declared a national state of disaster due to the drought on 08 February 2018 and on 26 February 2020 in response to this. Persistent and continuous negotiations from the NMBM Disaster Management Sub-Directorate with the Provincial Disaster Management Centre ensured that the NMBM was classified through the National Disaster Management Centre as a national drought disaster area on 20 July 2021 through Government Gazette No. 44876. The declaration of a state of disaster provides the authority whereby the NMBM can reprioritise resources and budgets towards drought related projects and follow emergency procurement procedures to secure the resources required to implement its drought mitigation plan. It is however assumed that this declaration has since lapsed, **thus the need to reclassify the current drought as a Provincial Disaster**.

Current estimations, as shown by the trendline below, indicate that the NMBM has approximately 6 months of water left in its local dams (as measured from the beginning of January 2026 until the end of July 2026) should there be little to no rainfall in the catchment areas.

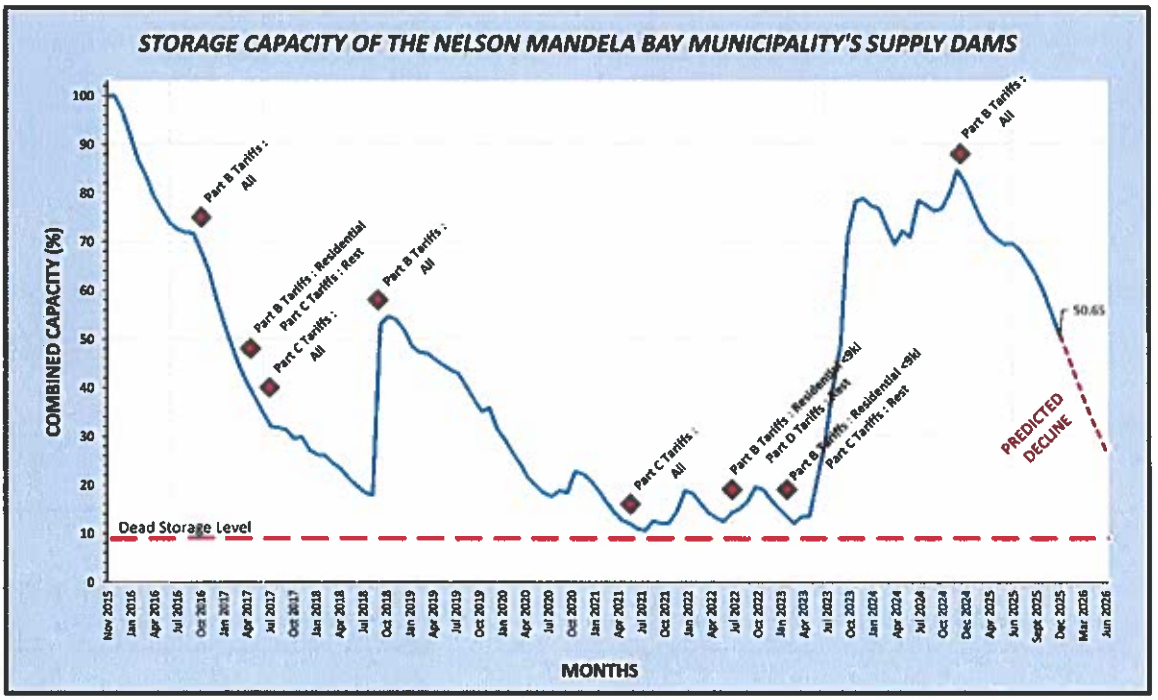


Figure 1-2: Predicted Decline if trend continues

The following figure highlights the severe pressure on the available storage capacity of the NMBM's supply dams, as it is evident that the combined storage level has touched the lowest levels dating back to 1978.

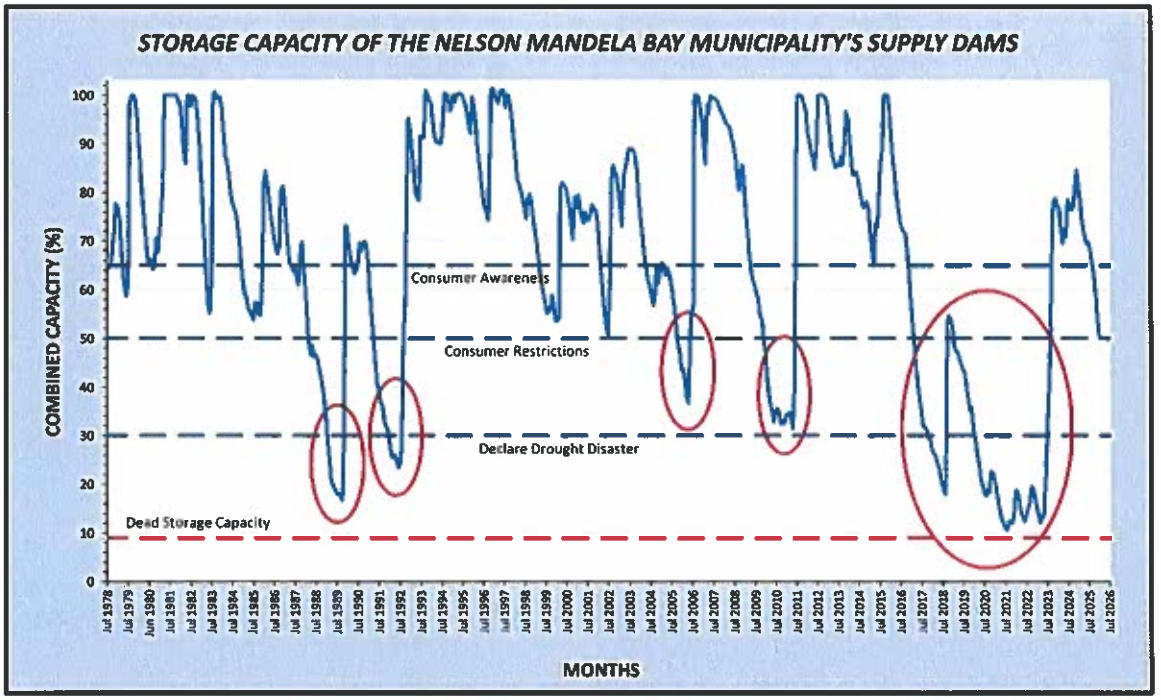


Figure 1-3: Historical trend of combined storage capacity of the NMBM's supply dams

What needs to be pointed out is that the last time the local dams reached full (100%) storage capacity was in 2015 – as depicted in the graph below. A concern is the recent consistent decline in dam levels – from 84.68% in November 2024 to 45.78% on 28 January 2026.

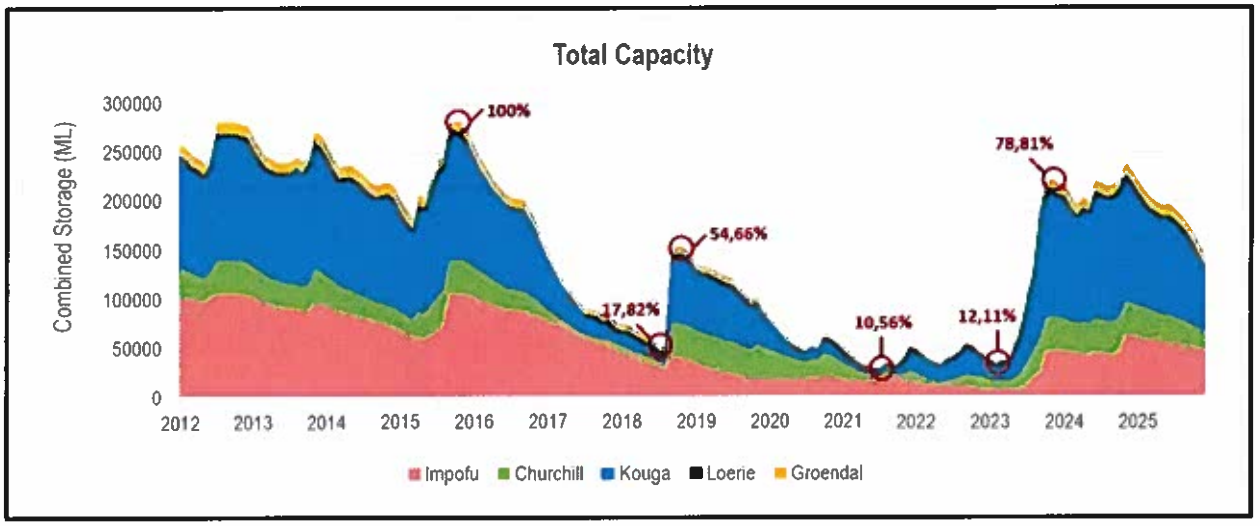


Figure 1-4: Total combined storage capacity of the NMBM's supply dams from 2012 to the present

The below average rainfall since June 2025 is illustrated in the figure below which shows rainfall data in the catchment area of the Churchill Dam over the last 11 years. This is the second lowest over this period.

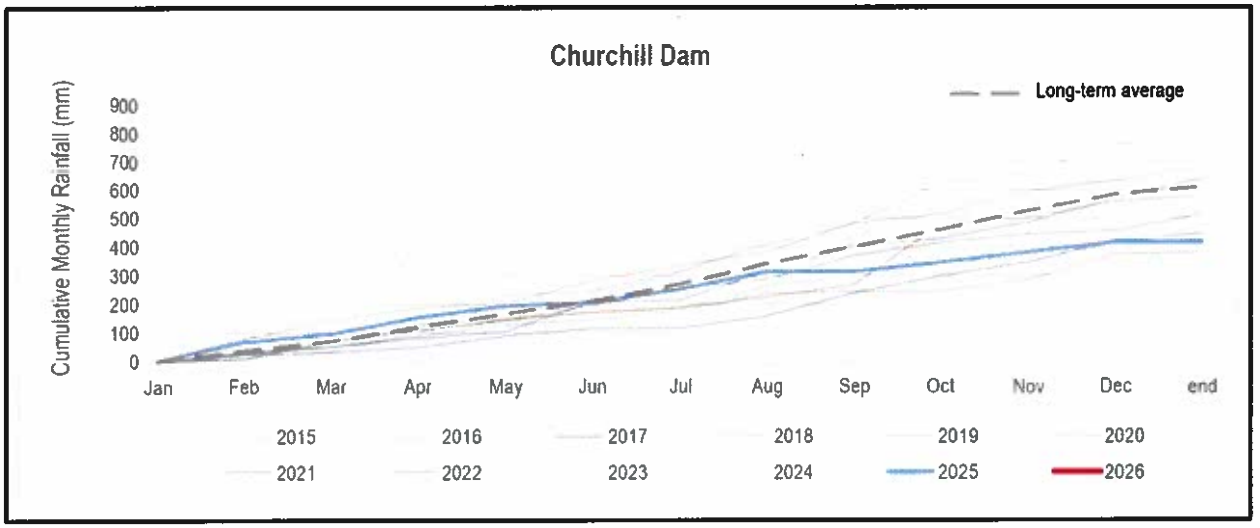


Figure 1-5: Rainfall data of the Churchill catchment since 2015 – note below average precipitation since June 2025

Depleting the water sources is not an option, and measures need to be implemented to ensure that the available water will last until the next high rainfall event. The concern is that there is currently not an active drought disaster classification in place.

1.2 DOCUMENT AUDIENCE

The document was compiled by the Water and Sanitation division, under the Infrastructure and Engineering Department, for other governmental departments, i.e., CoGTA, NDMC, DEDEAT, DWS and Treasury, as well as internal NMBM departments and any/other interested third parties.

1.3 PURPOSE OF THE REPORT

To prevent the supply dams from running dry or in the case that the NMBM's abstraction volumes from the dams are entirely restricted, the NMBM is currently implementing various water augmenting & water saving measures and strategies.

Taking the above into account, the purpose of this report therefore is to document the following:

- Status Quo of the NMBM's water supply system and sources,
- The NMBM's strategy to mitigate the effect of the current severe drought,
- Discuss measures taken to augment the NMBM's water supply,
- Discuss measures taken to reduce the NMBM's water demand,
- List and discuss emergency supply options,
- The financial implications of the interventions,
- The sectorial & internal coordination.

The NMBM's Infrastructure and Engineering Department compiled the report to present the reader with a credible source of information and knowledge to be kept up to date with all the various interventions and measures that the NMBM is currently implementing in the endeavour to ensure a reliable water supply to all their residents, businesses, and industries.

The NMBM's drought mitigation action plan is demonstrated diagrammatically on the following page.

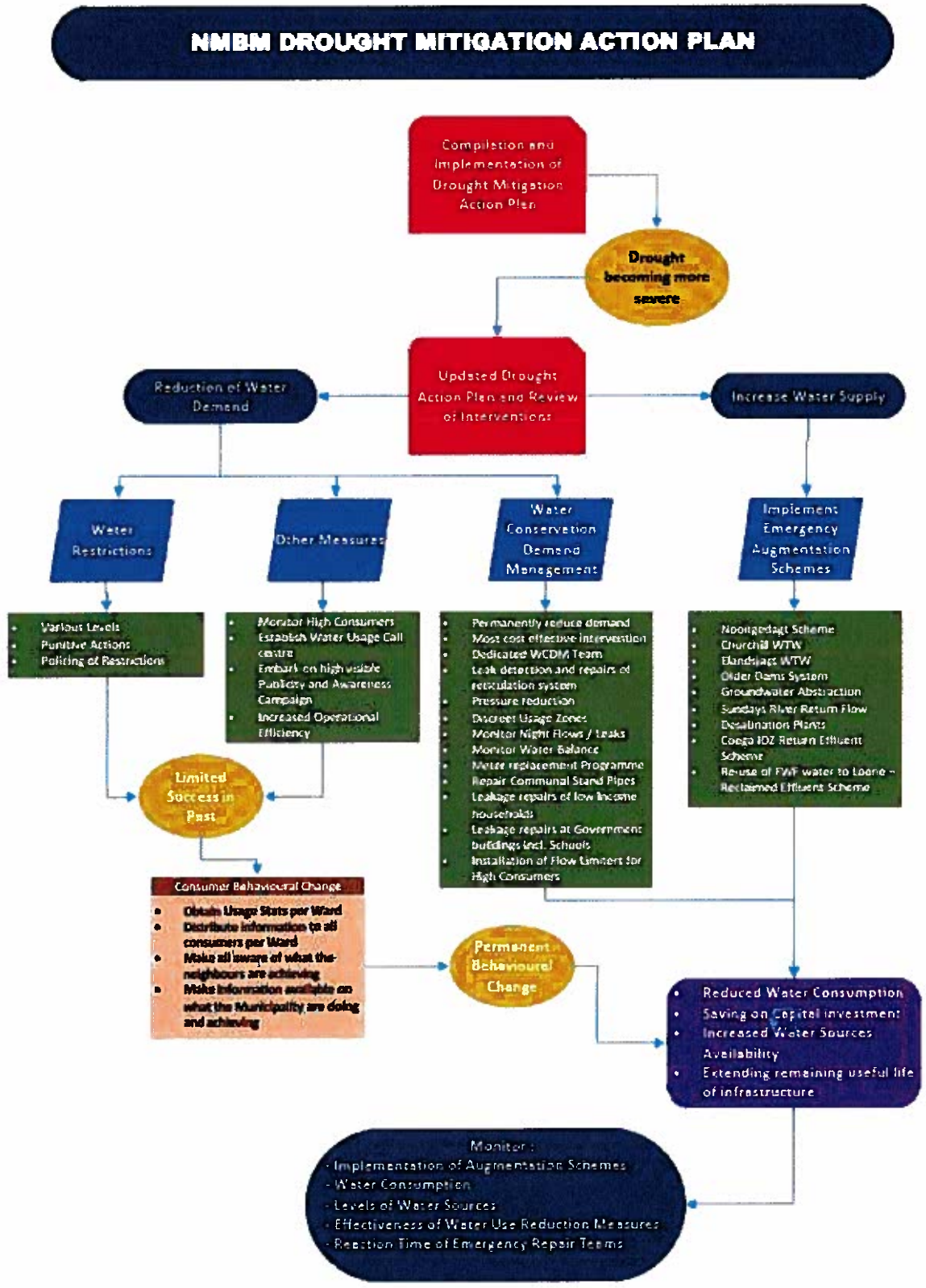


Figure 1-6: Drought Mitigation Plan

2. CURRENT STATUS OF THE NMBM's WATER SUPPLY SYSTEM

2.1 NMBM BULK WATER SUPPLY SYSTEM OVERVIEW

The water supply of the NMBM, and several smaller towns within the Kouga Local Municipality, is supplied by the Algoa Water Supply System (Algoa WSS) which consist of various systems as indicated by the diagrammatic layout below:

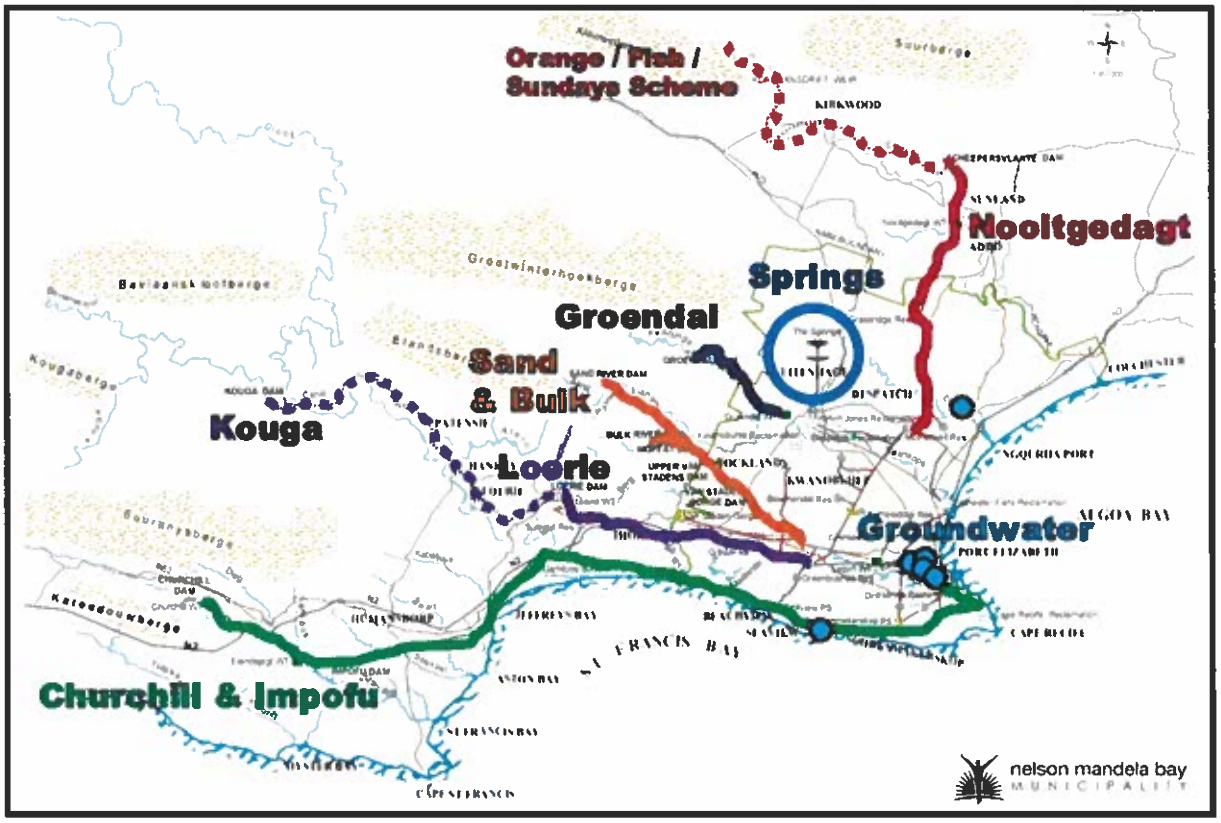


Figure 2-1: Diagrammatic Layout of NMBM Bulk Water Supply

The Algoa WSS is sub-divided into the Western-, Eastern- and Central Systems, which must meet the water demand for the city, smaller coastal towns, industries, mining, and agriculture. These systems are almost entirely dependent on rainfall.

The Western System provides water to NMB from the Churchill and Impofu dams on the Kromme River and from the Kouga Dam on the Kouga River, via the Gamtoos Irrigation system to the Loerie Balancing Dam on the Loerie Spruit, a tributary of the Gamtoos River. The NMBM owns the Churchill dam while Department of Water and Sanitation (DWS) owns the other western dams. Therefore, the bulk water supply system is operated jointly by the NMBM and the DWS. The bulk supply from the combined Western System amounts to approximately 167 Mℓ/day, under unrestricted conditions, at an assurance of 1 in 50 years. This means that severe restrictions should be required only about once every 50 years. In addition to the latter, the Gamtoos Irrigation Board also has an allocation from Kouga Dam. There is also relatively small usage by irrigators and several smaller towns supplied by this sub-system within the Kouga Local Municipality, which includes Cape St. Francis, St. Francis Bay, Hankey, Humansdorp, Kruisfontein, Jeffreys Bay, Oyster Bay, Patensie and Thornhill. As is the norm, there is a small provision for Ecological Water Requirements (EWR) below the Impofu Dam.

DWS has imposed restrictions on the Kouga system (10%) and the Kromme system (25%) for the period 1 November 2025 to 31 October 2026. This implies that the NMBM's allocation from the three dams (Kouga, Churchill & Impofu) has been reduced to 135 Mℓ/day.

Historically, approximately half of the residents in NMB are supplied from the dams located on the western side of the NMBM.

The Eastern System comprises of the Orange-Fish and Lower-Sundays River Transfer Scheme (DWS owned) that supplies Orange River water from the Gariep Dam (situated some 450km's north of Gqeberha) to the Great Fish River valley and the Sundays River valley, supplementing local water supply for irrigation and urban use. The Lower Sundays River Irrigation Scheme supplies water for irrigation as well as for two major water users, namely the Sundays River Valley Local Municipality and NMB for domestic water supply. NMB's current allowable abstraction volume from the source, through the Nooitgedagt water treatment works, amounts to roughly 210 Mℓ/day.

The Central System consists of the older dams on the Sand-, Bulk-, Van Stadens- and Kwa Zunga (a tributary of the Swartkops) rivers and the Uitenhage Springs. All these dams are owned by the NMBM. Combined, the quantity of water that can be abstracted from these sources, under unrestricted conditions, amounts to approximately 31 Mℓ/day.

To supplement the Algoa WSS, the NMBM has developed groundwater as a source of potable water which can be utilized and introduced to the water reticulation network so to relieve the NMBM's total dependence on surface runoff water. To this effect, the NMBM has developed multiple groundwater wellfields over various location across the NMB municipal area. The current total combined allowable abstraction volume from these source amounts to approximately 23.8 Mℓ/day and is particularly discussed in more detail in Section 4.3 later in the report.

The table below provides an overview of the NMB's water supply sources, as well as the current licenced, but unrestricted, abstraction volumes authorised by the DWS.

Table 2-1: Overview of the NMB's unrestricted water supply sources

Supply System	Sources of Supply	NMB Licenced Abstraction Volumes (Mℓ/day)
Western Supply	Churchill/Impofu Dams	104.32
	Kouga/Loerie Dams	63.01
Central Supply	NMBM Older Dams	12.49
	Groendal Dam	12.71
	Springs	5.92
Eastern Supply	Gariep Dam (Transfer Scheme)	209.73
NMBM Wellfields	Groundwater	23.84
	Combined Total Volumes:	**432.02**

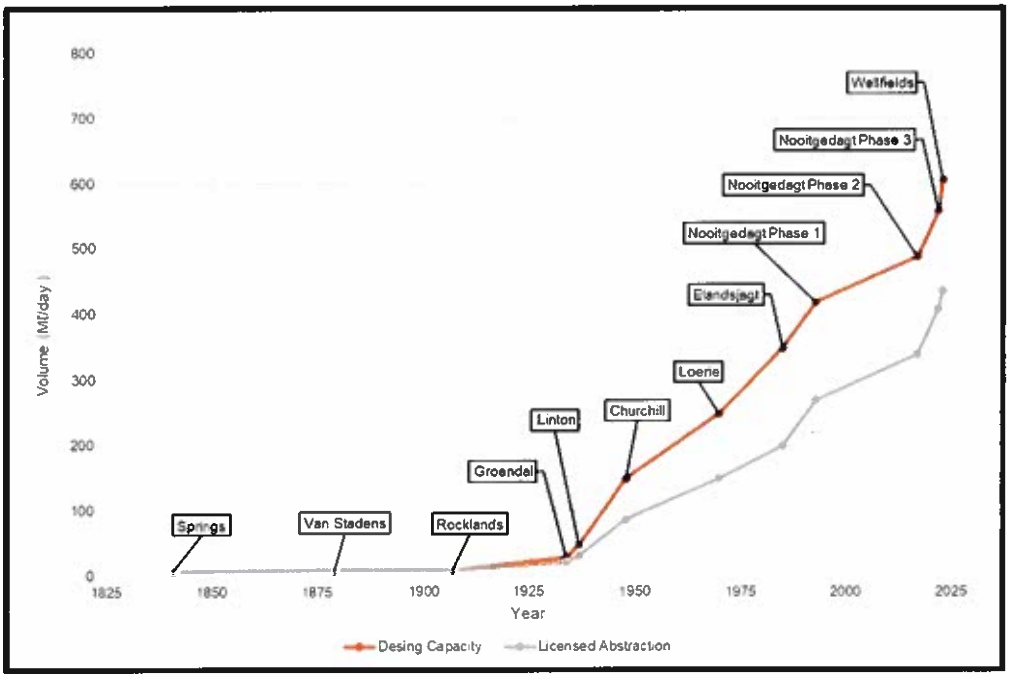
To treat the raw water from dams and schemes, various water treatment works had to be constructed over time to keep up with the increasing water demand, level of service and growing population within our municipality. The water treatment works of the Algoa WSS, owned, and operated by the NMBM, are listed in the table on the following page.

Table 2-2: Overview of the NMB's Water Treatment Works

Water Treatment Works		Date of Commissioning	Current Capacity (Mℓ/day)	Source(s)
1	Nooitgedagt WTW	1992	210	Scheepersvlakte Dam
2	Loerie WTW	1968	100	Kouga & Loerie Dams
3	Churchill WTW	1947	100	Churchill Dam
4	Elandsjagt WTW	1985	105	Impofu Dam
5	Groendal WTW	1985	20	Groendal Dam
6	Linton WTW	1936	15	Bulk & Sand River Dams
7	Springs WTW	1940	6	Uitenhage Springs
8	Rocklands WTW	2006	0.18	Bulk & Sand River Dams
9	Coegakop WTW	2023	20	Coegakop Wellfield
10	Bushy Park WTW	2023	17.2	Bushy Park Wellfield
11	St Georges Park WTW	2023	3.6	St Georges Park Wellfield
12	Fairview WTW	2022	1.5	Moregrove Wellfield
13	Fort Nottingham WTW	2022	1.0	Moregrove Wellfield
14	Glendinning WTW	2022	2.2	Moregrove Wellfield
		Combined total:	**601.68**	

The combined treatment capacity of the water treatment works amounts to **601.68 Mℓ/day** - providing sufficient overall capacity to treat raw water and supply the current daily water demand. However, we are entirely dependent the availability of this volume of water and can only treat licensed abstraction volumes from the various water sources. These are limited by restrictions imposed by DWS, especially during severe droughts.

As per the tables provided above and on the previous page, the graph below visually represents the increase in the capacity for treatment of raw water, licensed abstraction volumes from water sources, as well as the NMBM's water demand over time.



Graph 2-1: Visual representation of the increase in the NMBM's water sources, treatment capacity and water demand over time

2.2 CURRENT STATUS ON NMBM'S WATER SOURCES

Since NMB is currently experiencing a severe drought, it is important to understand the rainfall forecasts and weather patterns for our region, as well as the catchment areas of the water sources to plan and manage the water resources carefully. As mentioned previously, the catchment areas for the NMB dams rely on cut-off low weather systems that produce rainfall events of greater than 50 mm in 24 hours. These need to be followed by regular rainfalls of more than 10 mm in 24 hours to provide significant run-off. The following figure indicates the various catchment areas for the NMBM's local dams.

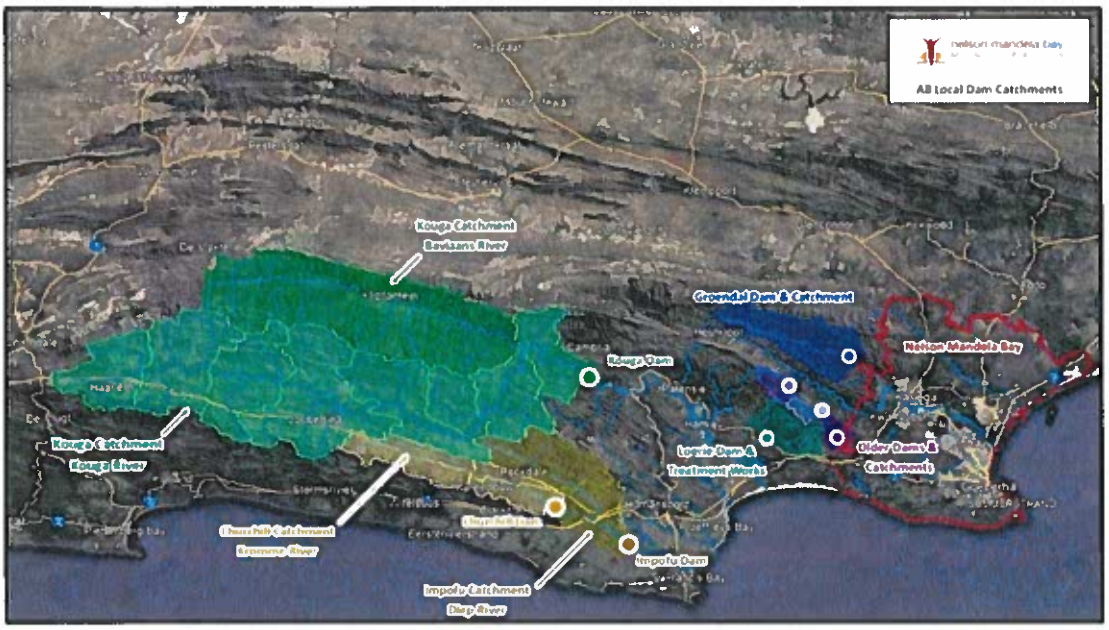
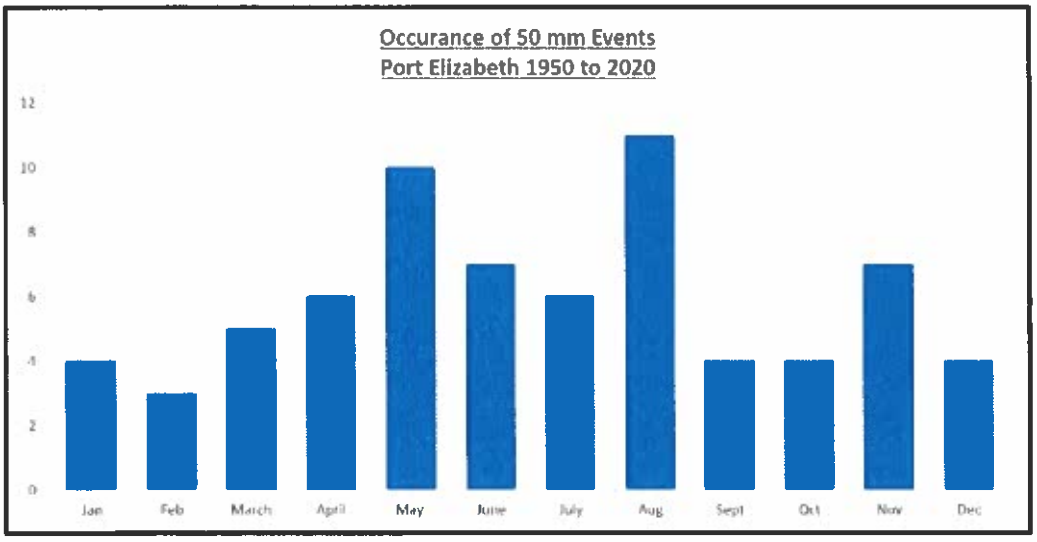


Figure 2-2: Catchment areas for the NMBM's local dams

According to South African Weather Services (SAWS), a high intensity rainfall occurrence is characterised by a rainfall event of more than 50mm within 24 hours. The graph below indicates further historical data that shows the number of high intensity rainfall occurrences for each month over a 60-year period, from 1950 to 2020.



Graph 2-2: Historical High-Intensity Rainfall events

From the graph on the previous page, it is evident that these high intensity rainfall events mostly occur during the months of May, June, August, and November, although odd ones have been recorded across the entire year.

According to SAWS's seasonal climate watch report from January 2026 to May 2026, hot and dry conditions will most likely continue until at least May 2026. Below-normal rainfall is expected over the southern and eastern coastal areas during autumn, areas which normally receive significant rainfall over this period climatologically. The figure below indicates the expected rainfall conditions predicted by the SAWS for the period January 2026 to May 2026.

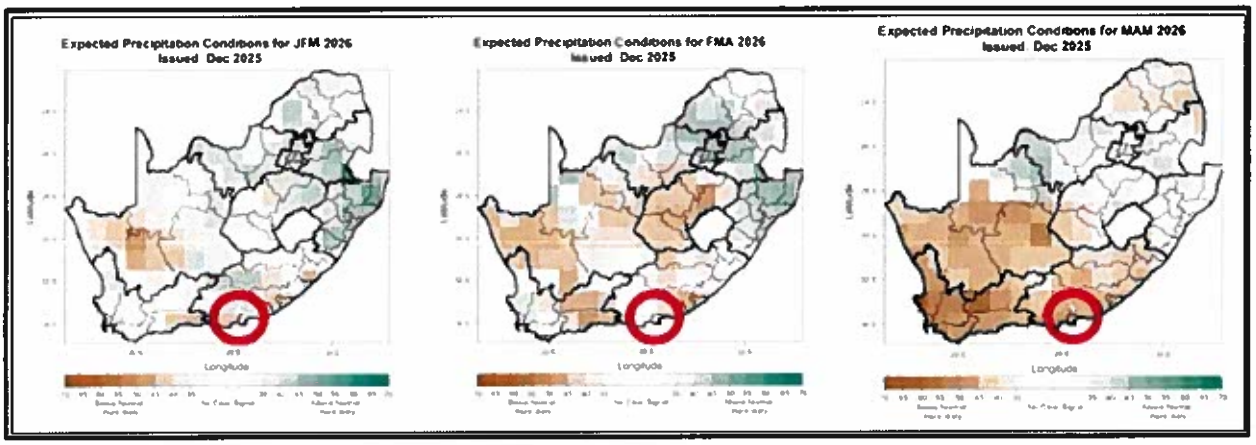
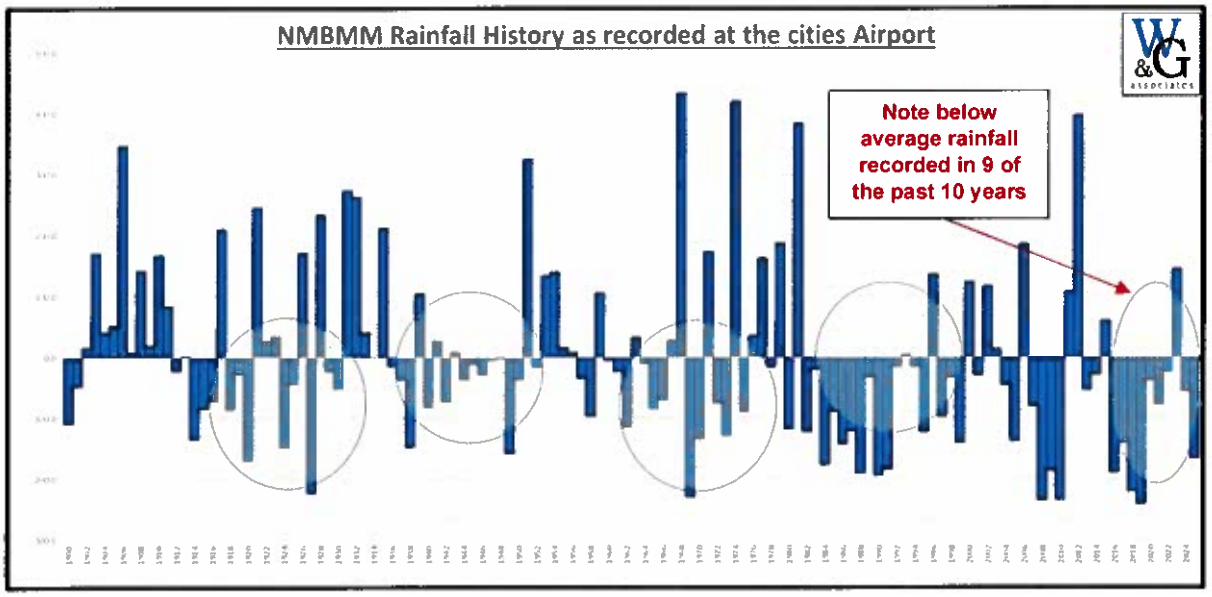


Figure 2-3: Excepted Rainfall Conditions between January 2026 and May

The SAWS has in the recent past observed record high temperatures for the Eastern Cape, exacerbating the dry conditions and increasing the rate of evaporation from surface water storage. For instance, a maximum temperature of 40.2 °C was measured in NMB on 16 February 2020, which marked the hottest day in 55 years. The severity of the drought experienced over the Eastern Cape, especially in the NMB, is apparent, compared to historical rainfall data, since 1900. In only five of the last 20 years, did the city receive higher than average rainfall, with 2022 being the seventh consecutive year of well-below average rainfall. The same occurrence was recorded during the extreme drought between circa 1982 and 1994 as indicated in the graph below.

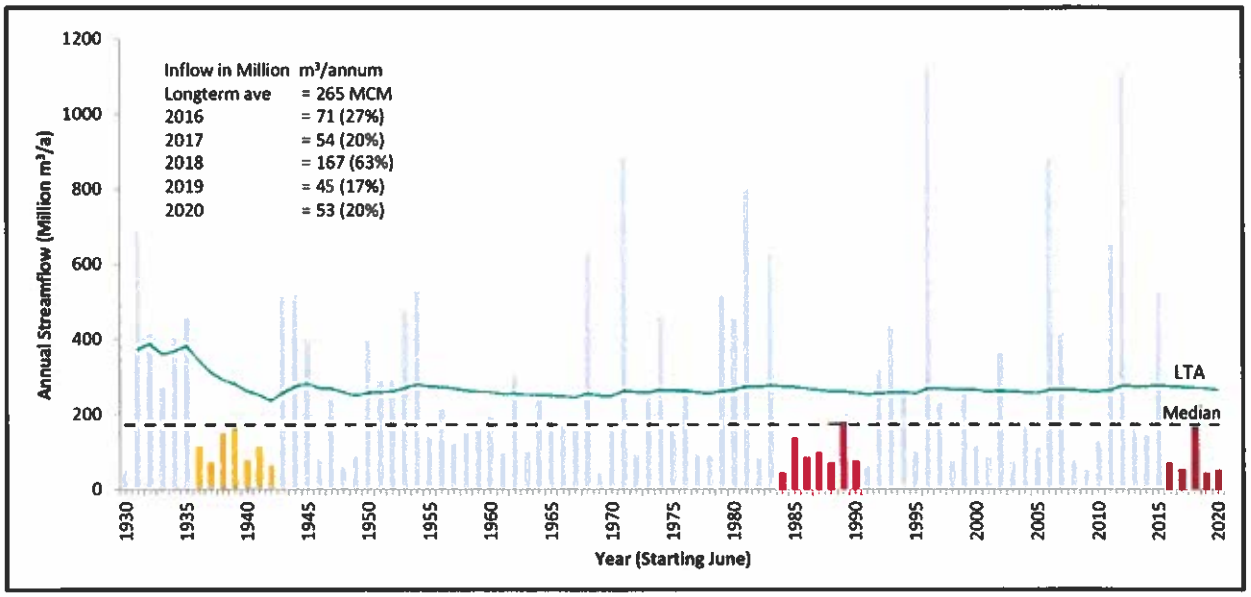


Graph 2-3: Historical Rainfall Data – as measured at Gqeberha's airport (Information provided by Garth Sampson)

The rainfall data provided in the graph on the previous page shows below average (the vertical bars below the horizontal zero axis) rainfall recorded in 9 of the last 10 years (the period 2015 to 2024), the year 2023 being the only year in which above average rainfall occurred.

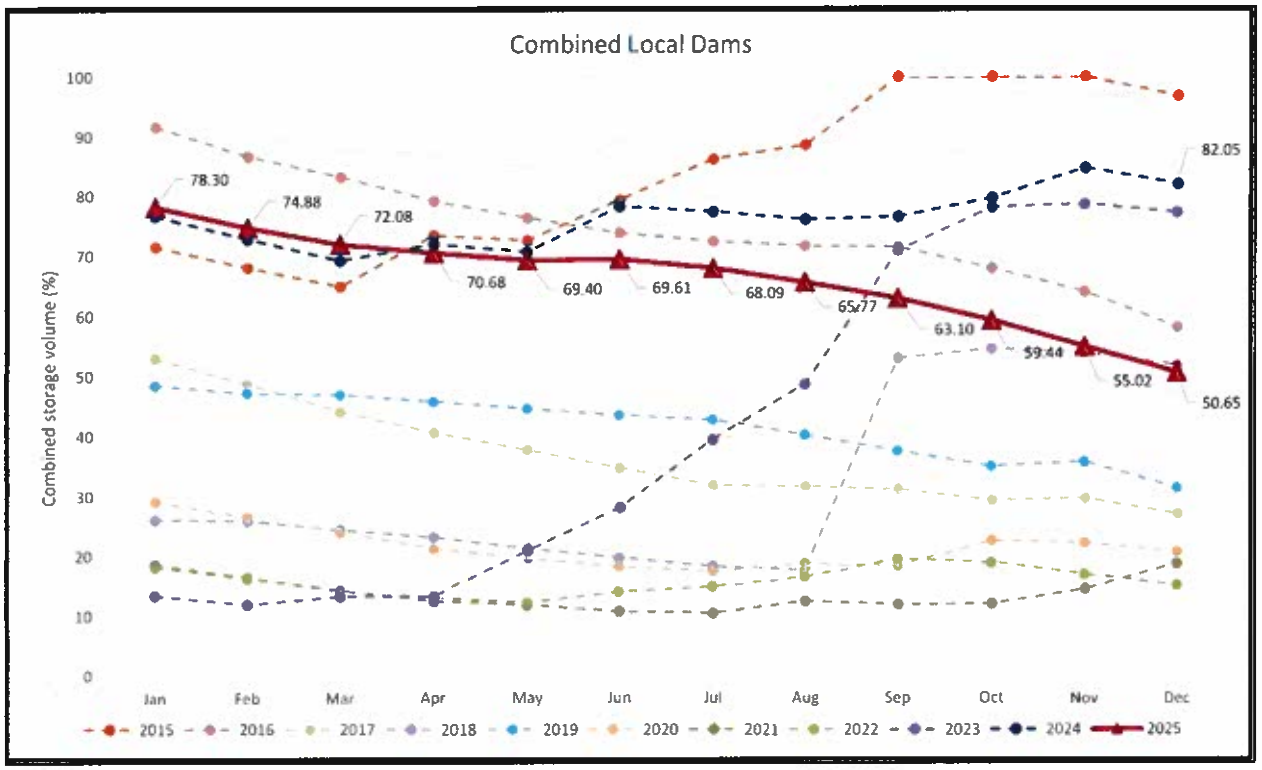
The SAWS advises that strict water management protocols will need to be followed in the western parts of the Eastern Cape to manage available water resources – given the forecast for below normal rainfall over the next few months. It must be highlighted that water resources along the Garden Route, Koukamma and Kouga are already under stress due to ongoing hot and dry conditions – which leads to higher evaporation rates and increased water demand.

As previously mentioned, the Western Water Supply Systems of the Algoa WSS is entirely dependent on runoff from rainfall. Several high intensity rainfall events are required at this stage to create sufficient runoff for the dams located to the west of the NMB to recover. In natural environments, a cyclic drought, which consists of repeated drought-recovery cycles, is considerably more common than a prolonged drought event. The NMBM therefore believes that the current hydrological drought is cyclical and will be relieved by a recovery period. This statement is furthermore supported by the historical information as indicated by the graph above, which indicates the historical rainfall compared to a long-term average, as well as the graph below which visually represents the measured rainfall runoff into the local dams.



Graph 2-4: Historical rainfall runoff into dams

Further to the aforementioned, the graph below represents an extract of the combined dam storage volumes tracked over the past 20 years, **highlighting the years from 2015 to current**, while the grey trendlines represent historical information tracked from 2002 to 2014.



Graph 2-5: Combined Dam Storage Levels for the past ±20 years

From the historical information visually represented on the graph above, the dams previously exceeded the 100% combined storage capacity in 2015, during the months of September, October, and November (darker orange line). Since then, extremely poor rainfall, together with a growing economy and increased water demand, resulted in a steep decline of the combined water storage in dams. Historically the dam levels do not follow a specific trend, but the combined storage has not recovered since a brief spike in 2018, as indicated by the lighter, purple-dotted line in the graph.

Notably, the combined dam storage levels reached an all-time historical low of **9.98% on 21 July 2021** as indicated by the grey dotted line, which represents the combined dam storage levels for 2021. Current combined dam levels, shown by the dark-red line, were at 50.65% of full capacity at the end of December 2025. During 2025 dam levels dropped consistently – from 78.30% in January to 50.65% in December. Current combined levels are at 45.78% - as measured on 28 January 2026.

This trend (consistent drop in dam levels) is most likely to continue if current weather conditions remain the same.

It is evident that the impact of the drought has severely affected the dam storage throughout the Western Supply Region of the Algoa WSS. The chart below indicates the current available water capacity in the dams (extracted portions of the chart) vs storage capacity when the dams are full (transparent portions + extracted portions) as measured at the end of December 2025.

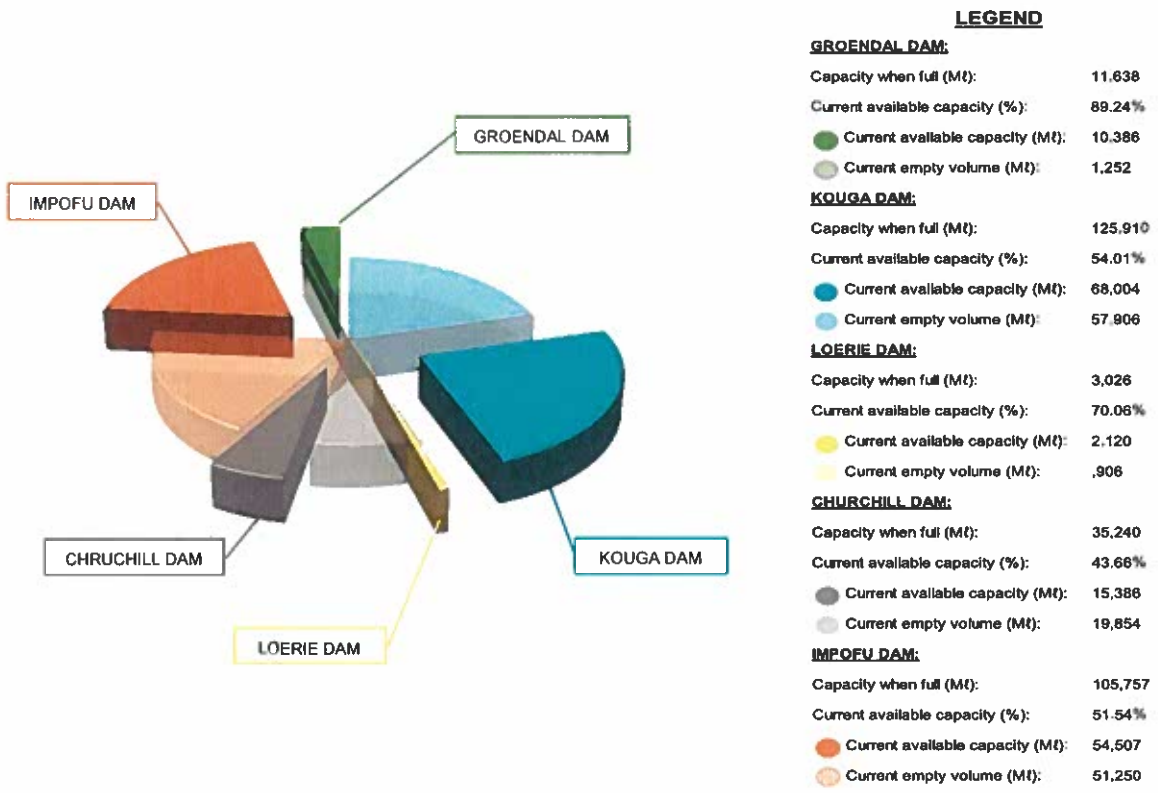


Figure 2-4: Current overview of available water capacity in the NMBM's dams

The impact of the severe drought together with an increased water demand has put dam levels under a great deal of pressure. The following sections will provide some background and an overview of current status quo of each dam which currently supplies the NMBM with water.

2.2.1 Churchill Dam and Impofu Dam

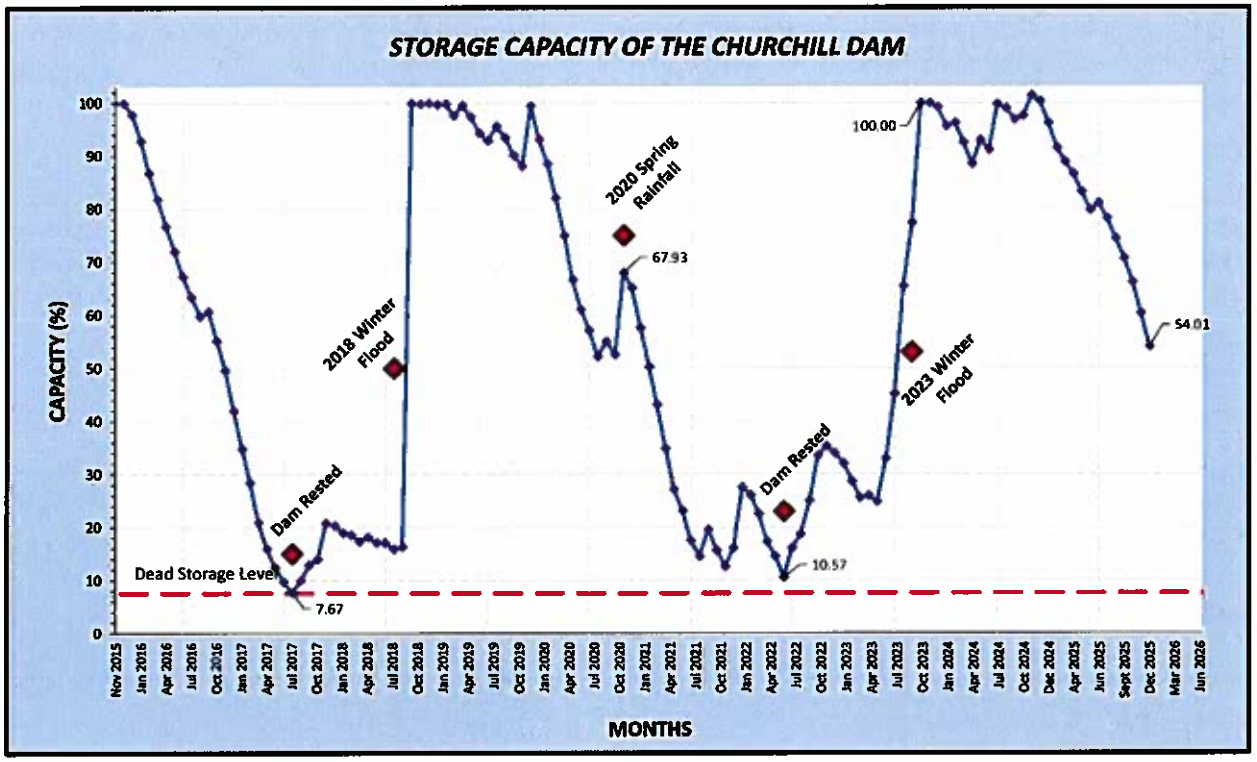
Due to the rapid decline in storage, historically, all abstraction from the Churchill dam ceased at the 7% storage level during July 2017 and the dam was subsequently rested. The storage level gradually increased over the following months and with some good rain events the dam was filled to 100% capacity in September 2018. Note that any overflow from Churchill Dam will subsequently accumulate in the downstream Impofu Dam.

Water in Churchill Dam is preserved for when the Impofu Dam drops below 22%, to prevent a total failure of supply from the Impofu / Churchill water supply branch of the Western Supply System. In October 2019, the Impofu Dam reached 17% storage. As a result, a barge was required (to lower the dam inlet level) to pump raw water from the Impofu Dam to the treatment works. This reduces the capacity of the treatment works and thus abstraction from Churchill Dam had to be implemented as well.

The graph below shows the trendline of the storage capacity for the Churchill Dam since the 100% storage volume was reached during 2015 and repeated in 2023 and 2024. The dam's storage level measured at 54.01% as on 31 December 2025. It has since dropped to 49.53% (as recorded on 28 January 2026).

Figure 2-5. Churchill Dam - 14.63% @ 25 November 2021

The dead storage capacity of Churchill Dam is 7%. Once this level is reached, electrical supply and pumping equipment will be required to access the dead storage capacity.



Graph 2-6: Churchill Dam Storage Level

Having three times the storage capacity of the Churchill dam, historically, the Impofu Dam supplies most of the water required for the Churchill pipeline system. When the dam reached a storage level of 17% in October 2019, the utilization of a barge was required to maximise the use of the dead storage and supply raw water to the Elandsjagt water treatment works. The first barge was subsequently commissioned and deployed during March 2020 with an abstraction capacity of 33.75 Mℓ/day. A second barge was thereafter commissioned and deployed during August 2021 and increased total maximum abstraction capacity to 67.25 Mℓ/day.

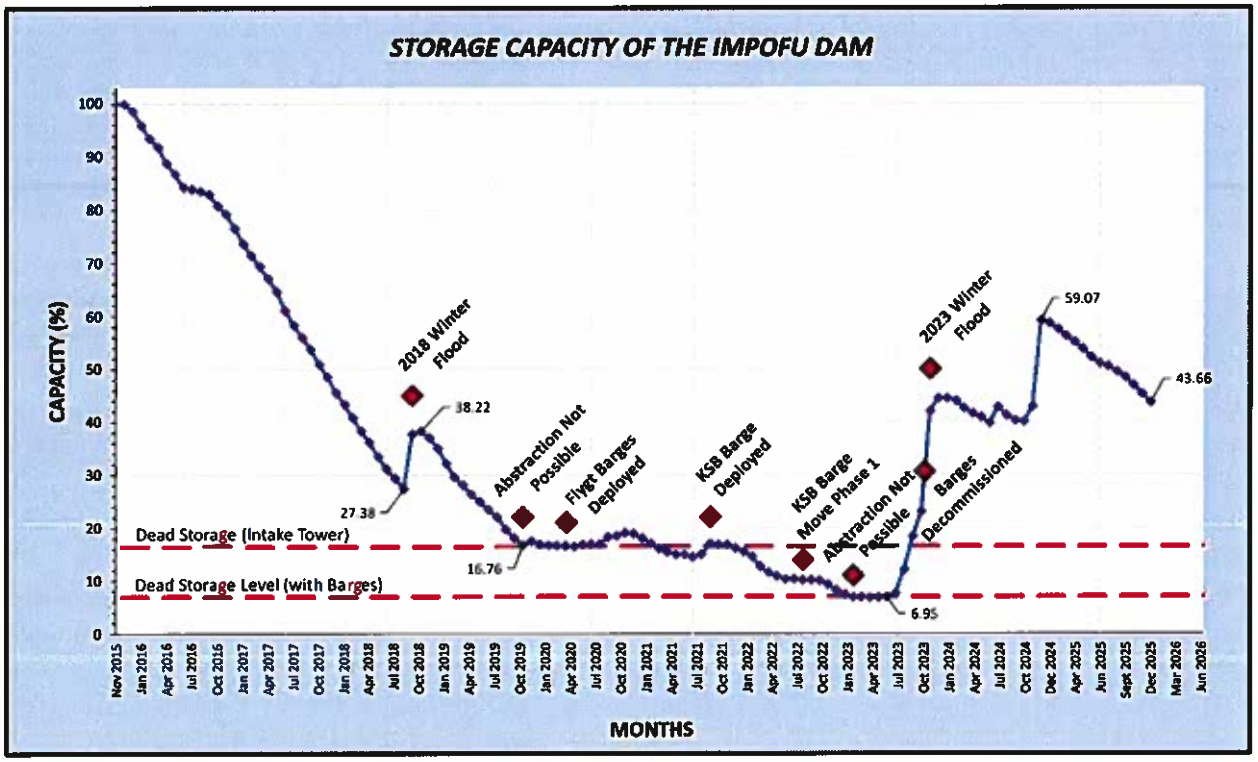
However, abstraction had to be halted during June 2022 when the dam reached 9.5% storage capacity, so to prevent damage to the barge pumps as the water level underneath the barge pumps were too low for normal operations. This means that any shortfall in the allowable abstraction requirement through the Impofu / Churchill water supply branch must be made up with abstracted water from the Churchill Dam.

To mitigate the impending depletion of the Churchill Dam and to maximize the total available dead storage at the Impofu Dam, the NMBM have embarked on upgrading the existing barge arrangement and pumps at the Impofu Dam which will be discussed later in the report.

The barges were decommissioned when the dam level reached 30% in 2023. The respective components have been placed in storage, but are ready for re-commissioning, if required.

The graph below indicates the trendline of the storage level for the Impofu Dam since the 100% storage level was achieved during 2015. The dam's level was at 43.66% at the end of December 2025. It has since dropped to 41,95% as recorded on 28 January 2026.

Figure 2-6: Impofu Dam – 50.36% @ 04 August 2025

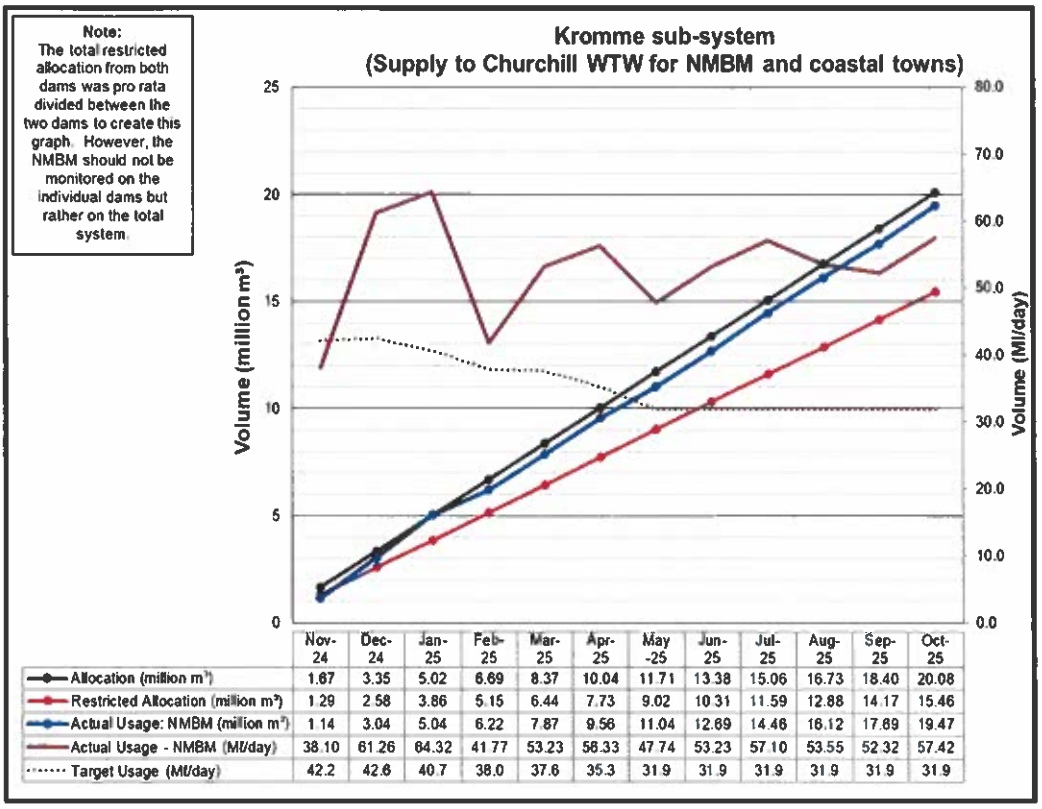


Graph 2-7: Impofu Dam Storage Level

Note that the recent rainfall in the catchment areas haven't had a noticeable effect of the dam's storage level due to no overflow from Churchill Dam.

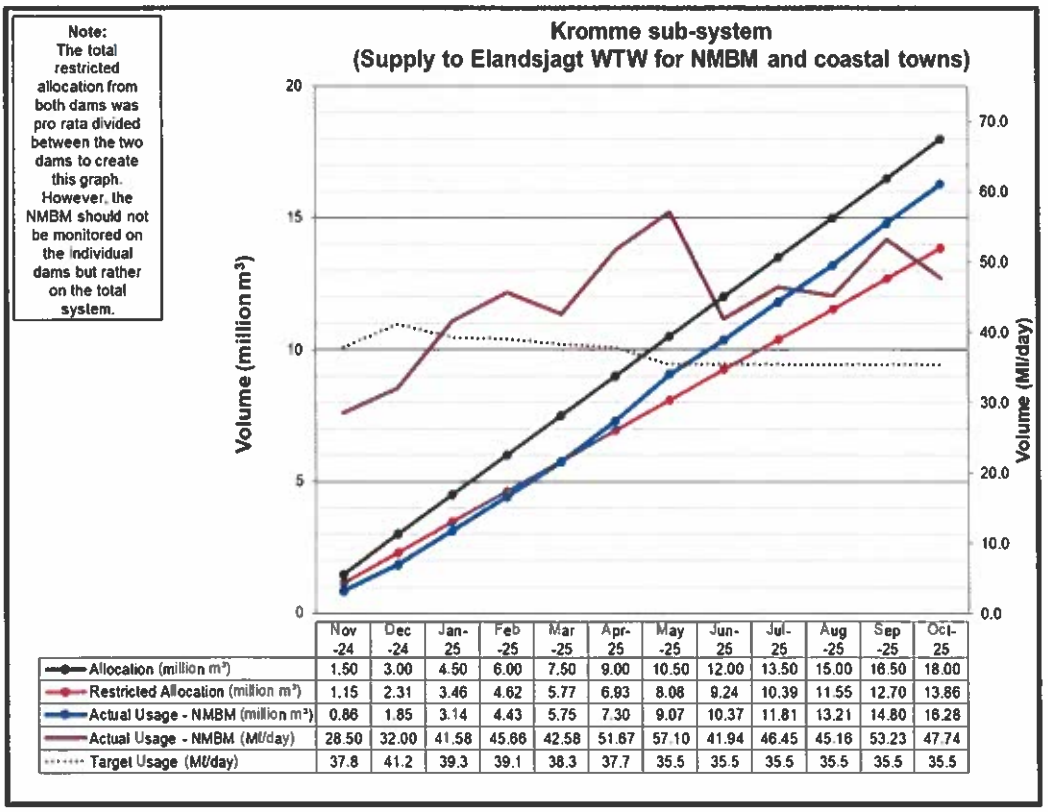
Due to the extreme pressure on the available water storage capacity in the western dams, it is now crucial, more than ever, to monitor the dam levels daily in order to gauge when dead storage levels will be reached, to plan ahead regarding a possible "Day Zero" event and to keep the public informed so to further encourage the NMBM's consumers to reduce their water demand.

The two graphs below indicate that the targeted abstraction from the Kromme Sub-System should be zero at this stage as the actual abstraction (indicated by the blue line) currently exceeds the restricted allocation (indicated by the red line).



	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25
Allocation (million m³)	1.67	3.35	5.02	6.69	8.37	10.04	11.71	13.38	15.06	16.73	18.40	20.08
Restricted Allocation (million m³)	1.29	2.58	3.86	5.15	6.44	7.73	9.02	10.31	11.59	12.88	14.17	15.46
Actual Usage: NMBM (million m³)	1.14	3.04	5.04	6.22	7.87	9.56	11.04	12.69	14.46	16.12	17.69	19.47
Actual Usage - NMBM (Ml/day)	38.10	61.26	64.32	41.77	53.23	58.33	47.74	53.23	57.10	53.55	52.32	57.42
Target Usage (Ml/day)	42.2	42.6	40.7	38.0	37.6	35.3	31.9	31.9	31.9	31.9	31.9	31.9

Graph 2-8: Kromme Sub-System – Actual Abstraction for Churchill WTW vs Restricted Allocation



	Nov -24	Dec -24	Jan-25	Feb -25	Mar -25	Apr-25	May -25	Jun-25	Jul-25	Aug -25	Sep -25	Oct-25
Allocation (million m³)	1.50	3.00	4.50	6.00	7.50	9.00	10.50	12.00	13.50	15.00	16.50	18.00
Restricted Allocation (million m³)	1.15	2.31	3.46	4.62	5.77	6.93	8.08	9.24	10.39	11.55	12.70	13.86
Actual Usage - NMBM (million m³)	0.86	1.85	3.14	4.43	5.75	7.30	9.07	10.37	11.81	13.21	14.80	16.28
Actual Usage - NMBM (Ml/day)	28.50	32.00	41.58	45.66	42.58	51.67	57.10	41.94	46.45	45.16	53.23	47.74
Target Usage (Ml/day)	37.8	41.2	39.3	39.1	38.3	37.7	35.5	35.5	35.5	35.5	35.5	35.5

Graph 2-9: Kromme Sub-System – Actual Abstraction for Elandsjagt WTW vs Restricted Allocation

The NMBM was issued with a directive from DWS dated 28 October 2025 for failing to comply with the gazetted water restrictions applicable within the Kromme Sub-system (Churchill and Impofu Dams). The overall restricted allocation from both dams for the 2024-2025 water year ending 31 October 2025 was 29.32 million m^3. However, by the end of August 2025 the NMBM had already used a volume of 29.06 million m^3, two months before the end of the water year – as indicated in the above graph.

The NMBM's reply to this (in a letter to DWS dated 24 November 2025) explained that:

- The increased demand from both the NMBM and coastal towns in Kouga Local Municipality was due to the need to recover from the worst drought in recorded history, where increased demand is unavoidable in a post-drought period.
- Within this period there was a temporary shutdown of the Korhaansdrift Canal by DWS to perform a permanent tie-in of the canal. This interruption forced the NMBM to utilise more water from western sources.

In this letter the NMBM indicated that it remains fully committed to achieving compliance with the restricted allocations outlined by DWS under challenging conditions. The NMBM further undertook to continue with transparent reporting to and proactive engagement with DWS officials.

The NMBM is currently in the process of applying for additional allocations from the Kromme Sub-System. This is mainly due to the various interventions (which will be discussed in more detail later in the report) currently being implemented by the NMBM at these dams so to reduce the dead storage capacity, resulting in an increase in available supply volumes.

2.2.2 Kouga Dam and Loerie Balancing Dam

Figure 2-7: Kouga Dam - 9.40% @ 25 November 2021

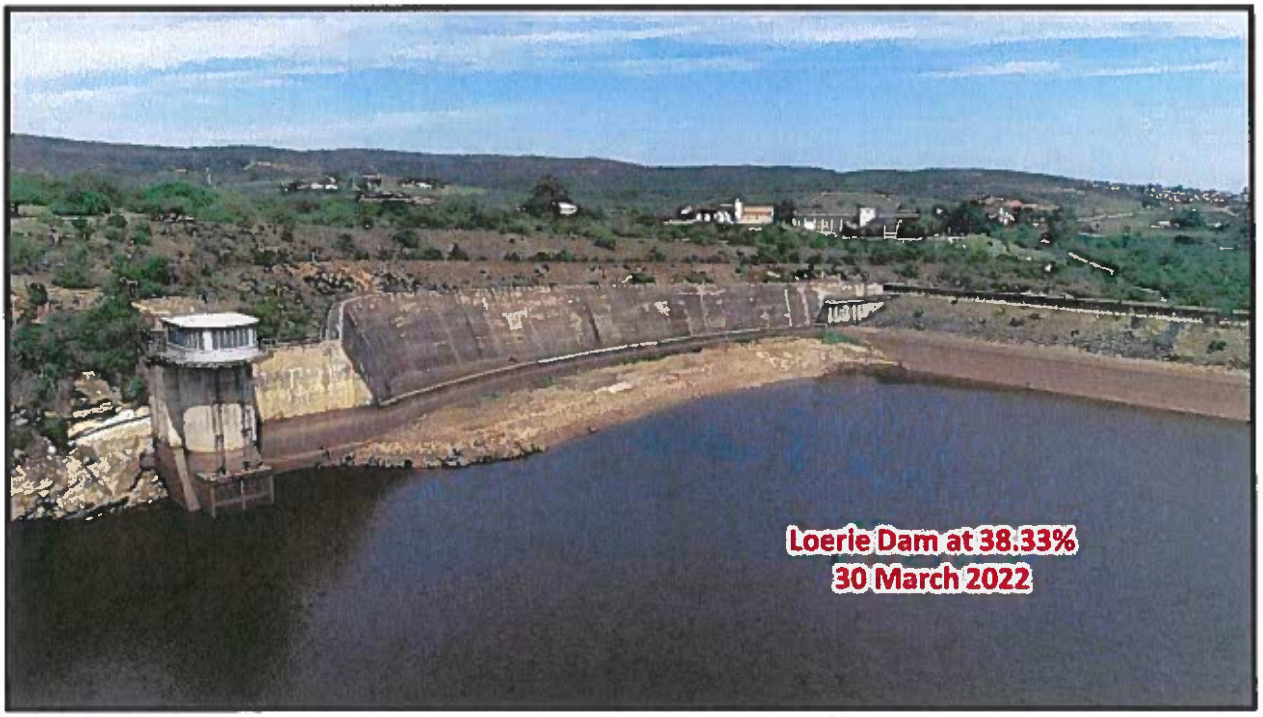


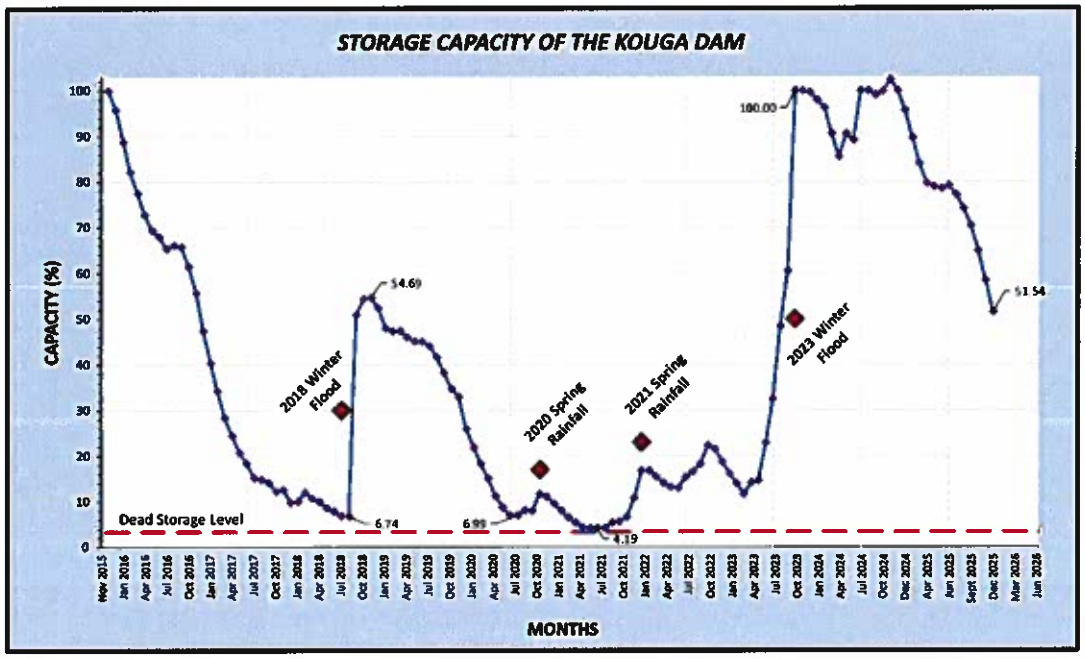
Figure 2-8: Loerie Dam - 38.33% @ 30 March 2022

The major users of the Kouga Dam include the Gamtoos Irrigation Board, the towns of Hankey and Patensie, and the NMBM. Currently the NMBM's official abstraction from the Loerie Balancing Dam, which is fed by a

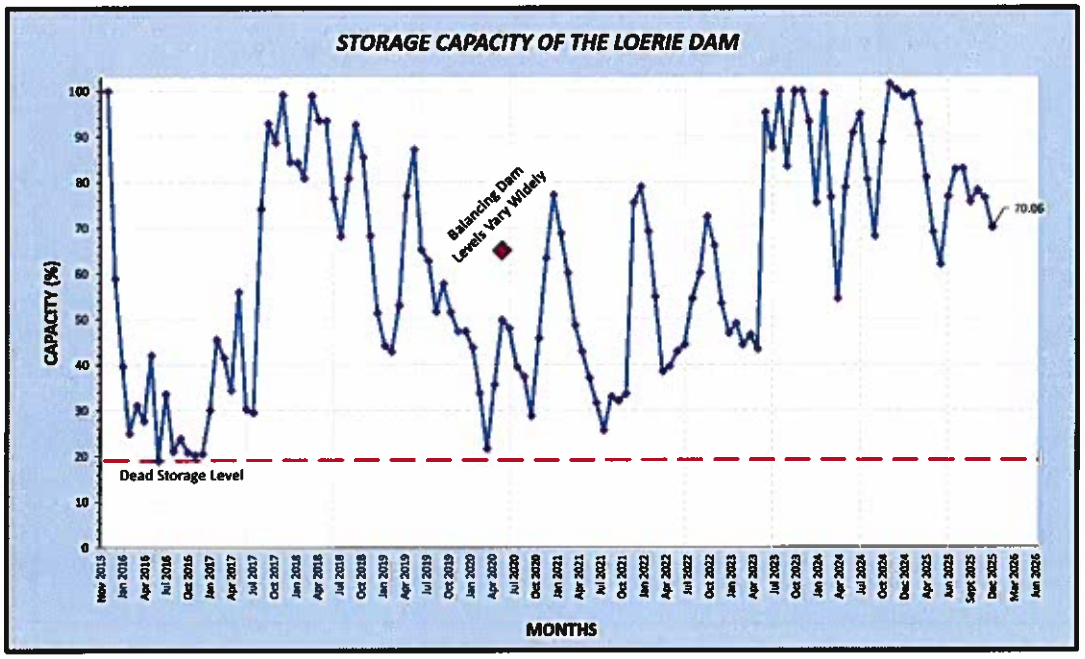
canal from the Kouga Dam, has been restricted by the DWS by 10% - 20.7 million m³/annum (56.71 Mℓ/day) instead of the unrestricted allocation of 23 million m³/annum (63 Mℓ/day).

The Kouga Dam will be unable to supply water on reaching 3.1% storage capacity. It is therefore crucial to monitor and manage the water levels in this system to maintain storage above this level.

The following two graphs indicate the trendlines for the Kouga Dam and Loerie Balancing Dam since these dams last overflowed during 2024.

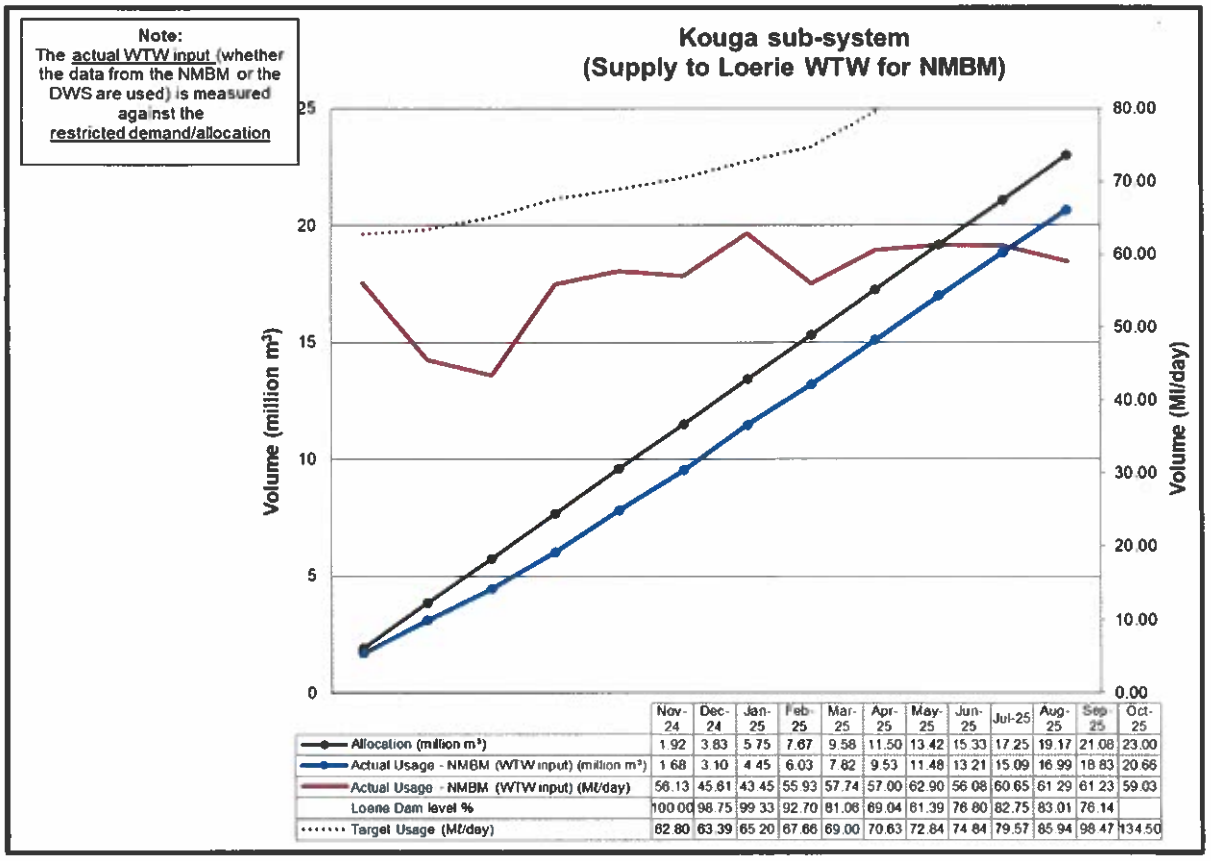


Graph 2-10: Kouga Dam Storage Level



Graph 2-11: Loerie Dam Storage Level

The following graph was extracted from the Algoa Water Supply System's monthly monitoring report dated September 2025 and published by DWS. The graph indicates that the NMBM is currently adhering to the restricted allocations from the Kouga Sub-System as the actual abstraction (indicated by the blue line) is currently less than the restricted allocation (indicated by the black line).



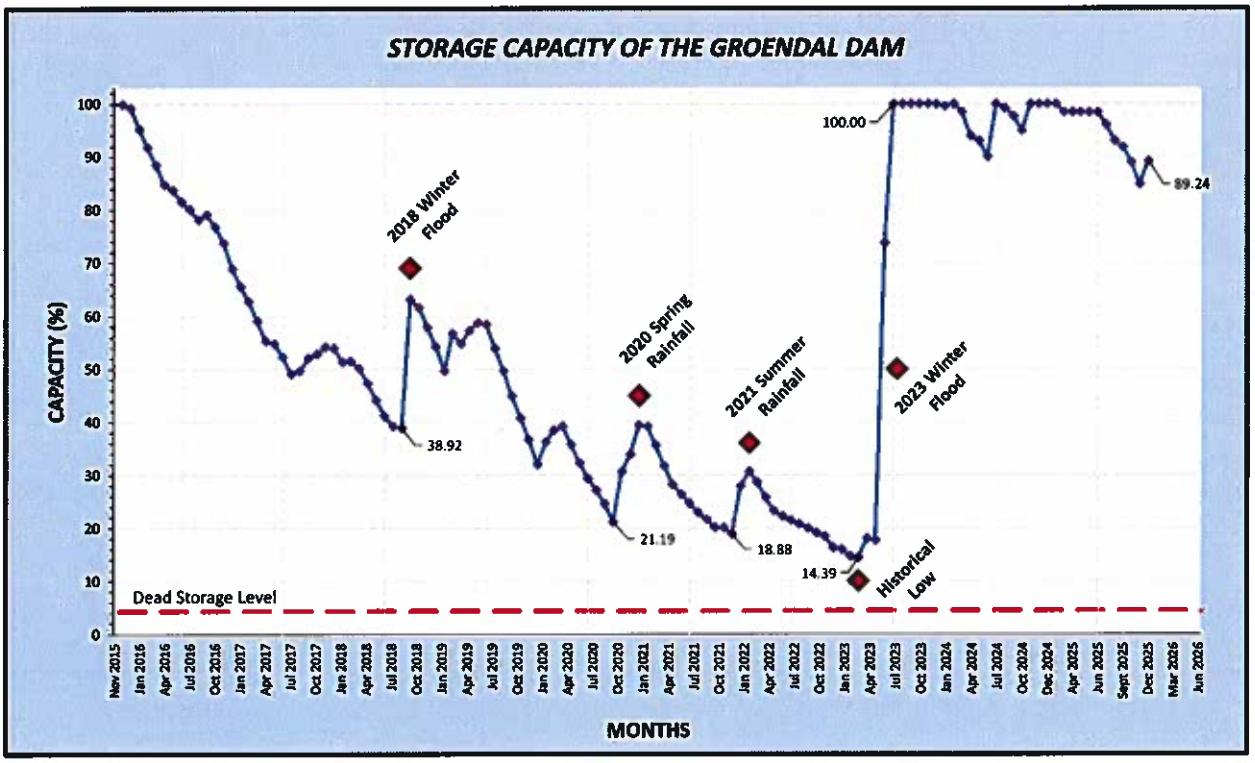
	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25
Allocation (million m³)	1.92	3.83	5.75	7.67	9.58	11.50	13.42	15.33	17.25	19.17	21.08	23.00
Actual Usage - NMBM (WTW input) (million m³)	1.68	3.10	4.45	6.03	7.82	9.53	11.48	13.21	15.09	16.99	18.83	20.66
Actual Usage - NMBM (WTW input) (Ml/day)	56.13	45.61	43.45	55.93	57.74	57.00	62.90	56.08	60.65	61.29	61.23	59.03
Loerie Dam level %	100.00	98.75	99.33	92.70	81.06	69.04	61.39	76.80	82.75	83.01	76.14	
Target Usage (Ml/day)	62.80	63.39	65.20	67.66	69.00	70.63	72.84	74.84	79.57	85.94	98.47	134.50

Graph 2-12: Loerie Balancing Dam - Actual Abstraction vs Restricted Allocation

2.2.3 Groendal Dam

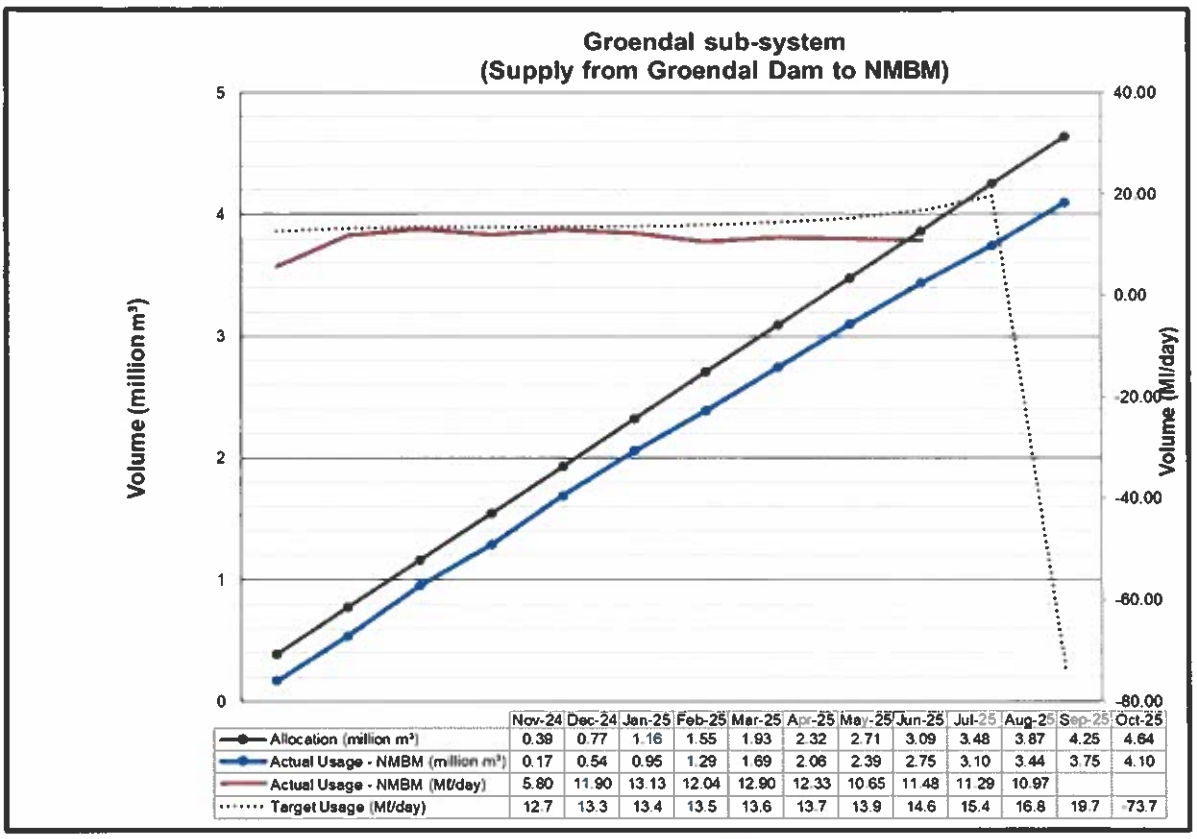
The Groendal Dam, constructed in 1934, reached a record low of 14.39% capacity in February 2023, as indicated in the graph below. This dam only serves selected areas within Kariega. It is also important to monitor and manage the water level in this dam as there are no other water supply sources to these specific areas in Kariega.

Figure 2-9: Groendal Dam – 27.13% @ 21 December 2017



Graph 2-13: Groendal Dam Storage Level

The graph below, extracted from the Algoa Water Supply System's monthly monitoring report dated September 2025 and published by DWS, indicates that the NMBM is currently abstracting less (blue line) than the targeted abstraction (black line).



	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25
Allocation (million m³)	0.39	0.77	1.16	1.55	1.93	2.32	2.71	3.09	3.48	3.87	4.25	4.64
Actual Usage - NMBM (million m³)	0.17	0.54	0.95	1.29	1.69	2.06	2.39	2.75	3.10	3.44	3.75	4.10
Actual Usage - NMBM (Ml/day)	5.80	11.90	13.13	12.04	12.90	12.33	10.65	11.48	11.29	10.97		
Target Usage (Ml/day)	12.7	13.3	13.4	13.5	13.6	13.7	13.9	14.6	15.4	16.8	19.7	73.7

Graph 2-14: Groendal Sub-System - Actual Abstraction vs Restricted Allocation

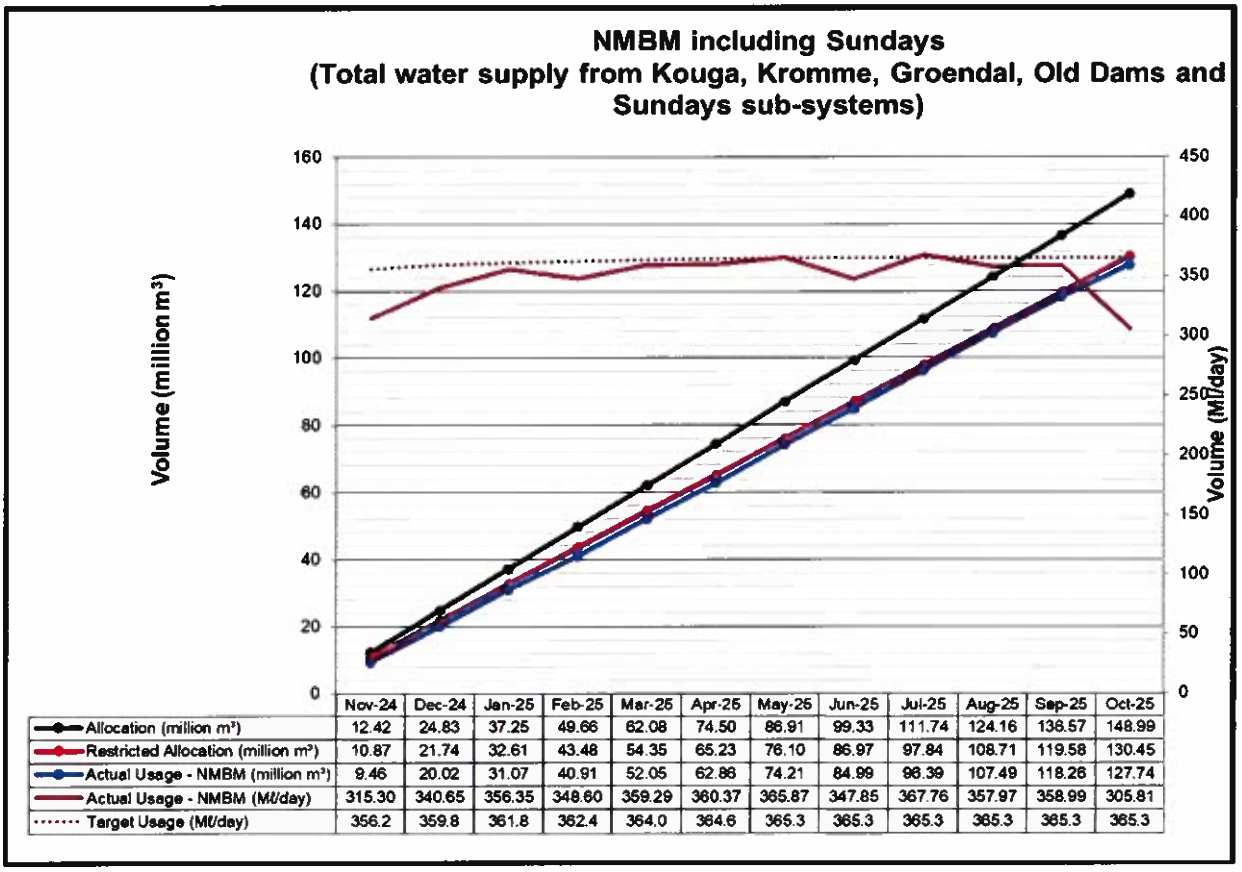
Normally during severe droughts and very low dam levels, as currently being experienced by the NMBM, restrictions are imposed on Licenced Abstraction volumes for water sources by the regulating/operating body. The following section will indicate the Licenced Abstraction volumes for the various consumers of the Algoa WSS and will highlight the current restrictions that are being imposed by the DWS.

2.2.4 Licenced Abstraction Volumes and Current Restrictions

During normal conditions and in the event of an abundant supply of water, the NMBM can abstract a total of just over **432 Mℓ/day** from the various water sources of the Algoa WSS. The total licenced abstraction volume increased recently from approximately 348 Mℓ/day, mainly due to approval of the application submitted to the DWS to increase the current abstraction volume from Nooitgedagt supply scheme from 159.7 Mℓ/day to around 209.7 Mℓ/day, as well as the approval of the WULA applications to abstract a total combined capacity of around 24 Mℓ/day from the various NMBM wellfields.

However, due to the extremely low dam levels, below-average rainfall in catchment areas and one of the worst droughts in history, the DWS has imposed restrictions on licenced water abstraction volumes by the various consumers of the Algoa WSS. These restrictions are mostly applicable to the Western Water Supply Schemes and is required to curtail the abstraction of water volumes from the specific sources to manage the water resources and prevent dams from running dry.

The NMBM's total abstraction from all the supply systems during the 2024 – 2025 water year amounted to 127.74 million m^3, which was less than the restricted allocation of 130.45 million m^3 – as indicated in the graph below.



	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25
Allocation (million m³)	12.42	24.83	37.25	49.66	62.08	74.50	86.91	99.33	111.74	124.16	136.57	148.99
Restricted Allocation (million m³)	10.87	21.74	32.61	43.48	54.35	65.23	76.10	86.97	97.84	108.71	119.58	130.45
Actual Usage - NMBM (million m³)	9.46	20.02	31.07	40.91	52.05	62.86	74.21	84.99	96.39	107.49	118.26	127.74
Actual Usage - NMBM (Mℓ/day)	315.30	340.65	356.35	348.60	359.29	360.37	365.87	347.85	367.76	357.97	358.99	305.81
Target Usage (Mℓ/day)	356.2	359.8	361.8	362.4	364.0	364.6	365.3	365.3	365.3	365.3	365.3	365.3

Graph 2-15: All surface water resources – actual abstraction

As per the current restrictions (2025-2026 water year) the NMBM is only allowed to abstract a total of about **406 Mℓ/day** from the Algoa WSS. The table below indicates the latest gazetted restrictions.

The restrictions and various system constraints applicable to the NMBM are highlighted in orange below:

Table 2-3: Restrictions imposed on the NMBM's Water Sources, and various system constraints

01 NOVEMBER 2025 TO 31 OCTOBER 2026										
DWS Curtailment of Water Sources										
Component			Licensed Volumes		Restrictions			System Contsraints		
					2025/26			2025/26		
Sub-system	Category	Cosumer	Mm^3/a	Ml/day	Restrictions	Mm^3/a	Ml/day	Constraints	Mm^3/a	Ml/day
Sundays	Urban	NMBM	76.6	209.7	0%	76.6	209.7	9%	69.7	190.9
Kouga	Irrig.	Gamtoos IB	60.3	165.2	20%	48.2	132.2	0%	48.2	132.2
	Irrig.	Direct	0.7	1.9	80%	0.1	0.4	0%	0.1	0.4
	Env.	Canal Losses	6.9	18.9	0%	6.9	18.9	0%	6.9	18.9
	Urban	Hankey	0.5	1.2	10%	0.5	1.1	0%	0.5	1.1
	Urban	Patansie	0.4	1.2	10%	0.4	1.1	0%	0.4	1.1
Lorie	Urban	NMBM	23.0	63.0	10%	20.7	56.7	2%	20.3	55.6
Kromme	Urban	NMBM	38.1	104.3	25%	28.6	78.2	8%	26.3	72.0
	Urban	Kouga LM	3.6	9.9	0%	3.6	9.9	0%	3.6	9.9
	Irrig.	Impofu	0.6	1.6	40%	0.4	1.0	0%	0.4	1.0
	Env.	Release	2.0	5.5	0%	2.0	5.5	0%	2.0	5.5
Groendal	Urban	NMBM	6.8	18.6	0%	6.8	18.6	0%	6.8	18.6
	Irrig.	Uitenhage	2.6	7.1	80%	0.5	1.4	0%	0.5	1.4
Old Dams	Urban	NMBM	4.7	12.5	0%	4.7	12.5	60%	1.9	5.0
Uitenhage Springs	Urban	NMBM	2.2	5.9	0%	2.2	5.9	16%	1.8	5.0
NMBM Wellfields	Urban	NMBM	8.7	23.8	0%	8.7	23.8	100%	0.0	0.0
Kouga LM Wellfields	Urban	Kouga LM	4.3	11.8	0%	4.3	11.8	0%	4.3	11.8
		NMBM ONLY	160.0	437.9	7%	148.2	405.5	14%	126.7	347.0
		KOUGA LM	8.8	24.1	1%	8.7	23.9	0%	8.7	23.9
		ALGOA IRRIGATION*	73.1	200.2	20%	58.2	159.3	0%	58.2	159.3
		TOTAL	241.9	662.2	11%	215.0	588.7	10%	193.6	530.2

*Includes environmental release

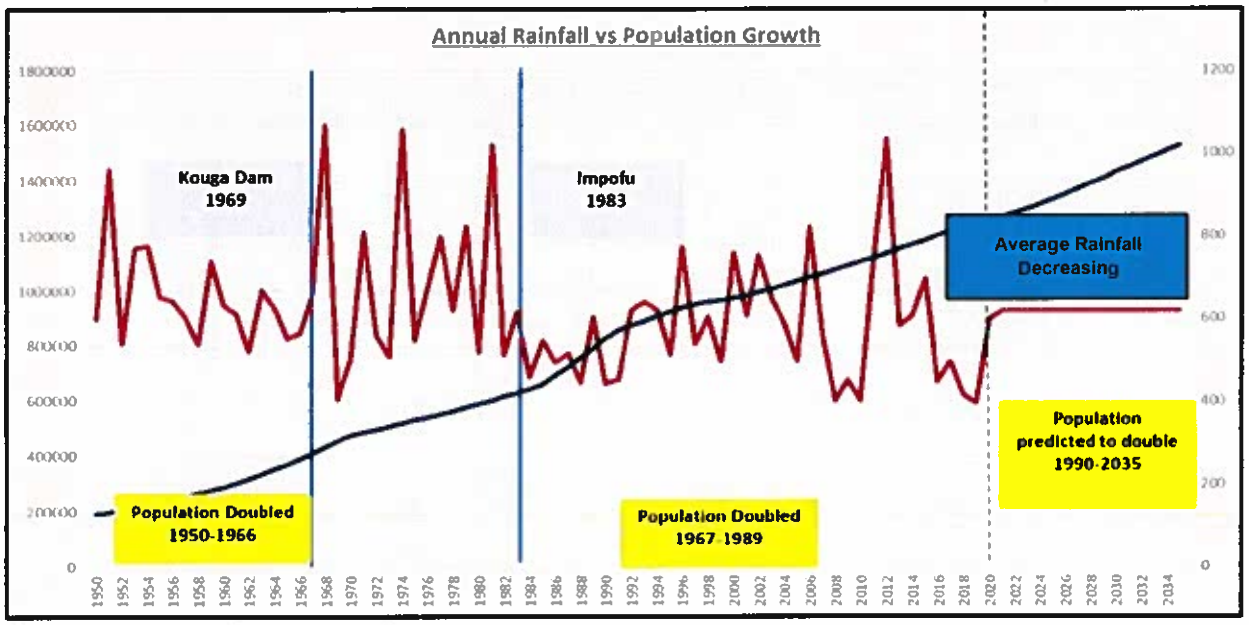
In December 2025 an average volume of **382 Mℓ/day** was abstracted and supplied from the system to meet the water demand. This recent significant increase in demand is a concern as it could deplete available water sources before the next high rainfall event occurs. Taking this into account, the NMBM is therefore implementing various interventions and is currently actively working on reducing the various water supply system constraints to be able to supply the current water demand with very limited disruptions.

Should there be no above-average rainfall in the catchment areas during this time, the NMB's water supply will be mostly reliant on the Eastern WSS through Nooitgedagt WTW, the NMBM Wellfields, as well as the Central WSS through Springs and other smaller dams.

2.3 OVERVIEW OF NMBM'S WATER CONSUMPTION

The NMBM must plan for the worst while climate change, an ever-growing population, improved level of service and increasing water demand remains challenges to be addressed.

This graph below illustrates population growth together with historical annual rainfall information dating back to 1950.



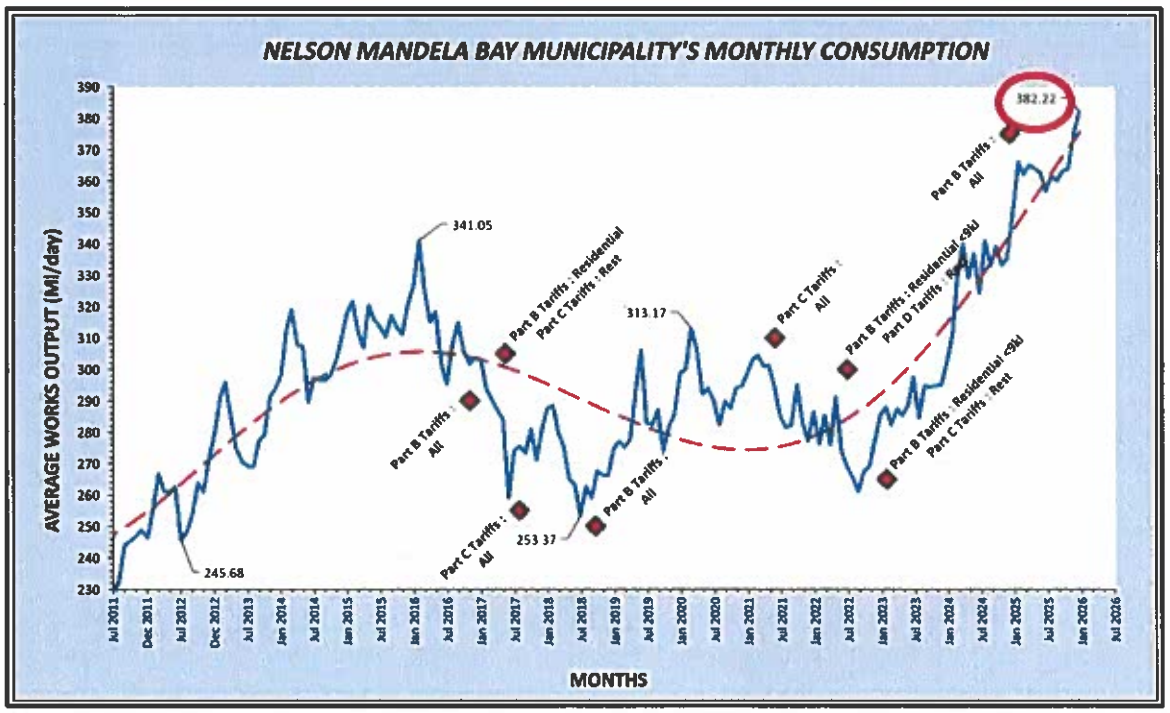
Graph 2-16: Annual Rainfall VS Population growth

From the graph above, it is evident that the average rainfall is decreasing, whilst the population is steadily growing. Formalised housing projects and economic growth of the city are positive, and have intensified over the past two decades, but has resulted in an increase in the demand for water as the NMBM strives to not only provide an increased level of service to their customers, but more importantly, provide services to everyone.

Keeping the latter in mind, the NMBM's Water Master Plan based its outcomes and implementation timeframe dates on a potable water demand increase of 3% per year in relation to the population growth of 1.2% as per the Census 2021 data. However, the actual potable water demand growth figure has proven to be in the order of 6%. The reasons for this were investigated and it was concluded that the NMBM has been aggressively pursuing its programme for the provision of formal low-cost housing to informal settlements. Informal settlements typically received potable water via standpipes within 200 m walking distance of a household. Water is then collected from the standpipe with a bucket and carried to each household. The amount of water that can be carried by hand with a bucket is very limited and resulted in an approximate demand per household of about 1 kℓ water per month. Furthermore, the sanitation service for these areas would either be VIP toilets or the bucket system which places no demand on the potable water system.

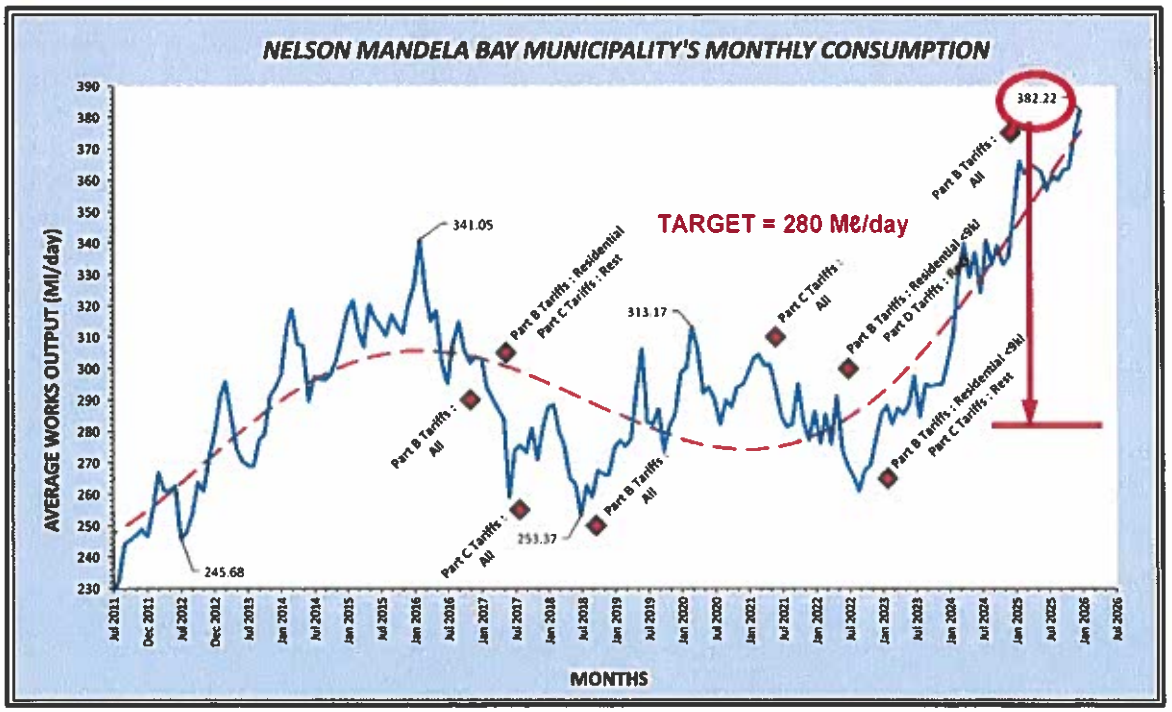
When converting these informal settlements to formal low-cost housing structures with full municipal services the status quo changes drastically. It was found that since water was now available from a tap within the house and full waterborne sanitation connections are available, the approximate 1 kℓ per month water demand increases up to and beyond the free basic water provision from the NMBM of 8 kℓ per month.

Taking the above into account, the graph of the following page provides an overview of the NMBM's increasing water demand/consumption since July 2011.



Graph 2-17: NMBM's Historical and Current Water Consumption

Highlighting the historical water demand, dating back to September 2011, together with the current water demand, the following graph indicates the NMBM's projected reduced water demand requirement. It is crucial to immediately reduce the current water demand to **280 Mℓ/day** to stretch the water resources in the Western Supply Scheme beyond **June/July 2026**.



Graph 2-18: Reduced Water Demand requirement

Recently measuring just over **382 Mℓ/day** on average for the month of **December 2025**, the NMBM's water demand consists of the following water outputs measured at the various WTW's throughout the NMB:

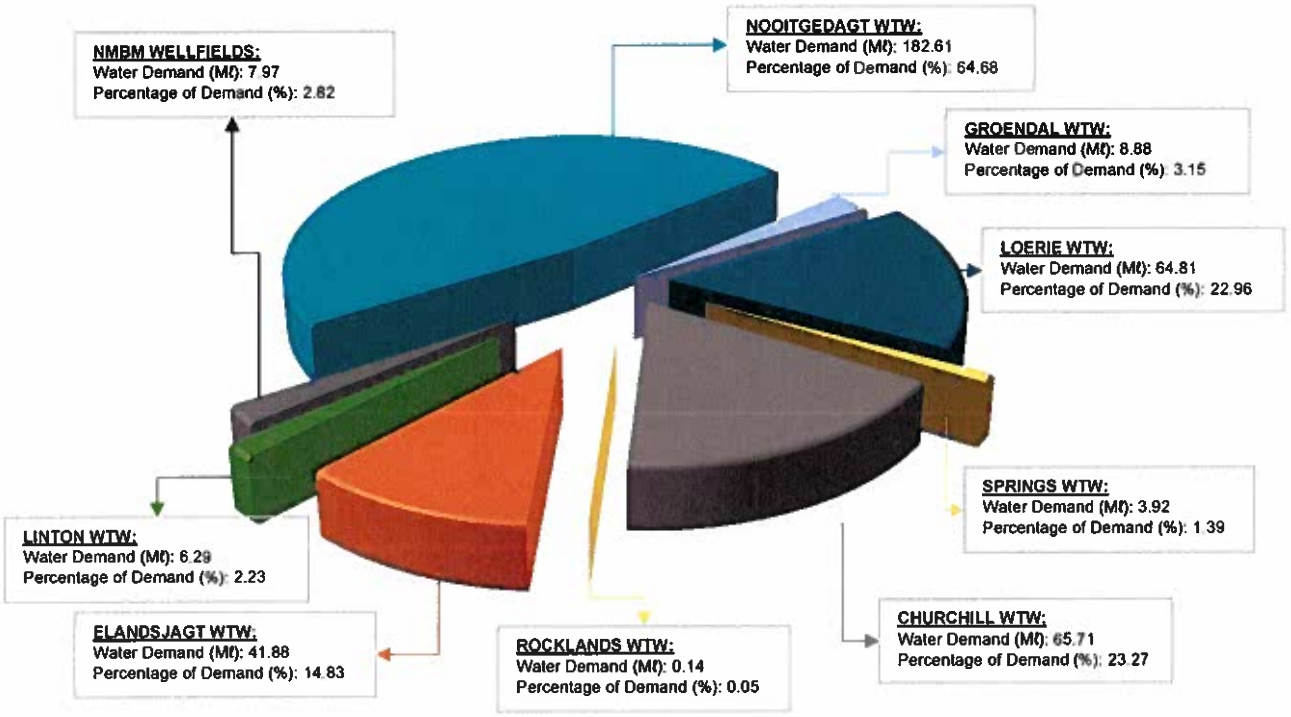
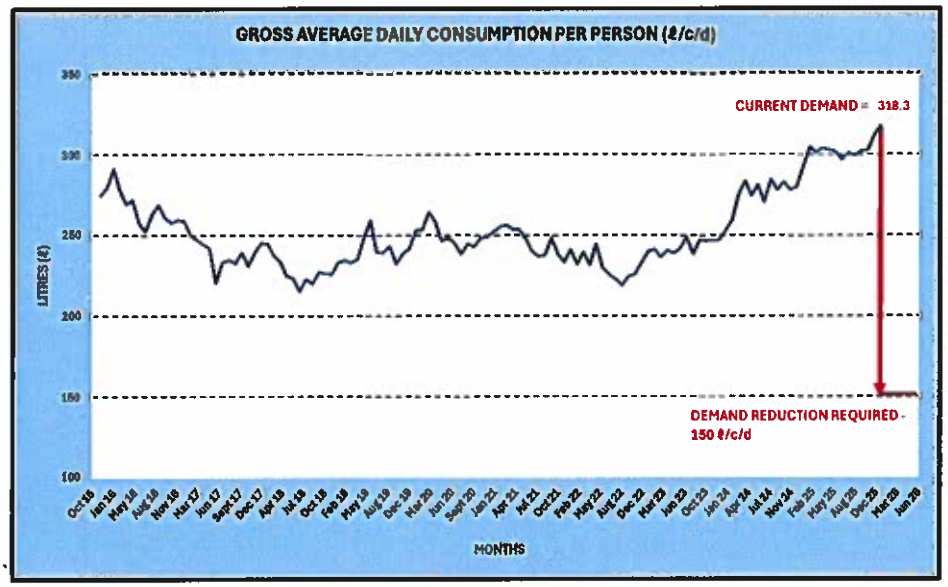


Figure 2-10: December 2025 – Output per treatment works to meet demand

As indicated previously, the NMBM is focussed on reducing the current water demand to **280 Mℓ/day** immediately (inclusive of system losses). When comparing the current water demand to the NMBM's population, it was recently calculated that the gross average daily water consumption per person (based on a population of 1.2 million) throughout the NMBM amounts to 318 ℓ - as indicated by the graph below.



Graph 2-19: Gross Average Daily Consumption Per Person

It must be underlined that the targeted 150 ℓ/c/day is the city-wide consumption, which includes water usage at commercial, industrial and institutional premises. The target at household level is typically between 50 and 100 ℓ/c/day.

Similar to Graph 2.19 on the previous page, the NMBM is convinced that should the gross average daily water consumption per person throughout the NMBM reduce to **150 ℓ/d**, the overall water demand reduction of **280 Mℓ/day** will be achieved.

In the endeavour to reduce and manage the current water demand effectively, the NMBM monitors the water demand for various sectors within the NMBM monthly. Through this activity the NMBM can quickly identify certain anomalies and short-term interventions that are required to reduce the water demand accordingly. The chart below indicates what percentage of the water demand each sector contributes to the total water demand (as per the billed volumes at the end of December 2025).

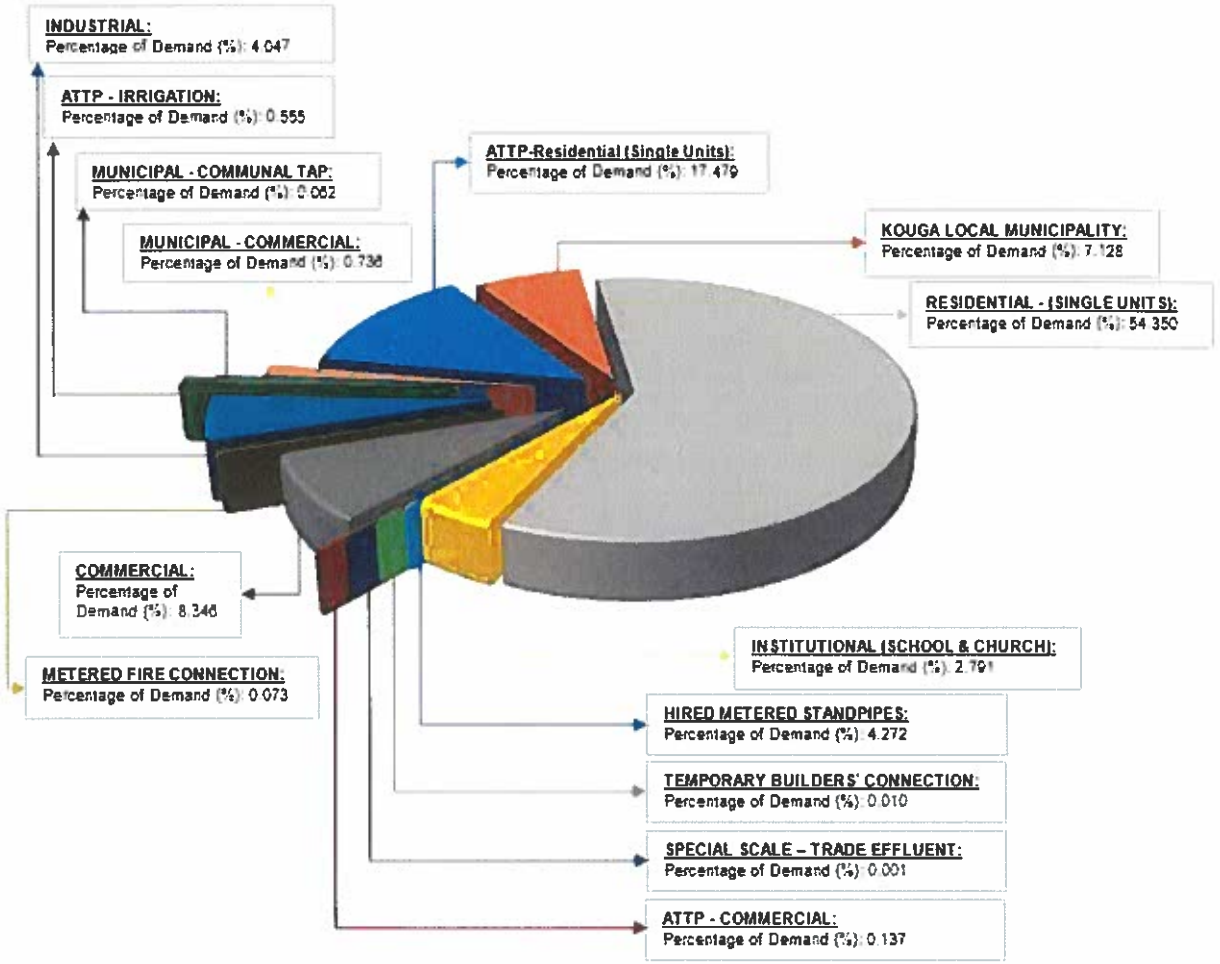


Figure 2-11: Percentage water demand per sector (based on December 2025 CDE statistics)

To curb current water demand, The NMBM has identified various short-term measures that are either currently in the implementation phase or being planned for implementation. These measures will be discussed later in the report.

3. NMBM'S STRATEGY TO MITIGATE EFFECT OF THE SEVERE DROUGHT

Depleting the NMBM's existing water sources is not an option, and measures must be implemented to ensure that the available water will last until the next high rainfall event occurs, or all of the available water can be distributed across the entire metropolitan area.

The NMBM have therefore identified short-, medium- and long-term drought mitigation interventions and measures to:

1. Manage the water supply sources optimally and diversify / augment our water supply,
2. Drastically reduce the current water demand.

The short-term drought mitigation interventions are mainly focussed on the measures to be taken to reduce the overall abstraction, which currently measures approximately **382 Mℓ/day** – based on December 2025 consumption data. These interventions are typically focused on projects that can be implemented within 3 to a maximum of 6 months. The target is to reduce consumption to **280 Mℓ/day**.

The medium – to long-term drought mitigation interventions are directed to the implementation of emergency augmentation schemes, to augment and diversify the NMBM's water supply. It is acknowledged that it is not possible to build one's way out of a drought but planning and implementation of long-term alternative water supplies are often accelerated during periods of reduced water availability. Medium-term drought mitigation interventions have been identified as projects that can be implemented within a year, whereas the long-term drought mitigation intervention's project life cycle extends 12 months.

Chapter 4 & 5 of this report will discuss the various interventions that are currently being implemented or being planned to (1) augment the NMBM's Water Supply and (2) to reduce the current NMBM's water demand, respectively.

In addition to the above, available funding, at all times, plays a vital role in the successful implementation of the NMBM's interventions. Chapter 8 will therefore provide an overview, in tabulated format, of the most important interventions that must be implemented in the near future, as well as indicates the budget availability / shortfall to implement these interventions successfully. This table must be read in conjunction with all the interventions discussed under Chapter 4 and 5, as well as the Emergency Supply Options discussed under Chapter 7 of this report.

4. MEASURES TO AUGMENT NMBM'S WATER SUPPLY

The interventions included here are mostly focussed on the augmentation of the NMBM's bulk water supply network, and forms part of the medium- to long-term drought mitigation measures.

Several infrastructure upgrades are currently being implemented to ensure that water supply is maintained throughout the NMB supply area. These include upgrading of aging bulk infrastructure, as well as addressing bottlenecks (constraints) within the distribution network. Some emergency schemes that were identified as additional water sources to the municipality are also being fast tracked to augment water supplies where possible.

4.1 IMPROVING / UPGRADING OF LOCAL SOURCES

4.1.1 Upgrading of the Impofu Barges

Status: Completed & Available

The upgrading the existing barge arrangement and pump capacity at the Impofu Dam was identified as a short- to medium term water supply augmentation intervention. The main reason for this intervention is to mitigate the impending depletion of the Churchill Dam. Historically the Churchill Dam (due to the less storage capacity available in comparison with the Impofu Dam) is preserved for when the Impofu Dam drops below 22%, to prevent a total failure of supply from the Impofu / Churchill water supply branch of the Western Supply Scheme.

As mentioned earlier in the report, when the initial water storage level dropped below **17%**, the Impofu Dam reached dead storage capacity. This causes the pumps in the intake tower not to function, and therefore the Elandsjagt WTW cannot be supplied with raw water from the dam. Two barges were therefore commissioned and deployed during March 2020 and August 2021, respectively, with a total combined maximum abstraction capacity of 60 Mℓ/day. These barges were installed to maximise the use of the dead storage capacity and supply raw water to the WTW by means of pumping the raw water from the dam into the intake tower.

Unfortunately, and due to the persisting drought, abstraction had to be halted during June 2022 when the dam reached **10%** storage capacity, so to prevent damage to the barge pumps as the water level underneath the barge pumps were too low for normal operations.

In order to ensure a reliable abstraction and water supply to consumers, the NMBM proceeded to implement the following two interventions so to best maximise the available dead storage capacity:

1. Phase 1: Move the existing KSB barge (commissioned during July 2022), capable of abstracting approximately 33 Mℓ/day, 200 m downstream from the intake tower to a location where it can resume operations as per normal. This phase also included the decommissioning of the Flygt barges which were moved to be utilized at the Churchill Dam when required. To date, this phase ran successfully until 18 January 2023, when the Impofu Dam reached a storage level of **7%**. The barge unfortunately had to be turned off before the pumps got damaged by sucking up the riverbed.
2. Phase 2: Installation of a 3.5 km 800 mm diameter HDPE Pipeline, and the construction and commissioning of a new barge capable of abstracting approximately 60 Mℓ/day downstream of the intake tower. However, this phase was skipped as the NMBM decided to implement Phase 3 directly to save on time and cost.
3. Phase 3: Installation of a 6 km 800 mm diameter HDPE Pipeline, and the construction and commissioning of a new barge capable of abstracting approximately 60 Mℓ/day downstream of the intake tower. The new barge will be located at the dam wall and will allow the NMBM to draw Impofu Dam down to approximately **3%** of its storage capacity. Progress to date includes construction of the 6 km long new

pipeline, assembly of the new barge and the provision of an electrical connection and overhead power lines.

The dam's level increased after good rainfall in 2023 and Phase 3 was therefore not commissioned. All the equipment has been safely stored and the scheme can be re-commissioned at short notice.

Some photos have been included herewith below to show relevant progress of the phases as described above.

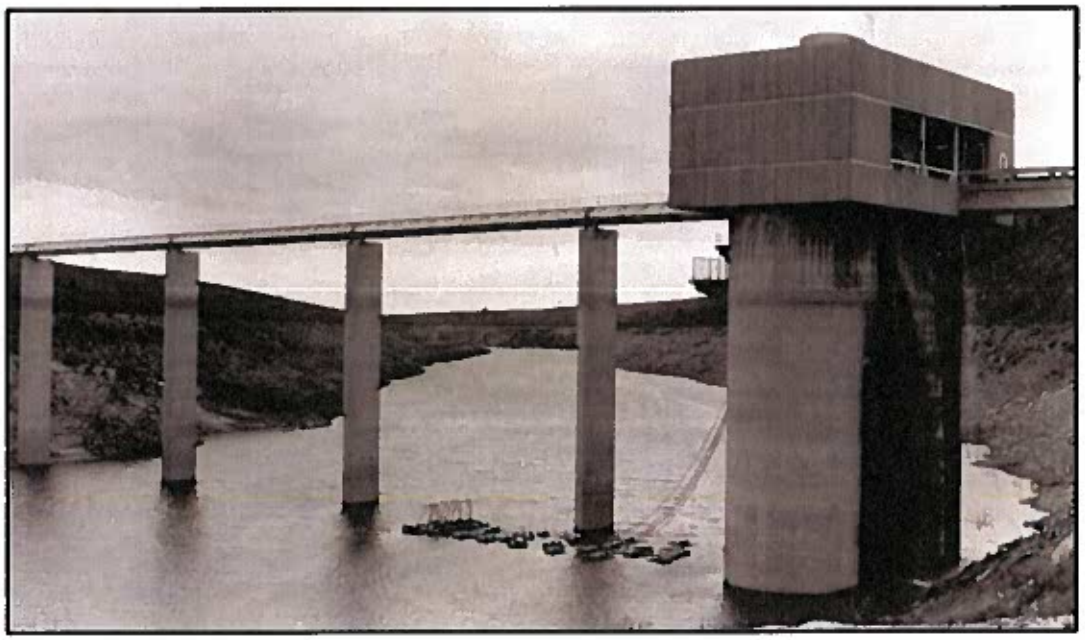


Figure 4-1: Historical photo of the first Flygt Barges installed at the Impofu Dam (1989)

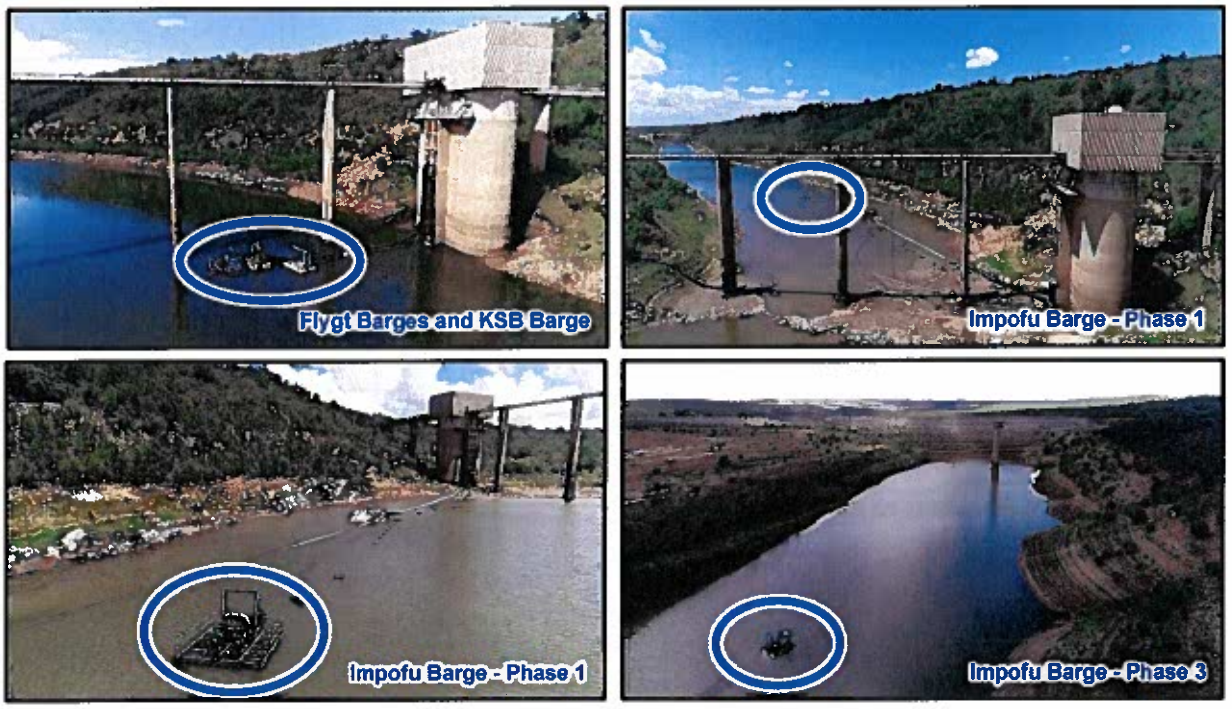


Figure 4-2: Upgrading of Barges at the Impofu Dam

4.1.2 Churchill Water Treatment Works (WTW) Backwash Recovery

Status: Work in Progress

The Churchill WTW uses gravity filters which blocks up after a period of time. The filters therefore require regular backwashing with water abstracted from the dam. These abstracted volumes are measured and by default is part of the allocated daily abstraction volume from the dam. During the backwashing cycle, the water is currently being discharged into the river downstream of the WTW, effectively resulting in an estimated 5 – 25% water loss, depending on the daily treated water volume.

The NMBM has therefore committed to recover water used during the filter backwash cycle and has subsequently embarked on emergency repairs and telemetry upgrades at the plant in order to measure the exact amount of water that is lost over the entire plant. These upgrades and repairs will allow the water treatment process to not only increase the efficiency of the WTW, but also to reduce the percentage of treatment losses at the WTW.

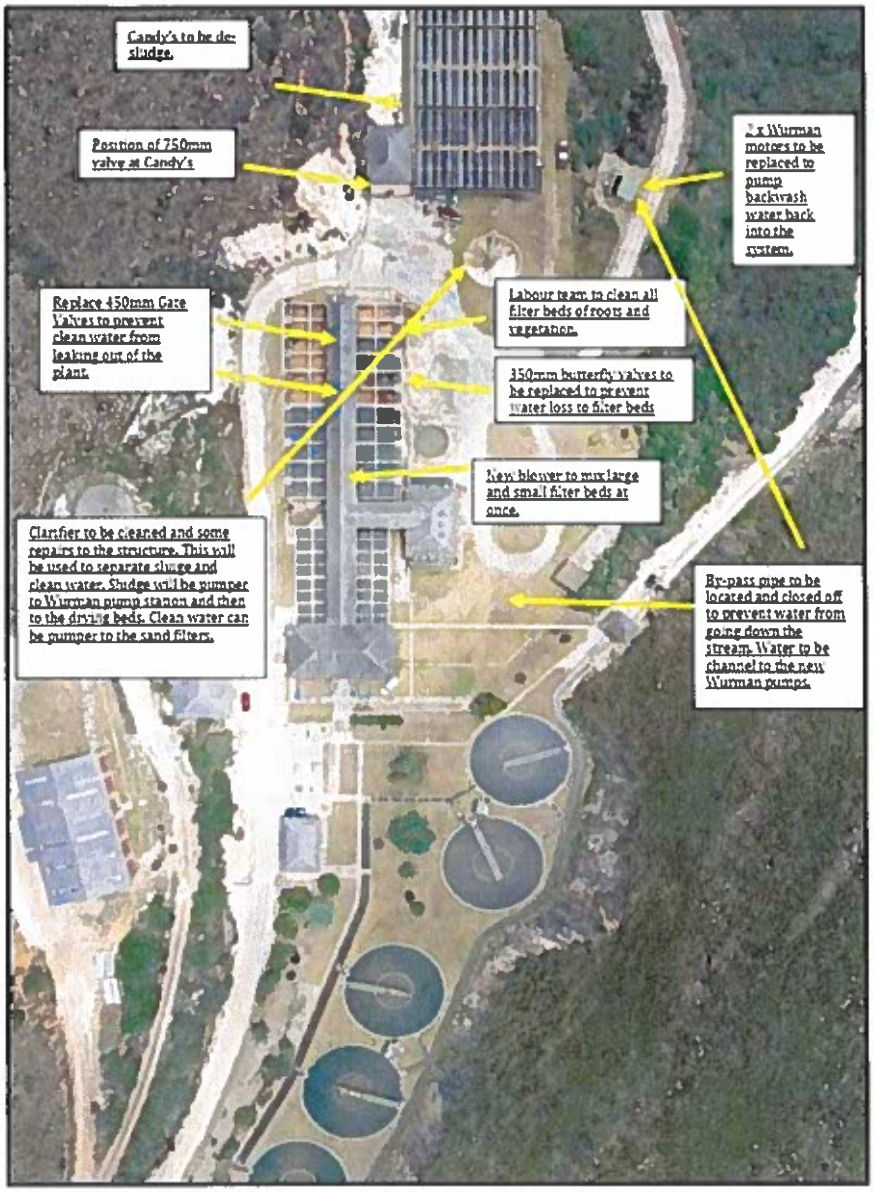


Figure 4-3: Plan view of the Churchill WTW with relevant scope of works for emergency repairs

4.1.3 Refurbishment of the Linton Water Treatment Works (WTW)

Status: Completed & Operational

The NMBM has also embarked on an intervention to upgrade the efficiency and water treatment capacity of the Linton WTW. The WTW receives water from the NMBM's older dams via Central WSS. Historically less than 3 Mℓ/day has been treated and supplied. The recent rehabilitation carried out to this 80-year-old plant resulted in an increase of the plant's average treatment capacity to 7 Mℓ/day. Further operational improvements are being carried out, for instance the recent replacement of the lime dosing system due to constant blockages that was experienced on the old system. These improvements are required to boost the treatment capacity even further, with a recent peak of 10 Mℓ/day being recorded.

Figure 4-4: Refurbishment of the Linton WTW

4.1.4 Lower & Upper Van Stadens Dam Supply

Status: Work in Progress

The total permissible abstraction allocation of approximately 3 Mℓ/day from the Lower Van Stadens and Upper Van Stadens Gorge Dams are not being utilized at this stage. This is mainly due to old and outdated infrastructure/pumping equipment that must urgently be upgraded/refurbished so that the entire allocation from this source can be fully utilized in order to offset some of the volume of water currently being abstracted from the Kouga Dam, via the Loerie Balancing Dam.

The NMBM investigated the requirements to upgrade/refurbish the infrastructure in order to re-instate the abstraction from these dams to supply the Linton WTW accordingly. Although the electrical supply was sufficient, a new pump set will be required together with minor modifications to existing pipework to accommodate the new pump set. The NMBM recently procured and installed a new pump set as indicated by the figure below and is in the process of modifying the existing pipework accordingly.

At this stage the fibre cables and electrical supply must still be completed.

Figure 4-5: Photo of Pump House and Pump Set procured for Van Stadens Gorge

4.1.5 New WTW (package plant) to supply water to the Van Stadens Reservoir

Status: Planning Commenced

The NMBM continually explores interventions required to upgrade and improve its water infrastructure to maintain the maximum allowable abstraction allocation from the local water sources as best as possible. Therefore, and in addition to utilising the maximum allowable allocation from the Van Stadens Dams and transporting this water to Linton WTW, the NMBM is also investigating the possibility to supply the Van Stadens Reservoir with water from the Van Stadens Dams. This project will include the construction of a new ±800m pipeline and package treatment plant as indicated by the schematic below.

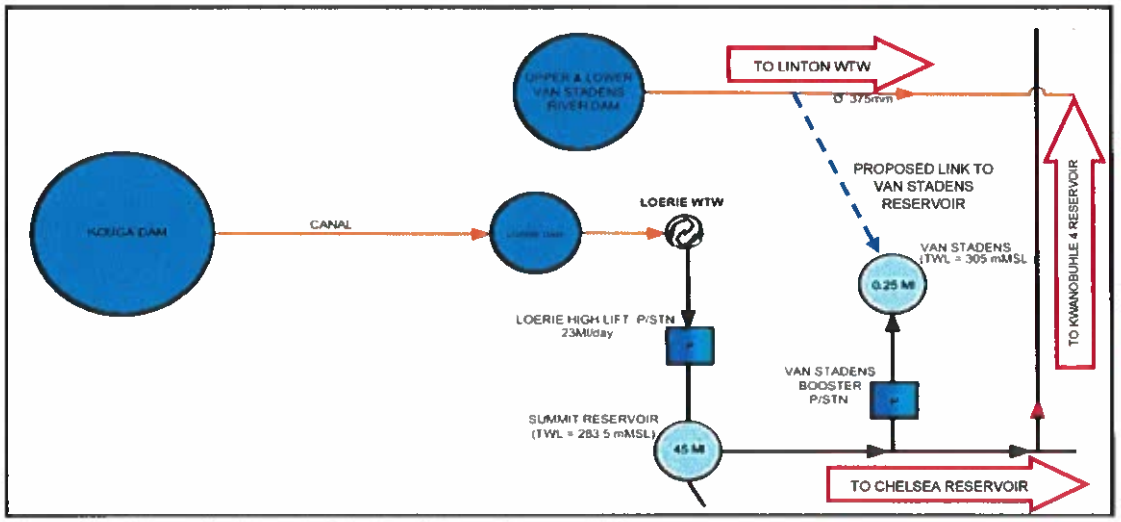


Figure 4-6: Schematical Layout of the Van Stadens Dams and Reservoir

4.1.6 Groendal Raw Water Booster Pump Station

Status: Planning Commenced

The NMBM's current licenced allocation from the Groendal Dam is 12.71 Mℓ/day. Over the last six months of 2025 (1 July 2025 to 31 December 2025) average abstraction under gravity flow was 11.01 Mℓ/day (1.7 Mℓ/day less than the allocated supply).

The intent is therefore to recommission the existing raw water pump station located downstream of the dam wall to maximise abstraction from this unrestricted water source.

Refurbishment and recommissioning will include:

- Providing a SCADA link to the pump station for remote monitoring and control.
- Installation of on-site power generation, which will consist of solar panels and batteries.
- Refurbishment/replacement of electrical and mechanical equipment, including 2 x 250kW motors.

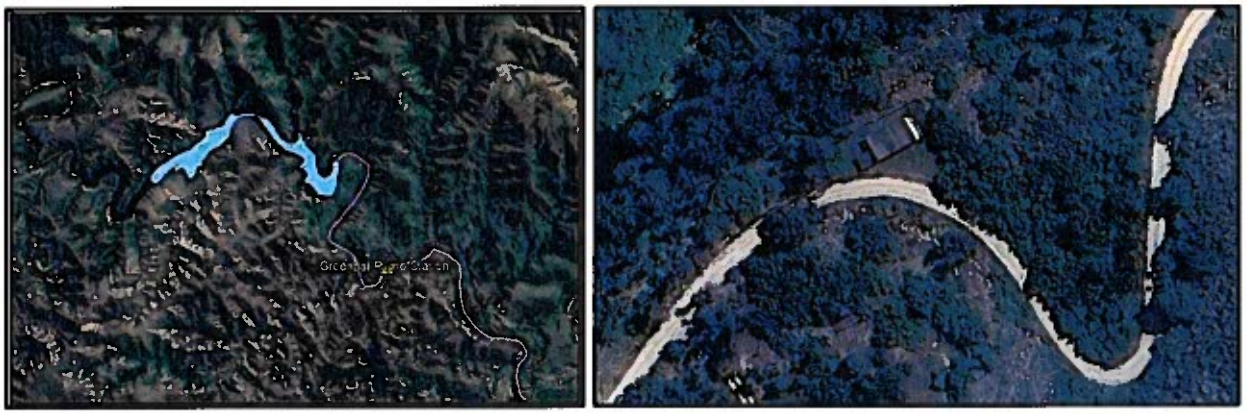


Figure 4-7: Groendal Raw Water Booster Pump Station Locality and Aerial View

4.2 GARIEP DAM / ORANGE RIVER TRANSFER SCHEME (MAXIMISING NOOITGEDAGT)

To meet the continuing growth in water demand, the Nooitgedagt High Level Scheme (NHLS) project commenced in 1993. This scheme linked the then drought stricken Eastern Cape metropolitan area to the Orange River Supply source. This forms part of the Eastern Water Supply System of the Algoa WSS and is a crucial link in the chain of various schemes that supply water to the NMB.

The High-Level Scheme transfers water to the 23 Mℓ Grassridge Reservoir at top water level (TWL) 235 mMSL. This TWL is equal to the 90 Mℓ Chelsea Reservoir located to the south-west of the city. These reservoirs are linked via a high-pressure pipeline system and enables the municipality to distribute water to several reservoirs within the supply system.

The Nooitgedagt/Coega Low Level Scheme (NCLLS) has increased the supply of Orange River water from the Gariep Dam which is treated at the Nooitgedagt WTW from the original 70 Mℓ/day supplied by the High-Level Scheme to a combined capacity of 140 Mℓ/day. Further upgrades to the NCLLS will see this increase from 140 Mℓ/day to 210 Mℓ/day. Under the NCLLS additional water will be pumped to the new Olifantskop Reservoir from where it will gravitate to the Coega Special Economic Zone (SEZ) and to the Motherwell Reservoir, subsequently supplying large portions of the NMB water system.

Due to budgetary constraints the NCLLS had to be implemented in phases. Phase 1 was funded by a R 453 million Emergency Scheme grant from DWS, with another R 125.7 million allocated by the NMBM from their own capital budget over several financial years. During this phase the low-level pipelines from the Nooitgedagt WTW to the Olifantskop Reservoir site and from Olifantskop to the Motherwell Reservoir, with a branch into the Coega SEZ, were constructed. Also included in Phase 1 of this project was the construction of a 10 Mℓ reservoir at Olifantskop, as a temporary measure, and the Motherwell & Stanford Road Booster Pump Stations.

The Stanford Road Pump Station boosts the pressure in the pipeline between the Motherwell and Chelsea Reservoirs to be able to supply the Chelsea Reservoir and therefore the western areas of NMB, which are normally supplied by the dams through the western supply system. The capacity of the pipeline is however a limiting factor when water is supplied to the western areas of NMB. The pipeline consists of parallel 500 mm diameter and 700 mm diameter pipes, all of which require urgent rehabilitation and augmentation to transfer the maximum capacity from the Nooitgedagt Scheme to the western areas for distribution.

Due to the need to supply additional water to the western areas under the prevailing drought conditions, the 700 mm pipeline cannot currently be taken out of commission for rehabilitation as the 500 mm pipeline on its own does not have the capacity to supply the demand. Studies are currently being undertaken into the feasibility of replacing the 500mm pipe with one of a larger diameter. This will then provide the required capacity to supply the western demands and will allow for the urgently required rehabilitation of the 700 mm pipe.

Phase 2 of the project was commissioned in July 2017 thereby increasing the treatment capacity at the WTW to 140 Mℓ/day, while the pumping capacity was increased to 210 Mℓ/day.

The figure on the following page provides an overview of the Nooitgedagt High- & Low-Level Schemes.

To alleviate the pressure on the western dams, the NMBM is committed to maximise the water supply output of the Nooitgedagt WTW, as this is the most significant intervention to assist in mitigating the current drought disaster. To achieve this commitment, the following measures have been and are being implemented to manage the dam levels on the Western WSS:

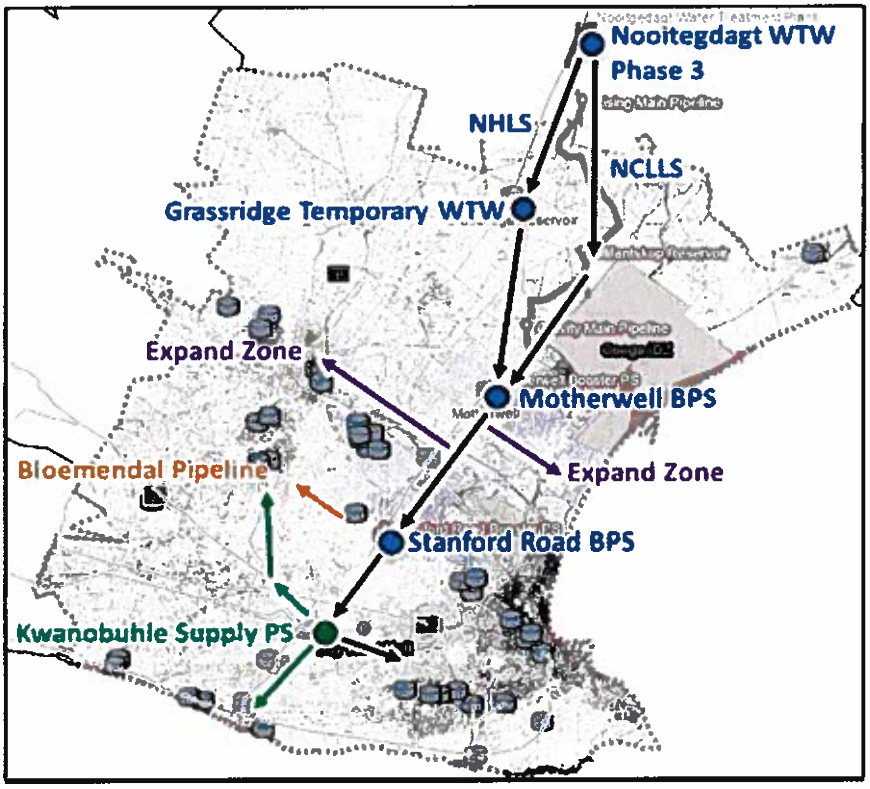


Figure 4-8: Nooitgedagt High Level and Nooitgedagt / Coega Low Level Schemes

4.2.1 Nooitgedagt WTW Upgrade Phase 3

Status: Completed & Operational

Phase 3 commenced with construction in May 2017 and has since been completed. The project was funded directly by DWS, with Amatola Water appointed as the implementing agent by the Minister of the Department of Water & Sanitation in June 2015. The water treatment works has the capacity to supply a total capacity of 210 Mℓ/day. Practical completion was achieved on 29 September 2022, and the official Completion Date was 14 December 2023.

Figure 4-9: Nooitgedagt Phase 3 – Construction completed & fully commissioned

4.2.2 Grassridge Temporary Water Treatment Works

Status: Completed & Available

In 2018, before the September 2018 rains, the NMBM realised that the Nooitgedagt Phase 3 portion of the works will not be completed in time to assist with the supply of the water demand, and that additional water was drastically required. To this end, the historic temporary water treatment system at the Grassridge Reservoir, which was used during 1992 before the Nooitgedagt High-Level Scheme was commissioned in 1993, was upgraded to make use of modern water treatment technologies and commissioned in July 2019.

Whilst the pump station for the Nooitgedagt/Coega Low-Level Scheme can transfer 140 Mℓ/day of treated water via the Low-Level pipeline, the High-Level Pump Station was connected directly to the untreated water feed from the Orange-Fish River Transfer Scheme and subsequently pumped to the Grassridge Reservoir where the water was treated to produce an additional volume of around 55 Mℓ/day.

When practical completion was achieved on Nooitgedagt Phase 3 in September 2022, it was no longer necessary treat raw water at the Grassridge Reservoir and the treatment facility was decommissioned. The reservoir is thus currently used for storage only.

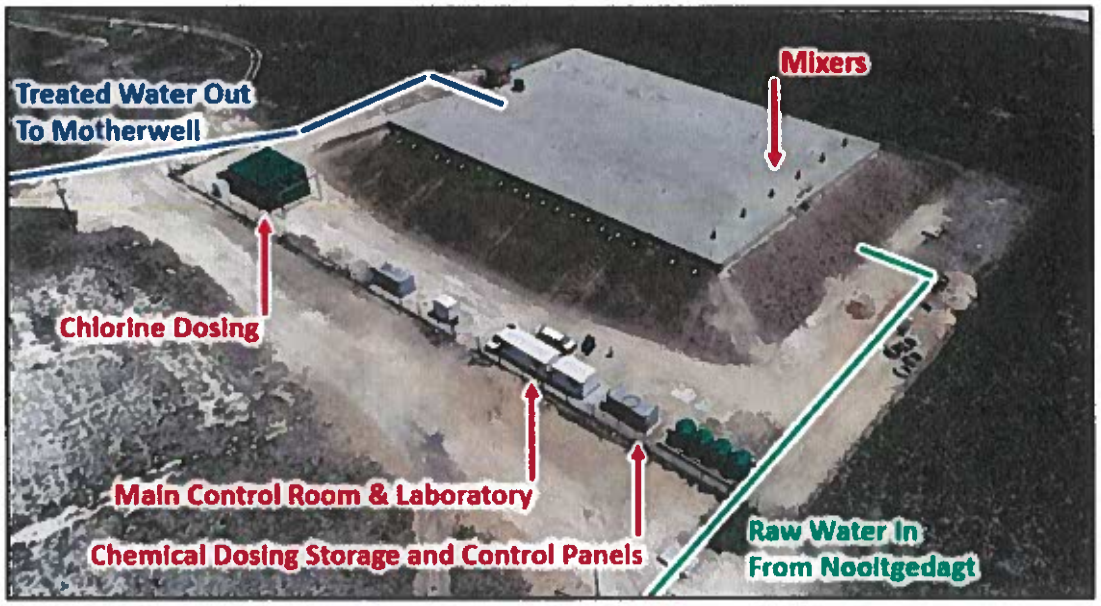


Figure 4-10: Layout of Grassridge Treatment Works

4.2.3 Motherwell and Stanford Road Booster Pump Stations

Status: Completed & Operational

The Motherwell and Stanford Road Pump Stations boost the pressure in the pipeline between the Motherwell and Chelsea Reservoirs to be able to supply the Chelsea Reservoir, and thereafter the western areas of NMB. The Motherwell Pump Station has a transfer capacity of 90 Mℓ/day, whilst the Stanford Road pump station is limited to around 90 Mℓ/day due to capacity constraints in the 500 mm and 700 mm diameter pipelines. To convey the additional water available from the Nooitgedagt Scheme to the NMB western supply zones, the Motherwell & Stanford Road Pump Stations have been upgraded to a transfer capacity of 120 Mℓ/day and 135 Mℓ/day, respectively.

The upgraded Motherwell Pump Station was commissioned (first water available) on 19 February 2024 and the Stanford Road Pump Station on 08 March 2024. Practical completion on this project was achieved on 09 April 2024 and completion on 07 June 2024.

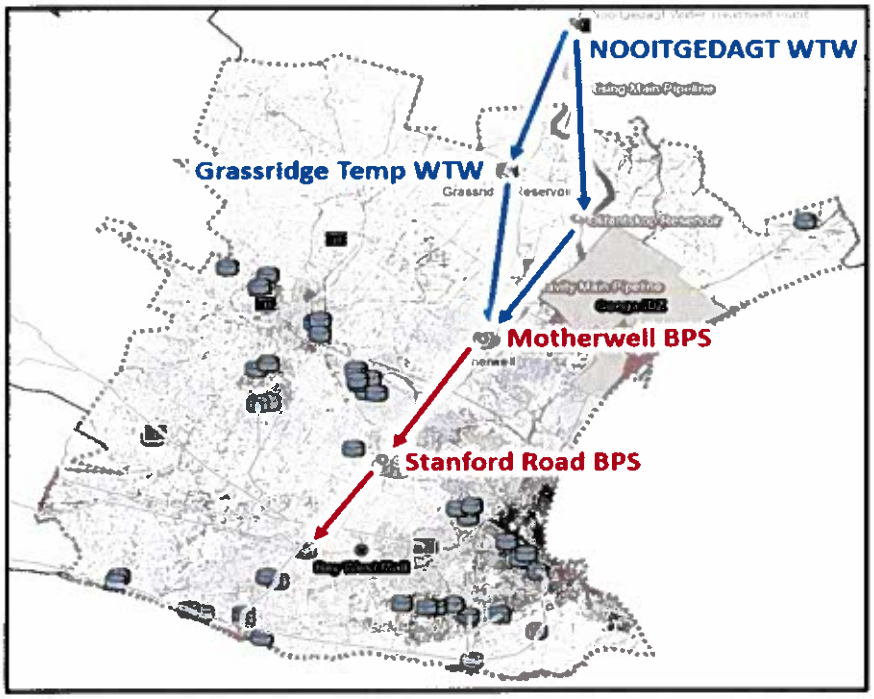


Figure 4-11: Schematic representation of water flow from the Motherwell and Stanford Road Booster Pump Stations

Figure 4-12: Drone footage of the Motherwell and Stanford Road Booster Pump Stations

4.2.4 Chelsea Pump Station (Kwanobuhle Supply)

Status: Completed & Operational

Kwanobuhle currently receives its water from the Loerie Water Treatment Works and has an estimated demand of 15 Mℓ/day. Recent projections have revealed that there exists a high probability that the Kouga Dam, which supplies Loerie WTW, will run dry in the coming months. It is essential to avail an alternative source of water to supply Kwanobuhle in this regard.

Water from the Orange-Fish River Water Transfer Scheme (Gariep Dam) treated at Nooitgedagt WTW was selected as the most viable alternative source of water. It is possible to supply Kwanobuhle with this water via various bulk water pipelines and pump stations through a combined approach. This would alleviate the strain on the Loerie dam and maximize Nooitgedagt water use even further. To convey the required water through to Kwanobuhle, the supply pump station located at the Chelsea reservoir was therefore upgraded to divert Nooitgedagt water back through the Summit-Chelsea pipeline and into Kwanobuhle Reservoir 4 for when abstraction from the Loerie WTW is no longer viable. Another benefit of the upgraded pump station is that it will enable water, treated at Nooitgedagt WTW, to be transferred to the Greenbushes Reservoir. From the Greenbushes reservoir water can then be supplied into the Churchill pipelines, enabling the NMBM to directly supply large portions of the NMB's western supply zones that have previously relied on water from the sources in the west.

The upgrade of this pump station was completed and commissioned on 28 November 2022.

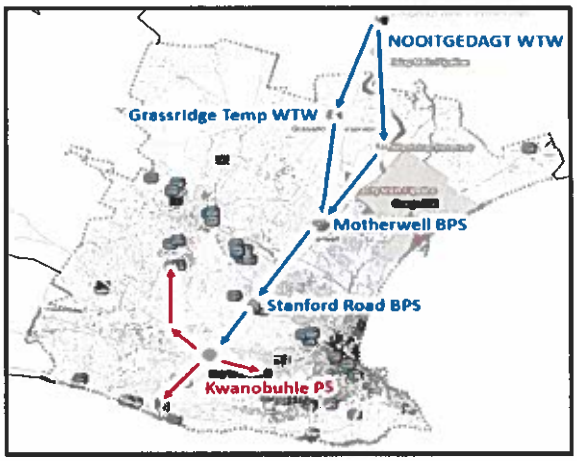


Figure 4-13: Schematic representation of water flow from the Chelsea Pump Station (Kwanobuhle Supply)

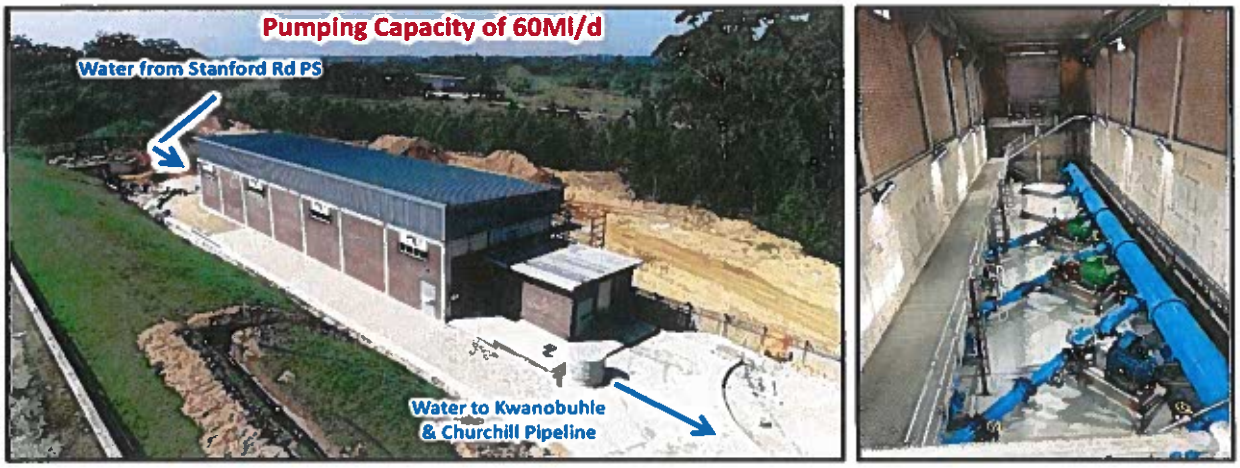


Figure 4-14: The newly completed Chelsea Pump Station

4.2.5 Bloemendal to Kwanobuhle Pipeline

Status: Completed & Operational

To further convey the available Nooitgedagt water into the Kwanobuhle zone, as described above, the construction of a 5,500 m x 450 mm diameter link pipeline between Bloemendal Reservoir & Kwanobuhle Reservoir 3 along the proposed Stanford Road extension was required.

Furthermore, the installation of the Bloemendal to Kwanobuhle pipeline would unlock development within the Jachtvlakte and Kwanobuhle areas. This link pipeline is currently designed to supply approximately 70% of Kwanobuhle's daily water demand. Construction is completed with first water officially supplied on 26 October 2021.

However, during commissioning of the pipeline, it was evident that pressure in the pipeline was too low to supply the Kwanobuhle Reservoir 3 as intended. This was mainly due to the high water demand on the Bloemendal reservoir at the time. It was therefore required to install a cross-connection between a gravity fed pipeline from the Chatty Reservoir and the Bloemendal-Kwanobuhle pipeline in order to boost the pressures in the newly constructed pipeline so to ensure a reliable water supply to the Kwanobuhle zone.

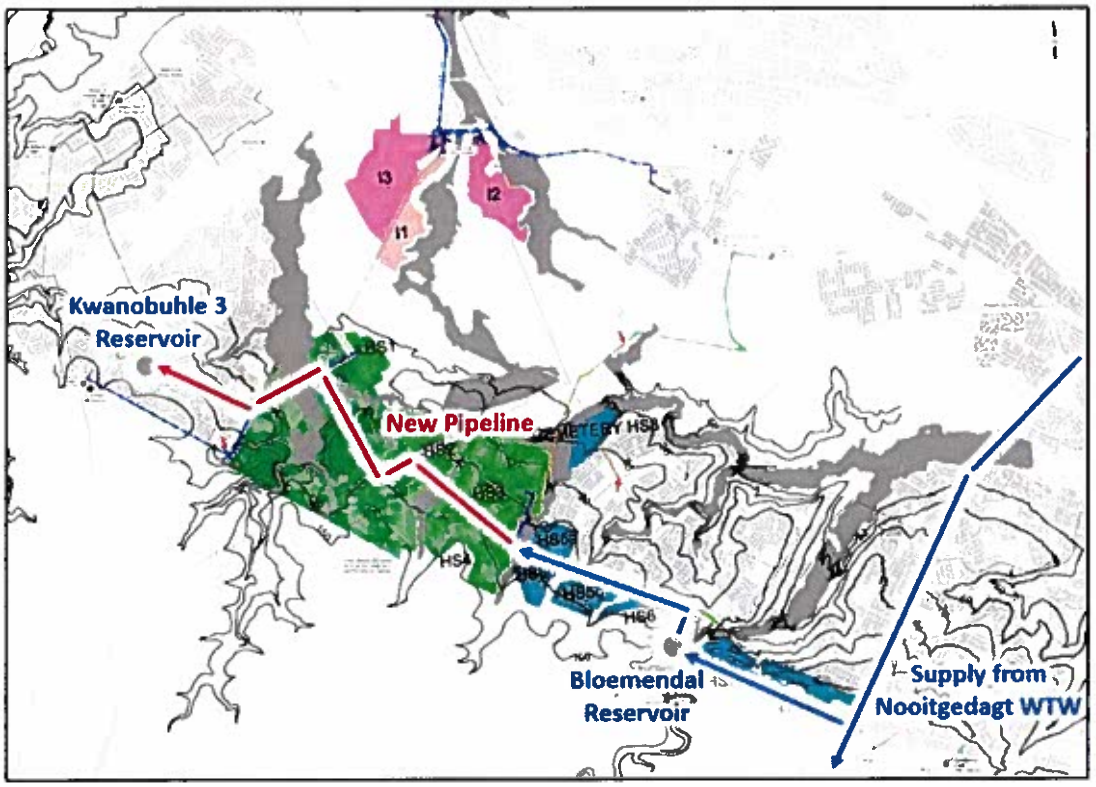


Figure 4-15: Bloemendal to Kwanobuhle Pipeline Route

4.2.6 Additional Expansion of the Nooitgedagt Water Supply Zone

In addition to the specific interventions above, the NMBM is also constantly investigating the further expansion of the Nooitgedagt Water Supply zone in specific zones/areas, which is normally supplied by water from the Western WSS. These investigations include, but are not limited to, the following:

- Rezoning of the Zwide Water Supply Zone:
- Rezoning of the Deal Party (Ibhayi) Water Supply Zone
- Maximising the Nooitgedagt Water Supply zone by supplementing the Emerald Hill Supply zone.
- Verwoerd Pump Station Rehabilitation
- Construction of the Willow Road Pipeline
- Mel Brookes to Kwanobuhle Bulk Water Pipeline Link

These investigations, as listed above, will be discussed in more detail below.

Rezoning of the Zwide Water Supply Zone:

Status: Completed & Available

Historically, the Zwide water supply zone received a portion of their water demand from the Western WSS via the Gelvandale Reservoir. Through the opening and closing of boundary valves, the NMBM was able to extend the Nooitgedagt Water Supply zone, as indicated by the figures below, thereby alleviating the strain on the water demand from the dams in the west.

Currently (February 2026) the zoning has reverted to the original (normal) setting, as shown in Figure 4-15, but can be switched back to the Nooigedagt supply at short notice – as shown in Figure 4-16. Switching over remains an option, when required.

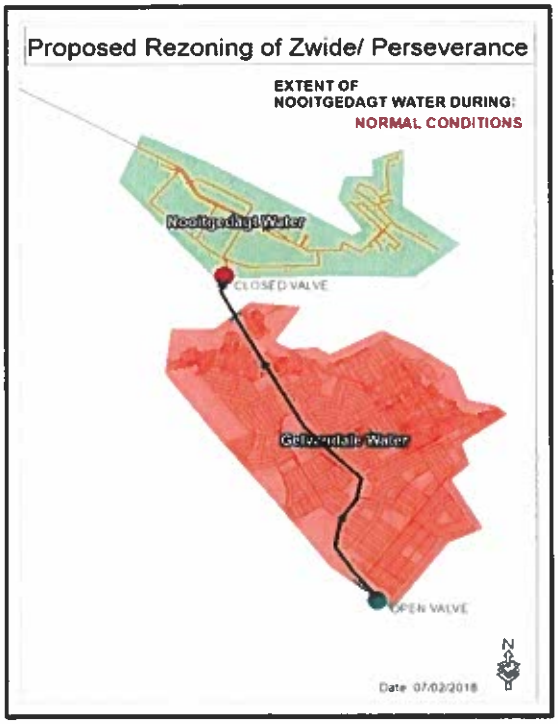


Figure 4-17: Water supply for Zwide under normal conditions

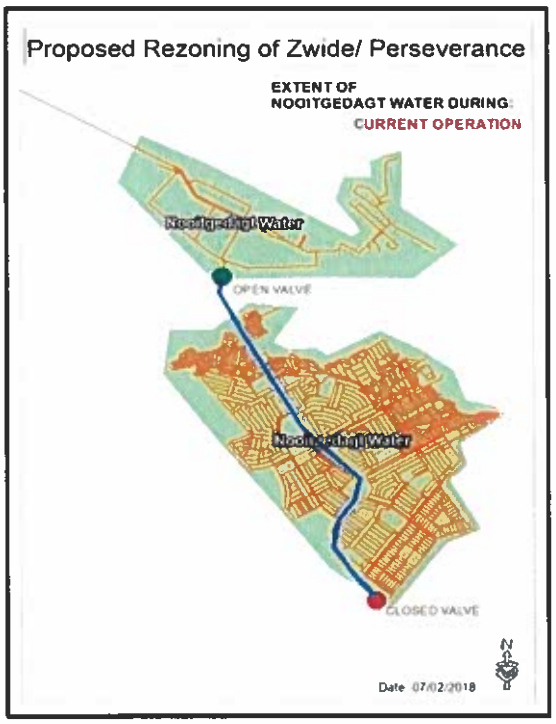


Figure 4-16: Water supply for Zwide when necessary to maximise usage Nooitgedagt water

Rezoning of the Deal Party (Ibhayi) Water Supply Zone

Status: Completed & Available

Similar to the above, and as indicated by the two figures below, the Deal Party/Ibhayi water supply zone was also modified by opening and closing strategic valves, to receive a portion of the zone's water demand from the Nooitgedagt Water Supply. Currently (February 2026) the zoning has reverted to the original (normal) setting, as shown in Figure 4-18, but can be switched back to the Nooigedagt supply at short notice – as shown in Figure 4-17. Switching over remains an option, when required.

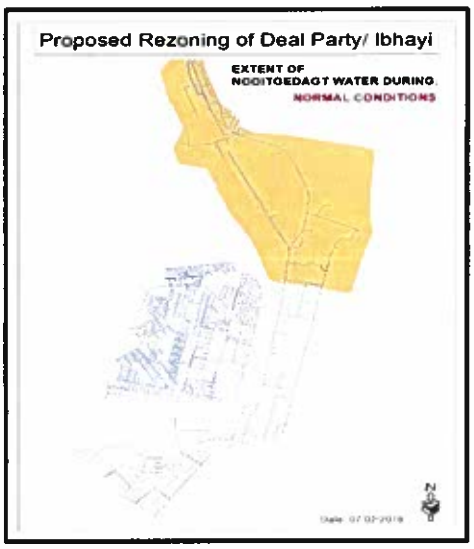


Figure 4-19: Water supply for Deal Party/Ibhayi under emergency conditions

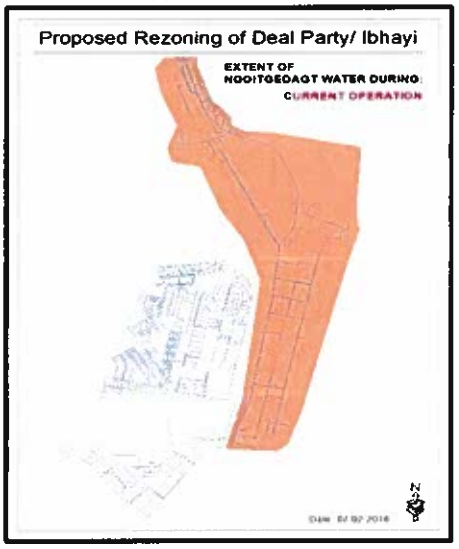


Figure 4-18: Water supply for Deal Party/Ibhayi under normal conditions

Investigations are currently underway to further increase the Nooitgedagt Water Supply zone as indicated by the two figure below, thereby continuing the alleviate the pressure on the water demand on the dams in the west.

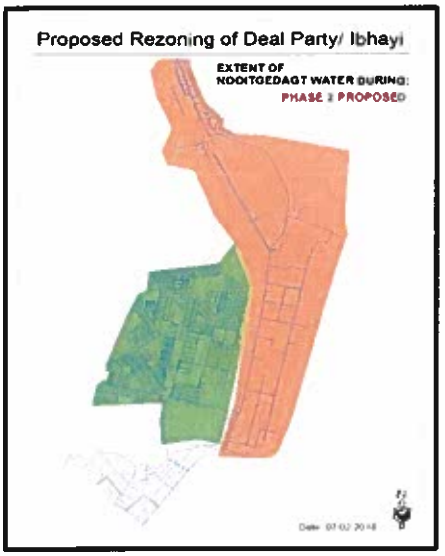


Figure 4-21: Proposed future expansion of the Nooitgedagt Water Supply Zone - Phase 2

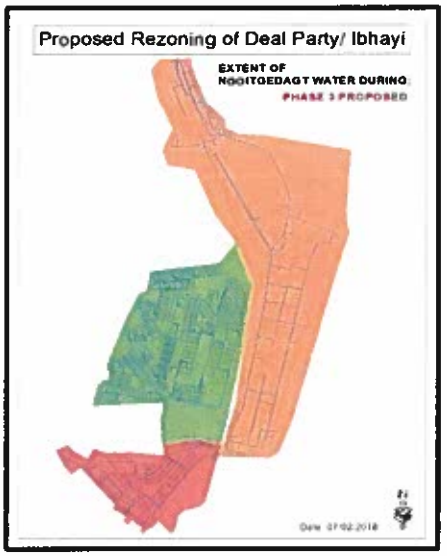


Figure 4-20: Proposed future expansion of the Nooitgedagt Water Supply Zone - Phase 3

Supplementing the Emerald Hill Supply Zone

Status: Completed & Available

The NMBM also identified that the Nooitgedagt Water Supply zone can further be expanded through the upgrading of a PRV station located at the Linton Reservoir. Nooitgedagt water from the Motherwell/Chelsea pipeline can therefore be utilized to supplement the Linton Reservoir & fill the Gelvandale Reservoir and at the same time be transferred via pipelines located along Cape Rd, and connected into the Newton Park Zone, which is normally supplied by water from the Western WSS via the Emerald Hill Reservoirs.

The design of the upgrading of the PRV station located near the Linton Reservoir, construction thereof, and subsequent commissioning has been completed.

The figure below provides an overview of how the Nooitgedagt Water Supply Zone can be expanded through the upgraded PRV station at the Linton Reservoir and the pipelines along Cape Road which tie into the Newton Park Zone.

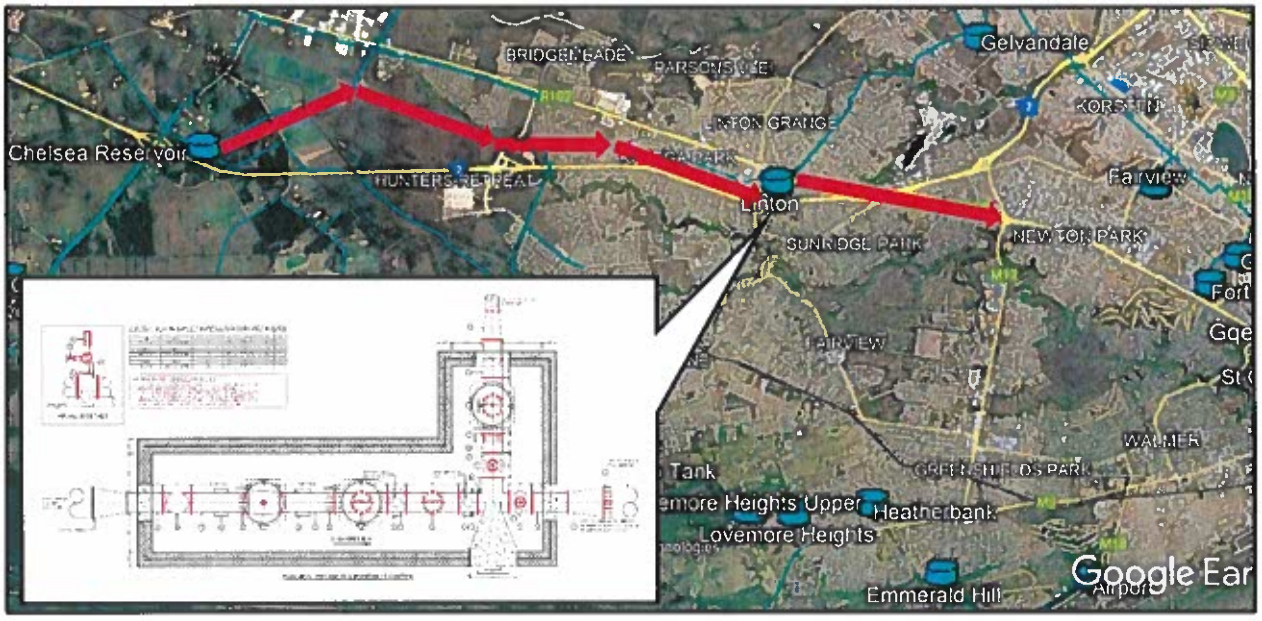


Figure 4-22: Expansion of Nooitgedagt Water Supply Zone into the Emerald Hill Supply Zone, through the Newton Park Zone

Verwoerd Pump Station Rehabilitation

Status: Completed & Operational

In addition to the aforementioned interventions to expand the footprint of the Nooitgedagt Water Supply Zone, the NMBM has also identified the upgrading/refurbishment of the Verwoerd Pump Station as a crucial activity. Upgrading the Verwoerd Pump Station allows the NMBM to utilise water from the Fairbridge Heights reservoir. This reservoir receives water mainly from the Nooitgedagt WTW through an offtake from the Motherwell/Chelsea Pipelines and supplies the eastern residential part of Uitenhage. With the upgraded pump station, it is now possible to boost flow from the Fairbridge Heights reservoir to the Rosedale Reservoir and its supply zone. The Rosedale Reservoir normally receives water from the Groendal Dam as indicated by the basic schematic of the NMBM's bulk water infrastructure below.

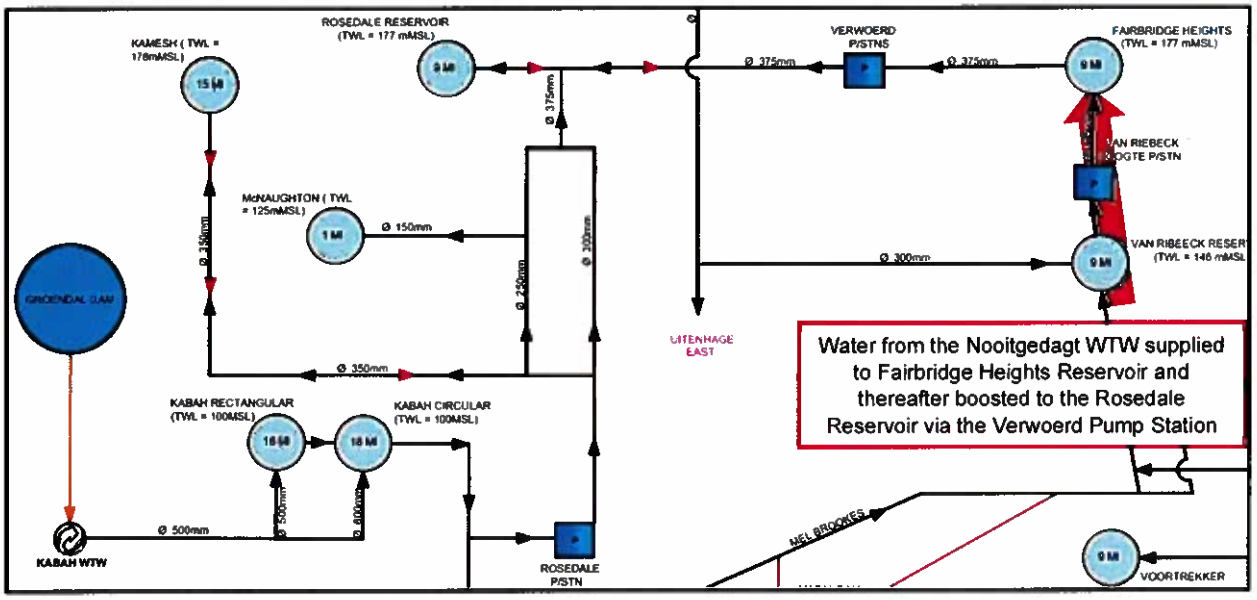


Figure 4-23: Expanding the footprint of the Nooitgedagt Water Supply zone through the Verwoerd PS

To date the switchgear at the Verwoerd Pump Station has been successfully upgraded to ensure that the pumps can operate more efficiently. It will however be necessary to upgrade the remaining equipment in the pump station soon to fully utilise the potential of this intervention.

Construction of the Willow Road Pipeline

Status: Planning Commenced

To improve the NMBM's water supply system's interconnectivity and flexibility, it has been identified that a new bulk pipeline is required to be installed in Willow Road. This new 400 mm diameter u-PVC Class 12 pipeline will link the existing 375 mm diameter asbestos cement (AC) pipeline in Circular Drive which receives water from the Heatherbank Reservoirs (or Chelsea Reservoir) to the existing 315 mm diameter uPVC pipeline located in William Moffett Expressway which receives water from the Emerald Hill reservoirs.

Once constructed and commissioned, this pipeline will enable the municipality to:

1. Supplement the Emerald Hill Supply Zone with potable water from the Heatherbank Reservoirs (or Chelsea Reservoir). The Emerald Hill Supply Zone is entirely dependent on potable water supply from the western dams, while the Heatherbank Reservoirs receives potable water from the Chelsea Reservoir. This will therefore enable the NMBM to distribute the potable water received from the Nooitgedagt WTW through the Motherwell/Chelsea transfer pipelines even further to the western suburbs which, as indicated previously in this report, are very dependant of potable water supplied from the western supply dams. The commissioning of this pipeline will therefore assist in maximising utilisation of water treated by the Nooitgedagt WTW and distributed throughout the NMBM - as explained in Section 4.2 above.
2. Once the new Willow Road pipeline is connected to the Emerald Hill Supply Zone, the municipality will be able to shut down the Emerald Hill Reservoirs to perform much needed refurbishment and replacement of old and faulty isolation valves. The municipality will also be able to commission a new 900 mm diameter pipeline which was constructed along the William Moffatt Expressway.

Taking the above into account, as well as the current severe drought experienced throughout the NMB and other parts of the Eastern Cape, it is critical for the NMBM to get this pipeline installed and commissioned. The inception, preliminary-design and detail-design phases for the project have been completed. The procurement and construction phases are therefore ready to proceed but is currently constrained by budget shortfalls.

The figure below indicates an overview plan of the proposed Willow Road Pipeline route highlighted in blue.

Figure 4-24: Overview Map of the proposed Willow Road Pipeline Route

Mel Brookes to Kwanobuhle Bulk Water Pipeline Link

Status: Work in Progress

Kwanobuhle (a mainly residential area) has an estimated population of in excess of 250,000 and is situated to the south of Kariega. The area, which has an estimated water demand of 15 Mℓ/day, receives its water supply from the Kouga Dam via the Loerie Balancing Dam & Loerie WTW, as well as the newly installed Bloemendal to Kwanobuhle pipeline (discussed under Section 4.2.5 above). In October 2021 the NMBM's official abstraction from the Loerie Balancing Dam, which is fed from the Kouga Dam, was restricted by the DWS by 85% (thus only 15% of the licensed abstraction volume was allowed) due to severe drought conditions at the time. Current (2025-2026 water year) restrictions are 10%, with 90% of the licenced abstraction volume available.

Prior to the restriction on the Loerie licensed abstraction volume of 63 Mℓ/day, the dam supplied Kwanobuhle its required estimated demand of 15 Mℓ/day. However, with the restrictions in place only 9.3 Mℓ/day could be abstracted from this system, which is significantly less that the water demand of Kwanobuhle. To adhere to the DWS restriction, it was thus imperative towards the end of 2021 to cut the water supply to Kwanobuhle from the Loerie system by 85%.

The NMBM are currently supplying water to the Uitenhage Industrial areas (Kabah Supply Zone) through a combination of both Scheepershoogte Reservoir and Kabah Reservoir, the latter reservoir being supplied from the Groendal Dam. Scheepershoogte Reservoir and Kabah Reservoir has a storage capacity of 15 Mℓ and 18 Mℓ respectively, both with a top water level of 100 MSL. Two existing 300 mm diameter AC pipes run parallel to each other from Mel Brookes Avenue, across the Swartkops River, linking the Kabah Supply Zone to Kwanobuhle at their tie in point next to Matanzima Road. The above is illustrated by the red circle below in an extract from the NMBM Water Master Plan Review 2011 – 2035.

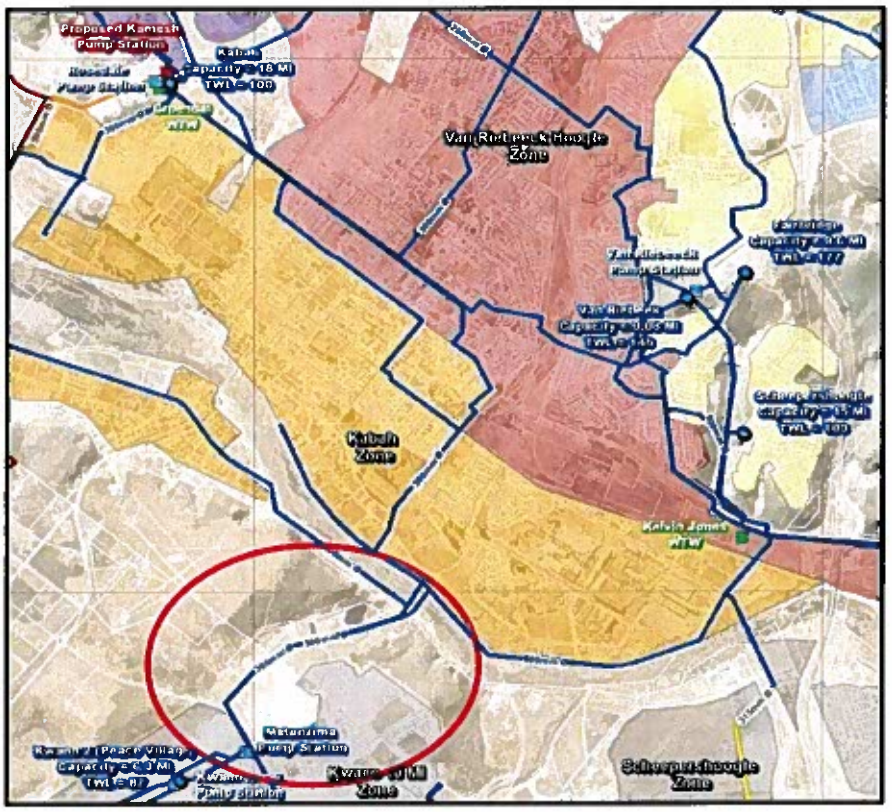


Figure 4-25: Extract from the NMBM Water Master Plan

Due to operational challenges, it has not been possible to supply water to Kwanobuhle via the two 300 mm AC pipelines. As they are located at the low contour levels within a valley, large rains have washed away sections of these pipes on numerous occasions in the past. In addition, sewerage from overflowing sewers also located within the valley continued to seep through the collars of the existing AC pipelines – thus preventing commissioning of the pipelines. Although the NMBM had previously planned to replace one of the existing 300 mm diameter pipelines with a 315 mm diameter u-PVC pipeline, only a section thereof (across the Swartkops River) was replaced.

To mitigate the possibility of the Kwanobuhle area running out of water and to reduce the abstraction demand on the Kouga / Loerie sub-system, the NMBM decided to add an alternative water supply to the area of Kwanobuhle by decommissioning the old existing pipelines and constructing a new Mel Brookes to Kwanobuhle bulk water pipeline in addition to the newly installed and commissioned Bloemendal to Kwanobuhle bulk water pipeline (as discussed under Section 4.2.5 above). A new pipeline route has been identified at a higher contour level in the valley. The pipes will be installed with increased cover depth and thus at a higher invert level to prevent seepage of sewage through pipe joints and minimise the risk of flood damage.

This project further entails the construction of a 1.8 km long, 450 mm diameter Class 12 u-PVC water pipeline, which aims to supply approximately 2.3 Mℓ/day from the Scheepershoogte Reservoir to Kwanobuhle whilst working in conjunction with the Bloemendal to Kwanobuhle pipeline. The pipeline will have additional capacity to supply a total of 5.36 Mℓ/day of Groendal Water to Kwanobuhle, in the event that the Bloemendal to Kwanobuhle pipeline needs to be shut down (decommissioned) for maintenance. It is estimated that this pipeline can deliver approximately 1 Mℓ/day to Kwanobuhle when the level of the Groendal Dam is low but will be able to supply greater volumes at increased dam levels. The pipeline has therefore been designed to accommodate the following three scenarios:

1. **Scenario 1:**

   To supply 1 Mℓ/day from Groendal Dam (via the Scheepershoogte and Kabah reservoirs) through the new Mel Brookes to Kwanobuhle Pipeline in conjunction with both the Bloemendal & Kouga/Loerie Supply.

2. **Scenario 2:**

   To supply 2.3 Mℓ/day through the new Mel Brookes to Kwanobuhle Pipeline when the Groendal Dam can deliver a greater volume of water with increased dam storage levels, while the Bloemendal supply and the Kouga / Loerie supply is still active.

3. **Scenario 3:**

   To supply 5.36 Mℓ/day through the new Mel Brookes to Kwanobuhle Pipeline when the Groendal Dam can deliver a greater volume of water with increased dam storage levels, the Kouga / Loerie supply is still active, but the Bloemendal supply is shut. It will also supply the high-level areas in Kwanobuhle.

It must also be noted the inception, preliminary-design and detail-design phases for the project have been completed and therefore the procurement and construction phases are ready to proceed. Considering that the NMBM has already purchased all 1,800 m of the 450 mm diameter Class 12 u-PVC pipes required, the budget allocation required to complete the construction phase of this project is estimated at approximately R 10 million.

4.2.7 Motherwell/Bethelsdorp – East to West Pipeline Upgrade

Status: Work in Progress

The two existing pipelines (700 mm and 500 mm) between Motherwell Reservoir and Bethelsdorp Reservoir (a critical section of the Motherwell/Chelsea Pipeline), which transfers treated water supplied through the Nooitgedagt WTW to the western suburbs of the NMB, are constrained by both pipeline age (risk of failure at high pressure) and sizing (limited transfer capacity).

At this stage it is crucial for these pipelines to remain in operation as the water transferred to the western suburbs through these pipelines is used to supplement and offset the water demand from the dams located to the west of NMBM (which remain under stress due to drought conditions).

The 500 mm water pipeline specifically is old, bursts frequently and has reached the end of its useful life. Therefore, this watermain requires urgent upgrading which, along with the remaining 700 mm pipeline, will enable full transfer of the required volume of Nooitgedagt water to the western suburbs. This will create enormous flexibility within the NMBM's water transfer system and will drastically minimise future drought conditions - similar to what is currently being experienced.

This project (East to West Pipeline) aims to improve the reliability of the transfer of bulk water from the eastern (Nooitgedagt Water Supply System) to the western side of the NMBM (Chelsea/Greenbushes Supply Zone) by adding a third pipeline to alleviate the capacity constraints in the existing pipeline system. Furthermore, the same pipeline should be able to transfer flow under gravity conditions, in reverse, from Chelsea reservoir in the west to the Motherwell reservoir in the east.

The new pipeline is approximately 9 km long and is specified to be a 900 mm nominal diameter continuously welded steel pipeline. The pipeline will extend from the start tie-in point near the decommissioned Azalea Reservoir to the end tie-in point directly opposite the Jose Pearson TB Hospital. Both tie-ins will tap into the existing 750mm diameter Motherwell/Chelsea pipeline.

The existing 500 mm pipeline will become redundant once the new 900 mm pipeline has been commissioned. However, in the interim, during construction of the replacement pipeline, urgent refurbishment of the existing 500 mm pipeline is necessary to extend its useful life.

An environmental directive in terms of Section 30A has already been obtained from DEDEAT for the implementation of the majority of the NMBM's drought mitigation projects. An amendment was drafted for this Motherwell/Bethelsdorp (East to West) Bulk Water Transfer Pipeline upgrade to be included into the existing Section 30A approval for inclusion and approval by DEDEAT. Environmental Authorisation (EA) was received on 17 September 2025 and General Authorisation (GA) on 05 November 2025. All wayleave approvals and servitude permissions have been received. Site handover took place on 19 November 2025.

An amount of R410 million has been secured through Budget Facility Infrastructure (BFI) funding for this project. With re-apportionment approval (letter from DWS dated 09 July 2024) this has since been increased to R520 million.

Refurbishment of the 500 mm pipeline has commenced. However, work has been delayed due to the inability of effecting planned shutdowns by the NMBM Bulk Water Team which will allow for the installation of 30 air valves, 14 scour valves, 18 isolation valves and 1 inspection T-piece. Planned shutdowns were previously arranged, but due to vandalism and the volatility of the network, work continues to be delayed. The 900 mm pipelines are currently being manufactured with the first delivery to site expected during February 2026.

The figure below provides an overview of the section of the Motherwell/Chelsea Pipeline which requires upgrading.

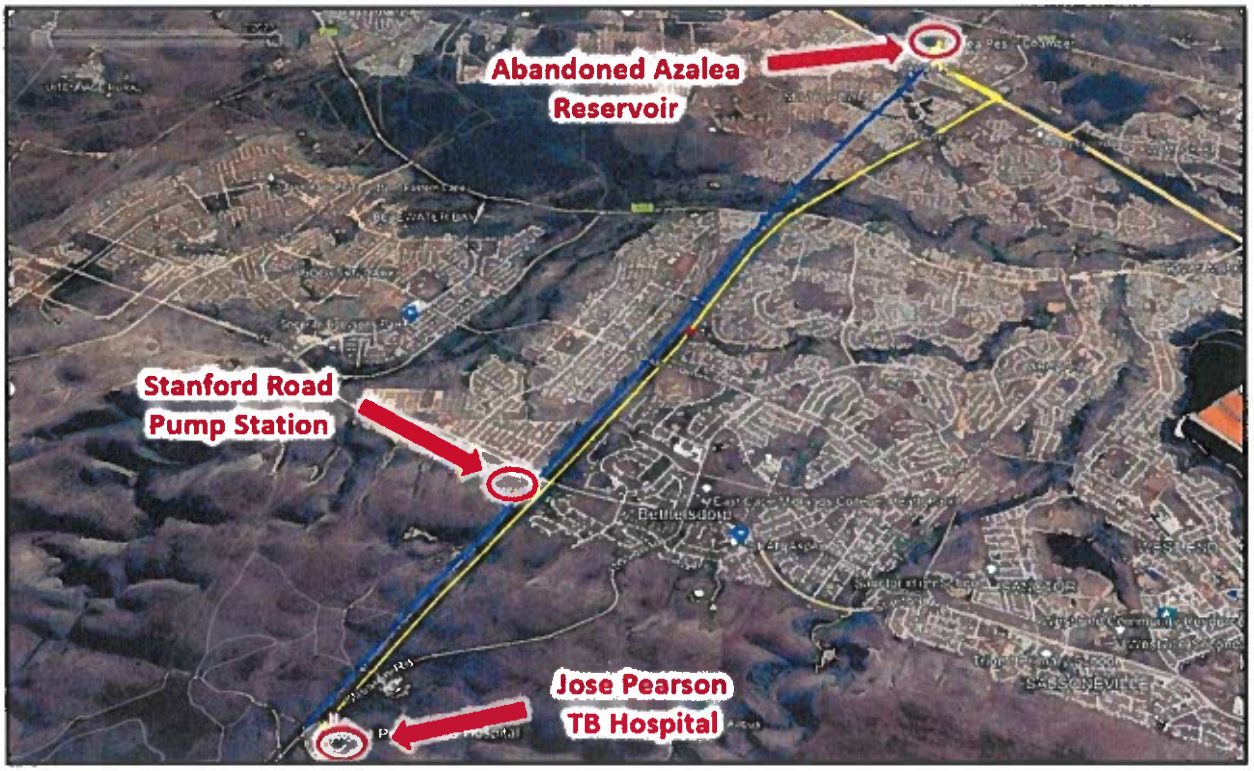


Figure 4-26. Motherwell/Bethelsdorp (East to West) Pipeline upgrade

4.2.8 Chatty Reservoir Offtake Repair

Status: Work in Progress

The Chatty Reservoir is normally supplied with water from the Nooitgedagt WTW through the Motherwell/Chelsea Pipelines. This Reservoir can be supplied via two scenarios, either from a connection on the 400 mm diameter pipeline supplying the End Street Reservoir, or from another connection straight from the Motherwell/Chelsea Pipelines via a 450 mm diameter GRP pipeline as indicated by the schematic layout below.

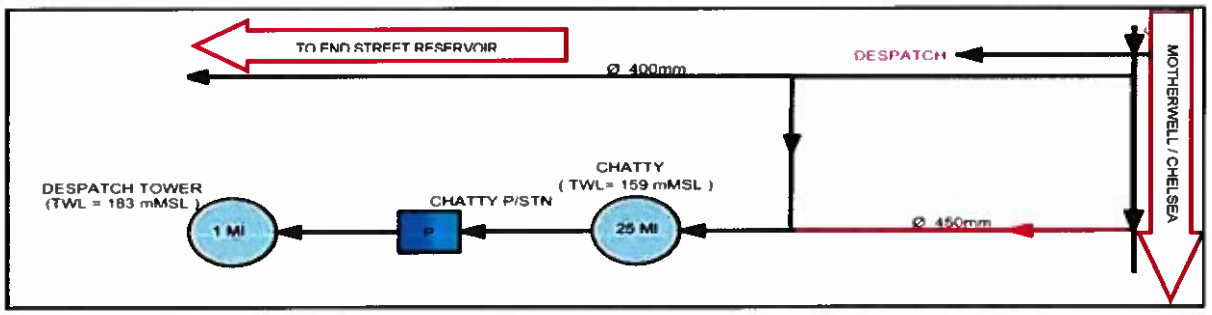


Figure 4-27: Schematical layout of the Chatty Reservoir Supply

Unfortunately, due to old age, the 450mm diameter GRP pipeline (highlighted in red in the schematic layout above) is prone to regular bursts, especially over the section where it crosses the Chatty River. A section of this pipeline has therefore been decommissioned, resulting in the fact that Chatty Reservoir can now only be filled up with water through the connection from the End Street Reservoir supply. It is crucial for the NMBM to keep all bulk pipelines in the network in good working order to ensure flexibility in the water supply system, especially during severe droughts similar to the one currently being experienced.

The repair was completed but the pipeline could not be commissioned due to faulty isolating valves at the interconnection with the Despatch pipeline. The Despatch pipeline will need to be shut in order to replace these valves, but this cannot be done at this stage due to a faulty valve at the main offtake. The replacement of the offtake valve will require a shutdown of the Grassridge / Chelsea pipelines.

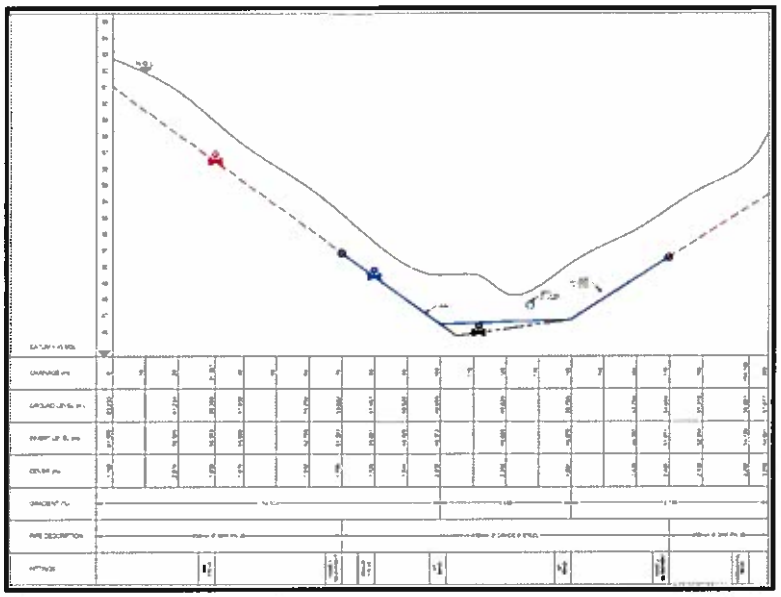


Figure 4-28: Completed design for the Chatty Reservoir Supply Offtake repair

4.2.9 Construction of the Chatty Pump Station to supply the Despatch Tower

Status: Work in Progress

Under normal/stable network conditions the Despatch Tower reservoir was supplied with water from a connection on the Motherwell/Chelsea transfer pipelines. However, due to the required increase in the water demand from the Chelsea Reservoir with water supplied from the Nooitgedagt WTW, the Stanford Booster Pump Station is running at maximum capacity to supply Chelsea Reservoir accordingly. The pressure in the Motherwell/Chelsea transfer pipelines therefore reduced drastically.

The NMBM subsequently installed a booster pump station that draws water from the Chatty Reservoir to fill the Despatch Tower Reservoir. Phase 1 of the project included the construction of a temporary containerized pump station and has been completed and is currently in operation. Phase 2 of the project, which is currently constraint by budget availability, will include the construction of a permanent pump station building.

The photos below were taken during Phase 1 of this project.

Figure 4-29: Photos of the Chatty Booster Pump Station

4.2.10 Construction of the Proposed Coerney Dam

Status: Work in Progress

To ensure a constant reliable water supply from the Gariep Dam / Orange River Transfer Scheme, the construction of the proposed Coerney Dam has been identified as one of the long-term drought mitigation interventions which will be implemented and owned by DWS.

Once constructed, the Coerney Dam will have an estimated capacity of 4,690 Mℓ and will be able to supply 210 Mℓ/day (the Nooitgedagt WTW's peak conditions as per Section 4.2.1 above) for 21 days during canal shutoffs/breakdowns or other emergencies. This will certainly increase the assurance of supply to the Nooitgedagt WTW which at this stage provides most of the NMBM's potable water.

The technical feasibility study for the construction of the dam was completed in July 2020. Subsequent to the latter, Professional Service Providers have been appointed to proceed with the EIA process, which is currently taking place. Environmental Authorisation is still pending at this stage.

The figure below indicates the proposed location of the Coerney Dam, relative to the existing Scheepersvlakte Dam.

Figure 4-30: Proposed Location of the Coerney Dam

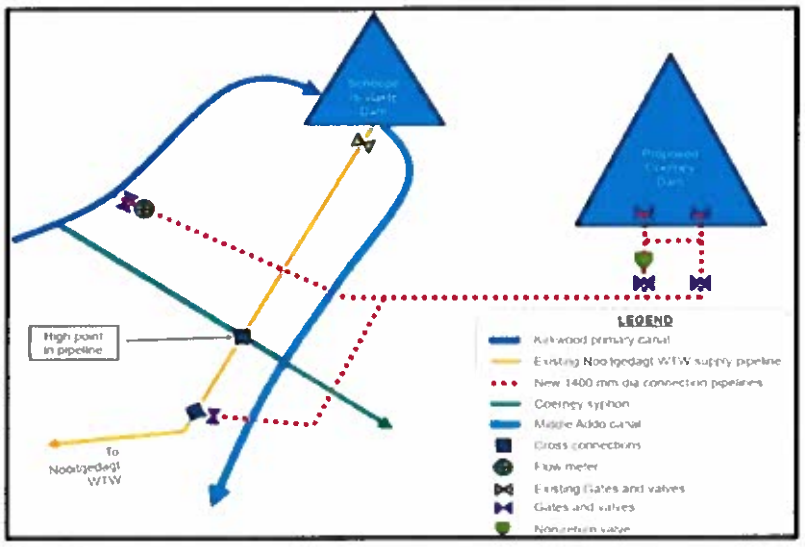


Figure 4-31: Proposed Schematical Layout of the Coerney Dam Project

4.2.11 Nooitgedagt Phase 4: Expansion of the Gariep Dam / Orange River Transfer Scheme

Status: Planning Commenced

With Nooitgedagt WTW Upgrade Phase 3, as describe under Section 4.3.1 above, completed, the water treatment works is able to process a total of 210 Mℓ/day. With the current dire state of limited water supply from the western water sources, the NMBM embarked on a high-level planning programme to expand the eastern water supply sources. The programme is required to (1) identify the various constraints in the current system and (2) what upgrades are required so to boost the water treatment plant's capacity with 70 Mℓ/day so to be able to treat and supply a total volume of 280 Mℓ/day. To date the following items have been identified and which will need further attention during the endeavour to expand the water supply from the Gariep Dam / Orange River transfer scheme accordingly:

1. Increase the allocation to NMBM from the Orange-Fish Government Water Supply Scheme.
2. Permanent repair to the damaged section of irrigation canal between Kirkwood and Scheepersvlakte Balancing Dam. The canal failed catastrophically and has not been permanently repaired. The temporary repair limits the amount of water that can be conveyed to Scheepersvlakte Dam. Failure to affect a permanent repair places the raw water supply to Nooitgedagt WTW at high risk. Should the canal fail again the Nooitgedagt WTW will run dry within about 2 days. DWS did embark on repairs to the canal but was stopped by disgruntled EMEs. Repairs to the canal are estimated to take approximately 6 months
3. Construction of the 2nd Scheepersvlakte Balancing Dam (now known as the Coerney Dam). This will allow for 21 days of raw water storage, which in turn will allow for maintenance of the supply canal. Maintenance is currently not possible due to the high demand on the Nooitgedagt WTW. DWS has undertaken preliminary design of the new dam and has started the EIA process.
4. Provision of a second syphon under the Sundays River to supply raw water from Scheepersvlakte Dam to Nooitgedagt WTW. This will provide redundancy in the event of the existing syphon failing. It will also allow for maintenance of the existing syphon.
5. Construction of a fourth 70 Mℓ/day treatment module at Nooitgedagt WTW comprising flash mixer, settling tanks and filters without a clearwell below. Filtered water will be collected in the existing eastern clearwell constructed under Phase 3.
6. Upgrade the pumping capacity at Nooitgedagt WTW to move the additional volume of water to NMBM.
7. Construction of a 1,000 mm diameter x 23.4 km rising main from Nooitgedagt WTW to Olifantskop Reservoir site and a 20 km gravity pipeline from there to Motherwell.
8. Construction of a second 45 Mℓ reservoir at Olifantskop reservoir site.
9. Upgrading of the Motherwell / Chelsea pipeline from the Motherwell reservoir to past the Stanford Road booster pump station with a total length of approximately 10,5 km. The old and fragile 500mm diameter pipe should be replaced with a new 1,000mm pipeline.
10. Install an additional 750 mm rising main from Chelsea Reservoir to increase supply to the Greenbushes Reservoir.
11. Increase the capacity of the by-pass pipeline from Greenbushes Reservoir to the Churchill pipeline by making minor alterations to the exiting break-pressure system.

By increasing the supply from the Nooitgedagt system and reducing leaks in the water reticulation system, pressure on the western dam's supply will be greatly reduced. The western dams can then be used to meet the peak water demand rather than the base water demand. This will result in the supply from the dams being able to last much longer under drought conditions. By implementing the abovementioned items, the NMBM will certainly be in a position to secure a long-term reliable water supply for their consumers. As mentioned before, this programme is currently in a high-level planning stage and will therefore require more detailed planning and preliminary designs to determine actual scope of works, as well as associated costs for implementation.

4.3 GROUNDWATER AUGMENTATION

4.3.1 Overview and Background

DWS has advised that groundwater is generally underutilised in South Africa and that the water scarce areas should focus on the possible extraction of groundwater. The 2010/2011 drought in the Eastern Cape resulted in groundwater being investigated by the NMBM as one of the possible solutions for augmenting potable water supply. Investigations have shown that there are areas, located on properties owned by the municipality which have high groundwater potential. Groundwater is generally more affordable than water re-use or desalination, depending however on the quality.

Subsequently approximately 200 exploration boreholes were drilled within the region to locate suitable sites, as indicated in the figure below.

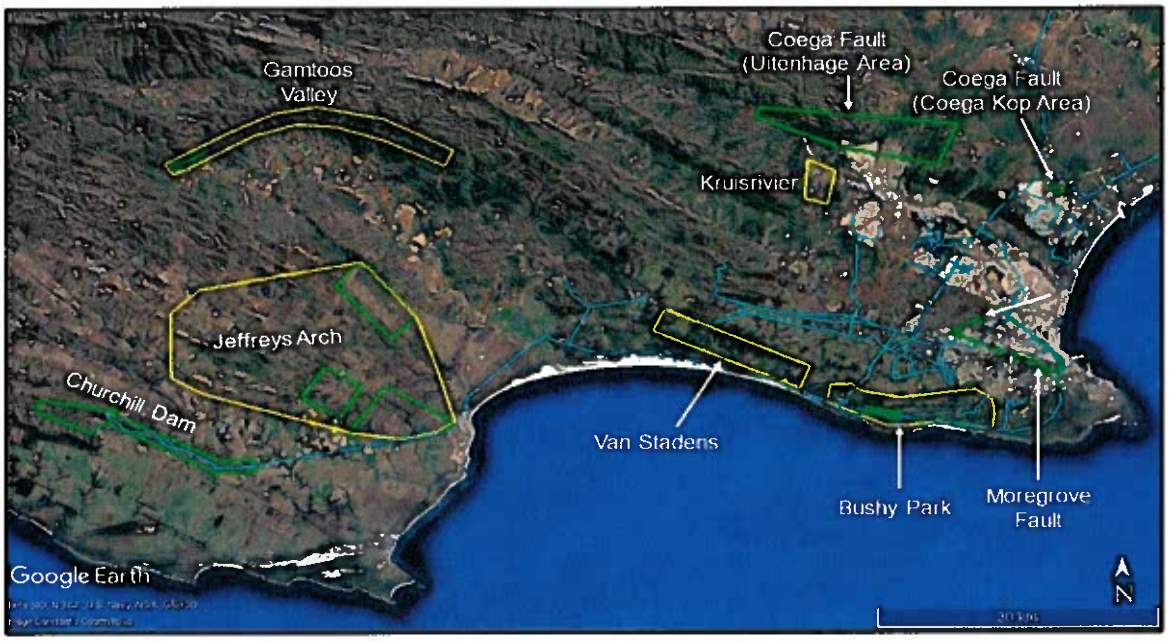


Figure 4-32: Borehole Sites Identified within the NMBM

The sites identified for groundwater development are summarised in the table below:

Table 4-1: Sites for groundwater development, showing licenced abstraction volumes

LOCATION	ALLOCATION (million m³/annum)	ALLOCATION (Mℓ/day)
Coegakop	3.66	10.02
Bushy Park	2.57	7.04
St Georges Park	0.76	2.07
Fort Nottingham	0.38	1.04
Fairview	0.52	1.42
Glendinning	0.82	2.25
Total	**8.70**	**23.84**

After the initial drilling of boreholes to identify suitable groundwater sources, the NMBM opted to develop an implementation plan that would augment/supplement the bulk water supply to the NMB accordingly. It was anticipated at the time that a sustainable yield of around approximately 30 Mℓ/day can be abstracted through these groundwater sources. This action plan consisted of the following:

4.3.2 Coegakop Wellfield

Status: Completed & Operational

During the 2009-2012 drought period, various potential groundwater sources were identified, investigated and the results documented. The Groot Winterhoek Aquifer was found to be the most favourable and preparation was made to commence with drilling exploration and probe boreholes in the Coegakop Area. In February 2014, work commenced for the drilling of thirty-six exploration boreholes, the intent being to site five production boreholes. These, along with the raw and final water rising mains, were completed in September 2019. This completed Phase 1 to 3 of the project.

Phase 4 of the project, which has been completed, included the construction of a water treatment works and the installation of borehole mechanical and electrical equipment. At this stage the Coegakop Water Treatment Works will be the largest Biofiltration Plant in South Africa and is able to produce up to 20 Mℓ/day of treated potable water to augment the surface water supply sources of the NMBM.

The first water from this scheme was delivered on 07 September 2023. Completion was achieved on 23 February 2024 and final completion on 04 March 2025.

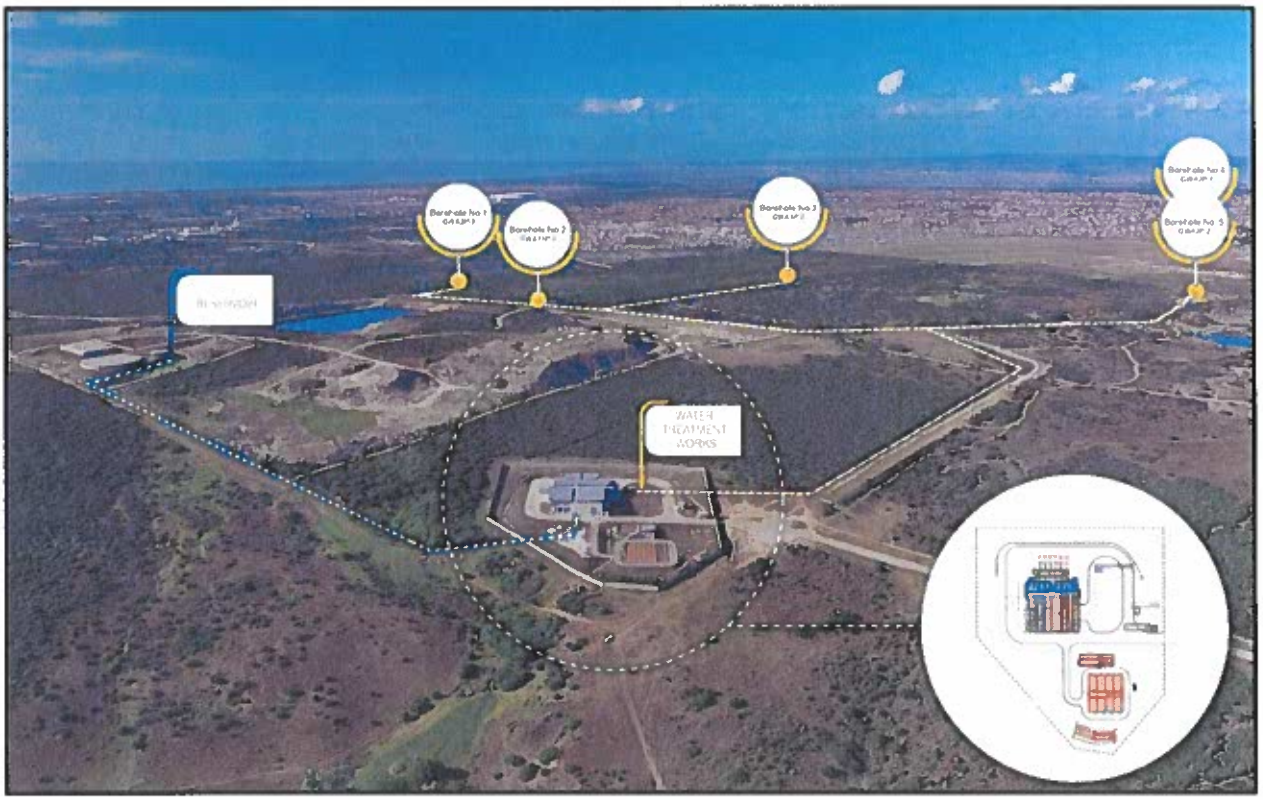


Figure 4-33: Coegakop Wellfield schematical layout

4.3.3 Bushy Park Wellfield

Status: Completed & Operational

This project's scope included the construction of infrastructure required to abstract, treat, and distribute groundwater into the NMBM bulk water supply system. Ten production boreholes have been identified with combined pumping yields of between 7.0 and 13.3 Mℓ/day. Water quality testing in terms of SANS:241 indicated that the raw water will need to be disinfected and blended in order to produce potable water of an acceptable standard. An additional thirteen monitoring boreholes were drilled to better understand and manage the aquifer. Monitoring of nearby agricultural boreholes will also be done on an ongoing basis as a means of ensuring minimal impact to this sector.

The closest practical point for connecting this groundwater scheme into the NMBM's bulk water supply infrastructure is by injecting directly into the Churchill pipelines. These two pipelines, a Soccoman 1,050 mm diameter and Steel 675 mm diameter, convey water from the Churchill and Elandsjagt WTWs into the city. This wellfield, when in operation, thus reduces the demand placed on the Western dams by augmenting the supply of potable water to the Western suburbs, CBD, and Ibhayi areas of Gqeberha.

The first water from this scheme was delivered on 17 March 2023. Practical completion was achieved on 19 May 2024, completion on 28 September 2023 and final completion on 11 October 2024.

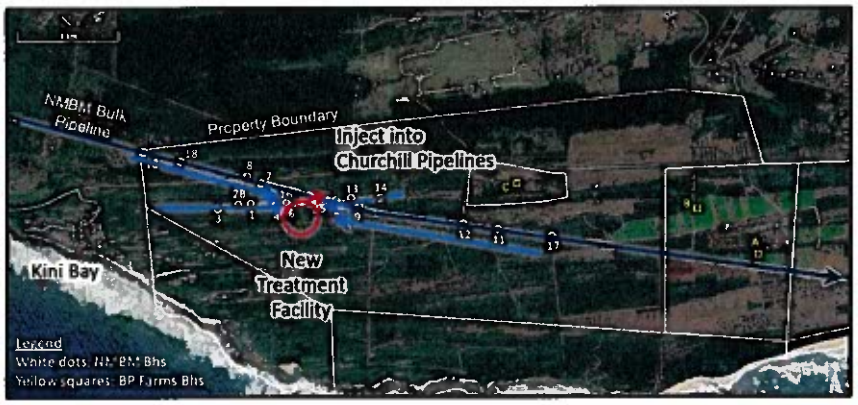


Figure 4-34: Bushy Park Wellfield schematical layout

Figure 4-35: Bushy Park Wellfield aerial view of scheme nearing completion

4.3.4 St Georges Park Wellfield

Status: Completed & Operational

The construction of infrastructure required to abstract, treat, and distribute groundwater into the NMBM bulk water supply system is included within this project's scope. To date four production boreholes have been identified and drilled with combined pumping yields of between 1.4 and 3.6 Mℓ/day.

Water quality testing in terms of SANS:241 indicates that the raw water is required to be filtered and disinfected in order to produce potable water. An additional five monitoring boreholes were drilled to better understand and manage the aquifer.

The closest practical point for connecting this groundwater scheme into the NMBM's bulk water supply infrastructure is the St Georges Reservoir. The reservoir was constructed in 1907, is supplied with water from the Churchill Pipeline, and has a storage capacity of 8.8 Mℓ. The zone supplied by the St Georges Reservoir includes the suburbs of Central, Humewood, Humerail, South End, and the Harbour.

The groundwater is treated prior to being discharged into the reservoir. Zone demand calculations indicate that there is a potential surplus of up to 1.0 Mℓ/day from the boreholes after supplying the zone fed from the St Georges Park Reservoir. The excess potable water is thus pumped by a new pump station directly into the Churchill pipeline nearby in order to supply other reservoirs fed by this bulk pipeline.

The first water from this scheme was delivered on 01 March 2023. Practical completion was achieved on 19 May 2024, completion on 28 September 2023 and final completion on 11 October 2024.

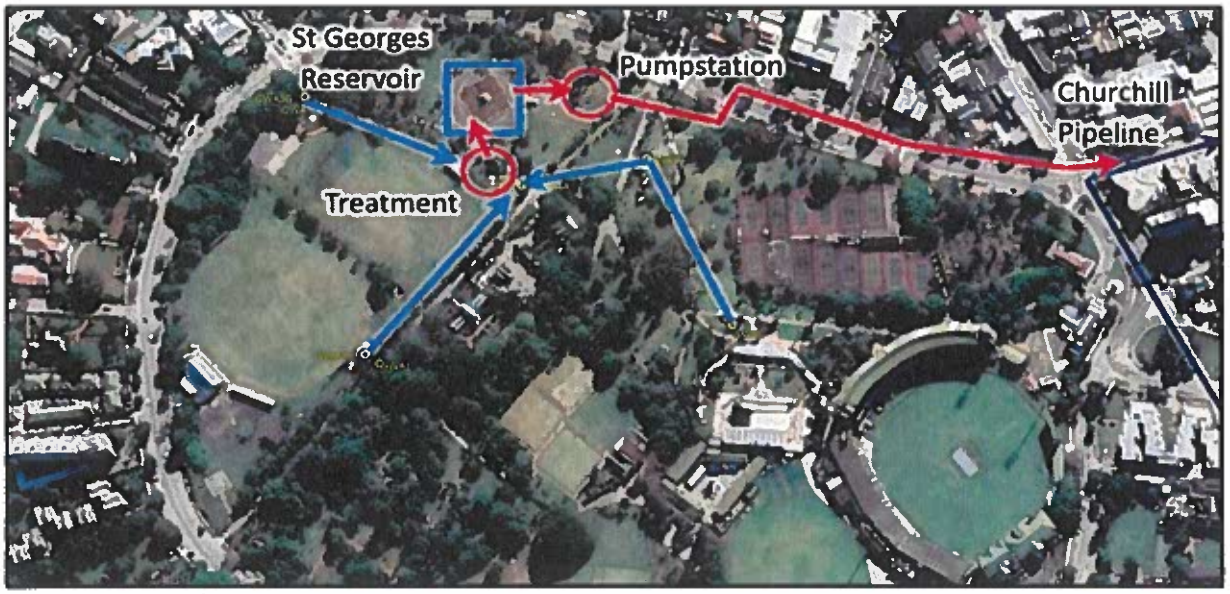


Figure 4-36: Schematic representation of water flow from the St Georges Park Wellfield

Figure 4-37: St Georges Park Wellfield buildings

4.3.5 Moregrove Wellfields

Status: Completed & Operational

This project's scope included the construction of infrastructure required to abstract, treat, and distribute the groundwater into the NMBM bulk water supply system. To date eleven production boreholes have been identified with a combined sustainable pumping yield of 4.8 Mℓ/day. Water quality testing in terms of SANS:241 indicates that the raw water will need to be disinfected and blended in order to produce potable water. An additional seven monitoring boreholes were drilled to better understand and manage the aquifer.

Disinfected groundwater is discharged into the Fort Nottingham, Glendinning and Fairview Reservoirs respectively. The produced volumes will not be enough to meet the full demand from each of these reservoirs and thus the groundwater will be blended with water supplied by the Churchill Pipeline.

Construction for the development of this wellfield and ancillary water treatment works commenced on 12 July 2021, with first water achieved on 25 September 2022. Construction was completed on 15 December 2022.

Figure 4-38: Schematic representation of the Fort Nottingham Wellfield

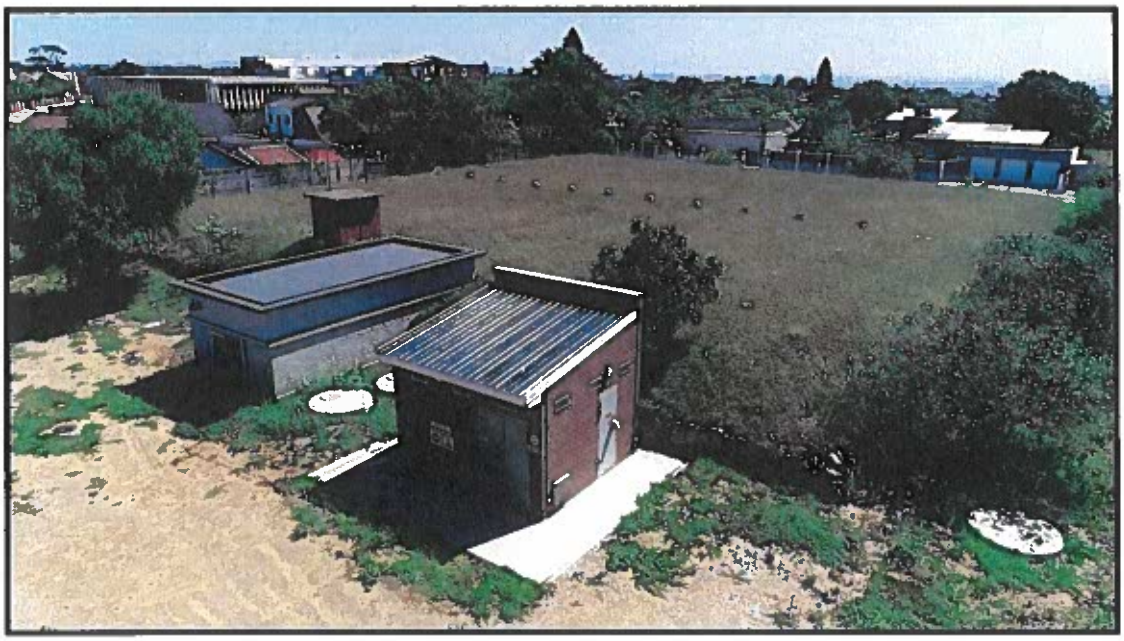


Figure 4-39: Completed Fort Nottingham Wellfield treatment building

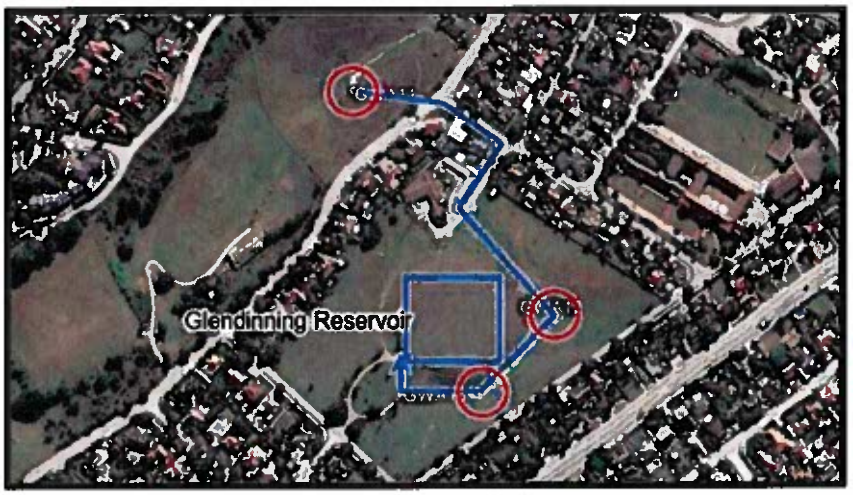


Figure 4-40: Schematic representation of the Glendinning Wellfield

Figure 4-41: Completed Glendenning Wellfield treatment building

Figure 4-42: Schematic representation of the Fairview Wellfield

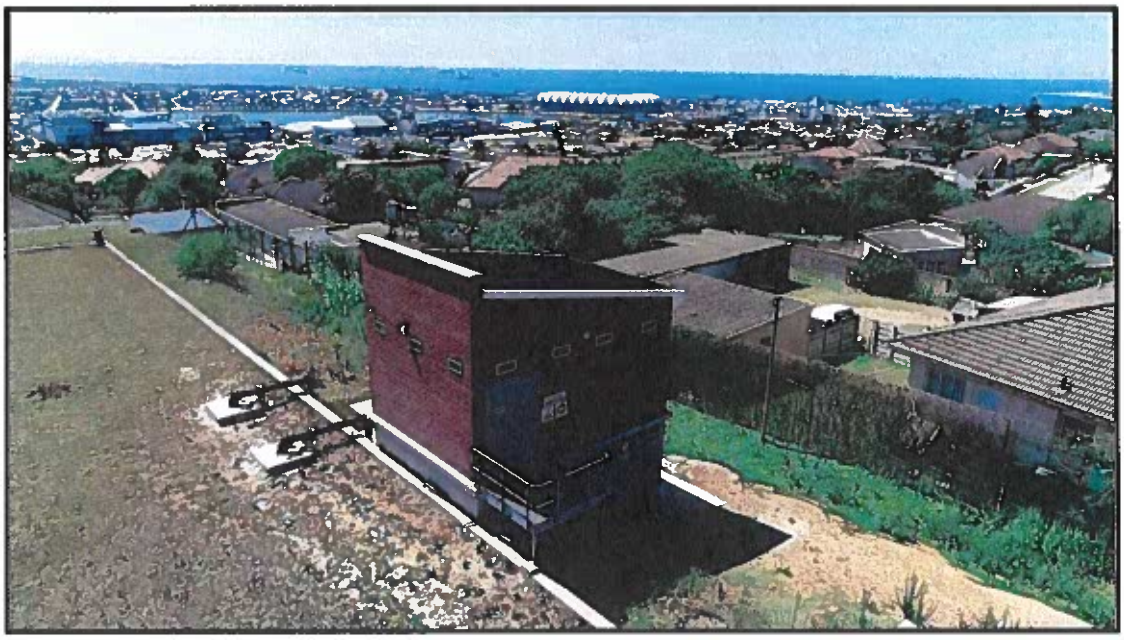


Figure 4-43: Completed Fairview Wellfield treatment building

4.3.6 Churchill Wellfield

Status: Work in Progress

The Churchill Wellfield is a strategic initiative aimed at augmenting the raw water supply from the Churchill Dam by integrating groundwater into the existing Water Treatment Works (WTW). To date, 73 boreholes have been drilled on municipal property, with 19 currently identified for production. While conceptual designs are already finalized, the project's commencement remains contingent upon secured funding. Upon completion, the initial scheme is expected to yield an additional 1.7 to 3.6 Mℓ/day; however, plans for 26 further boreholes and ongoing exploration in the dam's vicinity could potentially boost this output to a total of 4.9 to 6.4 Mℓ/day.

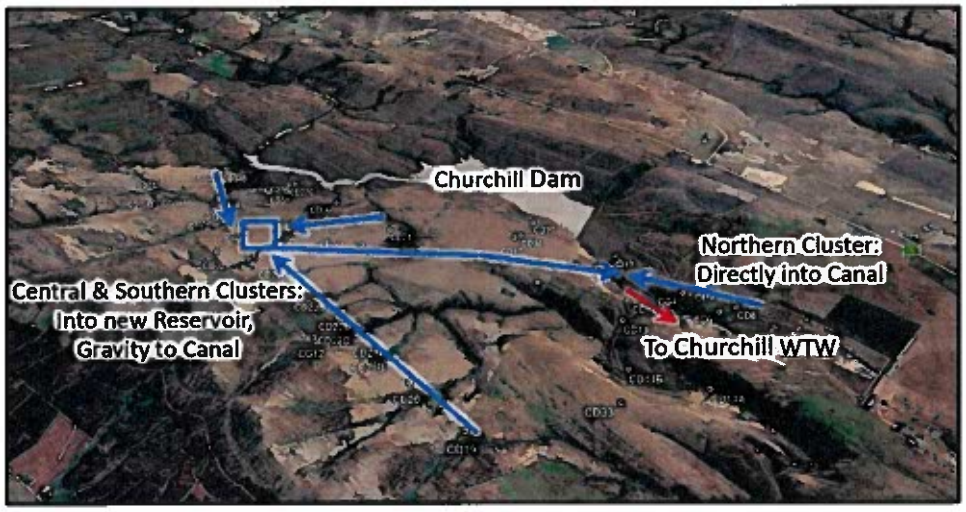


Figure 4-44: Churchill Wellfield proposed schematical layout

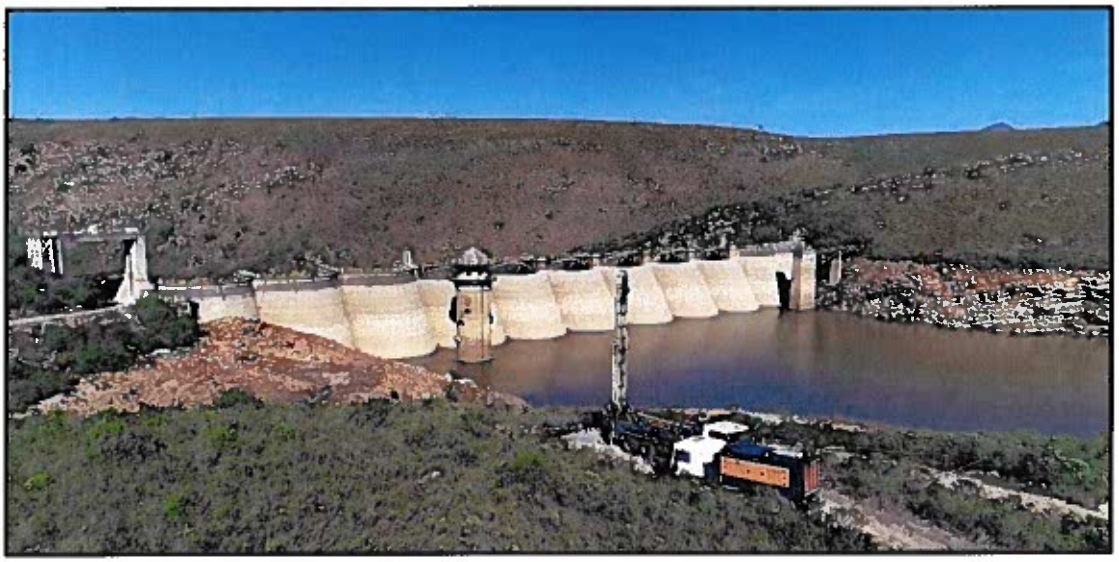


Figure 4-45: Drilling in progress upstream of the dam wall at the Churchill Wellfield

4.3.7 Driftsands Wellfield

Status: Work in Progress

Drilling of exploration boreholes in the vicinity of the Driftsands Wastewater Treatment Works (WWTW) commenced on 26 February 2025. A total of 49 boreholes were drilled and yield-tested and as of 04 November 2025, the combined sustainable yield of 23 proposed production boreholes amounted to 15.74 Mℓ/day, which is 104.95% of the targeted yield of 15 Mℓ/day. The lowest yielding borehole was 4 ℓ/s (345.6 kℓ/day) and the highest yielding borehole 24 ℓ/s (2,073.6 kℓ/day).

Figure 4-46. Driftsands Wellfield position of boreholes drilled to date

Figure 4-47:Drilling commences at the Driftsands Wellfield

4.3.8 Aspin Heights Wellfield

Status: Planning Commenced

It is the municipality's intent to develop groundwater sources in the in the vicinity of the Bethelsdorp Reservoir. This will allow for more water to be transferred to areas supplied by the western dams through the Chelsea Reservoir. The recommendation from the hydrogeologist is that geophysics and drilling be done in the road reserves of Mission and Stanford Roads, as well as within the existing bulk water pipeline servitudes. The area identified for exploration drilling is indicated as a green polygon in the figure below.

Figure 4-48: Proposed Aspin Heights Wellfield area identified for exploration drilling

4.3.9 Malabar Wellfield

Status: Work in Progress

Several boreholes were drilled in the Summerville area to the northwest of the Moregrove Quarry during the NMBM 2019/20 drilling project. Most gave low yields, but some were not on the pegged sites due to access restrictions. One potential production borehole, GWA17B, on the eastern edge of this area, gave a recommended production yield of 1.4 Mℓ/day (16 ℓ/s), indicating that there is potential to develop groundwater sources in this area.

The recommendation from the hydrogeologist is that groundwater exploration should be completed in this area to determine its full potential from a future water supply perspective. A map showing which shows the proposed exploration areas (green polygons) for both the Malabar area and Parsons Vlei (not discussed in this report due to its relatively low size and expected impact) is shown in the figure below.

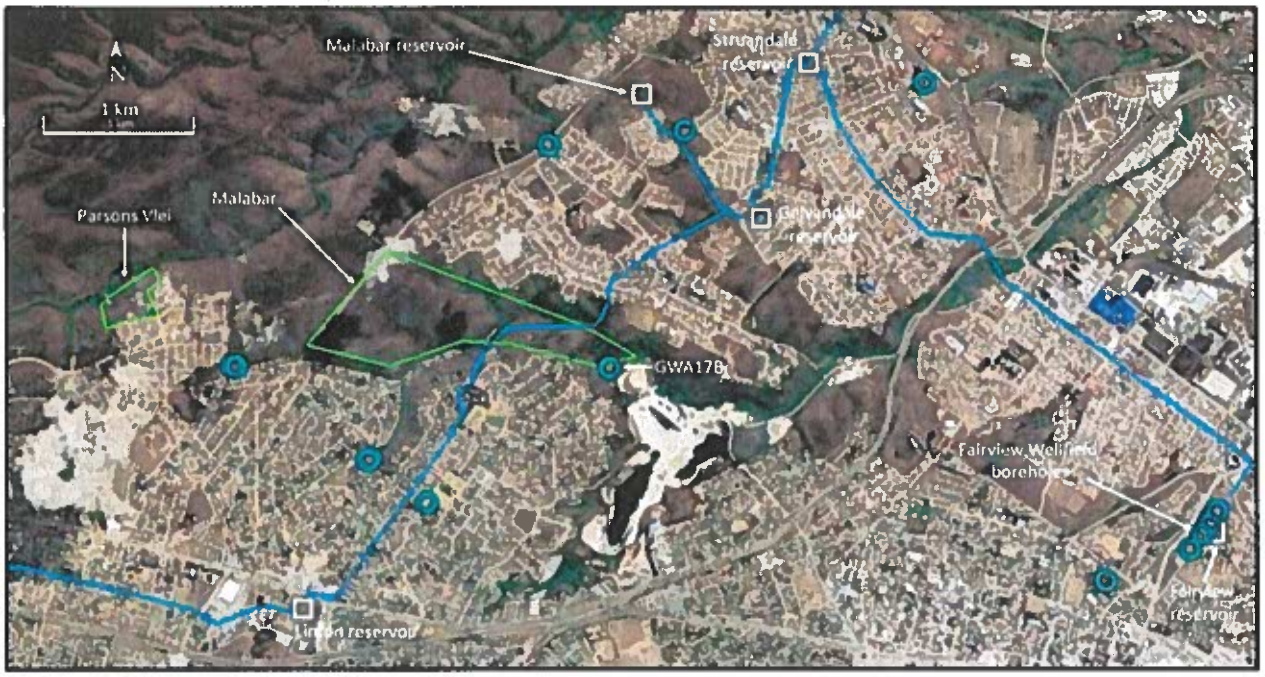


Figure 4-49: Proposed Malabar Wellfield area identified for exploration drilling

4.3.10 Future Groundwater Exploration

Status: Planning Commenced

Groundwater schemes will specifically address the risk of possible water supply stoppages and shortages for the NMBM by providing an alternative supply to our surface water sources. While, as per the sections above, the NMBM has done extensive work under groundwater exploration and development, several new boreholes and test pumping of existing boreholes will be required in and around the Nelson Mandela Bay to further augment the municipality's water supply to the reservoirs.

The target is to have groundwater make up 15% of the total volume of treated water produced at the NMBM's Water Treatment Works. With the total volume estimated to be 400 Mℓ/day by the year 2030, the groundwater contribution will need to amount to 60 Mℓ/day. The six completed wellfields plus the Uitenhage Springs are currently licensed to abstract a combined volume of 29.76 Mℓ/day, which is 50% of the targeted total groundwater volume.

The yellow polygons in the figure below indicate the areas that were identified by the NMBM for future groundwater exploration and development – over and above those discussed in the sections above.

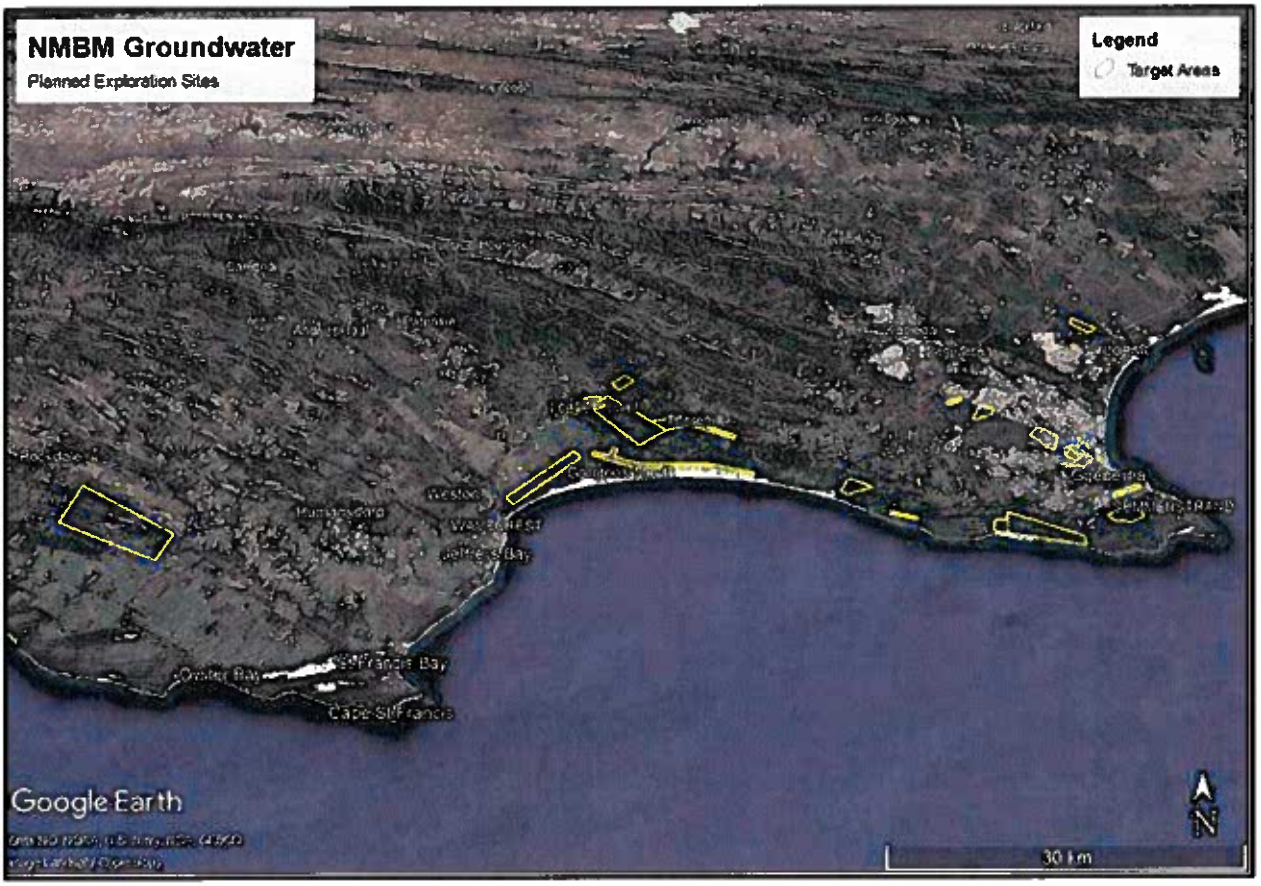


Figure 4-50. Future Groundwater exploration sites

4.4 DESALINATION

4.4.1 Overview and Background

Desalination remains the most expensive source of water augmentation, although it is the only water source which is not impacted by climate change and is virtually unlimited in potential. Desalination is included in the National Water Strategy as well as the Algoa WSS reconciliation strategy and will form part of the long-term future water supply. Small scale temporary plants are especially expensive, and yields are too low to provide water supply assurance to a region such as NMB. Desalination is not a silver bullet solution during drought.

Following the drought of 2010-2011, numerous investigations have been conducted into the possible locations for a desalination plant to augment our bulk water supply. By using a multi-criteria analysis tool, the identified, potential desalination plant sites were evaluated in terms of cost effectiveness, locality to existing infrastructure, environmental impacts, etc. to identify the preferred sites for implementation.

From this process, two sites, in two different locations, were identified for further investigation, namely in the Coega SEZ and along the southern coastline, in the Schoenmakerskop area.

4.4.2 Coega SEZ Desalination Plant

Status: Planning Commenced

The Coega Development Corporation (CDC) has planned for a 15 Mℓ/day plant (ultimately to be expanded in phases to 60 Mℓ/day). The NMBM is considering an offtake agreement with the CDC for the implementation of this project. The primary motivation to do so is to secure a potable water supply for future expansion and investment within the Coega Special Economic Zone (SEZ). The excess potable water will be available to be pumped to the NMBM's Olifantskop Reservoir, whereafter it shall contribute to supply water to the residents of Gqeberha. Note that all costing received to date is based on a 15 Mℓ/day plant.

Figure 4-51: Coega SEZ Desalination Plant schematical layout

4.4.3 Western Desalination Plant

Status: Work in Progress

Following the multi-criteria analysis site identification, a Detailed Feasibility Investigation was initiated. The feasibility study's components included a comprehensive water quality monitoring program, marine bathymetry and geophysical surveys, brine dispersion modelling, and preliminary design considerations for the marine intakes and outfall, the desalination plant, and the delivery pipeline.

The preferred potential plant location would then also be subject to a full Environmental Impact Assessment (EIA). The previous Feasibility Investigation was concluded in 2017, with the pre-feasibility investigations, site selections and marine bathymetry having been completed, and with the water quality monitoring evaluation done at desktop level.

A Design Basis Report as well as an Implementation Readiness Study (IRS) report have since been prepared for this particular scheme. The next step would be to commence with the mandatory Environmental Impact Assessment (EIA).

This is a large-scale capital infrastructure project and has been identified as a long-term water resource, with costing based on the full 60 Mℓ/day plant.

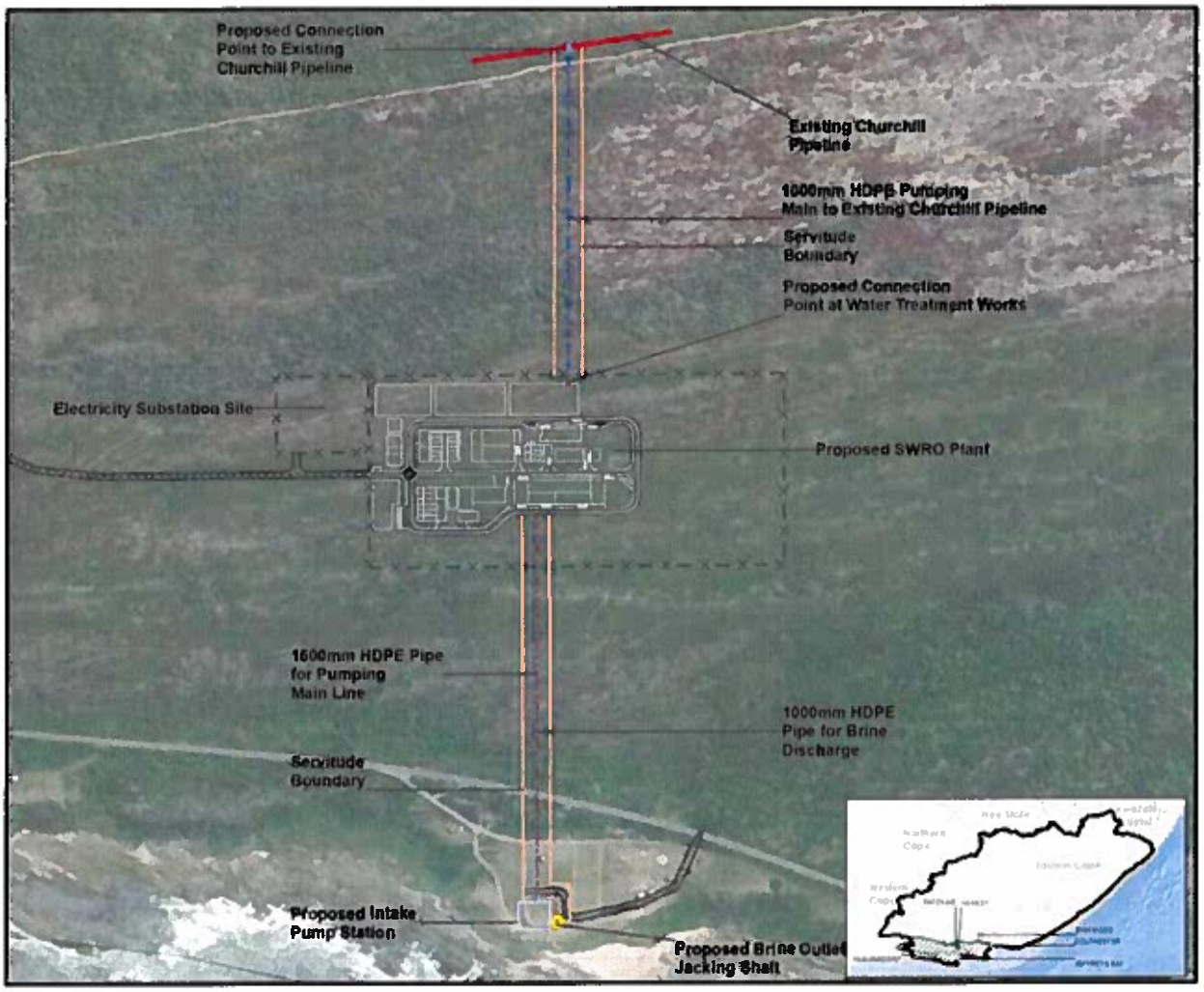


Figure 4-52: Schematic layout of proposed Schoenmakerskop Seawater Desalination Plant: Land infrastructure

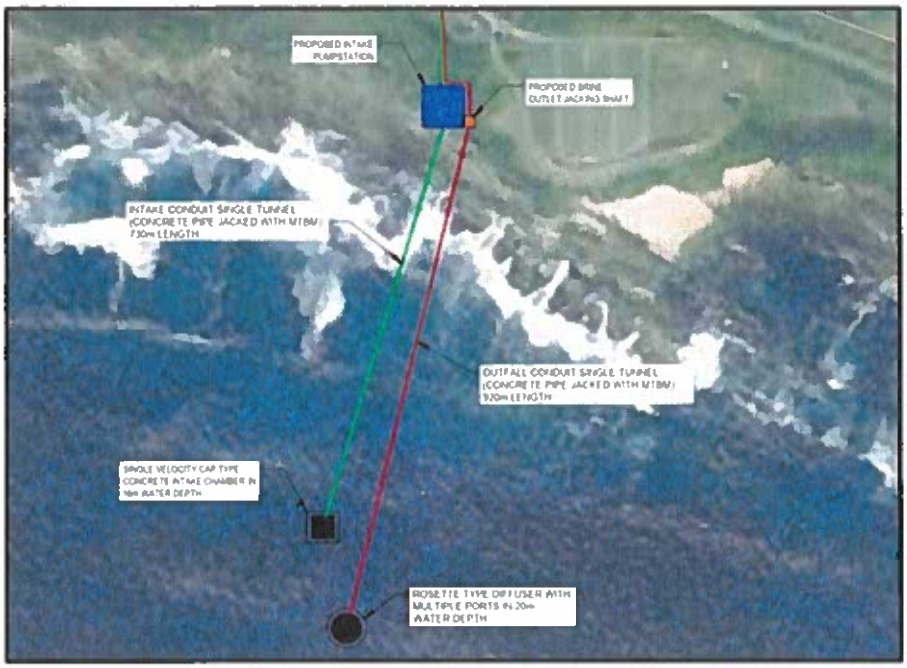


Figure 4-53: Schematic layout of proposed Schoenmakerskop Seawater Desalination Plant: Marine infrastructure

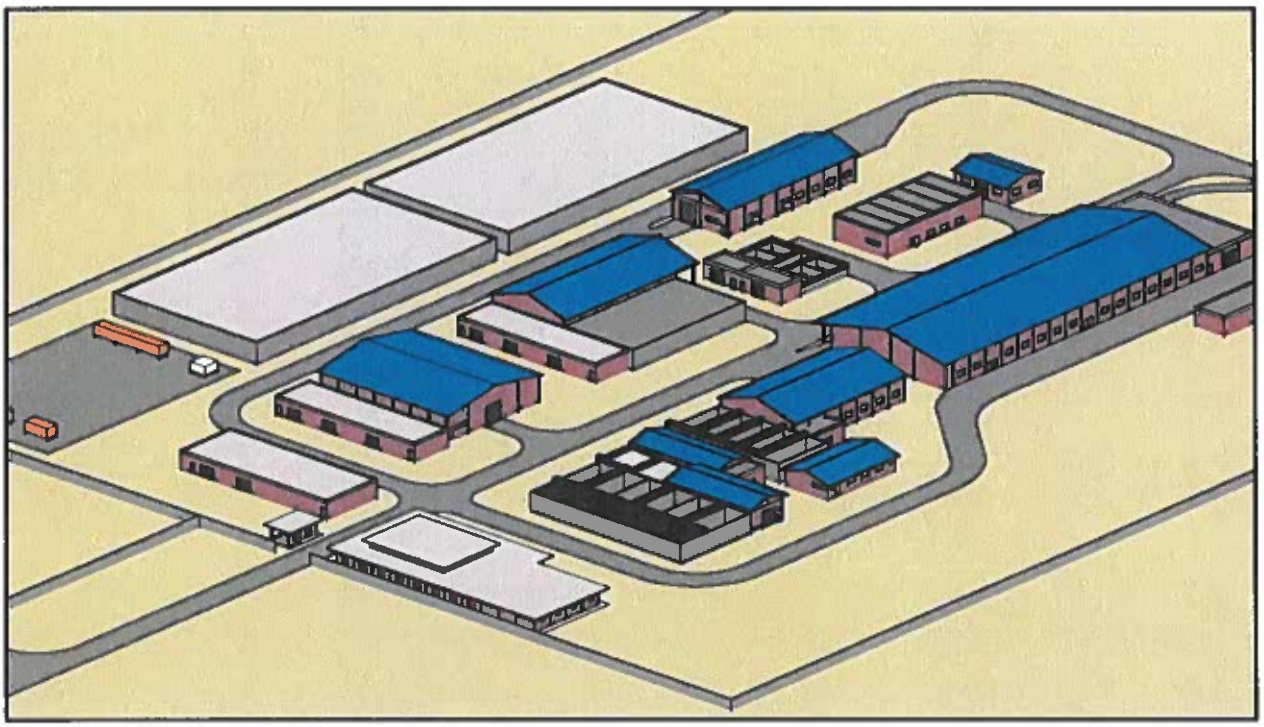


Figure 4-54: 3D render of the proposed Schoenmakerskop Seawater Desalination Plant

4.5 RE-USE OF TREATED EFFLUENT AT WASTEWATER TREATMENT WORKS (WWTW)

4.5.1 Existing Re-Use of treated effluent from WWTW's throughout NMB

Status: Completed & Operational

There are currently eight existing wastewater treatment works located throughout the NMB. These facilities are listed in the table below and has total treatment capacity of **205.04 Mℓ/day**.

Table 4-2: List of Existing Wastewater Treatment Works throughout the NMB

	Wastewater Treatment Works	Type	Status	Commission Date	Last Upgrade	Current Peak Capacity (Mℓ/day)
1	Cape Receife	Activated Sludge	Existing	1971	2013	9.00
2	Despatch	Activated Sludge	Existing	1969	2005	8.86
3	Driftsands	Activated Sludge	Existing	1985	2018	22.00
4	Fishwater Flats	Activated Sludge	Existing	1976	2018	132.00
5	Kelvin Jones	Activated Sludge	Existing	1936	2018	24.00
6	Kwanobuhle	Activated Sludge	Existing	1985	1999	9.00
7	Rocklands	Activated Sludge	Existing	2006	-	0.18
8	Brickfield	Pre-Treatment	Existing	-	-	-
					TOTAL:	**205.04**

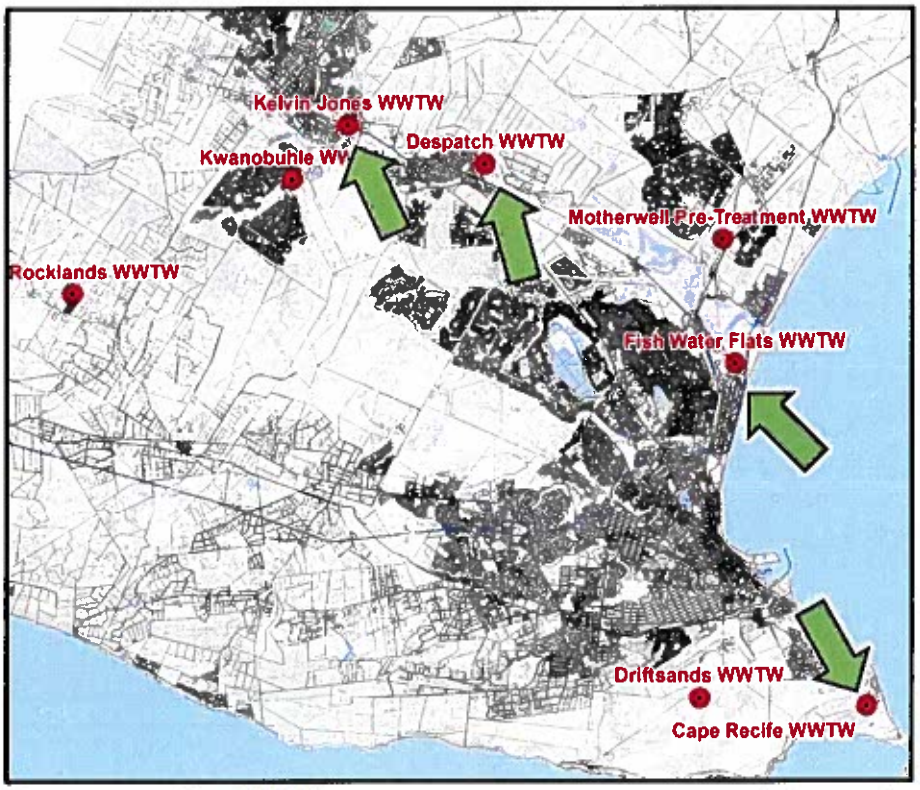


Figure 4-55: Location of WWTW's throughout the NMB area. The green arrows indicate at which plants treated effluent is available for re-use

All the treatment works are in operational condition and are being operated and maintained while the refurbishment of existing and/or replacement of components or internal refurbishment/upgrading of the works are carried out on a daily basis. The map on the previous page shows the location of each of the WWTW's throughout the NMB.

The NMBM is dedicated reduce current water demand by also making treated effluent available for collection by the public, at these WWTW's. Treated effluent is generally used for agricultural and irrigation activities as it contains a higher proportion of nutrients, which reinforces its suitability for plants and crops.

Therefore, the NMBM is currently very active in encouraging the residents/water consumers to collect treated effluent for any construction and agricultural related activities that will offset potable water use and resulting in a potential reduction in the current high-water demand. The volume of treated effluent currently being re-used amounts to just under 8 Mℓ/day, which represents ≈4% of the total treatment capacity of all the WWTWs. Treated effluent are being re-used/collected at the following four existing WWTW's (and as indicated by the green arrows on the map on the previous page).

Table 4-3: Re-Use of Treated Effluent

	Wastewater Treatment Works	Current Peak Capacity (Mℓ/day)	Volume Billed (Mℓ/day)
1	Fishwater Flats	132	2.00
2	Kelvin Jones	24	0.70
3	Despatch	8.86	1.90
4	Cape Receife	9	3.00
TOTAL:		**173.86**	**7.60**

The following sections will provide a brief overview of the re-use of the treated effluent at the specific WWTWs as indicated in the table above.

Fish Water Flats (FWF) WWTW

The works has a scheme that includes distribution to various industries within the Deal Party area. The works also makes use of RE in various treatment processes. A water collection point for RE from the on-site 9 Mℓ reservoir has been established as part of a drought intervention.

Figure 4-56: Overview of the Fishwater Flats WWTW's re-use scheme the supply of treated effluent

Kelvin Jones (KJ) WWTW

The exiting re-use scheme includes distribution of reclaimed effluent to various school grounds; industries; and the Uitenhage Golf Course. The licence conditions limit this scheme to 897 kℓ/d.

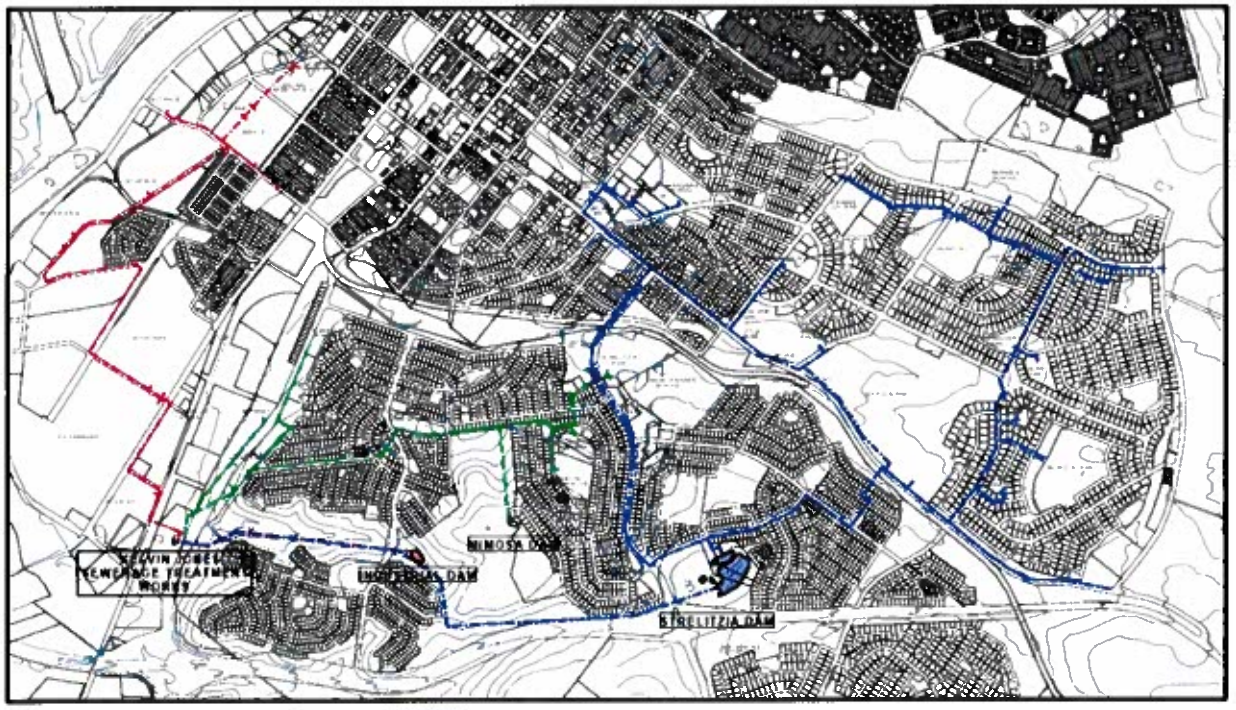


Figure 4-57: Layout of the Kelvin Jones WWTW's re-use scheme

Despatch (DES) WWTW

Treated effluent from the Despatch WWTW are abstracted from the final effluent at the chlorine contact tanks, which is then distributed to various school grounds, church grounds, and recreational parks for irrigation purposes. The licence conditions limit this scheme to 1,011 kℓ/day.

Cape Recife (CR) WWTW

The Cape Recife WWTW currently supplies treated effluent to three consumers within the NMBM for irrigation purposes. The treatment works has an existing return effluent (RE) scheme that services Nelson Mandela University (NMU), Humewood Golf Course and the Pine Lodge Resort

The current scheme utilises an existing pump station to pump treated effluent from the northern corner of the first maturation pond with 2 centrifugal pumps. The water is supplied to users via a well-aged asbestos cement pipe. The pipe runs from the pump station through NMU's property and terminates at the Humewood Golf Course. There are 3 take-offs on the existing system with an estimated daily draw of 1.5 Mℓ. The first is between NMU's storage dam and the WWTW and supplies RE to Pine Lodge. The second take off is into NMU's storage dam. The final take off delivers RE to the Humewood Golf Course's storage dam.

The current scheme is underutilised and unreliable. This, coupled with the water scarcity currently being experienced in NMB, provides substantial reason for a much-needed upgrading and optimised utilisation of treated effluent for irrigation purposes.

The new proposed RE scheme seeks to fully utilise all available treated effluent for the purpose of irrigation of multiple users and is planned to be extended to Pearson High School and the Beachfront as indicated by

the layout below. The result of this will be a decrease on potable water demand and beautification of the areas utilising the RE scheme's water.

Occasionally construction trucks also collect RE for dust control from the WWTW.

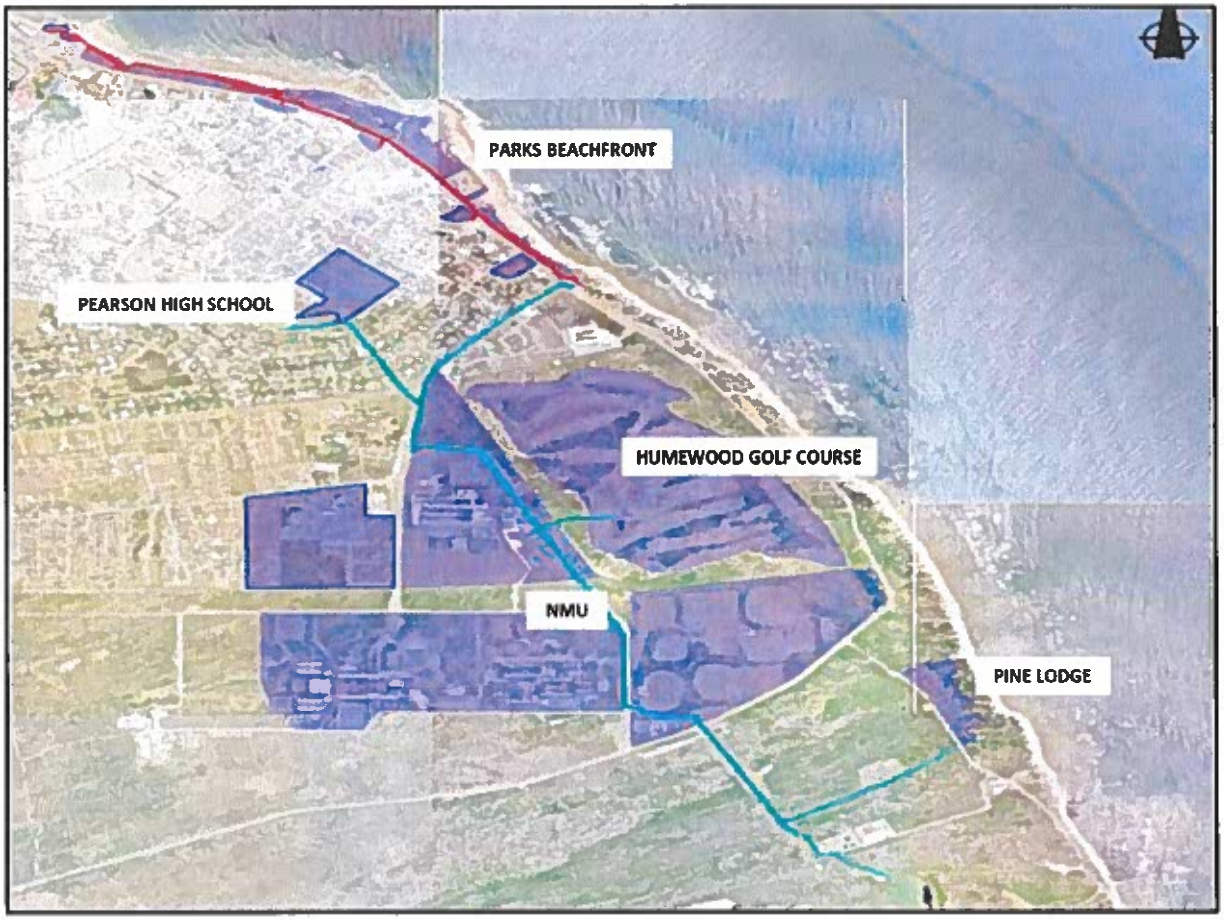


Figure 4-58: Layout of existing and planned re-use scheme at the Cape Recife WWTW

From the information provided above, the NMBM is therefore dedicated to increase the volume of treated effluent currently being re-used, as it is evident that the availability of treated effluent is currently being underutilised. The NMBM has thus identified the following projects, which will be discussed in more detail below, to increase the utilization of treated effluent:

1. Future Re-Use of treated effluent from FWF WWTW to Coega SEZ,
2. Direct Re-Use of treated effluent from WWTW.

4.5.2 Re-Use of Treated Effluent from FWF WWTW to Coega SEZ

Status: Work in Progress

With the on-going drought only a limited supply of conventional water sources is available to meet the (ultimate) water demand for the Coega SEZ's. It must be noted that sustainable industrial development depends on a reliable water supply that conforms to industrial standards.

Taking the above into account, the use of reclaimed effluent (RE) from the Fishwater Flats WWTW as a source for industrial water use was a condition of the EIA approval and ROD issued by DEAET for the development of the Coega SEZ. The table below indicates the various categories for the quality of Industrial Water.

Table 4-4: Industrial Water Quality Categories

INDUSTRIAL WATER QUALITY CATEGORIES	
DWS Industrial Water Quality Category	**DESCRIPTION**
Category 1	High Quality Water
Category 2	Between High Quality and Potable Water
Category 3	Similar Standards to Potable Water (SANS 241 - Class 1)
Category 4	Lower Quality Water

According to the South African Water Quality Guidelines most of the water demand for the Coega SEZ industries falls under Categories 3 and 4. It was therefore decided and agreed that the final effluent from the FWF WWTW will be treated to Category 4 Industrial Water Quality standards and will then be supplied to the Coega SEZ. This project is considered to be a suitable high-tech project for a Public Private Partnership (PPP) and several companies have already indicated their interest.

The layout map below provides an overview of the extent of the scheme.

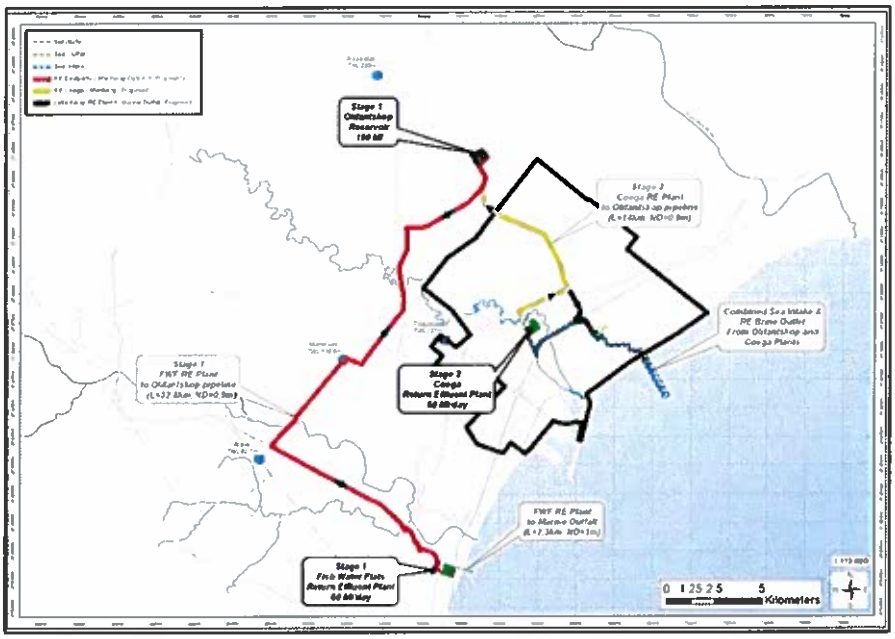


Figure 4-59: Layout of the proposed re-use scheme at the Fishwater Flats WWTW

Due to the extent of the works, this project has been divided into phases. The first phase of the proposed scheme includes the following:

- Ensure that FWF WWTW treats raw sewerage to Category 4 Industrial Water Quality standards and can supply treated effluent of up to 60 Mℓ/day.
- Construction of a pump station and a 900mm diameter rising main pipeline to the Olifantskop Reservoir.
- Construction of a 900mm diameter gravity pipeline to the Coega SEZ.

The basic schematical layout below provides an overview of the treatment prosses required to treat raw sewerage to Category 4 Industrial Water Quality standards.

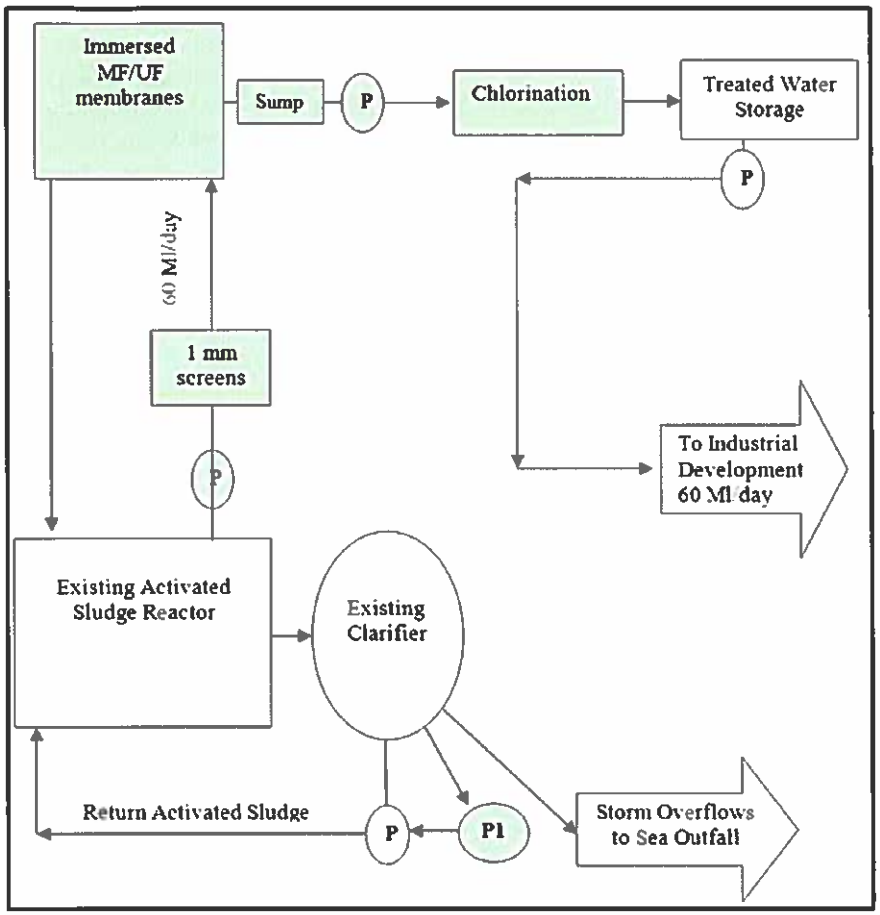


Figure 4-60: Schematic layout of wastewater treatment process to treat raw sewerage to Category 4 Industrial Water Quality Standards

4.5.3 Direct Re-Use of Treated Effluent from Wastewater Treatment Works (WWTW)

Status: Planning Commenced

Water reclamation for potable use presents a sustainable strategy towards ensuring water security for the residents of the NMBM. The current severe drought conditions therefore warrant opportunities of water reclamation for potable use to be investigated further. This section will discuss a pilot project this is planned for implementation for the direct re-use of treated effluent from the Cape Recife WWTW and will further elaborate regarding the future direct re-use of the treated effluent from Driftsands WWTW.

Pilot Project for the Direct Re-Use of Treated Effluent from Cape Recife WWTW

The Nelson Mandela University's (NMU) South and North campuses are currently being supplied with water sourced from the Impofu and Churchill dams, which are severely stressed and run the risk of running dry during the current drought. To mitigate this, alternative sources of drinking water for these NMU campuses need to be found. The combination of the campuses' proximity to the Cape Recife WWTW (300 m), relatively high demand (+/- 2 Mℓ/day), and well-educated users (good for public participation) makes them suitable candidates for a potential direct reuse scheme.

Importantly, NMU has expressed and confirmed their willingness to accept reclaimed water for potable use as such a scheme aligns with the institution's sustainability goals. Furthermore, such a reclamation scheme would complement the existing treated effluent reuse irrigation scheme, which will strengthen the established institutional relationship between the NMBM and the NMU.

The successful implementation and operation of such a reclamation scheme would be an applicable demonstration case in the city. As a result, creating a track record, building trust and acceptance of the notion of water reclamation with the public. Ultimately, supporting NMBM's strategy for future water supply security, from a sustainable source.

The Cape Recife WWTW is in the Cape Recife Nature Reserve, in Gqeberha. The works treats mainly domestic wastewater from the Summerstrand, Walmer and Kabega areas. The available inflow data indicates that the average daily flow is in the region of 11.4 Mℓ/day. The original works was built in 1968 with a treatment capacity of 8.5 Mℓ/day. NMBM is currently engaged with planning and design of an upgrade and extension to the works. It is envisaged that once upgraded, the treatment capacity will be approximately 18.5 Mℓ/day. To date the feasibility study for the implementation of this project has been completed.

Application of science and technology make it possible to reclaim water, from wastewater, to drinking water quality standards - in a safe and reliable manner. The existing six water reclamation plants (WRP) in Southern Africa are evidence that these types of plants can be successfully implemented in contexts similar to that of NMBM. The planned reuse schemes, for the other large coastal cities of South Africa, suggest a future where reclaimed water for potable use is a key component of a South African coastal city's water supply resources.

In the context of limited available information about the raw water quality, two treatment options, for a WRP, are conceptualised. One being a desalination reuse option and the other a non-desalination reuse option. A third option is conceptualised as temporary solution, lending itself to be utilised as a demonstration plant.

Although the non-desalination reuse scheme option is a more cost-effective solution at R14.90/kℓ vs the R18.41/kℓ for the desalination option, the intended use of the reclamation plant is for direct potable reuse without blending. Despite being capable of achieving the treatment objectives for direct potable reuse water, a non-desalination option is often perceived as not being suitable for direct potable use without any further treatment. Therefore, if this is not possible, the introduction of a desalination step is recommended despite the additional complexity and treatment cost. The latter will give peace of mind to the end-users as well as the producer of the water that the produced water is of good quality and in accordance with SABS standards. The flow chart on the following page provides an overview of a typical desalination process to reclaim treated effluent delivered by WWTWs.

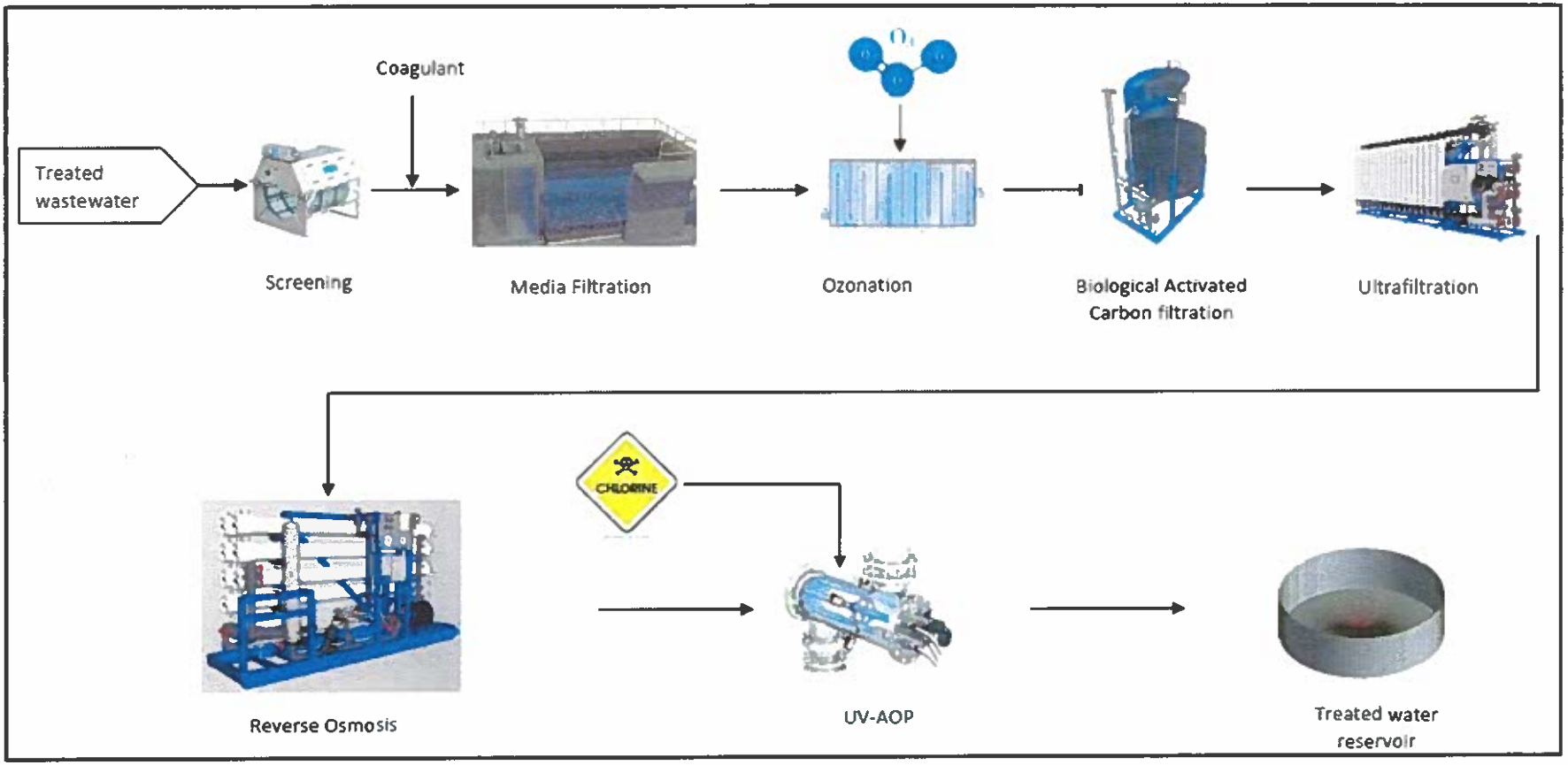


Figure 4-61: Schematical flow chart of the desalination process

Future Direct Re-Use of Treated Effluent from Driftsands WWTW

Direct potable water reuse on a small scale (such as 2 Mℓ/day) is often not financially sustainable, unless there is no other option. Economy of scale is a significant component that can influence the financial feasibility of a WRP. The bigger a treatment scheme, the more cost effective it tends to be. Furthermore, the operating cost of a large sea water desalination scheme are comparable with the operating cost of a small-scale reuse plant.

The Driftsands WWTW, with a treatment capacity of 22 Mℓ/day, together with the Driftsands Reservoir (with a storage capacity of 24 Mℓ/day), has therefore been identified as the perfect project for the direct Re-Use of treated effluent at a large scale. The figure below indicates the location of the Driftsands reservoir near the Driftsands WWTW. The treated effluent from the WWTW can effortlessly be stored in the Driftsands Reservoir and can then be distributed to the Driftsands Reservoir Water Supply Zone, which is normally served by potable water from the Western WSS.

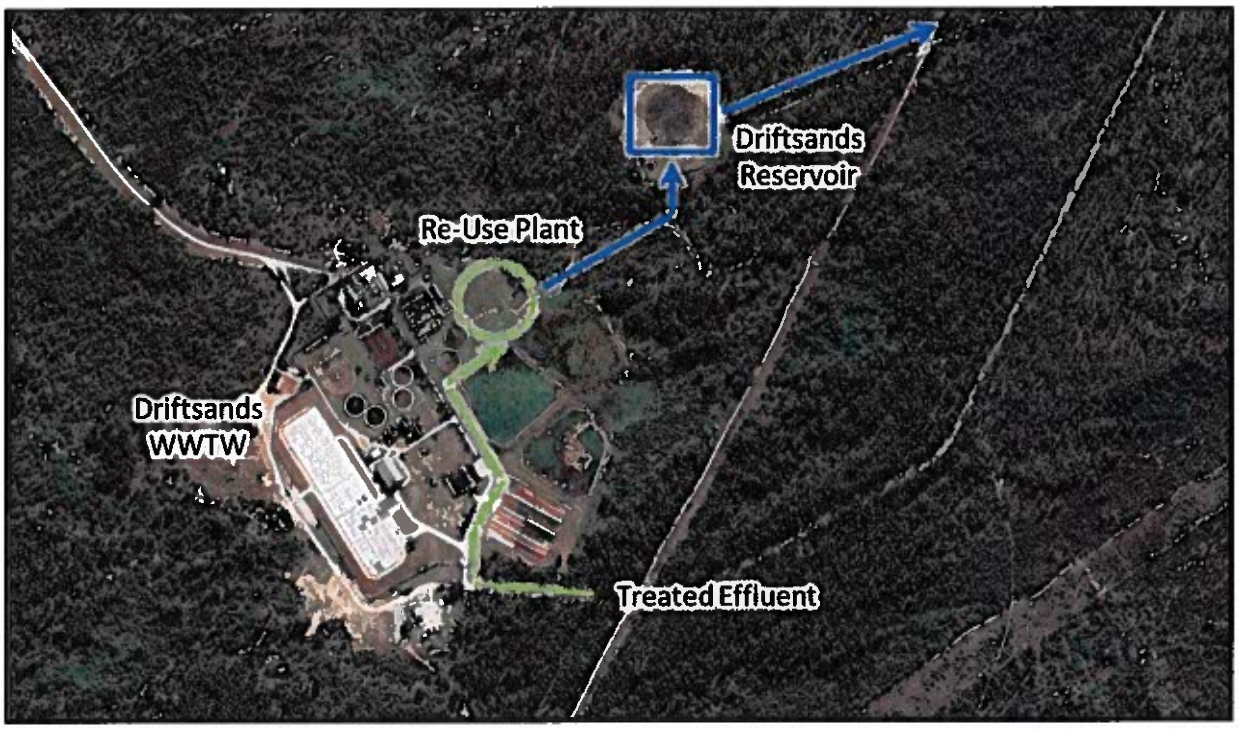


Figure 4-62: Driftsands WWTW and Driftsands Reservoir

With the Pilot Project at Cape Recife WWTW and the size of the proposed treatment scheme identified at the Driftsands WWTW, it is therefore recommended that a further investigation be commissioned to explore the potential of installing a larger WRP(s) at these and other WWTWs throughout the NMBM.

4.6 SYSTEM REMOTE MONITORING & CONTROL

4.6.1 Telemetry / Scada Upgrade

Status: Work in Progress

The NMBM recently embarked on a major overhaul of their Telemetry & Supervisor Control and Data Acquisition (SCADA) system for their Water Network infrastructure.

The municipality's SCADA system in its current configuration is a highly effective management tool and, since operational, has been used extensively to avoid a possible "dry taps" situation in the ongoing drought - which started during 2015, with a slight relief in 2023. The system (which shows flow rates and reservoir levels in real time) enables operating staff to make instant adjustments to a highly interconnected water network where it is often necessary to find the balance between high demand and a restricted supply. It has become an essential tool in managing daily operations, drought conditions and other emergencies.

NMBM has since emerged as a leader in this field, with recognition received via awards from:

- The Institute of Municipal Engineering of Southern Africa in 2024.
- The Water Institute of South Africa in 2025.

All work done is documented in a Functional Design Specification (FDS) which includes a full implementation specification that shall be utilized on future NMBM SCADA implementations to ensure a level of standardization.

Communication to and from site has also been upgraded using the cellular network. This improvement negates the limitations in bandwidth experienced over the previously used radio network. The communication protocol has also been upgraded to MODBUS and DNP3, both open-source protocols. The Graphical User Interface (GUI) was completely redeveloped to follow a clear "situational awareness" display philosophy. Situational Awareness aims to only attract operator attention to sites requiring intervention and/or action. The two figures below represent the difference the old SCADA System & GUI vs the upgraded/new SCADA System & GUI.

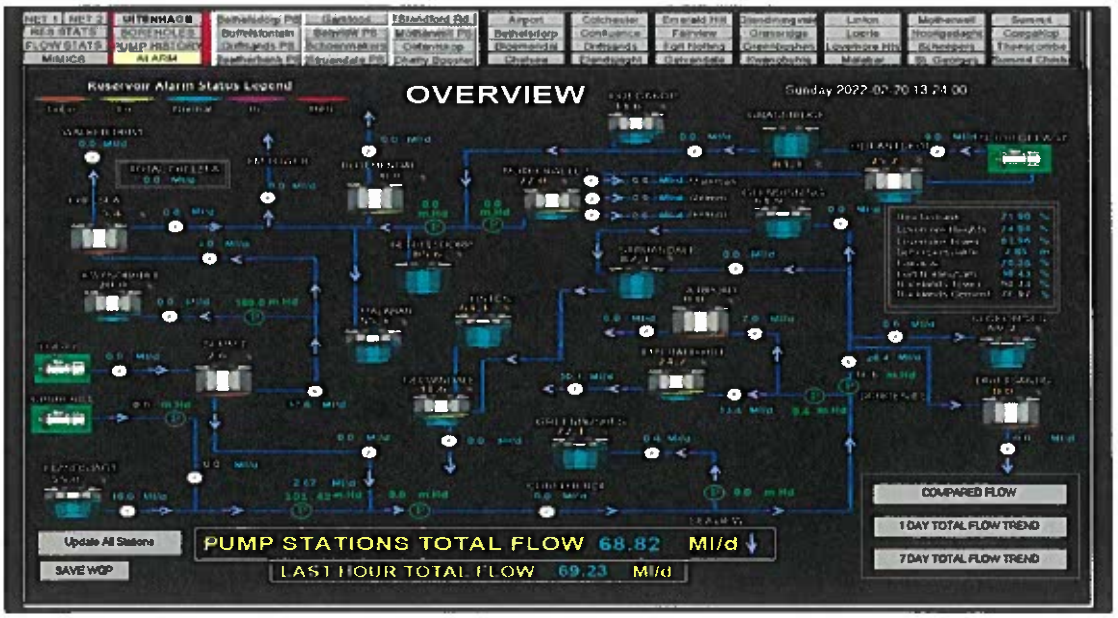


Figure 4-63: Legacy Water SCADA System and GUI

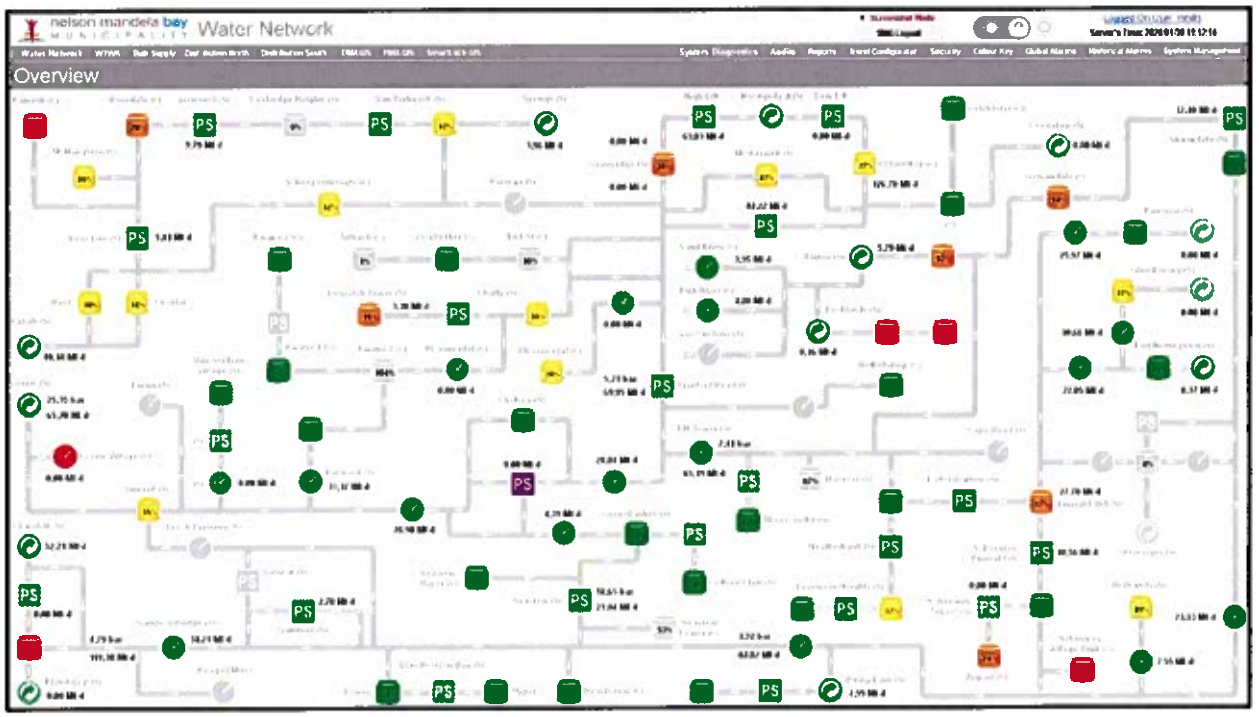


Figure 4-64: New Water SCADA System and GUI

A functional Telemetry-SCADA system enhances the ability of a water services authority (WSA) to progressively ensure efficient, affordable, economical and sustainable access to water services to all consumers in its area of jurisdiction, as per the requirements of the Water Services Act.

5. MEASURES TO REDUCE NMBM'S WATER CONSUMPTION

5.1 20% / 40% WATER CONSUMPTION REDUCTION STRATEGY

To stretch the available water stored in the dams (~46% of capacity as at 28 January 2026), the NMBM must reduce their water consumption immediately. NMB has been using just over 380 million litres per day (Mℓ/day) in total over the past few weeks. The NMBM must reduce total abstraction to a targeted 280 Mℓ/day with immediate effect. The NMBM has therefore introduced the daily water consumption tracker as per the graphic below which is utilized in our marketing campaign and widely used in social media, local forums, and platforms so to motivate all the NMB consumers to save every drop.

Figure 5-1: Daily Water Consumption Tracker

During the height of the recent drought the NMBM has developed the following map, which is divided into 3 zones, and highlights the percentage of water consumption reduction immediately required throughout the NMBM.

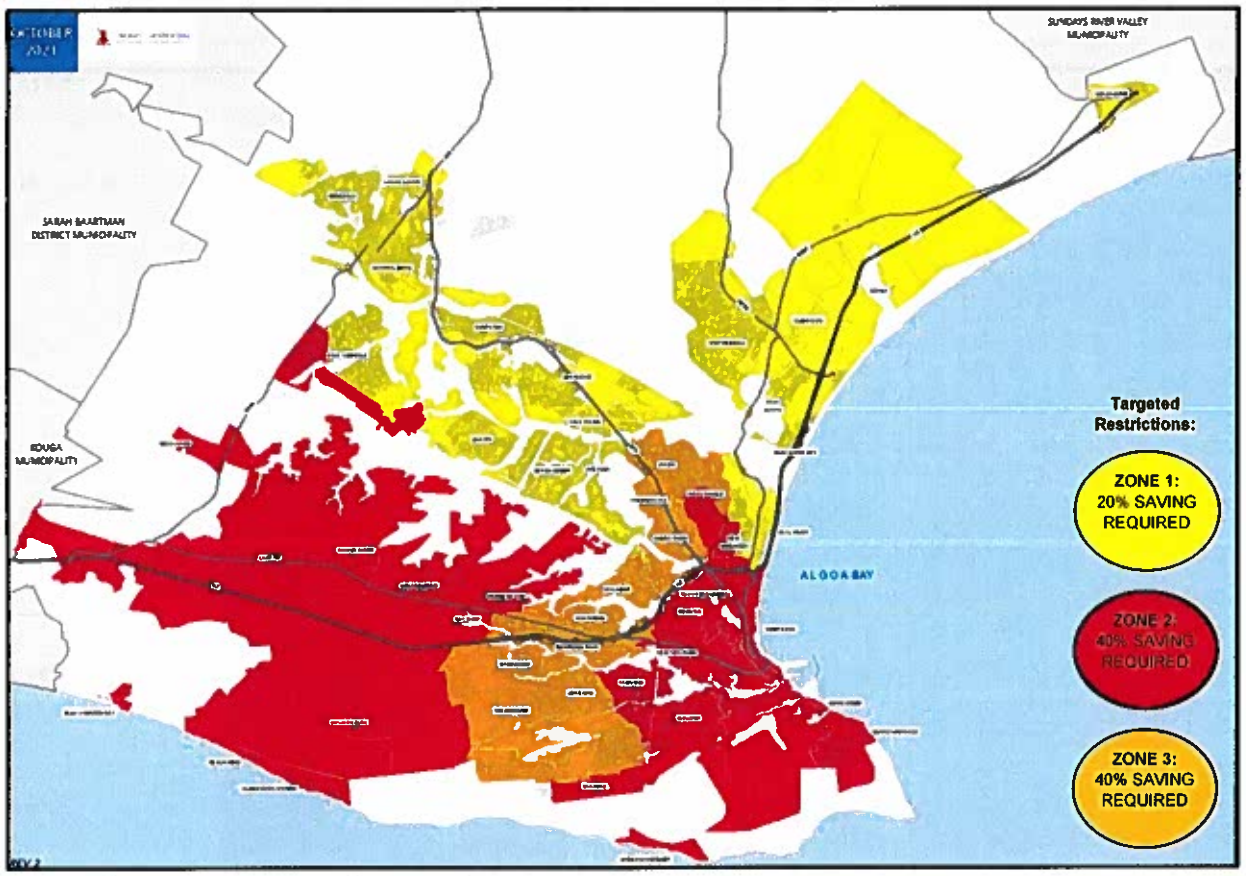


Figure 5-2: NMBM Water Consumption Reduction Strategy

The three zones consist of the following:

- **Zone 1**, highlighted in yellow on the map, is supplied through the Gariep Dam, via the Nooitgedagt Water Supply Scheme (which is currently about 95% full). These areas must immediately reduce their consumption by 20%. Once this is achieved, it will allow the municipality to transfer more water through the Nooitgedagt WSS to areas normally supplied through the Western Water Supply Scheme (Western WSS), which is predominantly dependant on water availability from the major dams located to the west of NMB,
- Areas highlighted in red are included under **Zone 2**. These areas are supplied by the local Eastern Cape dams, which provide water to the Kromme and Kouga WSS, and the Groendal dam. These areas must reduce their consumption instantly by 40% to prolong the water resources currently available in the western dams,
- A portion of the NMBM, highlighted in orange and zoned as **Zone 3**, also must reduce their consumption by 40% immediately. These consumers are supplied mainly from the Nooitgedagt WSS, but due to the high-water demand has also been drawing water from the western dams and thus depleting them faster.

The water system discriminates in favour of those in low-lying areas, and in this instance, those naturally served by Nooitgedagt WSS have a further advantage, but as the NMBM need to stretch this limited resource everyone needs to work together to make sure that the metro's taps don't run dry.

5.2 WATER CONSERVATION AND WATER DEMAND MANAGEMENT

The NMBM's 10-year Non-Revenue Water (NRW) Business Plan dated September 2022, was adopted by NMBM Council on 24 July 2025 as part of the Metro Trading Services Strategy for the Nelson Mandela Bay Municipality. The NRW Business Plan set its target for NRW to be between 20 - 25% in the next ten years. This benchmark was obtained from the City of Cape Town which managed to reduce their NRW from 47% to around 20% within ten years.

It should be noted that NRW is a continuous maintenance regime of the water infrastructure and cannot be viewed as a once-off intervention. It relates to the constant repair, maintenance, and rehabilitation of water infrastructure in a consistent and holistic manner which requires an institutional approach from various directorates within the NMBM.

Water conservation is defined as: "The minimisation of loss or waste, the preservation, care, and protection of water resources, and the efficient and effective use of water".

Whereas **water demand management** is defined as: "The adaption and implementation of a strategy by a water institution to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equality, environmental protection, sustainability of water supply and services, and political acceptability."

Further to the above, the NMBM have been active in implementing water conservation and water demand management (WC/WDM) measures for over 8 years but have also implemented additional measures since the introduction of water restrictions in August 2016.

The following **15 water conservation and demand management workstreams** have therefore been identified by the NMBM to ensure that the NMBM's water demand are restricted and conserved in an efficient, reliable, and cost-effective manner, while minimalizing water loss or wastage.

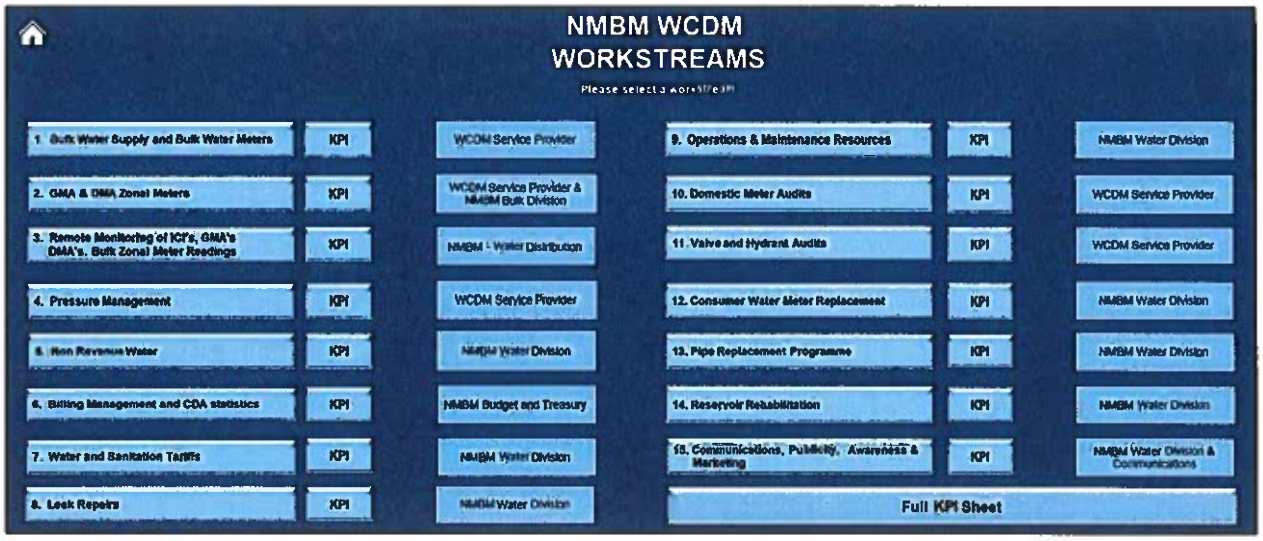


Figure 5-3: 15 WCWDM Workstreams

Each workstream, as indicated in the figure above, has a small group of role-players which is typically made up of consultants, service providers and various municipal staff. As mentioned in Section 2.3 earlier in the report, the NMBM must reduce the total water demand from roughly **382 Mℓ/day** (peak demand measured in December 2025 to a targeted **280 Mℓ/day** immediately. In addition to the water consumption reduction strategy, as explained under Section 5.1, the 15 workstreams plays an essential role in the NMBM's endeavour to reduce the current water demand. The sections below will provide an overview of each of the 15 workstream as indicated above.

5.2.1 Bulk Water Supply and Bulk Water Metering

Actuate bulk water supply metering and management of the bulk water supply provides the critical capability to proactively establish bulk water supply balances across the NMBM's major bulk water supply pipelines. This enables the NMBM to accurately assess water losses across the bulk water supply system and will assist in identifying old infrastructure that requires maintenance/replacement or upgrading. To achieve this, adequate and accurate metering of the bulk supply system is required. The bulk water supply balances are normally calculated by comparing the total volume of water leaving the raw water treatment works versus the total water entering the NMBM's supply/distribution reservoirs, as well as any consumer offtakes along the bulk supply system.

Various key initiatives were identified under this workstream which are utilized to determine the current bulk water supply and bulk water metering status, identify shortcomings in the current scenario, and then implement/recommend interventions to combat these shortcomings. The key initiatives can be listed as follows:

- Bulk Water Supply Meter Audits,
- Bulk Pipeline Condition Assessments,
- Bulk Pipeline ICI offtakes,
- Regular update of the Bulk Water Supply Schematics,
- Identification and installation of critical bulk metering supply points,
- Installation of New Meters for a More Accurate Bulk Water Supply Balance.

Through active management of these initiatives, the NMBM believes that their Bulk Water Supply Balances will continue to improve, and this will ensure to reduce any water losses along the Bulk Water Supply Systems. The NRW% on each of the three major bulk water supply systems as measured at the end of September 2022 were as follows:

- Churchill/Elandsjagt System : 5.6%,
- Loerie/Summit/Chelsea System : 10.8%,
- Nooitgedagt/Motherwell System : 5.3%.

The Churchill/Elandsjagt Bulk Water Supply System in approximately 120 km long. It is therefore not good practise to calculate a single water balance over such a long distance. The NMBM have identified multiple shorter sections over this supply system that will form part of the water balance calculated over the entire length of the Churchill/Elandsjagt Bulk Water Supply System. However, new water meters are required to be installed in order to accomplish this goal. This activity is mostly constraint by the available budget at this stage. The table below indicates the status-quo of the Bulk Water Supply Meters:

Table 5-1: Status-quo of Bulk Water Supply Meters as of 30 June 2025

Description	No meter	Not Working	Working	Proposed	Total
Bulk Water Supply System	4	34	39	**30**	**107**

Once all critical bulk metering supply points are addressed, and a history of consumer offtake volumes maintained, it becomes necessary to identify additional positions for meter installation with the aim of splitting the bulk supply system into smaller segments. This will allow the NMBM to more readily locate the source of losses identified in the bulk water balances. Care should be taken to avoid unnecessary additional metering positions, as each new installation increases monitoring and maintenance costs.

5.2.2 GMA & DMA Zonal Meters

Greater Metered Area (GMA) and District Metered Area (DMA) management is crucial for the success of a WCDM programme. A GMA can be described as a larger supply area and can include multiple DMAs. DMAs are typically comprised of fixed areas that are supplied through gravity fed reticulation, or fixed areas that are under pressure management (Pressure Management Zones – PMZs). Through the management of this workstream, it is the NMBM's goal to ensure that all GMAs and DMAs are metered and that all the meters are in a working condition.

Effective management of individual GMAs and DMAs, enables the water services provider to determine where the water is being consumed/lost and can therefore advise as to where specific interventions are required to be implemented to improve water conservation and to reduce NRW. This is typically achieved by conducting a zonal water balance that allows for the accurate assessment of the NRW in each GMA and their respective DMAs. In order to achieve a successful analysis of the respective zonal water balances, it is required that each zone is measured accordingly and are kept discrete through ensuring that the zonal boundary valves are closed at all times. The NMBM is determined to ensure that all GMAs and DMAs are measured and has adopted the following statement:

"To measure is to know." "If you cannot measure it, you cannot improve it." - William Thomson, Lord Kelvin

To identify various interventions to be implemented under this workstream, the following activities are normally performed:

- GMA and DMA meter audits,
- Discreteness activities,
- New meter installations, and refurbishments of existing meters,
- Boundary Valve Hexagonal Heads and Valve Marker Identification,
- Development of communication channels with NMBM plumbers.

To date, the NMBM have identified a total of 240 possible zonal water meter locations and have appointed various contractors that are working tirelessly throughout the NMB to refurbish old meters and to install new meters. The following table indicates the status quo of the zonal water meters:

Table 5-2: Current Status of Zonal Meters as of 30 June 2025

Meter Type	No meter	Not Working	Working	Proposed	Total
GMA	6	6	13	1	**26**
DMA (Gravity Fed Zone)	20	21	76	2	**119**
PMA (Pressure Managed Zone)	3	19	73	0	**95**
Total	29	46	162	3	240

5.2.3 Remote Monitoring of ICIs, GMAs, DMAs and Bulk Zonal Meter Readings

Through the installation of remote flow monitoring devices, valuable information can be obtained for any given water network. Flow logging devices are typically installed on any "log-able" water meter.

Flow-logging data is typically used for the following purposes:

- Remote monitoring of ICI (high consumers),
- Determination of a flow profile for a GMA/DMA,
- Determination of MNF to evaluate losses within a zone,
- Sizing of a pipeline, PRV or bulk water meter.

Remote Monitoring of ICIs and High Domestic Water Consumers

Over the years, the NMBM identified the need to implement a strategy for the installation of Advanced Metering Infrastructure (AMI) at the high-water consumers within the NMBM's service delivery jurisdiction to manage the limited water resources accordingly. The intervention focusses mainly on the top water consumers for the Industrial, Commercial & Institutional (ICI) and Domestic water consumer categories by having their water meters read accurately and consistently through an automated process for improved consumption recording, customer billing and targets overall revenue generation for the NMBM.

The NMBM therefore previously appointed an external service provider to install the AMI remote monitoring devices which enabled two-way communications between the customers meter and the NMBM through an integrated system comprising of water meters, communication network and data management platforms. Although more than 9,500 ICI and High Domestic water consumers have been identified in the past, Phase 1 of this intervention was limited by budget availability and only a total of 1,246 AMI remote monitoring devices could be installed throughout the NMBM up to 30 June 2025. It is the NMBM's goal to roll-out the installation of the AMI remote monitoring devices on the remaining 8,254 consumers, however, this project depends entirely on available budget at this stage.

This will permit remote readings, monitoring, and data validation to take place more efficiently for a higher level of service delivery in future. It will also improve the quality of consumer billing, as well as increase revenue generation through the accurate billing of ICI & High Domestic water consumers. The online platform utilized will maintain system time synchronization across all devices to ensure accurate real time recording of flow measurements. The system performance, data management and reporting mechanism can be integrated with an existing EDAMS water management platform to supplement the bulk water balancing of the NMBM's water distribution network.

Remote Monitoring of GMAs & DMAs

Further to the above, it is the NMBM's goal to install remote flow data loggers on all working GMA & DMA zonal water meters throughout the NMB. This will enable the NMBM to monitor the MNF and water volumes supplied to the various zones on a daily basis and will thereby quickly identify certain interventions to be implemented.

Up to June 2025 the NMBM had purchased 240 remote flow and 100 pressure logging devices that are currently being installed through the NMBM on working GMAs & DMAs.

5.2.4 Pressure Management

Pressure management is imperative to any water conservation and demand management project and has been identified as the single largest contributor to the reduction of real losses within a water supply network. A well-maintained pressure reducing valve allows the NMBM to better manage high pressure within a DMA zone, thus reducing actual losses. Advantages to a well-managed pressure management plan include but is not limited to the following:

- A reduction in high MNF flows recorded within a network by controlling the leakage rate due to the reduction in any high pressures experienced,
- Reducing burst frequencies found within a discrete DMA zone through constantly reducing the high upstream pressures and eliminating any pressure surges experienced,
- Increased life of the water reticulation infrastructure,
- A further reduction in MNF can be achieved when advanced pressure management two-step controllers are installed, allowing the NMBM to further reduce high pressures at set time intervals or dynamically based on the demand of the zone.

Currently, as indicated by the map below, a total of 89 zones are being pressure-managed which is equal to approximately 35% of the NMBM's water reticulation network.

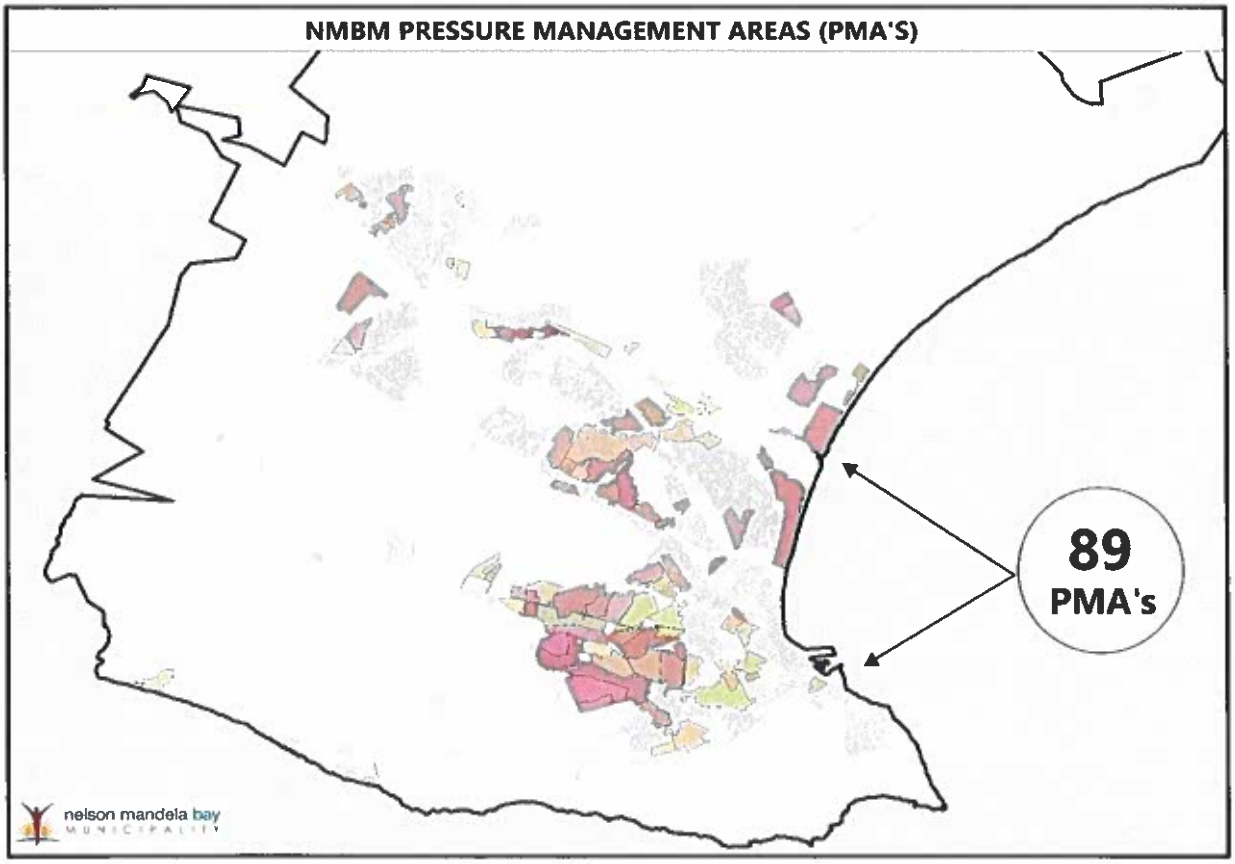


Figure 5-4: Indication of the NMBM's Pressure Managed Zones

Existing pressure managed zones are also being used to force down consumption by reducing zonal pressures to achieve 1 bar water pressure at critical points inside discreet pressure managed zones. The average water savings to date peaked at an estimated 10 Mℓ/day (measured during November 2021) from optimization of existing, as well as the newly constructed pressure managed zones.

Reducing pressure to 1.0 bar at critical points has resulted in increased water savings throughout the NMBM, as shown in two examples below:

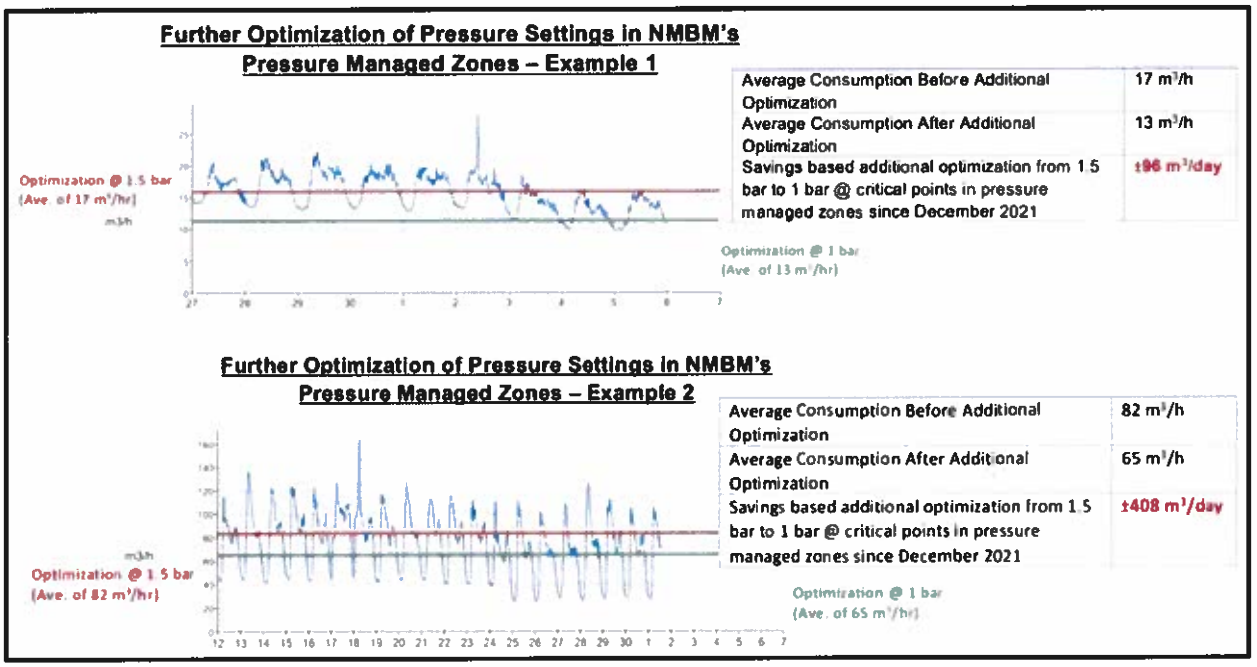


Figure 5-5: Water savings through optimization of PRVs

The NMBM is constantly investigating potential for the implementation of additional pressure management interventions throughout the municipality's water network and to increase the percentage coverage of pressure management throughout the entire NMBM water reticulation network. This will enable the NMBM to actively manage pressures and reduce losses even further while increasing the lifecycle of water related infrastructure as best as possible.

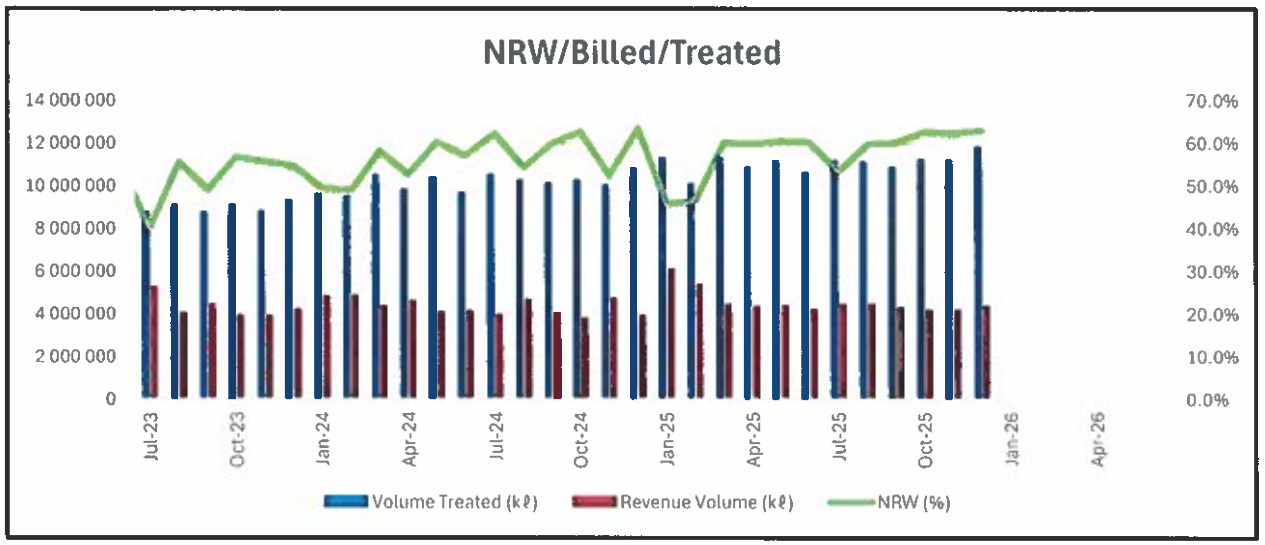
5.2.5 Non-Revenue Water

This section provides information on the water balance and water losses in accordance with International Water Association (IWA) standards.

Monthly meter readings do not necessarily reflect outflows in the same period that the inflow occurred, depending on the day on which meters were read, billing adjustments and the duration of storage of potable water before consumption.

It must be noted that the NMBM is required to report on these figures monthly to the DWS. The table below indicates the monthly NRW values for the period from July 2023 to December 2025.

Table 5-3: Monthly NRW Table from July 2023 to December 2025



The **NRW%** for December 2025 was more than 60%, which is a concern. As mentioned earlier in the report, the NMBM is focussed to drastically reduce the NRW% to between 20 -25% and aim to ensure that all WCDM workstreams are running smoothly in parallel to achieve this goal and to reduce the water demand throughout the NMBM accordingly.

5.2.6 Billing Management and Commercial Data Evaluation (CDE) Statistics

The NMBM also ensures that monthly billing analysis are conducted and engagements with Budget & Treasury are regularly taking place to maintain a realistic Billed Water Volume. This is a crucial workstream as it has a direct influence on the NRW percentage calculated each month. It is very important that the NMBM's customer database is as accurate as possible and is normally affected through billing accuracy, metering, and property information.

5.2.7 Water and Sanitation Tariffs

The most effective method of ensuring continuous water supply is to reduce consumption across the board. In fact, water is a scarce and precious resource and should be respected and used responsibly. Per capita water usage in NMB is much higher than what it should be. To reduce consumption, the NMBM have issued various water restriction notices since 01 November 2016. Originally restrictions were imposed back in September 2016 (Part B tariffs for all users), and because the drought persisted and the combined dam levels continued to drop to below 40%, additional restrictions were imposed in May 2017. See table from MH (insert).

Restrictions go hand-in-hand with stepped tariffs and increasing rates for higher water usage. Progressively more punitive tariffs were introduced so that higher water volume use came at an increased cost. For instance, during May 2017, Part C tariffs for Domestic and Institutional and Part B tariffs for Industrial and Commercial Consumers were imposed. This encouraged NMBM consumers to limit and restrict their water usage accordingly as shown.

Through this initiative the water demand was successfully reduced from around 290 Mℓ/day to an average water demand of just exceeding 253 Mℓ/day, measured during the month of June 2018. After significant rainfall in September 2018, restrictions were reduced to Part B for all consumers. Since then, the following tariff were introduced at the intervals indicated:

- June 2021: Part C Tariffs for all users.
- July 2022: Part B Tariffs for Residential Step 1 (up to 9 kℓ/month) to financially incentivise residential consumers to use less water and not punish them for low usage, and Part D for all other consumers.
- February 2023: Part B Tariffs for Residential Step 1 (up to 9 kℓ/month) and Part C for all other consumers.
- December 2024: Part B Tariffs for all consumers and relaxations of punitive water tariffs (following good rainfall in 2023 and 2024)

With dam levels declining, it is likely that the level of punitive water tariffs will need to be increased once more.

Current Tariffs

On 11 February 2025, the NMBM imposed Restriction Notice 12 which decreased restrictions for all consumers to Part B. This Restriction Notice also outlined the following:

- The suggested targeted domestic water usage to be 50 ℓ per person per day.
- Domestic households with excessive water usage will have a water management device installed, replacing the water meter, to limit high water use.
- ATTP households will be provided with a water management device to replace the water meter, should consumption be excessive, set at free basic water limit as approved by Council.
- Municipal water may not be used to water gardens, wash cars, wash down walls or paving, top up pools, fountains, etc.

- Water pressure will be reduced in the water reticulation system to an appropriate pressure at critical points in each pressure management zone.
- All borehole users must register with the NMBM and must abide by all relevant legislative requirements in terms of the National Water Act and the Municipal By-Law. Selling of borehole water that was intended for on site domestic use is illegal.
- No use of automatic urinal flushing systems allowed.
- Targeted municipal swimming pools will be allowed to be filled with Municipal water supply.
- By-law compliance will be enforced.
- All previous special concessions fall away and re-application is required.

The tariff structure which formed part of Notice 12 is provided below.

Charges & Tariffs (Applicable during times of water shortage): 2024/25		Part A (incl. 15% VAT)	Part B (incl. 15% VAT)	Part C (incl. 15% VAT)
Residential:	>0 ≤ 0.3 kl/d	R22.53	R22.53	R28.23
	>0.3 ≤ 0.5 kl/d	R24.45	R28.76	R43.14
	>0.5 ≤ 0.8 kl/d	R34.17	R43.14	R86.29
	>0.8 ≤ 1.0 kl/d	R58.98	R71.91	R143.82
	>1.0 ≤ 1.6 kl/d	R107.86	R143.82	R215.82
	>1.6 kl/d	R143.82	R287.63	R431.45
ATTP		R22.53	R22.53	R28.23
Institutional & Gov. Dept.		R22.53	R32.28	R32.28
Commercial / Industrial		R24.60	R32.06	R35.95

Figure 5-6: Notice of new water tariff structures implemented as form 13 December 2024 (Snip from Notice 12)

Household flow limiting disks and meters

In addition to the restrictions and punitive tariffs imposed to date, the NMBM have also opted to install flow limiting disks to restrict all domestic erven with a 3-monthly average water usage exceeding 15 kℓ/month. A round disk of the same internal diameter as the meter with a small orifice, as presented by the picture below, is installed at the household connection to reduce the pressure and flow to the property. Over 24,000 domestic consumers have been identified to be retrofitted with the flow limiting disk during Phase 1. To date 4,508 Single Residential flow limiting disks have been installed and a total of 13,063 were handed over to residential complexes to be installed at their own cost.

Figure 5-7: Example of a flow limiting disk installed on the downstream side on domestic water meters

Consumers with excessively high-water consumption levels will have a water meter management device installed at their own cost (±R3,500.00 charged to their municipal account). These water management devices will be calibrated to such an extent that only a basic amount can be consumed by property owners.

Currently, the NMBM is also working on programming and re-setting a total of 25,354 EZ3 flow limiters (indicated on the left-hand-side in the photos below) previously installed at various consumers throughout the NMBM. In addition to the latter, the NMBM also installed another 1,551 RDP flow limiters (indicated on the right-hand-side in the photos below) at various households throughout the NMBM so to restrict high water usage.

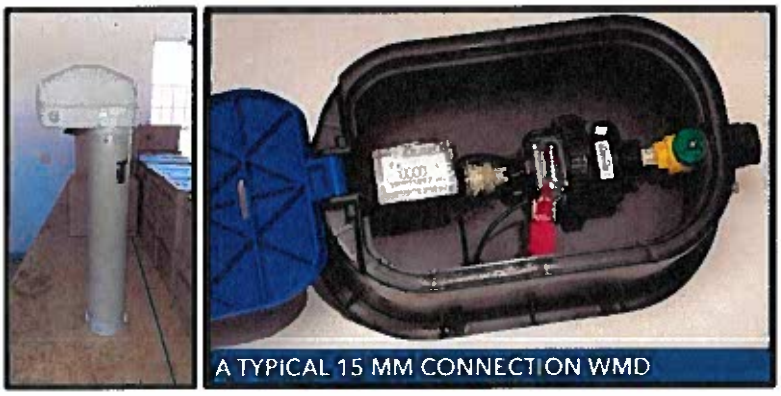


Figure 5-8: Water Meter Management Devices installed at various consumers

Restriction Notices issued to Kouga Local Municipality

Kouga Local Municipality (KLM) receives a portion of their water demand from the NMBM's Bulk Water Supply Pipelines and is the NMBM's largest consumer. Under normal circumstances KLM normally consume on average around 15 Mℓ/day, peaking at approximately 20 Mℓ/day during summer seasons.

Due to the severe drought that is currently being experienced, the NMBM has on numerous occasions, issued various letters to the KLM to keep them informed about water restrictions and tariffs applicable, as well as to encourage the KLM to reduce their water demand accordingly. The NMBM issued notices to the KLM on the following dates:

- 13 August 2020,
- 29 April 2021,
- 09 November 2021,
- 07 April 2022.

In addition to the above, the NMBM intended to install a restrictor plate on one of the offtakes from the Churchill Bulk Water Pipeline towards Humansdorp in the effort to reduce the KLM's total water demand accordingly. The supply to Kouga LM from the Kromme Sub-system averaged 11.48 Mℓ/day over December 2025. Their target for the current water year is 7.5 Mℓ/day, thus it may be necessary to install the restrictor plate if there is no drastic reduction in water use in St Francis Bay, Humansdorp and Jeffrey's Bay.

The following map provides an overview of the extent of the boundaries for the KLM and the effected towns defined by the red circles:

Figure 5-9 KLM Boundaries and affected local towns

5.2.8 Leak Repair

To curb the wastage of water through leaks, the NMBM has intensified its water leaks programme to fix damaged water pipes and water meters which contribute to water leaks.

Leak repair programmes throughout the NMB

The following figure provides an overview of the backlog water complaints which have been resolved as on Tuesday, 27 January 2026:

KEY	CLUSTER	COMPLAINTS RECEIVED	RESOLVED	OUTSTANDING	COMPLETED THIS WEEK
	Molly Blackburn	3,332	2,711	621	86
	Lillian Diedericks	8,985	6,700	2,285	274
	Alex Matikinca	2,203	1,542	661	45
	Zola Nqini	4,685	2,860	1,825	200
	Champion Galela	2,270	1,871	399	75
	Govan Mbeki	1,270	1,034	236	137
Unmatched		3	2	1	0
TOTAL		22,748	16,720	6,028	817

Figure 5-10: Overview of Water Complaints Resolved

Note that due to the aging infrastructure in the NMB, leaks will always be a challenge that municipalities in South Africa will face. The NMBM is therefore focused on reducing repair times to reduce losses accordingly.

Leak repair programmes at schools

The NMBM have partnered with the Nelson Mandela Bay Business Chamber to assist with the leak repair programmes at schools. The top 100 schools with the highest water usage have been identified and investigated. To date, 21 schools have been adopted with the potential to reduce water wastage significantly.

Assistance-To-The-Poor (ATTP) On-Site Property Leak repair programmes

The NMBM also partnered with the Nelson Mandela Bay Business Chamber via the "Adopt-a-Leak" initiative to assist with the on-site property leak repair programmes in specific suburbs within the NMBM and to supplement the ATTP programme accordingly. This initiative commenced early July 2022 and was completed by the end of November 2022. The implementation of this programme was very successful, and it must be noted that approximately 1,580 Mℓ/day have been saved by the "Adopt-a-Leak" initiative. This programme will be re-intensified shortly.

5.2.9 Operations and Maintenance

The NMBM identified this as part of the 15 water conservation and demand management workstreams due to the essential role operations and maintenance activities are playing in ensuring a reliable water supply to the NMB's water consumers.

This workstream focuses on tracking the works output and performance of the NMBM's O&M staff in order to improve on efficiency and service delivery, i.e., response time during bursts, repair time, etc. The NMBM has 5 depots which are located throughout the NMB as indicated on the maps below.

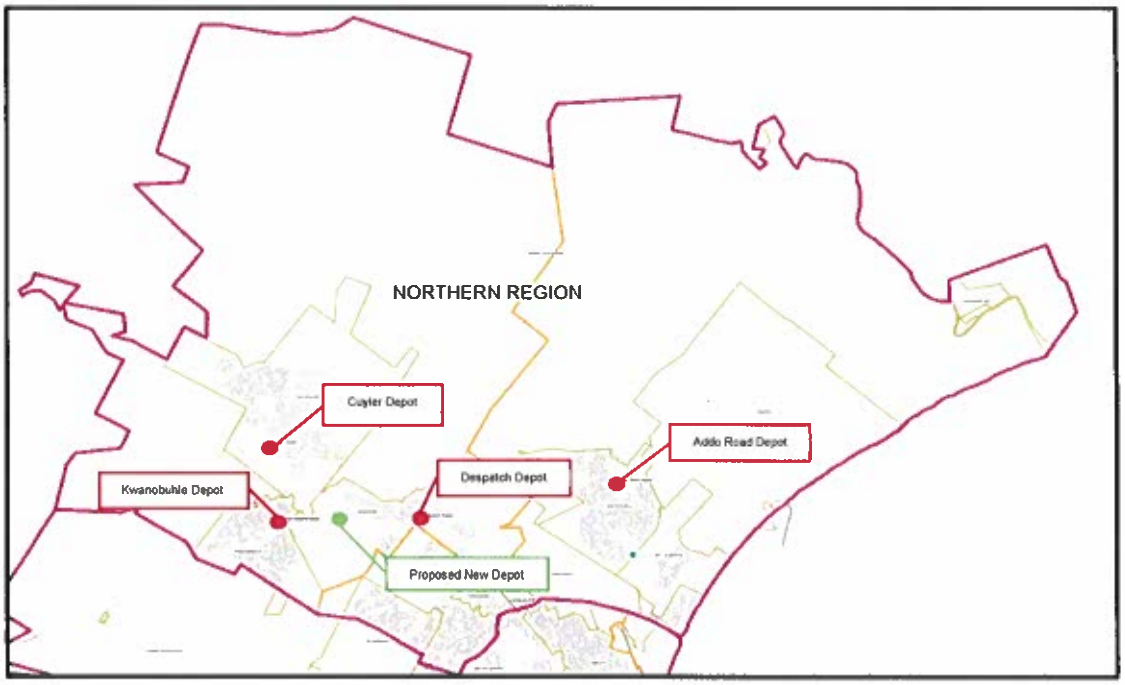


Figure 5-11: NMBM's Northern Region boundaries and Depots

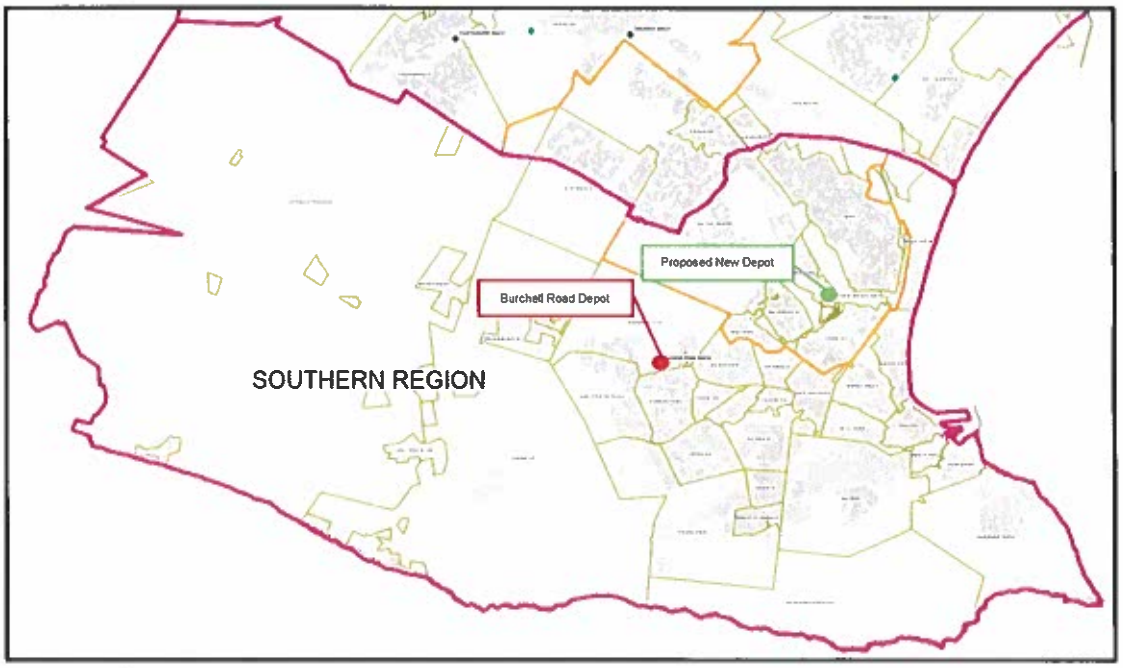


Figure 5-12: NMBM's Southern Region boundaries and Depots

5.2.10 Domestic Water Meter Audits

Metering of consumer's water consumption throughout the NMBM has been identified as an integral part of the WCDM workstreams. It is through these meters that revenue is generated, high consumers are identified, and water saving measures can be directed. Consumer water meter audits are therefore required to be conducted during any WCDM programme to captured information such as:

- Meter coordinates,
- Stand number,
- Meter serial,
- Meter make and model,
- Meter readings,
- Any related faults or leaks identified,
- Related photos of the audits.

Normally an on-site flow test is also conducted at each property during a consumer water meter audit. All this information is then processed to update the NMBM's customer database accordingly in order to work with an accurate data set that will improve billed water volumes. This information is also used to plan for the maintenance and replacement of domestic water meters throughout the NMBM.

5.2.11 Valve and Fire Hydrant Audits

Valve and fire hydrants are an integral part of any water infrastructure. Valves are required to maintain zone boundaries, isolate sections of the water network and or other water infrastructure that require maintenance or upgrades, and to assist in the location of leaks via means of step testing. Fire hydrants are primarily used in firefighting activities; however, they are invaluable in assisting with scouring from sections of the water reticulation network after planned/ad-hoc shutdowns to mitigate possible burst pipes that might be caused by trapped air. The fire hydrants also provide access to the water network whereby pressure readings can be obtained during discreteness activities.

Ensuring the functionality of this infrastructure is very important, together with their visibility and accessibility, however without an adequate operation and maintenance plan the valves and fire hydrants are often in disrepair and or buried. Valves and Fire Hydrant Audits are therefore also a crucial activity during a WCDM programme. Audits were conducted throughout the NMBM, and the information captured included the following:

- Coordinate location,
- Category of infrastructure, whether it was a valve of fire hydrant,
- The type per category, such as a gate or butterfly for valves, and bayonet or London round for fire hydrants,
- Any leaks located,
- The chamber and cover status,
- The condition of the audited infrastructure, i.e.: either serviceable/working, needs attention, or unserviceable/ not working,
- The open and closed status,
- The closing direction,
- Any associated faults, including marker and chamber related faults.

5.2.12 Consumer Water Meter replacements

With aging infrastructure, water meters under-register/measure the volume of water consumed by residents throughout the NMB. The result of this that the volume of water under-registered/measured is then lost and reported as non-revenue water. Around 130,000 water meters within the NMB are older than 8 years, and therefore requires an urgent water meter replacement programme. A total of 59,948 water meters were replaced during the period 01 January 2023 to 31 January 2026.

5.2.13 Pipe Replacement Programme

The NMBM's goal is also to systematically replace old infrastructure to reduce water wastage. This programme must run parallel with the Pressure Management intervention. This activity is mainly focused on the distribution supply pipelines and entails the rehabilitation/replacement of large diameter distribution supply pipelines to reduce periodic failures and curb water wastage from leaks. To date, approximately 9.6km of pipelines have been replaced and rehabilitated.

5.2.14 Reservoir Rehabilitation

This workstream focusses on improving infrastructure at reservoirs to prevent overflows and water wastage, which typically includes level control and early warning systems. Remote reservoir level monitoring loggers were therefore installed on 63 reservoirs/reservoir chambers throughout the NMBM to monitor water levels daily.

The table below indicates the reservoirs that have been equipped with level monitoring devices to date:

Table 5-4: Reservoirs equipped with Level Monitoring Devices throughout the NMBM

Reservoir Reference		
Airport	Fairview East	Malabar
Beachview	Fairview West	McNaughton
Bethelsdorp	Fort Nottingham East	Motherwell North
Bloemendal	Fort Nottingham West	Motherwell South
Blue Horizon Bay Lower	Gelvandale	Olifantskop
Blue Horizon Bay Upper	Glendinning	Rocklands
Bushy Park	Grassridge East	Rocklands Tower
Chatty North	Grassridge West	Rosedale
Chatty South	Greenbushes	Scheepershoogte
Chelsea East	Heatherbank 1 North	Schoenmakerskop Sump
Chelsea West	Heatherbank 2 South	Schoenmakerskop Village Tank
Coegakop (2 Mℓ)	Kabah 1 (Circular)	Seaview Lower
Coegakop (17 Mℓ)	Kabah 2 (Rectangular)	Seaview Upper
Colchester	Kamesh	St Georges
Colleen Glen Tank	Kwanobuhle 1 (Gunguluza 10 Mℓ)	Struandale
Despatch Water Tower	Kwanobuhle 2 (Peace Village 8 Mℓ)	Summit
Driftsands	Kwanobuhle 3 (New 10Mℓ)	Theescombe
Elandsjagt	Kwanobuhle 4	Tulbach Street
Emerald Hill East	Linton	Van Riebeeck Hoogte
End Street 1 & 2	Lovemore Heights	Van Stadens Village
Fairbridge Heights	Lovemore Heights Upper	Voortrekker Street

5.2.15 Communications, Publicity, Awareness & Marketing

Publicity, Awareness and Marketing Campaigns

The NMBM's water demand is largely dependent on domestic consumer water usage behaviour. It is therefore imperative that the NMBM's water usage behaviours be adapted to conform to water usage restrictions that are put in place. With the current imposed restrictions and punitive tariffs, all consumers need to contribute to preserve the water sources. All residents (and businesses) in the NMB will be impacted negatively should a portion (or the entire) city run out of water. Therefore, the NMBM require that all consumers work together and play their part in using water sparingly to curb our current high-water demand.

The NMBM's Communications Directorate is therefore performing a wide variety of communication functions to encourage our residents to reduce their water demand in our endeavour to extend the current resource availability and to avoid any dry taps in the near future, should no high intensity rainfall event occur soon. Regular water related updates and infographics for water saving tips are posted on the Municipal website, which is visited by over 35,000 people daily, as well as Social Media platforms like Facebook, Twitter, YouTube & LinkedIn.

The following extracts and pictures are examples of items regularly communicated to public.

Figure 5-13: Examples of the Community Awareness Programme

Water Services Operation Centre

The NMBM's Water Services Operation Centre was established on 01 June 2010 and was situated at 500 Cape Road, Linton Grange. The Operation Centre employs 40 permanent staff members and handles more than 30,000 calls per month, which varies between: Water, Sewer, Roads, Stormwater, Electricity, Public Health (including Covid related items) and Disaster Management complaints.

The NMBM reviewed the operational capacity of the Operation Centre and has established that there are numerous limitations and restrictions that had to be addressed in order for the Centre to operate more effectively. The following limitations and restrictions were identified:

- Very limited space for additional staff,
- No new phone lines are available,
- Too few PC's (MIS),
- IT & network issues due to server not being close by,
- Far distance from the NMBM's head office and therefore cannot monitor staff members effectively,
- Affected by loadshedding and water disruptions,
- Various critical vacancies were not being filled at the time.

The NMBM realized, especially recently due to the current drought and water supply issues, as well as the intensified drought media campaign, that the Operation Centre receives more calls daily as more NMBM departments are making use of the call centre to log formal complaints.

Taking the above into account, the NMBM committed to improve the Operation Centre in this regard so to ensure that the necessary monitoring and attention can be given to the various complaints that are being logged on a daily basis.

A new premises has therefore been identified during July 2020 so to mitigate the various issues as listed above. The new Operation Centre will be located on the 6th floor of the Fidelity Building in Govan Mbeki Avenue and will allow for:

- Additional staff members to be employed as they will be working on a shift basis so to ensure that calls are not dropped and that complaints are captured 24 hours of the day. This will certainly provide an increase level of service delivery to the NMB residents.
- 40 Additional PC's & Telephones to be procured and installed,
- Much closer to NMBM head offices for increased level of monitoring.

Before the Operation Centre could be moved to the new premises, various renovations had to be completed, which commenced during October 2021. To date all renovations are complete and the Operation Centre successfully moved in during the month of March 2023 to Govan Mbeki Avenue, Central.

Figure 5-14: Operation Centre Location (old premises on left-hand-side, new premises on right-hand-side)

5.2.16 Assistance from Budget Facility Infrastructure (BFI) Grant Funding

Regional Bulk Infrastructure Grant (RBIG) funding was approved through the Directive of Revenue Act (DORA) through Government Gazette No. 48017 on 10 February 2023. The total amount approved was R988 million (VAT included), spread over three consecutive financial years.

Of this total, an amount of R208 million was allocated for non-revenue water implementation, including fixing water leaks. At that stage the NMBM's NRW 10-year B/plan was already in place.

The NMBM's intent is to utilise the available funds for five of the 15 work streams as follows:

- Greater Metered Area (GMA) and District Metered Area (DMA) management: R12.5 million.
- Remote metering: R8 million.
- Pressure management: R5.56 million.
- Leak repairs: R20 million.
- Consumer meter replacement: R162.1 million.

Currently expenditure is at 99.15% and work done to date (meter replacement, etc.) is described in the sections above.

6. WATER QUALITY MONITORING AND TESTING REGIME

Due to the current drought disaster being experienced throughout the NMBM, the total water supply system remains vulnerable and susceptible to failure, more than ever in the past.

The NMBM's water quality monitoring and testing regime are therefore currently being carried out at the following two levels, which will be discussed in more detail below:

- At an operational level, &
- Routine inspections.

6.1 Operational Controls

To ensure that the water is compliant to the required water quality standards, the NMBM has the following control measures in place:

- On-site water sampling and quality testing, &
- Drinking Water Incident Management Protocol (DWIMP).

6.1.1 On-site water sampling and quality testing

The on-site water quality sampling and testing is conducted by the treatment works superintendents and operators by collecting samples at every critical point in the treatment process and conducting tests for parameters such as pH, turbidity, disinfectant residual, and conductivity every 4 hours, as part of the routine monitoring programme and the results are documented on a logbook to be reviewed. This ensures that the water treatment process produces water that is compliant with the SANS 241: 2015 water quality standards.

6.1.2 Drinking Water Incident Management Protocol (DWIMP)

The water reticulation system is very dynamic and like any other system which has been exposed to a 7-year drought, systemic failures can be expected. The water services act provides guidance in cases where failures occur in drinking water standards.

When such failures occur, the first level of response is an operational response from the NMBM operational and maintenance teams. These teams will take immediate corrective action in line with relevant control measures and will follow standard operating and emergency response procedures that are in place.

Once the first level of immediate response has been completed, the Scientific Services team (and/or operational team) will immediately take samples and validate the effectiveness of the response. Sampling will continue to ensure that the incident have been remediated and/or contained. Should the response monitoring indicate that the initial operational response is not effective, the response level will be elevated to Level 2. Response Level 2 will also be required immediately in the high-risk cases of Acute Health incidents or Organic/Radionuclide incidents.

The second (or elevated) level of incident response consists of an immediate Public Health Notice. This will include immediate disconnection and/or containment of water supply if possible and notices to the public with clear notice of the immediate health risk and measures to deal with it. This will include "Boil Water" notices and any other recognised medical health process. Response Level 2 will be triggered by the NMBM management and will involve all relevant public and environmental health departments. Public Health Notices will only be retracted once the operational and maintenance teams have managed to correct the incident and Scientific Services have validated that drinking water is safe again.

6.2 Routine Testing and Monitoring

Routine monitoring is usually based on simple observations and tests that are done periodically on risk indicators, such as turbidity. The NMBM water quality monitoring programme has the following requirements for routine monitoring:

Table 6-1: Minimum monitoring for prescribed process risk indicators (as per SANS 241: 2015)

Determinant	Minimum Monitoring Frequency		
	Raw water intake	Final Product water	Distribution system
Conductivity (or TDS)	Daily	Daily	Not applicable
pH	Daily	Once per 8h shift	Fortnightly
Turbidity	Daily	Once per 8h shift	Fortnightly
Disinfectant residuals	Not applicable	Once per 8h shift	Fortnightly
E. coli	Not applicable	Weekly	Fortnightly
Heterotrophic plate count	Not applicable	Weekly	Fortnightly
Treatment chemicals	Not applicable	Monthly	Not applicable

The minimum monitoring frequency/sample numbers of E. coli is determined by the population number that is supplied from the drinking water supply system/distribution system. It must be noted that during rainy seasons, sampling should be carried out more frequently as means to ensure that all spatial and temporal risks are identified. The following table provides an overview of the minimum number of sample tests that the NMBM must comply with.

Table 6-2: Minimum sample numbers for E. coli in distribution system (as per SANS 241: 2015)

Population served	Minimum number of samples per month
More than 500 000	1 per 20 000 head of population + 36 additional samples
100 000 - 500 000	1 per 10 000 head of population + 11 additional samples
5 000 -100 000	1 per 5000 head of population + 1 additional sample
Less than 2500	2 samples per month

From recent experience with intermittent water supply and emptying of reservoirs due to the severe draught, sediments in pipelines and at the bottom of reservoirs started to dislodge. This have brought about water quality related risks during severe drought conditions to light. Improvements are therefore needed and more frequent monitoring is required to mitigate any contamination risks within the NMBM's potable water infrastructure. The NMBM remains committed to provide potable water to their consumers that complies to the SANS 241: 2015 water quality standards at all times.

7. EMERGENCY SUPPLY OPTIONS

DWS has recently reviewed restrictions and has determined that more severe restrictions are required to mitigate the risk of dams running dry. Subsequently, the NMBM is only allowed to abstract a reduced volume from the Algoa WSS, inclusive of Nooitgedagt Phase 3. The figure below provides an overview of the NMBM's current targeted restricted abstraction volumes from the Algoa WSS.

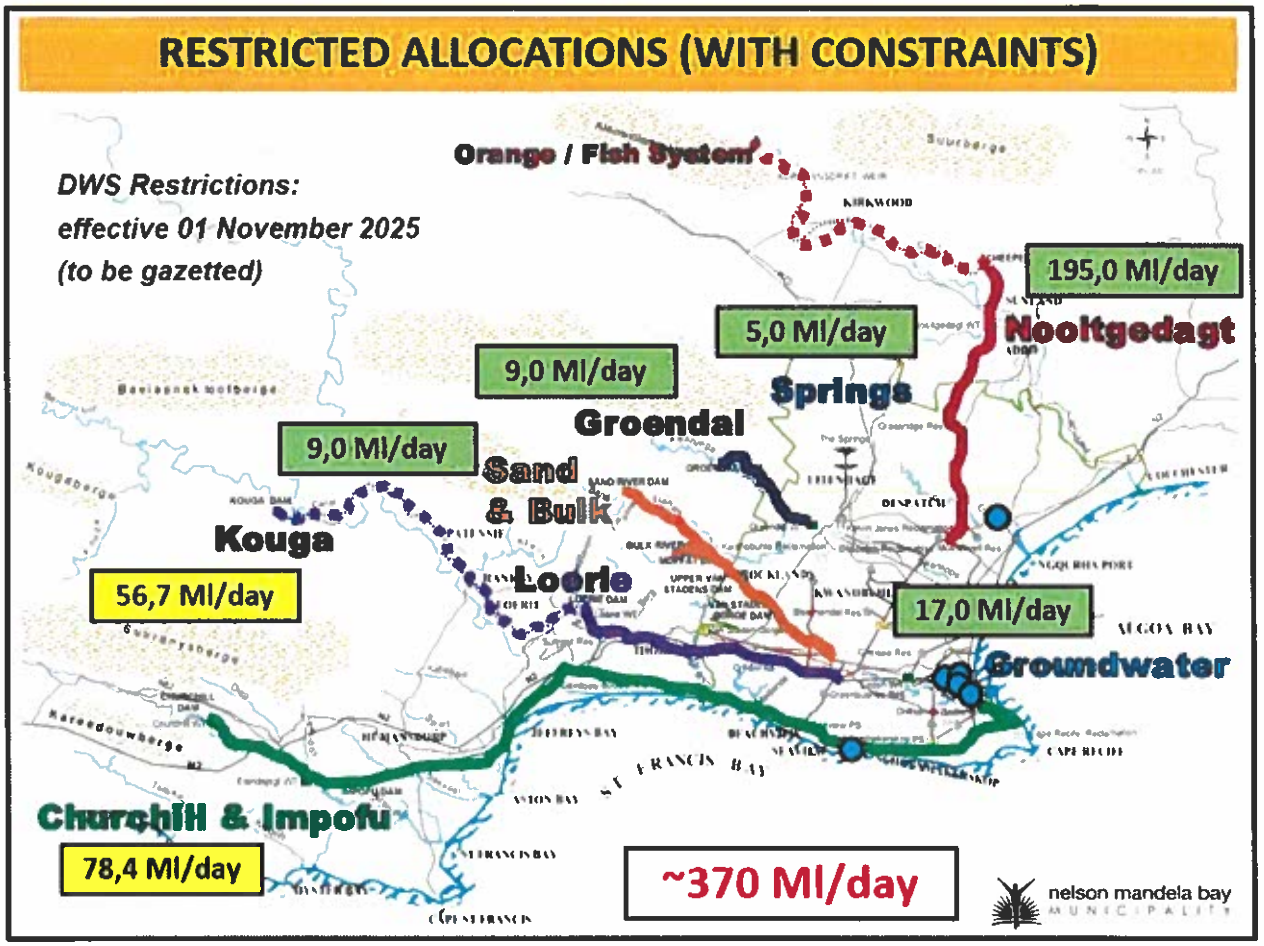


Figure 7-1: Visual Representation of the NMBM's Targeted Restricted Abstraction Volumes from the Algoa WSS

The NMBM previously planned for a possible supply system collapse in 2023. The interventions described below formed part of this strategy. When good rains fell in March 2023 and dam levels improved, these measures were put on hold. However, if conditions worsen, it will be possible to reactivate these interventions on short notice.

As such, and as mentioned earlier in the report, the NMBM must plan for the worst as climate change, an ever-growing population, improved level of service and increasing water demand remains challenges to be addressed.

The NMBM has thus prepared the following **"No Water Map"** which highlights the critical areas that will have no potable running water for an extended period of time, should taps run dry due to high water demand without a significant improvement in dam levels.

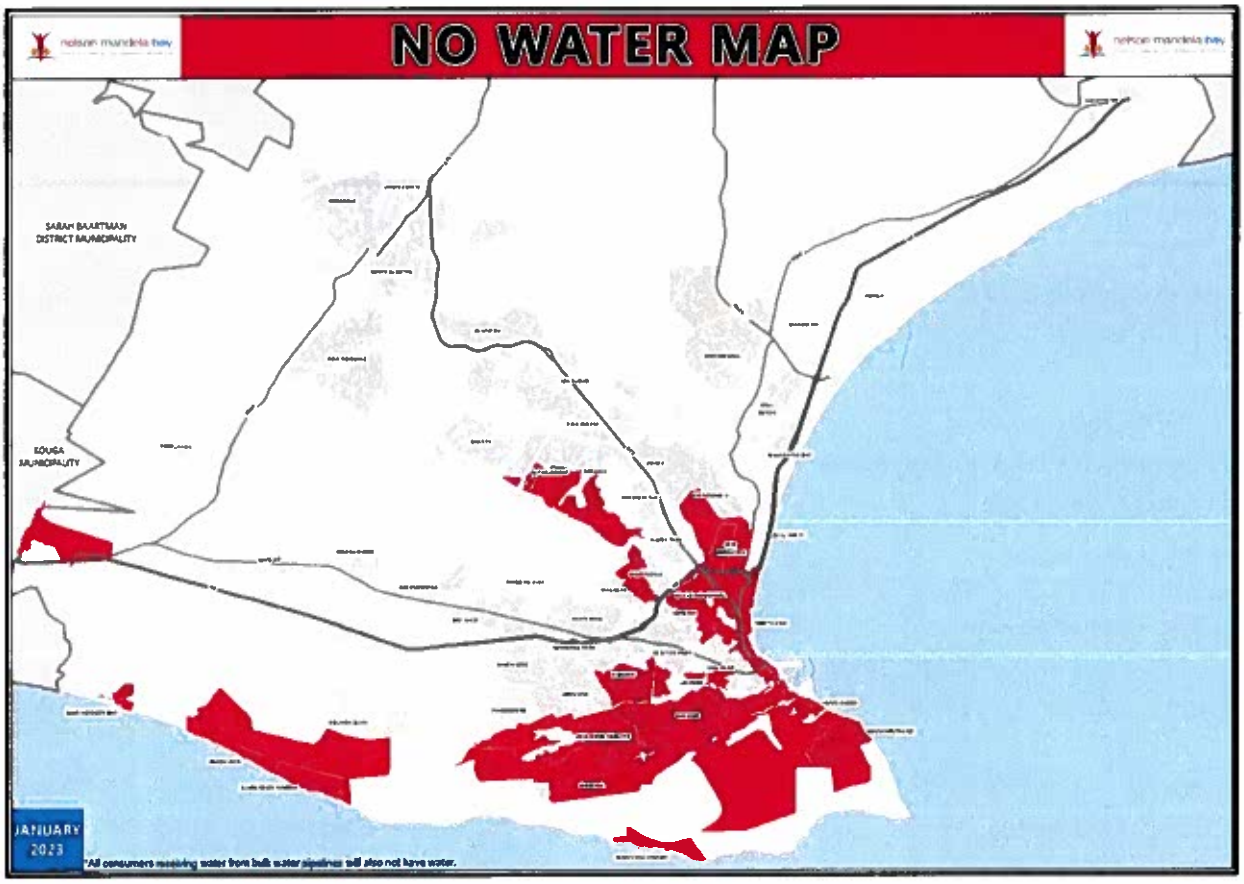


Figure 7-2: Indication of critical areas should the Kromme & Kouga Sub-System fail

Considering the above, and in accordance with the NMBM's Supply Chain Management Policy (v6 dated 20 November 2021), the NMBM may be facing a **major emergency drought disaster** and therefore it is critical that everyone within the Algoa Bay area work together to avoid this disaster from occurring soon.

As per the latest NMBM Supply Chain Management Policy, an **Emergency** can be described as follows:

*"**emergency**" includes the existence of one or more of the following:*

a) the possibility of human injury, death or suffering and the death of livestock and animals;

b) the possibility of damage to property;

c) the prevalence of human suffering or deprivation of rights;

d) the interruption of essential or support services critical to the effective functioning of the NMBM;

e) the possibility of serious damage to the natural environment;

f) the possibility that the security of the state could be compromised; and

g) the possibility that failure to take the necessary action may result in the NMBM not being able to tender an essential community service. The prevailing situation or imminent danger should be of such a nature and scale that it could not readily be alleviated by interim measures, in order to allow time for formal procurement processes; "

This **emergency drought disaster** constitutes all of the items listed above and will be described in more detail on the following pages.

a) *The possibility of human injury, death or suffering and the death of livestock and animals;*

Once the western supply sources are depleted (a possibility if the current drought continues into the winter months of 2026) water supply to the "No Water" areas, as indicated in Figure 7-2 on the previous page, will be limited. Access to water will be provided but it will require physically abled individuals to collect and cart their own water supply.

Human injury, death: A recent case in Durban has shown criminal gangs hijacking water trucks and water collection points. These gangs were armed and violent. If a situation like this escalates there is a high risk that citizens queuing for water could be caught in the crossfire and lose their lives.

Death of suffering: Individuals who are not able bodied, and not able to queue for water at any provided collection point run the risk of dehydration and dying of thirst.

Death of livestock & animals: Due to the difficulty and timely nature that will be required to collect water, citizens would prioritize water use for their own personal needs. The needs of animals and livestock will not be able to be met and could result in death due to dehydration and thirst.

b) *The possibility of damage to property;*

The continuous draining and filling of the water reticulation system has been proven to create significant damage to infrastructure, which is why the NMBM technical team through the "Emergency Water – Risk Mitigation" task team has recommended against any water shedding (to be further discussed later in the report).

If the pumping system is not operating at maximum output and reliability, demand will outstrip supply.

Damage to property: During the month of March 2022, the NMBM had to shut down the pumping system to perform critical work at Nooitgedagt and the Kwanobuhle Supply Pump Station. These actions drained the reticulation system. When the system filled up again the area of Beverly Grove was subjected to 7 burst pipes in a period of 24 hours. This was due to the filling of the drained pipes and the demand of the citizens on the system whilst filling was occurring.

c) *The prevalence of human suffering or deprivation of rights;*

Deprivation of rights: Access to water is a basic human right as described in the Constitution of the Republic of South Africa. Without the pump stations operating at maximum output and reliability the "No Water" areas will not only have dry taps in their homes, but no water available at water collection points.

The NMBM would therefor deprive all the citizens living in these areas of a basic human right.

d) *The interruption of essential or support services critical to the effective functioning of the NMBM;*

The "No Water" areas will not have water in their taps at residential level, however it is planned to keep the bulk reticulation systems filled and pressurized.

Joint Operation Centre: The JOC is situated within the "No Water" areas, but special concession and efforts could be made to ensure water supply is maintained. However, if the pumping system is not operating at maximum output and reliability, the NMBM would not have been able to transfer water from the Nooitgedagt system to the "No Water" areas and no water will be available.

Dawid Stuurman International Airport: The Dawid Stuurman International Airport is situated within the "No Water" areas, but special concession and efforts could be made to ensure water supply is maintained. However, if the pumping system is not operating at maximum output and reliability, the NMBM would not have been able to transfer water from the Nooitgedagt system to the "No Water" areas and no water will be available.

Fire Stations: In the event of a fire breaking out in one of the "No Water" areas firefighting will be greatly affected. Unless a fire hydrant is located close to a filled bulk reticulation pipework, fire trucks will have to drive a significant distance to re-fill with water for fire-fighting purposes.

In the event that the pump stations have not provided maximum output reliably the system will not allow for the fire trucks to re-fill in a short amount of time. This would lead to the failure of firefighting requirements and rampant fires could spread across the city.

Health Facilities & Hospitals: Several the NMBM's largest private and public hospitals and health facilities are situated within the "No Water" areas. These include hospitals like, St Georges Hospital, Greenacres Hospital, Mercentile Hospital and Dora Ingiza Hospital.

The NMBM has planned to keep water supply to these facilities live but if the pumping system is not operating at maximum output and reliability the NMBM would be able to transfer water from the Nooitgedagt system to supply these facilities with water.

e) *The possibility of serious damage to the natural environment;*

Lack of water will lead to sewer blockages and failure of the sanitation system. The pump stations spill water into the Baakens river that will cause environmental damage.

It is anticipated that the public will try and access any available water for use and sale. This includes illegal abstraction from rivers (Baakens river) and small dams (Frames dam) to make up for their water needs.

f) *The possibility that the security of the state could be compromised;*

Nooitgedagt WTW and key water transfer pump stations could be targeted to hold the NMBM ransom.

It is anticipated that the public will vandalise and damage water infrastructure and reservoirs to obtain water outside of the implemented supply collection points.

g) *The possibility that failure to take the necessary action may result in the NMBM not being able to tender an essential community service. The prevailing situation or imminent danger should be of such a nature and scale that it could not readily be alleviated by interim measures, in order to allow time for formal procurement processes;*

The NMBM needs to take action to ensure that the "No Water" areas will have some form of basic water available for use and collection. The approval of this item is required to ensure basic access to water as an essential service is maintained.

The failure of 3 of the NMBM's largest supply sources is beyond the control of the NMBM's technical teams and no interim measure could have overcome this situation.

Therefore, and in the event of water supply disruptions that would be due to source depletion and or serious reticulation challenges, the following emergency supply interventions are considered:

7.1 CONTINUED POTABLE WATER SUPPLY TO CRITICAL AREAS

Should the Kromme - & Kouga Sub- Systems of the Algoa WSS fail, there is the probability that certain water supply zones within the NMBM may run dry. To manage this risk, NMBM planning allows for the implementation of a number of Emergency Options to ensure that consumers in Nelson Mandela Bay do have access to a potable water source. This may involve:

- Water Carting,
- Water Shedding,
- Water Collection Tanks, &
- Water Collection Points.

These options have been assessed and are discussed in more detail in the sections below.

7.1.1 Water Carting

Although water carting using water tankers is an expensive operation (in terms of R/kℓ), in many instances it remains the only option to provide water to a community once existing water sources are depleted and taps run dry.

The municipal fleet is available to perform this service, but additional resources include water bowsers from the municipality's Fire Department, hired water tankers from private service providers, and water trucks made available by external organisations such as DWS, Gift of the Givers, etc.

A protocol exists for activating this service and it requires direct involvement from the respective Ward Councillors who will alert the municipality of any water shortages within their wards and assist with coordination of available resources.

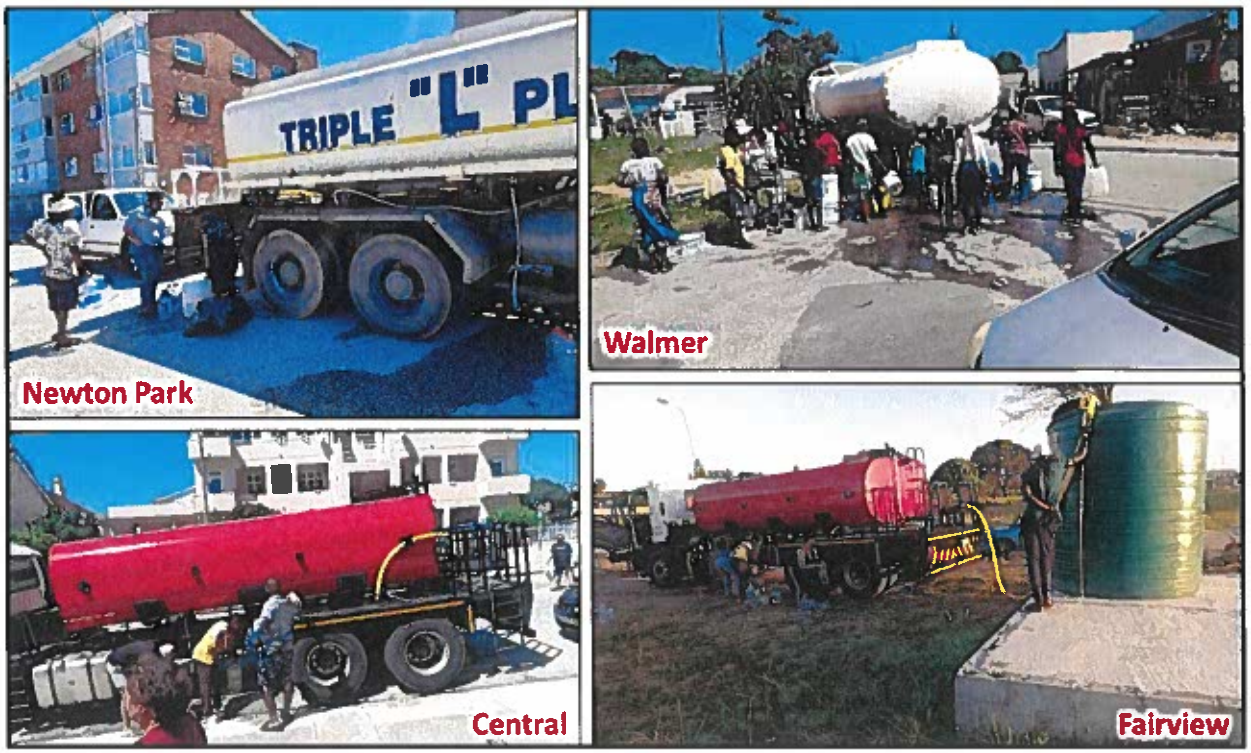


Figure 7-3: Collage of photos showing water tankers in operation

7.1.2 Water Shedding

Water shedding, or intermitted supply, is the process of switching off specific water supply zones on a rotational basis, much like load shedding. It requires the physical opening and closing of multiple isolating valves and is seen as a quick and easy solution, however, it is not instant like loadshedding.

During the risk analysis for this emergency option, the NMBM reviewed an international Case Study with regards to the implementation of intermitted water supply in Cyprus. The Case Study was conducted by Mr. Bambos Charalambous, who is the chair of the IWA Specialist Group on Intermittent Water Supply. In addition to this, the NMBM also compared the benefits vs. the disadvantages of current intermitted water supply being implemented in the towns of Hankey and Patensie since September 2018. The NMBM also reviewed various local papers published by Mr. Ronnie McKenzie, who is the chair of the IWA Specialist Group on Water Loss, regarding the various dangers of intermitted water supply as a measure to save water in South Africa.

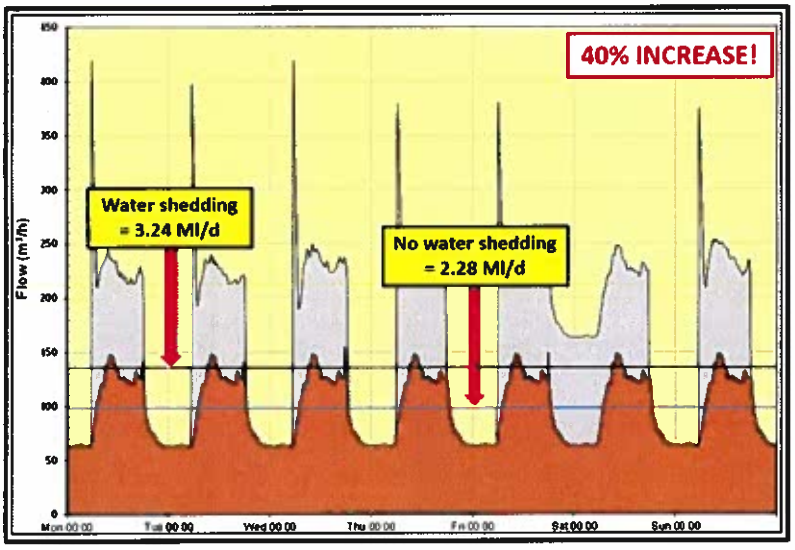


Figure 7-4: Graph illustrates increased daily water consumption after water shedding implemented in case study

The NMBM therefore concluded that the disadvantages far outweigh the benefits if water shedding is implemented to save water and have decided that the implementation thereof here in the NMBM will not be a viable option. The following disadvantages are just some to consider when water shedding is being implemented:

- Change in velocities loosens deposits leading to water quality failures,
- Low supply pressures, particularly in high ground areas. Therefore, not fair and equitable to water consumers as residents in the low-lying areas receive more water than those in the high-lying areas,
- Meter malfunctioning and accelerated wear and tear on municipal infrastructure which leads to more leaks/bursts,
- Customer/Consumer Water Meters may over-read (due to air),
- Increased level of customer dissatisfaction / complaints,
- Water Wastage – taps normally left open when there is no running water present,
- High coping costs for customers (tanks, pumps, etc.), &
- Increased main and service connection breaks.

Do to the above the implementation of water shedding is considered not ideal for reducing the water demand.

7.1.3 Water Collection Tanks

This emergency option entails the shutting down of the water distribution system and replacing it with water tanks placed at strategic locations which is filled by water trucks on a regular basis. Should the NMBM implement this option, the following items will be required:

- The purchasing and erection of tanks in a very short period of time,
- Hiring water trucks to fill the water tanks,
- Access control, and
- Security and lighting at the locations where these water tanks are erected.

The following items were considered during the risk analysis for this emergency option:

- Major capital funding required to purchase and erect tanks throughout the NMBM,
- The operating cost of hiring water trucks will also be excessive,
- Contamination while transporting and storing water is a major risk – a boil notice should be issued regularly together with the implementation of this emergency option,
- Security will be required to guard against theft and vandalism,
- It will be a challenge for the physically disabled, sick, and aged consumers to collect water on a regular basis,
- Long queues and slow collection rates due to small outlets at water supply points.

The photos below are some examples of the implementation of Water Collection Tanks as an emergency option to ensure that NMB water consumers can access potable water. It is also considered a better alternative to water shedding.

Figure 7-5: Examples of the implementation of Water Collection Tanks as an emergency option

7.1.4 Water Collection Points:

This emergency option involves a process of shutting all offtakes from selected main arterial pipelines and installing banks of communal taps at strategic locations, from which consumers can collect water throughout the NMBM. The implementation of such an emergency option requires the following:

- The isolation of zones,
- Purchase and erection of taps/standpipes,
- Access control, &
- Security and lighting at the locations where these standpipes are erected.

The following items were considered during the risk analysis for this emergency option:

- Similar to water collection tanks but with less risk,
- Requires significant time and resources to plan and investigate,
- Many of the required isolating valves to implement this emergency option are either not installed, missing or faulty,
- Major capital funding will be required for installing new and replacing of existing valves, as well as the of communal taps.
- Increased residual pressure in main pipes would cause leaks and bursts,
- Reduced risk of contamination,
- Security will be required to guard against theft and vandalism,

- It will be a challenge for the physically disabled, sick, and aged consumers to collect water on a regular basis, and
- Long queues and slow collection rates, but faster than with Collection Tanks.

Therefore, to ensure that NMB water consumers can access potable water, this emergency option, similarly to the erection of Water Collection Tanks, is also considered a better alternative to Water Shedding.

The following figure illustrates an example of locations for Water Collection Points in the Emerald Hill Water Supply Zone should this emergency option be implemented.

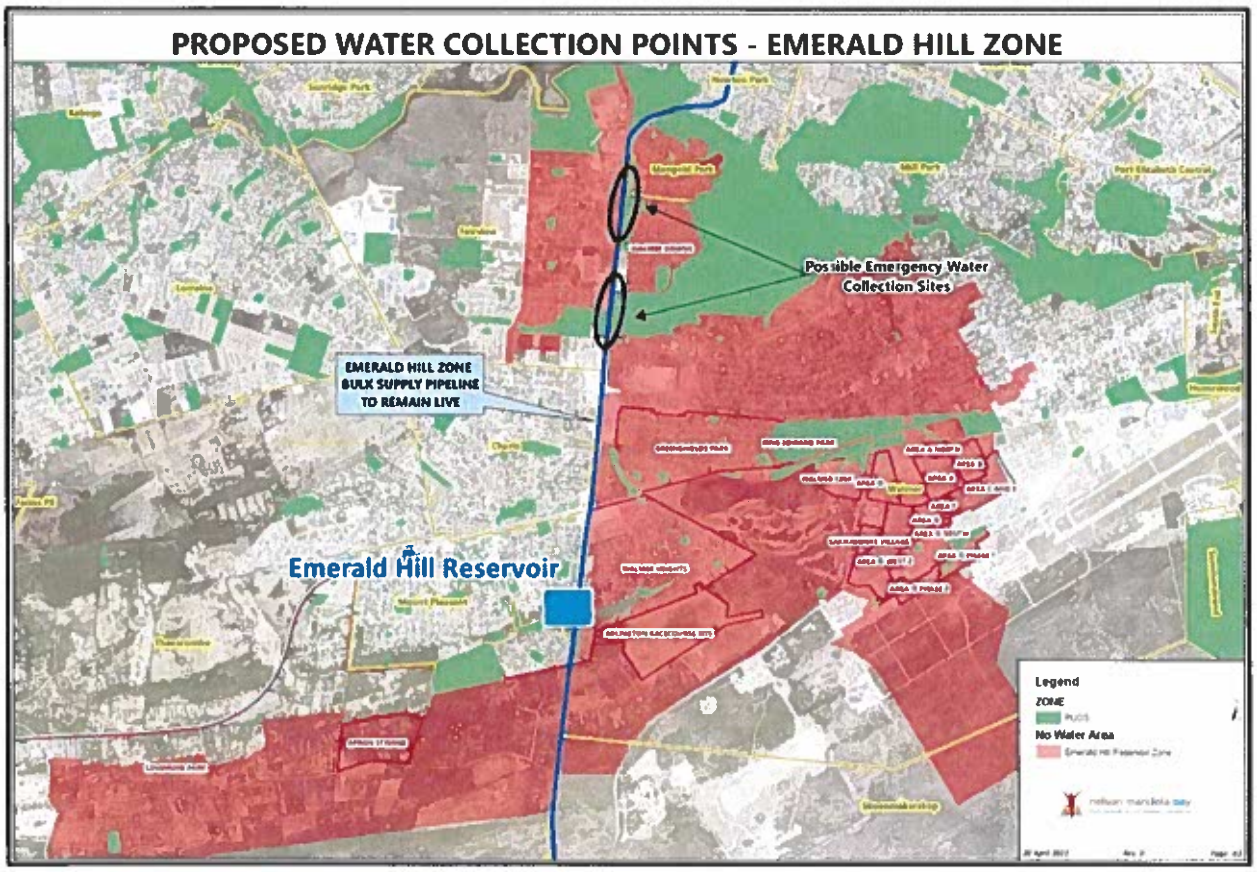


Figure 7-6: Proposed Water Collection Points within the Emerald Hill Water Supply Zone

Therefore, based on the above and the risk assessment that was carried out during the consideration of implementing emergency options to ensure that NMB water consumers residing in the affected critical areas, as indicated in Figure 7.2 earlier in the report, can access potable water it was concluded that the following emergency options be implemented as an interim water solution during the drought in the areas affected by the water shortages:

- Water Collection Tanks
- Water Collection Points

Although risks remain a huge challenge during the severe drought conditions, there are mitigation measures that must be developed and implemented in a swiftly manner.

The following map provides an overview of the proposed locations for Water Collection Tanks, as well as Water Collection Points.

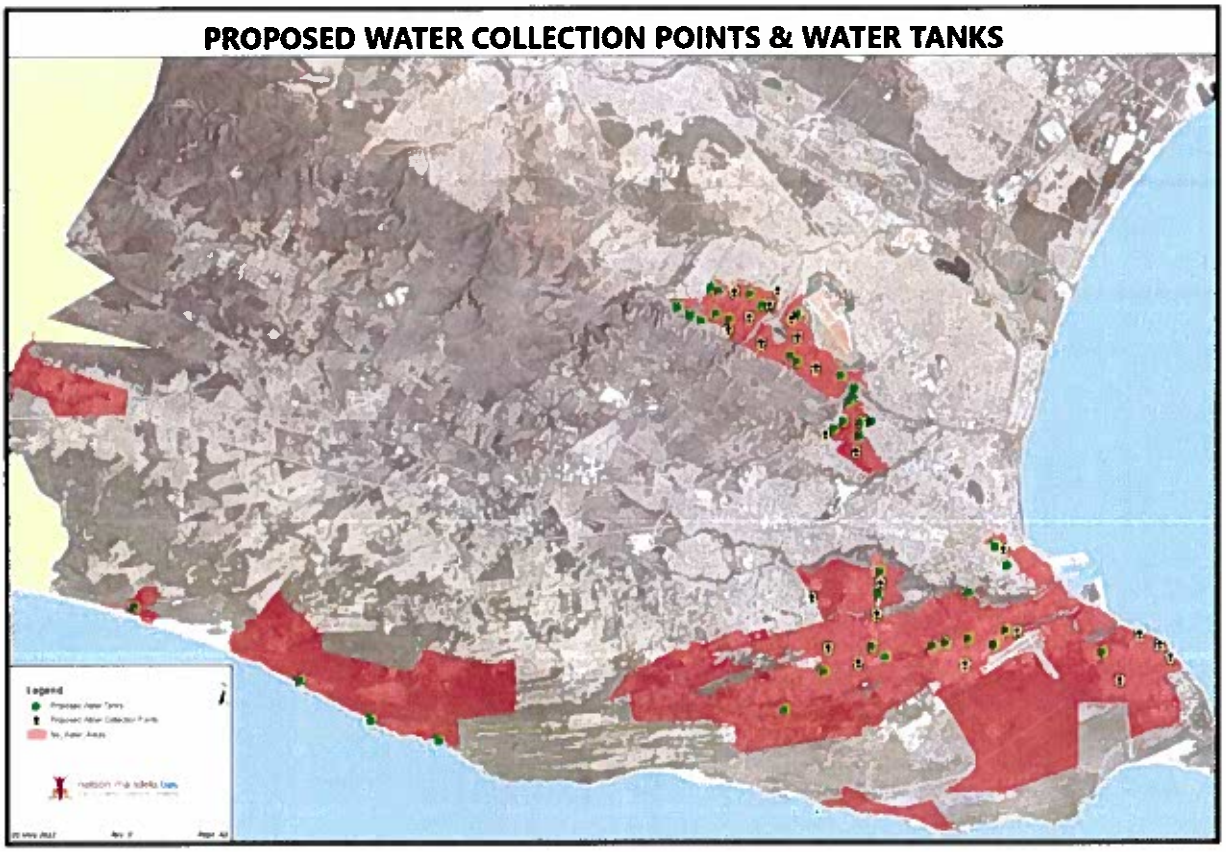


Figure 7-7: Proposed Water Collection Points & Water Tanks within the affected areas

Figure 7-8: Photo of a typical water collection point that was constructed recently (temporarily decommissioned)

The Cost implications for the implementation of these two emergency options are summarised under Chapter 8 of this report.

7.1.5 Emergency water supply to Municipal and Corporate Buildings

To ensure municipal and corporate buildings remain operational during severe drought conditions, the NMBM appointed a professional service provider (PSP) to investigate at seventeen (17) municipal buildings / facilities to establish possible solutions for water security.

The objective of the assessment was to establish whether the buildings / facilities had adequate water storage infrastructure for emergency purposes and to establish whether additional water storage infrastructure could be provided where practically possible.

The table below provides and overview of the findings from these investigations.

Table 7-1: Interventions required at Municipal and Corporate Buildings throughout the NMBM

BUILDINGS	"OFF-STREET" EMERGENCY WATER STORAGE	INTEGRATION	SECURITY
Brister House	10,000ℓ Tank incl. plinth & piping (5 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Eric Tindale Building	10,000ℓ Tank incl. plinth & piping (7 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Fidelity House	10,000ℓ Tank incl. plinth & piping (1 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Murray & Roberts Building (Leased)	To be determined and agreed with Landlord	To be determined and agreed with Landlord	Secure Fence with Gate
Starport (Leased)	To be determined and agreed with Landlord	To be determined and agreed with Landlord	Secure Fence with Gate
Kwantu Towers (Leased)	To be determined and agreed with Landlord	To be determined and agreed with Landlord	Secure Fence with Gate
Gqeberha City Hall	5,000ℓ Tank incl. plinth &piping (2 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Feather Market Centre	5,000ℓ Tank incl. plinth & piping (3 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Pleinhuis / Noninzi Luzipho Building	5,000ℓ Tank incl. plinth & piping (5 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Algoa House	5,000ℓ Tank incl. plinth & piping (4 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Woolboard Exchange	5,000ℓ Tank incl. plinth & piping (5 No)	Booster Pump & modification to water piping	Secure Fence with Gate
NMBM Wellness Centre	5,000ℓ Tank incl. plinth & piping (3 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Walmer Town Hall	5,000ℓ Tank incl. plinth & piping (3 No)	Booster Pump & modification to water piping	Secure Fence with Gate
West End Community Hall	5,000ℓ Tank incl. plinth & piping (3 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Gail Road Depot	5,000ℓ Tank incl. plinth & piping (8 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Chatty Community Hall	5,000ℓ Tank incl. plinth & piping (1 No)	Booster Pump & modification to water piping	Secure Fence with Gate
Seaview Community Hall	5,000ℓ Tank incl. plinth & piping (2 No)	Booster Pump & modification to water piping	Secure Fence with Gate

To ensure that municipal and corporate buildings remain operational during the severe drought resulting in water shortages, some of the above interventions have been implemented, for the critical buildings listed above, and others can also be implemented within a short time frame, if required.

7.2 COLLECTION FROM BOREHOLES FOR NON-POTABLE USE

The NMBM has previously drilled 27 boreholes within the boundaries of NMBM parks, pools, stadiums, and sports fields. These boreholes were drilled to substitute long term use of potable water with that of ground water for non-potable use. Of these, seven (7) boreholes provided suitable water quality and sufficient sustainable yield to take the respective facilities off-grid. All 7 boreholes were equipped in June 2019 and have cumulatively saved the NMB approximately 40,000 kilolitres (kℓ) of potable water to date.

The seven borehole sites are listed below:

- Gelvandale Sport Stadium & Pool,
- Motherwell NU2 Stadium,
- Rocklands Sports Field,
- St Georges Pool,
- Wolfson Stadium,
- Newton Park Pool,
- Westering Pool.

Due to the persisting drought and possibility of supply source depletion, the NMBM has expanded the potential use of these borehole sites by installing standpipes connected to the borehole supplies.

The standpipe arrangement is aimed to allow the NMBM residents to come and collect water for non-potable use such as flushing of toilets, washing of hands and can be made accessible to the public again, should the need arise.

7.3 TREATED EFFLUENT WATER COLLECTION FROM WWTW

The NMBM also has a long-standing arrangement that any company or individual can collect treated effluent at various Wastewater Treatment Works (WWTWs) around the NMBM, as previously discussed under Section 4.5.1 of this report. This water can be used to irrigate gardens, flush toilets and other non-potable water offset uses, the intent being to reduce the demand on the potable water supply system.

The following WWTWs can be made available to the public for non-potable reclaimed effluent collection, should the need arise:

- Fishwater Flats
- Kelvin Jones
- Despatch
- Cape Receife
- Driftsands

8. FINANCIAL IMPLICATION OF INTERVENTIONS

The NMBM has prepared this Drought Implementation Plan together with the tables on the following pages that highlights the Actual Expenditure to date, as well as the Estimated Budget required to successfully implement the various interventions as discussed under Chapter 4, 5 & 7 of this report. The NMBM aims to ensure a reliable water supply to all their citizens by the implementation of these interventions; that will curb the current water demand and will augment the bulk water supply system to create flexibility and to ensure longevity in their water supply over the long-term.

Table 8-1: Actual Expenditure and Estimated Budget required to successfully implement the NMBM's Drought Mitigation Plan

ITEM NO	CATEGORY	SUB-CATEGORY	SECTION	PROJECT TITLE	IMPLEMENTATION TIMEFRAME	ESTIMATED BUDGET REQUIRED	ACTUAL EXPENDITURE TO DATE	AVAILABLE FROM INTERNAL FUNDING	FUNDING SHORTFALL TO COMPLETE THE PROJECT
1	Measures to Augment NMBM's Water Supply	Improving/ Upgrading Local Sources	4.1.1	Upgrading of the Impofu Barges	Completed	R35 000 000	R35 000 000	R0	R0
2			4.1.2	Churchill Water Treatment Works (WTW) Backwash Recovery	Short	R5 000 000	R0	R2 500 000	R2 500 000
3			4.1.3	Refurbishment of the Linton Water Treatment Works (WTW)	Completed	R3 000 000	R3 000 000	R0	R0
4			4.1.4	Lower & Upper Van Stadens Dam Supply	Short	R1 500 000	R1 200 000	R300 000	R0
5			4.1.5	New WTW (package plant) to supply water to the Van Stadens Reservoir	Medium	R18 000 000	R0	R3 000 000	R15 000 000
6			4.1.6	Groendal Raw Water Booster Pump Station	Short	R2 500 000	R0	R1 000 000	R1 500 000
7		Gariep Dam/ Orange River Transfer Scheme (Maximising Nooitgedagt)	4.2.1	Nooitgedagt WTW Upgrade Phase 3	Completed	R520 000 000	R520 000 000	R0	R0
8			4.2.2	Grassridge Temporary Water Treatment Works	Completed	R28 000 000	R28 000 000	R0	R0
9			4.2.3	Motherwell and Stanford Road Booster Pump Stations	Completed	R99 500 000	R99 500 000	R0	R0
10			4.2.4	Chelsea Pump Station (Kwanobuhle Supply)	Completed	R46 000 000	R46 000 000	R0	R0
11			4.2.5	Bloemendal to Kwanobuhle Pipeline	Completed	R16 000 000	R16 000 000	R0	R0
12			4.2.6	Rezoning of the Zwide Water Supply Zone	Completed	R300 000	R300 000	R0	R0
				Rezoning of the Deal Party (Ibhayi) Water Supply Zone	Completed	R750 000	R750 000	R0	R0
				Supplementing the Emerald Hill Supply Zone	Completed	R1 000 000	R1 000 000	R0	R0
				Verwoerd Pump Station Rehabilitation	Completed	R600 000	R600 000	R0	R0
				Construction of the Willow Road Pipeline	Medium	R26 000 000	R0	R6 000 000	R20 000 000
				Mel Brookes to Kwanobuhle Bulk Water Pipeline Link	Short	R15 000 000	R5 000 000	R5 000 000	R5 000 000
13			4.2.7	Motherwell/Bethelsdorp – East to West Pipeline Upgrade	Medium	R520 000 000	R52 000 000	R268 000 000	R200 000 000
14			4.2.8	Chatty Reservoir Offtake Repair	Short	R7 500 000	R5 000 000	R1 500 000	R1 000 000
15			4.2.9	Construction of the Chatty Pump Station to supply the Despatch Tower	Medium	R46 000 000	R7 500 000	R0	R38 500 000
16			4.2.10	Construction of the Proposed Coerney Dam	Long	R700 000 000	DWS Project	DWS Project	DWS Project
17			4.2.11	Nooitgedagt Phase 4: Expansion of the Gariep Dam / Orange River Transfer Scheme	Long	R3 100 000 000	DWS Project	DWS Project	DWS Project

ITEM NO	CATEGORY	SUB-CATEGORY	SECTION	PROJECT TITLE	IMPLEMENTATION TIMEFRAME	ESTIMATED BUDGET REQUIRED	ACTUAL EXPENDITURE TO DATE	AVAILABLE FROM INTERNAL FUNDING	FUNDING SHORTFALL TO COMPLETE THE PROJECT
18		Groundwater Augmentation	4.3.2	Coegakop Wellfield	Completed	R355 000 000	R355 000 000	R0	R0
19			4.3.3	Bushy Park Wellfield	Completed	R95 000 000	R95 000 000	R0	R0
20			4.3.4	St Georges Park Wellfield	Completed	R50 000 000	R50 000 000	R0	R0
21			4.3.5	Moregrove Wellfields	Completed	R55 000 000	R55 000 000	R0	R0
22			4.4.6	Churchill Wellfield	Medium	R145 000 000	R12 500 000	R500 000	R132 000 000
23			4.4.7	Driftsands Wellfield	Medium	R260 000 000	R85 000 000	R80 000 000	R95 000 000
24			4.4.8	Aspin Heights Wellfield	Medium	R80 000 000	R0	R500 000	R79 500 000
25			4.4.9	Malabar Wellfield	Medium	R60 000 000	R1 500 000	R500 000	R58 000 000
26			4.3.10	Future Groundwater Exploration	Long	R95 000 000	R0	R0	R95 000 000
27		Desalination	4.4.2	Coega SEZ Desalination Plant	Long	R900 000 000	R0	R0	R900 000 000
28			4.4.3	Western Desalination Plant	Long	R4 800 000 000	R7 000 000	R3 000 000	R4 790 000 000
29		Re-Use of Treated Effluent at WWTWs	4.5.2	Re-Use of Treated Effluent from FWF WWTW to Coega SEZ	Long	R615 000 000	R15 000 000	R600 000 000	R0
30			4.5.3	Pilot Project for the Direct Re-Use of Treated Effluent from Cape Recife WWTW	Long	R35 000 000	R2 000 000	R0	R33 000 000
				Future Direct Re-Use of Treated Effluent from Driftsands WWTW	Long	R215 000 000	R0	R0	R215 000 000
31		System Remote Monitoring & Control	4.6.1	Telemetry / Scada Upgrade	Medium	R33 000 000	R12 000 000	R14 500 000	R6 500 000
32	Measures To Reduce NMBM's Water Consumption	Water Conservation and Demand Management	5.2.1	Bulk Water Supply and Bulk Water Metering	Medium	R32 000 000	R500 000	R4 000 000	R27 500 000
33			5.2.2	GMA & DMA Zonal Meters	Medium	R30 000 000	R1 500 000	R2 000 000	R26 500 000
34			5.2.3	Remote Monitoring of ICIs, GMAs, DMAs and Bulk Zonal Meter Readings	Medium	R36 000 000	R250 000	R14 000 000	R21 750 000
35			5.2.4	Pressure Management	Short	R24 000 000	R4 000 000	R2 000 000	R18 000 000
36			5.2.5	Non-Revenue Water	Short	R45 000 000	R4 000 000	R7 000 000	R34 000 000
37			5.2.6	Billing Management and Commercial Data Evaluation (CDE) Statistics	Short	R20 000 000	R9 000 000	R2 000 000	R9 000 000

ITEM NO	CATEGORY	SUB-CATEGORY	SECTION	PROJECT TITLE	IMPLEMENTATION TIMEFRAME	ESTIMATED BUDGET REQUIRED	ACTUAL EXPENDITURE TO DATE	AVAILABLE FROM INTERNAL FUNDING	FUNDING SHORTFALL TO COMPLETE THE PROJECT
38	Measures To Reduce NMBM's Water Consumption	Water Conservation and Demand Management	5.2.7	Water and Sanitation Tariffs	Short	R1 500 000	R0	R500 000	R1 000 000
39			5.2.8	Leak Repair	Short	R220 000 000	R55 000 000	R15 000 000	R150 000 000
40			5.2.9	Operations and Maintenance	Short	R36 000 000	R9 600 000	R1 500 000	R24 900 000
41			5.2.10	Domestic Water Meter Audits	Short	R8 000 000	R500 000	R0	R7 500 000
42			5.2.11	Valve and Fire Hydrant Audits	Short	R3 500 000	R500 000	R0	R3 000 000
43			5.2.12	Consumer Water Meter replacements	Long	R300 000 000	R23 000 000	R79 000 000	R198 000 000
44			5.2.13	Pipe Replacement Programme	Medium	R228 000 000	R63 000 000	R77 000 000	R88 000 000
45			5.2.14	Reservoir Rehabilitation	Medium	R59 000 000	R5 500 000	R34 000 000	R19 500 000
46			5.2.15	Communications, Publicity, Awareness & Marketing	Short	R17 000 000	R3 000 000	R5 000 000	R9 000 000
47			5.2.16	Assistance from Budget Facility Infrastructure (BFI) Grant Funding	Completed	R208 000 000	R208 000 000	R0	R0
48	Emergency Supply Options	Continued Potable Water Supply to Critical Areas	7.1.1	Water Carting	Short	R4 500 000	R1 000 000	R1 500 000	R2 000 000
49			7.1.2	Water Shedding	Short	R6 000 000	R0	R0	R6 000 000
50			7.1.3	Water Collection Tanks	Short	R11 000 000	R3 000 000	R1 000 000	R7 000 000
51			7.1.4	Water Collection Points	Short	R27 000 000	R4 000 000	R1 000 000	R22 000 000
52			7.1.5	Emergency water supply to Municipal and Corporate Buildings	Short	R12 000 000	R500 000	R1 000 000	R10 500 000
				TOTALS:		**R14 313 150 000**	**R1 906 700 000**	**R1 233 800 000**	**R10 462 150 000**

9. COORDINATION

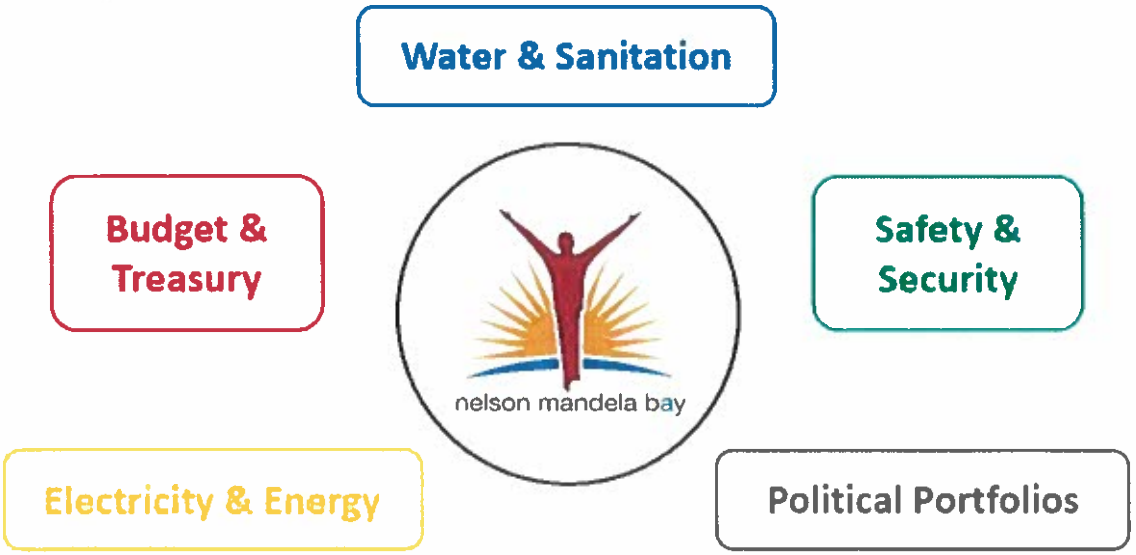
The NMBM has an extensive coordination relationship with all stakeholders. Continuous meetings and updates are provided across all spheres of government and internally to the NMBM's structures as described in the sections below:

9.1 SECTORAL COORDINATION

The NMBM engages in sectoral coordination meetings with the following spheres of government on a regular basis to discuss the management of the drought, provide updates and statuses of implementation and action plans.

9.2 INTERNAL COORDINATION

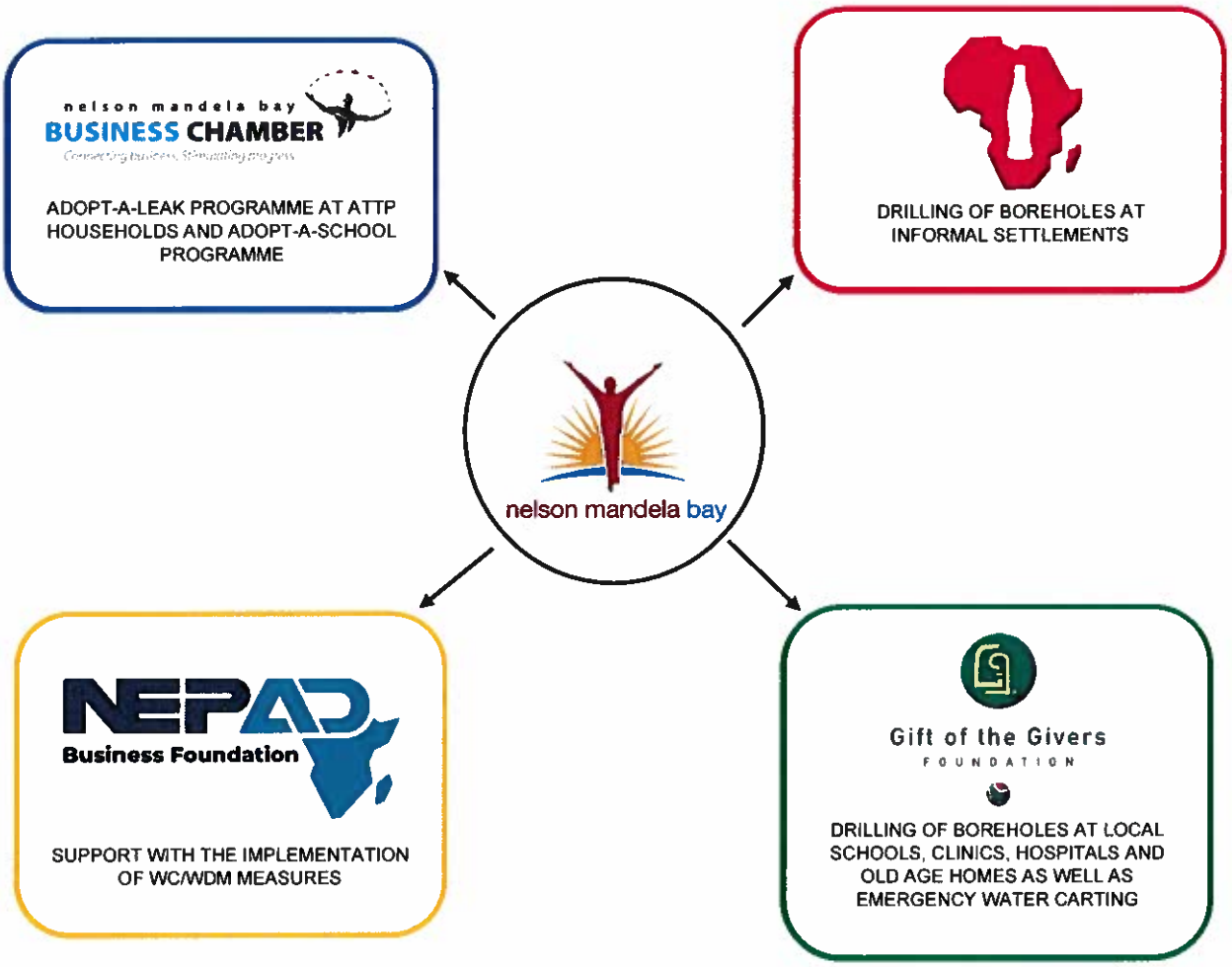
The NMBM has regular internal meetings with all relevant key role players from the following internal divisions:



9.3 EXTERNAL INSTITUTIONS

The NMBM also has ongoing, very successful partnerships with businesses and external institutions within the NMB municipal area. The assistance that these businesses and external institutions are providing is of crucial importance towards the sustainability of the NMB water supply. It also shows the commitment from these institutions in partnering with the NMBM to overcome the negative impacts of the current severe drought.

The following graphic indicates some of the recent partnerships, together with the various services provided:



10. CONCLUSION

10.1 CONCLUSION

Although the NMBM continues to experience a severe drought, which has seen some of the lowest dam levels in recorded history, the NMBM is working tirelessly to ensure a reliable water supply to all their citizens by the implementation of various interventions to curb our water demand and to augment the bulk water supply system. The NMBM believes that this will create flexibility and ensure longevity in their water supply over the long-term.

The rainfall statistics indicate that although there was slight relief from the drought which started in 2015 - with rainfall in 2018 and in 2023 that provided some relief – subsequent below average rainfall in the catchment areas of the western dams has resulted in continuing drought conditions within the Algoa Water Supply System. It is now at the stage where it is mandatory to intensify efforts to conserve water

Given the information provided in the report, supported by the SAWS indicating a likelihood of below average rainfall during the autumn and perhaps the early-winter period of 2026, it is essential that the Municipality and all residents of the NMBM work together to reduce the daily water demand from about 382 Mℓ/day to around 280 Mℓ/day with immediate effect.

The NMBM has therefore prepared and maintained a comprehensive Drought Mitigation Plan and has made steady progress on the listed interventions contained within. With the assistance from all National, Provincial, Local, as well as internal departments & external institutions, the NMBM will be able to adequality address and mitigate the effects of the persisting current and future drought conditions.

10.2 APPROVAL

The report and its content are approved for implementation and adoption by the:

	B. J. MARTINI	2026·02·10.
INFRASTRUCTURE & ENGINEERING	**PRINT NAME**	**DATE**
	Adv. L. NGOPO	11/02/2026
Act. **CITY MANAGER**	**PRINT NAME**	**DATE**