

KZN Universal Access Plan Date: 21 | 09 | 2021

Umgeni Water Vernon Perumal





Improving Quality of Life and Enhancing Sustainable Economic Development.

BACKGROUND

Universal Access Plan

Common Vision and Agenda:

- Bulk Water Master Plans (UW)
- Universal Access Plan (COGTA)
- Total Water Services Business Master Planning (DWS)
- Universal Access Plan Phase 1 Completed in 2014
- Universal Access Plan Phase 2 Completed in 2016
- Universal Access Plan Phase 3 Completed in 2020

UAP Phase 3 – Study Area



The Kwazulu-Natal (KZN) province is situated on South Africa's eastern seaboard, on the edge of the Indian Ocean and shares a total of 7.7% (92 060 km²) of the total area of South Africa. The neighbouring countries and provinces are Mozambique, Swaziland, Lesotho, Mpumalanga, Free State and the Eastern Cape.

The Capital City is Pietermaritzburg and other major cities and towns include Durban, Port Shepstone, Margate, Richards Bay, Ulundi.

The KZN comprises of 10 District Municipalities and 1 Metro, as follows:

- Amajuba (Newcastle);
- eThekwini (Durban) Metro;
- iLembe (KwaDukuza, formerly Stanger);
- Harry Gwala (Ixopo).
- Ugu (Port Shepstone);
- Umgungundlovu (Pietermaritzburg
- uMkhanyakude (Mkuze);
- Umzinyathi (Dundee);
- uThukela (Ladysmith);
- King Cetshwayo (Richards Bay); and
- Zululand (Ulundi).

Thus, there are 14 WSAs in KZN

Water Resources

E mi d e A m Zululand Un ny h Umgungundlov n i Water Management Areas Pongola Mtamvuna Mzimvubu Tsitsikamma

List of Major Dams

Reservoir	River	Full Supply	Water in
		Capacity (FSC) Mm ³	Dam Mm ³
Midmar	Mgeni	235,42	216,44
Nagle	Mgeni	23,236	17,649
Albert-Falls	Mgeni	288,14	90,565
Inanda	Mgeni	237,40	185,39
Hazelmere	Mdloti	37,133	15,224
		821,33	525,27
Spioenkop	Tugela	270,64	222,27
~Driel Barrage	Tugela	8,694	9,398
Woodstock	Tugela	355,42	274,22
Craigie Burn	Mnyamvubu	22,466	15,543
Mearns	Mooi	5,163	2,668
Spring Grove	Mooi	139,20	57,715
Ntshingwayo	Ngagane	194,56	126,99
Zaaihoek	Slang	184,26	102,38
Wagendrift	Boesmans	55,900	46,003
		1236,30	857,19
Lake Pobane	Mhlatuze	301,26	154,44
(Goedertrouw)			
Klipfontein	Wit Mfolozi	18,086	8,804
Hluhluwe	Hluhluwe	25,893	18,127
Pongolapoort	Phongolo	2267,07	914,12
Bivane	Bivane	114,04	71,812
Jericho	Mpama	59,273	40,373
Westoe	Usutu	60,095	18,219
Morgenstond	Ngwempisi	99,988	43,911
Heyshope	Assegaai	444,94 3390,65	312,72 1582,53
		· · ·	
Nooigedacht	Komati	78,343	64,832
Vygeboom	Komati	78,020	63,811
Driekoppies	Lomati	250,92	178,63
Maguga	Komati	333,75	193,29
Longmere	Wit	4,202	2,000
Klipkopjes	Wit	11,777	1,261
Witklip	Sand	12,519	7,864
Primkop	Wit	1,899	1,543
Kwena	Krokodil	158,65	69,349
Da Gama	White Waters	13,526	6,601
Inyaka	Marite	123,66	60,974 650 15
Source: DW/S 2020		1007,27	050,15

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Demographics and Backlogs

There are approximatly 8 279 000 people within 1714 000 househiolds residing in 4 503

communities.

WSA	No of Commu -nities	No of HH	No of People
Amajuba	97	26 107	163 276
City of uMhlathuze Local Municipality	58	110 616	390 069
Harry Gwala	399	123 112	701 995
iLembe	260	191 369	720 714
King Cetshwayo	423	108 896	585 377
Newcastle Local Municipality	29	92 485	434 174
The Msunduzi Local Municipality	30	175 308	690 521
Ugu	253	170 701	757 428
uMgungundlo vu	228	118 615	829 910
uMkhanyaku de	319	149 197	743 170
uMzinyathi	369	118 270	587 974
Uthukela	766	147 911	718 568
Zululand	1 274	183 642	955 450
Total	4 503	1 714 229	8 278 626

Source: DWS Referende Framework, 2019 excluding eThekwini

		1
No of HH	WS Backlog	% WS backlog
26107	7 063	27,1%
110 616	4674	4,2%
123 112	59 597	48,4%
191 369	72 202	37,7%
108 896	74 423	68,3%
92485	8 691	9,4%
175 308	16 935	9,7%
170 701	57 779	33,8%
116 615	19 691	16,9%
149 197	60 387	40,5%
118 270	53 811	45,5%
147 911	60 112	40,6%
183 642	39 155	21,3%
1 714 229	534 520	31,2%
	No of HH 26107 110 616 123 112 191 369 108 896 92 485 175 308 170 701 116 615 149 197 118 270 147 911 183 642 1714 229	No of HH WS Backlog 26107 7 063 110 616 4 674 123 112 59 597 191 369 72 202 108 896 74 423 92 485 8 691 175 308 16 935 170 701 57 779 116 615 19 691 149 197 60 387 118 270 53 811 147 911 60 112 183 642 39 155 1714 229 534 520



Existing Infrastructure

Bulk Pipeline (km): 10 821km

Reservoirs: 2 803 with capacity of 2 923 370 Kl

Pump Stations: 550

WTP (Capacity-MI): 151 WTPs with total capacity of 1 984.7 Ml/day

Blue Drop Status: 8

WTP Condition:

Primary: 8 Operational: 65 Dysfunctional: 61

Regular maintenance are only conducted on 65 WTPs.

198 Existing Regional Bulk Water Supply Schemes



Water Losses

Water Conservation & Demand Management

Each WSA should prepare a WC/WDM Strategy in order to address water inefficiencies and ensure protection and conservation of water resources as well as financial sustainability of providing water services.

Part of such a WC/WDM Strategy is reporting on the water balance that provides an overview of water supplied, as System Input Volume (SIV) and the potential water accounted for and billed or water not billed, or water lost.

The WSAs in KwaZulu-Natal each report monthly to the DWS Regional Office to provide information on its water balance components.

Sytem Input Volume vs Real Water Losses



Water Demand 2020: 1 992,2 Ml/day 2050: 2 917,3 Ml/day

The water requirements (in Ml/d) for the KZN are presented per WSA within below. These water requirements were calculated for consumers having formal water supply schemes and for consumers not yet supplied from a formal water supply scheme

WSA	Demand	Demand
	2020	2050
	(Mℓ/day)	(Mℓ/day)
Amajuba	29	46,9
City of Umhlathuze	284,4	500
Harry Gwala	128,6	170,9
llembe	147	218,4
King Cetswayo	115,4	141,2
Newcastle	116,7	171
The Mzunduzi Local	200,2	298,2
Municipality		
Ugu	194,7	323,1
Umgungundlovu	188,9	284,2
Umkhanyakude	137,6	177,2
Umzinyathi	115,3	166,7
Uthukela	142,5	180
Zululand	191,8	239,6
Kwazulu-Natal	1 992,20	2 917,30

Water Demand Model Methodology

A water demand model was developed to determine the demands for all areas included in the study, at least at a town level. The water demands were required to inform the concept design for a design horizon period up to 2050, with the minimum level of service a yard connection at 100l/capita per day.

The output of the water demand model was a total water demand (including direct demands, indirect demands and acceptable losses) for 2019; 2020; 2025; 2030; 2035; 2040; 2045 and 2050 per Small Area, in Ml/day.



Proposed Bulk Water Supply Interventions

A total estimated R 72.712 Billion is required to address the proposed 140 bulk water supply interventions (WSIs)

Bulk Pipeline (km) to be augmented from:

- Primary 1 681 km to 2 728.8 km
- Secondary 6 741.9 km to 9 179.3 km
- Tertiary 2 398.4 km to 4 645.2 km

Reservoirs: Increase the existing storage capacity of 3 839 Reservoirs with capacity of 3 367 MI to Reservoirs with planned capacities of 6 161 MI:

- Primary: 1 340.2 MI to 1 470.2 MI
- Secondary: 2 170 MI to 3 343.7 MI
- Tertiary: 0.25MI to 1 507.5 MI

Pump Stations: 643 Pump Stations with a pumping capacity of 35 249.2 Kw

WTP (Capacity-MI): The daily treatment capacity to be increased to 2 206 Ml/day that includes the construction of 19 new WTPs that are mainly located within Harry Gwala (7), King Cetshwayo (1), uMgungundlovu (2), uMzinyathi (1), uThukela (7) and Zululand (1)



Example of WSIA – UMkhanyakude DM

UK007 WSIA: Mkuze

- Pop 2050: 18 654 Demand 2050: 4.3 Ml/day
- Upgrade the existing bulk line (ø 200mm) to ø 762mm from Jozini New WTP to augment the Mkhuze and Mhlekazi Supply areas
- Bulk conveyance:
 - -Extend the ø 125mm secondary bulk from the Block 6 WTP to include 52km of secondary bulk pipes between ø 90mm and ø 200mm bulk main to reach the Mkhuze Town and Mhlekazi and the tertiary bulk to include 2.03km of bulk pipe of ø 200mm
- Storage:
 - –Add additional storage of 11,4 Mł with two (2) 4.3 Mł tertiary reservoirs to serve the Mkuze SP and Nkangala SP and two (2) tertiary reservoirs with a total capacity of 2.86 Mł to serve the Mhlekazi SP
- Cost requirement

WSIA	WSIA Name	Total Cost Requirement				
		Primary	Secondary	Tertiary	10% Contingencies	Total Cost (Excl VAT)
UK007	Mkuze	R0,00	R30 410 000	R48 979 000	R7 938 900	R87 327 900

Example of WSIA – UMkhanvakude DM



Example of WSIA – UMkhanyakude DM



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Example of WSIA – UMkhanyakude DM

Proposed Implementation Order

• Three (3) priorities are proposed as well as to follow a phased approach for implementation for e.g. initiate only the upgrade to the WTP at first and then when funding permits, can the bulk conveyance and storage be extended, upgraded or constructed

Proposed Priorities (Phased Approach)	WSIA No and Name		Proposed Project Name	Proposed Estimated Project Value
1	UK003	Mpukunyoni	Mfolozi Off Channel Storage Dam Feasibility Study and Dam Development:	
	UK005	Hluhluwe	1 Initiato Foosibility Study	R5 000 000
	UK006	Mtubatuba	2. Off-channel storage dam development	R2 077 643 156
2	UK007	Mkuze	Augment the supply to the Mkuze supply area from the Jozini WTP	R87 327 900
3	UK002	Shemula	Upgrade the existing Shemula WTP to 45 MI/day inclusive of an 195kW pump station at the WTP as well as increasing the storage capacity of the Command Reservoir to 6.74Mℓ.	R103 927 000

Deliverables Received

- Reports per WSA within KZN (13)
- Geo-Database (DWS format)
- 62 pages of WSIA for 13 WSA's in KZN
- Demand Tables
- Costing
- Mapbooks

Findings and Opportunities

- UW IMP : Incomplete As-Built information
 - Possible projects to capture this per WSA
- WC/WDM Strategies and Reports
- Maintenance Strategies for Water Infrastructure
- Investigations into Pressure Management
- Geodatabase can be used for WSDP
- WSIA can be included in WSA Masterplans as possible projects
- Pre and detailed feasibilities studies to be conducted on WSIA (Funding and Institutional arrangements dependent)
- UAP Masterplan for Ethekwini MM

Thank You



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