



UMGENI WATER

Infrastructure Master Plan 2012

2012/2013 – 2042/2043

Vol I



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UMGENI WATER

INFRASTRUCTURE MASTER PLAN 2012

2012/2013 - 2042/2043

MARCH 2012

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Preface

This Infrastructure Master Plan 2012 describes Umgeni Water's infrastructure plans for the financial period 2012/2013 – 2042/2043. It is a comprehensive technical report that provides detailed information on the organisation's current infrastructure and on its future infrastructure development plans. This report replaces the last comprehensive Infrastructure Master Plan that was compiled in 2011.

The report is divided into two volumes:

- **Volume I** describes the most recent changes and trends within the primary environmental dictates that influence Umgeni Water's infrastructure development plans (Section 2). Section 3 provides a review of historic water sales against past projections, as well as Umgeni Water's most recent water demand projections, compiled at the end of 2011. The current water resource situation, for both surface and groundwater, for the catchments that are important to Umgeni Water's operational requirements, is described in Section 4. Climatic impacts on these water resources and the potential future impacts of climate change are presented. Future water resource development plans for these catchments, as well as alternatives to the traditional resources, are discussed. Linkages are made to the water supply infrastructure development plans that are discussed in Volume II.
- **Volume II** documents the current water supply infrastructure that Umgeni Water utilises for operational purposes and describes the most recent infrastructure plans that have been developed to address the future water supply requirements (Section 5). These plans are aligned to the latest water demand projections and proposed water resources infrastructure developments as presented in Volume I. Section 6 describes the waste water works currently operated by Umgeni Water, and Section 7 provides individual project sheets for those infrastructure projects discussed in Section 5. All references made throughout the entire Infrastructure Master Plan are listed at the end of each volume.

It is important to note that information presented in this report is in a summarised form and it is recommended that the reader refer to the relevant planning reports if more detail is sought. Since the primary focus of this Infrastructure Master Plan is on Umgeni Water's existing bulk infrastructure supply network, the water resource infrastructure development plans are not discussed at length.

The Department of Water Affairs (DWA), as the responsible authority, has undertaken the regional water resource development investigations within Umgeni Water's area of operation. All of these investigations have been conducted in close collaboration with Umgeni Water and other major stakeholders in order to ensure that integrated planning occurs. Details on these projects can be obtained directly from DWA, Directorate: Options Analysis (East).

Cognisance is taken of the initiatives relating to water conservation and water demand management being undertaken by Umgeni Water and the various Water Services Authorities. However, these are not discussed in this Infrastructure Master Plan as they fall outside its primary focus, even though they are within the overall framework of Umgeni Water's infrastructure planning process.

The Infrastructure Master Plan is a dynamic and evolving document. Outputs from current planning studies, and comments received on this document will therefore be taken into account in the preparation of the next update.

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List of Acronyms

AADD	Annual Average Daily Demand
AC	Asbestos Cement
ADWF	Average Dry Weather Flow
AsgiSA	Accelerated and Shared Growth Initiative of South Africa
AVGF	Autonomous Valveless Gravity Filter
BID	Background Information Document
BPT	Break Pressure Tank
BWL	Bottom Water Level
BWSP	Bulk Water Services Provider
BWSS	Bulk Water Supply Scheme
CAPEX	Capital Expenditure
CMA	Catchment Management Agency
CoGTA	Department of Co-operative Governance and Traditional Affairs
CWSS	Community Water Supply and Sanitation project
DAEA	Department of Agriculture and Environmental Affairs
DEA	Department of Environmental Affairs
DFA	Development Facilitation Act (65 of 1995)
DM	District Municipality
DMA	District Management Area
DRDLR	Department of Rural Development and Land Reform
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
EFR	Estuarine Flow Requirements
EIA	Environmental Impact Assessment
EKZN Wildlife	Ezemvelo KZN Wildlife
EMP	Environmental Management Plan
EWS	eThekweni Water Services
EXCO	Executive Committee

FC	Fibre Cement
FL	Floor level
FSL	Full Supply level
GCM	General Circulation Model
GDP	Gross Domestic Product
GDPR	Gross Domestic Product of Region
GVA	Gross Value Added
HDI	Human Development Index
IDP	Integrated Development Plan
IFR	In-stream Flow Requirements
IMP	Infrastructure Master Plan
IRP	Integrated Resource Plan
ISP	Internal Strategic Perspective
IWRM	Integrated Water Resources Management
KZN	KwaZulu-Natal
LM	Local Municipality
LUMS	Land Use Management System
MA	Moving Average
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MBR	Membrane Bioreactor
MMTS	Mooi-Mgeni Transfer Scheme
MMTS-1	Mooi-Mgeni Transfer Scheme Phase 1
MMTS-2	Mooi-Mgeni Transfer Scheme Phase 2
mPVC	Modified Polyvinyl Chloride
MTEF	Medium-Term Expenditure Framework
MTSF	Medium-Term Strategic Framework
MWP	Mkomazi Water Project
MWP-1	Mkomazi Water Project Phase 1
NCP-1	North Coast Pipeline I

NCP-2	North Coast Pipeline II
NCSS	North Coast Supply System
NGS	Natal Group Sandstone
NPV	Net Present Value
NSDP	National Spatial Development Perspective
NWSP	National Water Sector Plan
OPEX	Operating Expenditure
p.a.	Per annum
PEST	Political, Economical, Sociological and Technological
PGDS	Provincial Growth and Development Strategy
PPDC	Provincial Planning and Development Commission (KZN's)
PSEDS	Provincial Spatial Economic Development Strategy
PWSP	Provincial Water Sector Plan
RCC	Roller Compacted Concrete
RDP	Reconstruction and Development Programme
RO	Reverse Osmosis
ROD	Record of Decision
RQO	Resource Quality Objective
SCA	South Coast Augmentation
SCP	South Coast Pipeline
SCP-1	South Coast Pipeline Phase 1
SCP-2a	South Coast Pipeline Phase 2a
SCP-2b	South Coast Pipeline Phase 2b
SDF	Spatial Development Framework
SHR	St Helen's Rock (near Port Shepstone)
STEEPLE	Social/demographic, Technological, Economic, Environmental (Natural), Political, Legal and Ethical
SWRO	Seawater Reverse Osmosis
TBM	Tunnel Boring Machine
TLC	Transitional Local Council

TWL	Top Water Level
uPVC	Unplasticised Polyvinyl Chloride
UW	Umgeni Water
WA	Western Aqueduct
WBS	Work Breakdown Structure
WC	Water Conservation
WDM	Water Demand Management
WMA	Water Management Area
WRC	Water Research Commission
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSNIS	Water Services National Information System
WSP	Water Services Provider
WTP	Water Treatment Plant
WWW	Wastewater Works

Spellings of toponyms have been obtained from the Department of Arts and Culture (DAC). DAC provides the official spelling of place names and the spellings, together with the relevant gazette numbers can be accessed at <http://www.dac.gov.za/doc/2012/APPROVED%20NAMES.XLSX2012.XLSX>. Please note that for this report, the new spelling of the toponyms as approved in 2010 and 2011 have not been used to allow easy understanding as to which toponyms are referred to.

List of Units

Length/Distance:	mm	millimetre
	m	metre
	km	kilometre
Area:	m ²	square metres
	ha	hectare
	km ²	square kilometres
Level/Altitude:	mASL	metres above sea-level
Time:	s	second
	min	minute
	hr	hour
Volume:	m ³	cubic metres
	MI	megalitre
	million m ³	million cubic metres
	mcm	million cubic metres
Water Use/Consumption/Treatment/Yield:	l/c/day	litre per capita per day
	kl/day	kilolitre per day
	MI/day	megalitre per day
	million m ³ /annum	million cubic metres per annum
	kg/hr	kilograms per hour

Flow velocity/speed:

m/s

metres per second

Flow:

m^3/s

cubic metres per second

l/hr

litres per hour

m^3/hr

cubic metres per hour

1 Introduction

1.1 Purpose

“He who fails to plan, plans to fail”

Anonymous

Established in 1974, Umgeni Water has developed into the second largest water utility in South Africa, supplying over 412 million cubic metres of bulk potable water annually to six Water Services Authorities (WSAs), comprising one metropolitan municipality, four district municipalities, and one local municipality, within the province of KwaZulu-Natal (KZN). The locality of Umgeni Water’s area of operation, i.e. the area of these six WSAs, is shown in **Figure 1.1**. However, it is important to note that within this area Umgeni Water currently does not supply bulk water in the southern portion of Ugu District Municipality, nor in the portion of Ilembe District Municipality north of the uThukela River, and nor in the entire Sisonke District Municipality other than in the town of Ixopo.

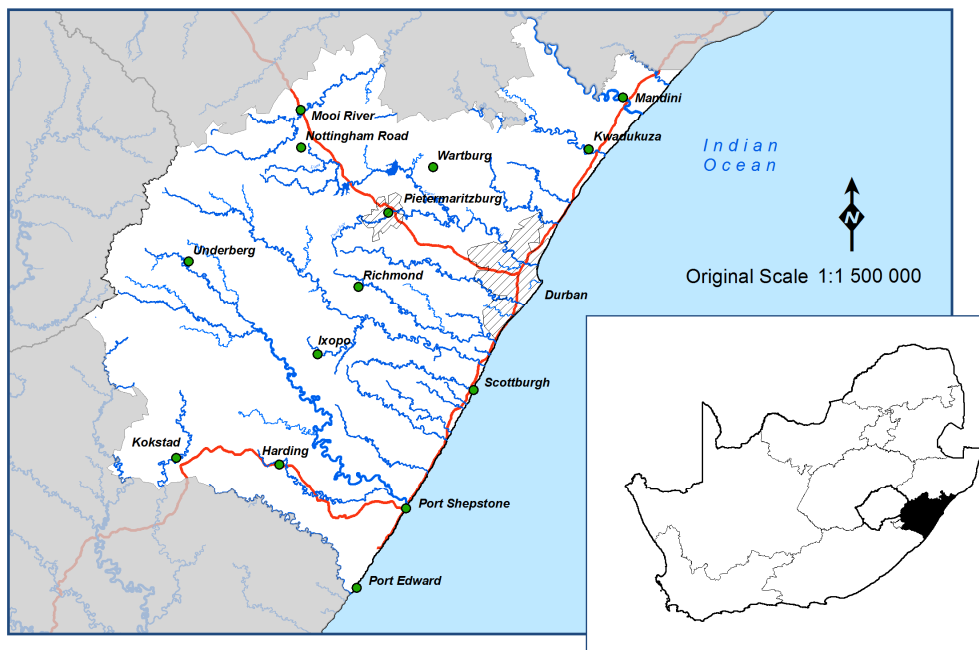


Figure 1.1 Locality of Umgeni Water’s area of operation.

These municipalities collectively contribute approximately 75% of the province’s Gross Value Added (GVA). However, the highest poverty densities in KZN are also located in these areas. Hence, Umgeni

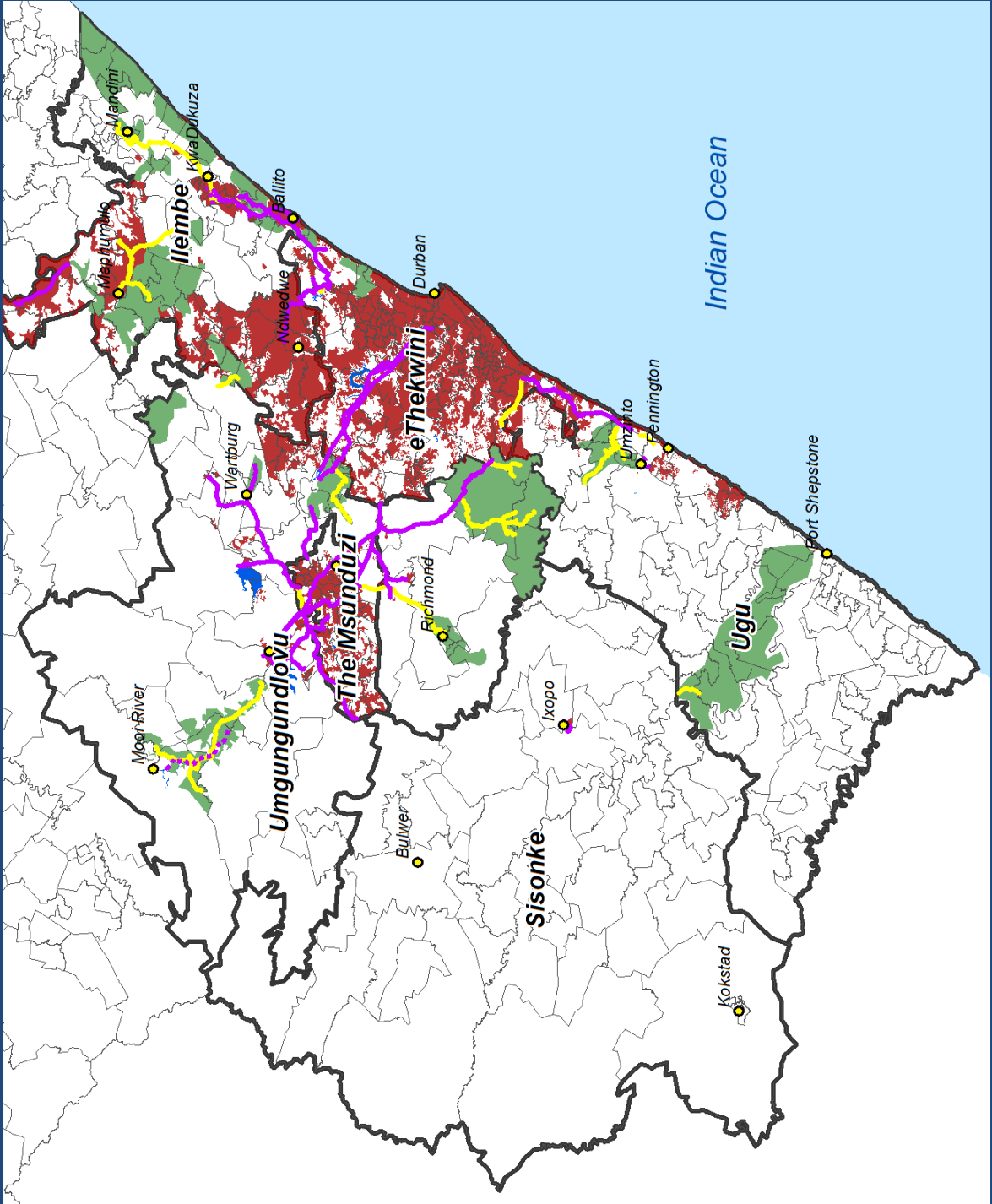
Water is faced with the dual challenge of ensuring that the province's economic engine remains served with a reliable supply of potable water, whilst also ensuring that water is adequately provided for the eradication of water backlogs, the improvement of the level of water services, and the alleviation of poverty.

The WSAs are responsible for water service delivery to the people who reside within their respective areas of jurisdiction. The areas that receive reticulated water from the WSAs, who in turn receive bulk potable water from Umgeni Water, are shown in **Figure 1.2**. This collective reticulated area constitutes Umgeni Water 'supply footprint' and comprises of various levels of service based on a number of bulk supply schemes that are both interdependent and stand-alone.

The environment within which Umgeni Water is required to fulfil its function as a regional bulk water service provider is constantly undergoing change, with many factors influencing both the water demand and water supply components of its business. In particular, the economic up- and down-turns that the country, including KZN, has experienced over the past few years have a marked influence. Umgeni Water's infrastructure planning therefore needs to be continually reviewed, updated and adapted in order to be responsive (wherever possible) to this dynamic external environment .

For any organisation to effectively achieve its mission, it needs to have, amongst other things, a clearly defined plan of what is required in the future so that it can be addressed in the present. This Infrastructure Master Plan 2012 (IMP 2012) describes how Umgeni Water intends to address the future bulk water infrastructure requirements within its area of operation in order to meet the anticipated needs. It also indicates the proposed integration between these water supply infrastructure plans and the regional water resource plans being developed by the Department of Water Affairs (DWA).

Figure 1.2 Umgeni Water's supply footprint.



Legend

- UW Pipeline
- ⋯ UW Operated Pipeline
- Proposed Pipeline
- UW current supply footprint
- UW target supply footprint
- WSAs for whom UW is BWSP
- Wards



Original Scale on A4 at 1 : 1 500 000

0 25 50 km

This infrastructure master plan comprises the following sections:

- **Section 2** identifies the changes that have occurred in the external environment since the IMP 2011 that have had an impact on the provision of sustainable bulk potable water;
- **Section 3** presents a review of actual sales achieved in 2010/2011 against the IMP 2009 forecast, and provides revised short-term (3 year) and long-term (30 year) water demand projections;
- **Section 4** analyses the current water resource situation and identifies the new water resource infrastructure required to meet the projected water demands;
- **Section 5** identifies the water supply capacity constraints and the new infrastructure required to meet the projected water demands;
- **Section 6** describes and identifies the capacity constraints of the wastewater infrastructure; and
- **Section 7** provides individual project sheets for those infrastructure projects identified in Section 5.

1.2 Setting the Scene

The distribution of Umgeni Water’s infrastructure and the projects that have been commissioned since the publication of the IMP 2011 are shown in **Figure 1.3**. These changes are summarised in **Table 1.1**.

Table 1.1 Recent additions to Umgeni Water Bulk Supply Infrastructure.

Infrastructure	Status
'57 Pipeline Augmentation	Certificate of completion issued in July 2011
Ndwedwe Reservoir 1 Upgrade	Commissioned in December 2011
Ndwedwe Reservoir 2 Upgrade	Commissioned in December 2011
Mhlabatshane Raw Water Pipeline (from dam to intermediate pump station)	Commission in August 2011
Bruyns Hill Reservoir Upgrade	Commissioned in December 2011
Umzinto Link (Ellingham to Umzinto WTP Emergency Water Supply)	Commissioned in March 2011
Middledrift/Madungela Abstraction (part of Ngcebo Bulk Water Supply Scheme)	Commissioned in December 2011

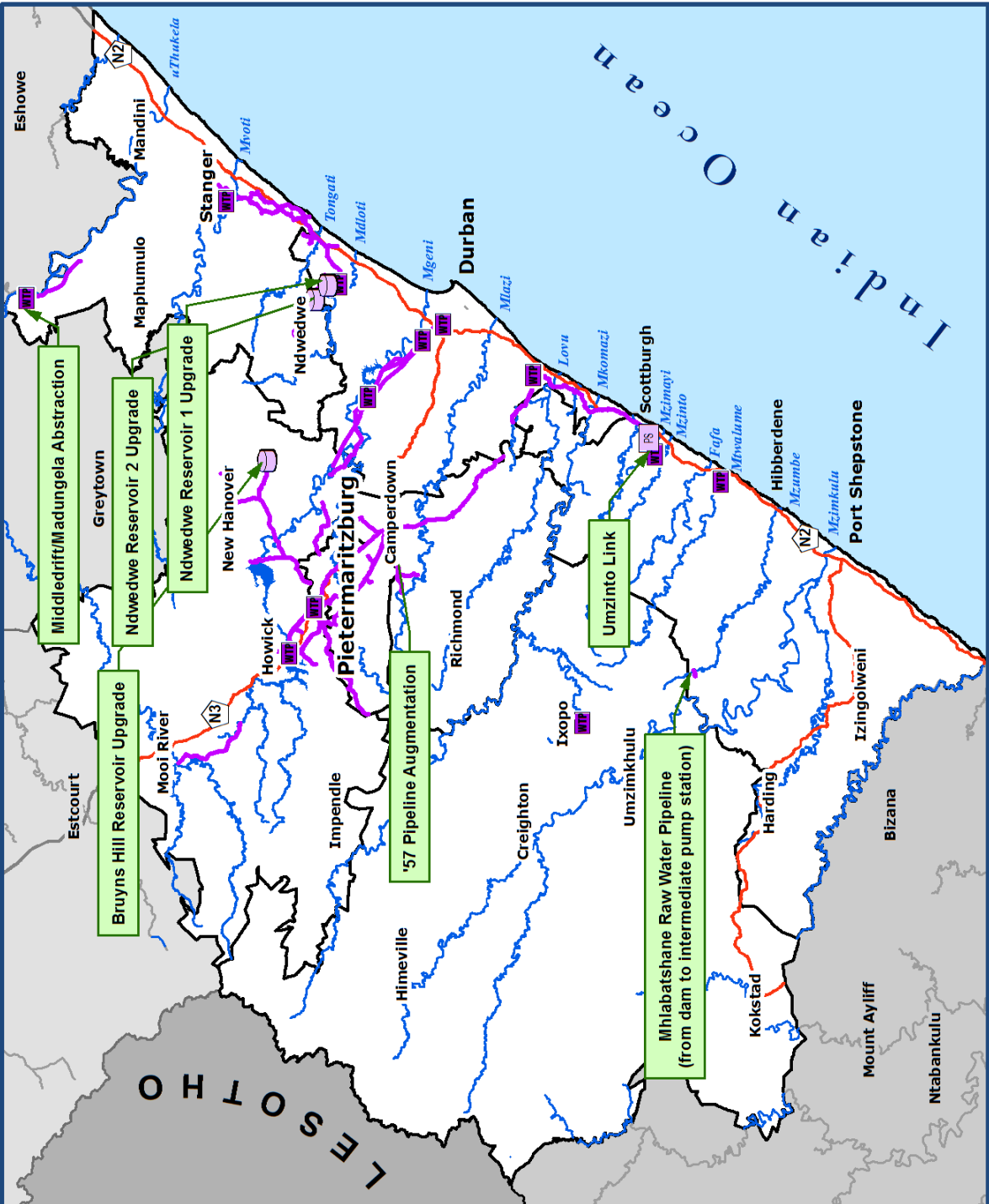


Figure 1.3 Changes in Umgeni Water's infrastructure 2010/2011 – present.

Legend

- UW Operated WTPs
- UW Operated Pipelines
- National Roads
- Rivers
- UW Operated Dams
- WSAs for whom UW is BWSP

Source:
 Department of Water Affairs
 KZN Department of Transport
 Municipal Demarcation Board
 Umgeni Water



Original Scale on A4 at 1 : 1 500 000

0 25 50 km