

5. WATER SERVICES INFRASTRUCTURE PROFILE

5.1 Existing water services infrastructure

ZDM has done extensive work on the development of a database that will serve as an asset register, but also to be used as the basis for the development of an asset management system and to capture asset related information electronically for ongoing use. The system has been named 'MANZI' and access can be gained on the ZDM website at www.zululand.org.za once the user has been issued with a username and password.

Table 5.1(a) below provides a brief overview of the schemes in the district that have been captured on the MANZI system and a summary of the infrastructure under consideration, as well as a rough estimate of the value of assets. These figures will be refined over time once the asset management system has been rolled out.

Table 5.1(a): Summary of schemes in the district

Summary Data	LOS	Total
Number of Schemes	Above RDP - Urban	14
	Above RDP - Rural	46
	RDP	87
	Rudimentary	142
	TOTAL SCHEMES	289

Figures 5.1 (a), (b) and (c) and Table 5.1 (b) below show examples of infrastructure data that is currently available on the GIS system and also on MANZI. Although some gaps still exist in the infrastructure information ZDM is working on getting all information gaps systematically updated.

Table 5.1 (b): Summary of infrastructure components available on the ZDM GIS system

Summary Data	Description	Total
Pipelines	Bulk	1 043.5 km
	Reticulation	4 723.9 km
Installations	Yard Connection	21 085
	StandPipe - Barrel	302
	StandPipe - Communal	3 681
	Electrical Point	77
	Valve	7 820
	Meter	522
	Bulk Metering Points	58
	Handpump	17
	Pump	19
	Pump Station	107
	Source / Abstraction	441
	Break-pressure Tank	169
	Storage - Jojo	181
	Storage - Reservoir	642
	Treatment (WTW, Sand filters etc)	38
Replacement Value	Civil	R 1 494 068 392.03
	Mechanical	R 436 348 330.19
	Electrical	R 172 738 372.57
	Telemetry	R 9 207 532.21

Figure 5.1 (a): Existing water infrastructure in the district

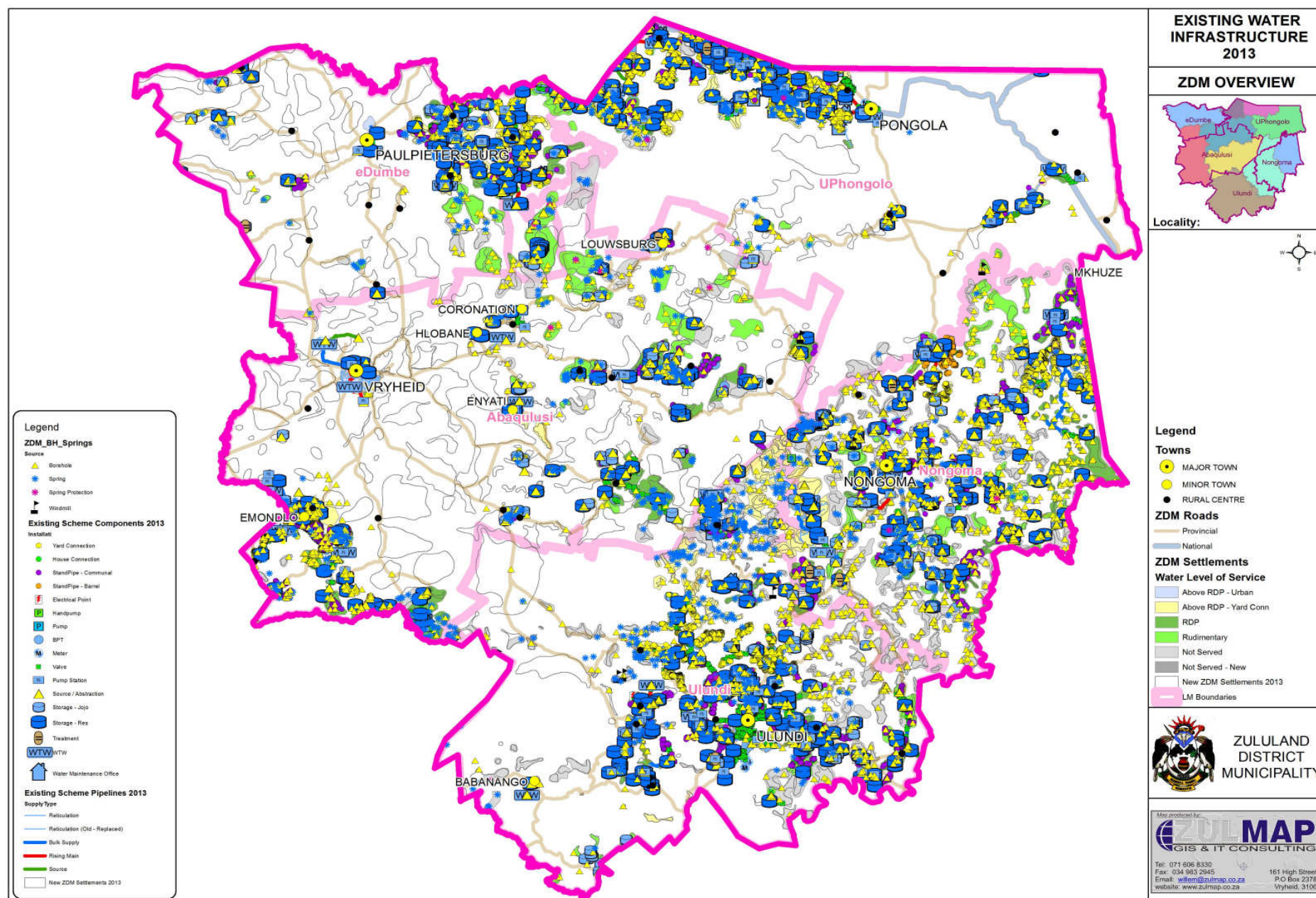


Figure 5.1 (b): Typical Bulk Water Scheme details available on the ZDM GIS database (Ulundi Area)

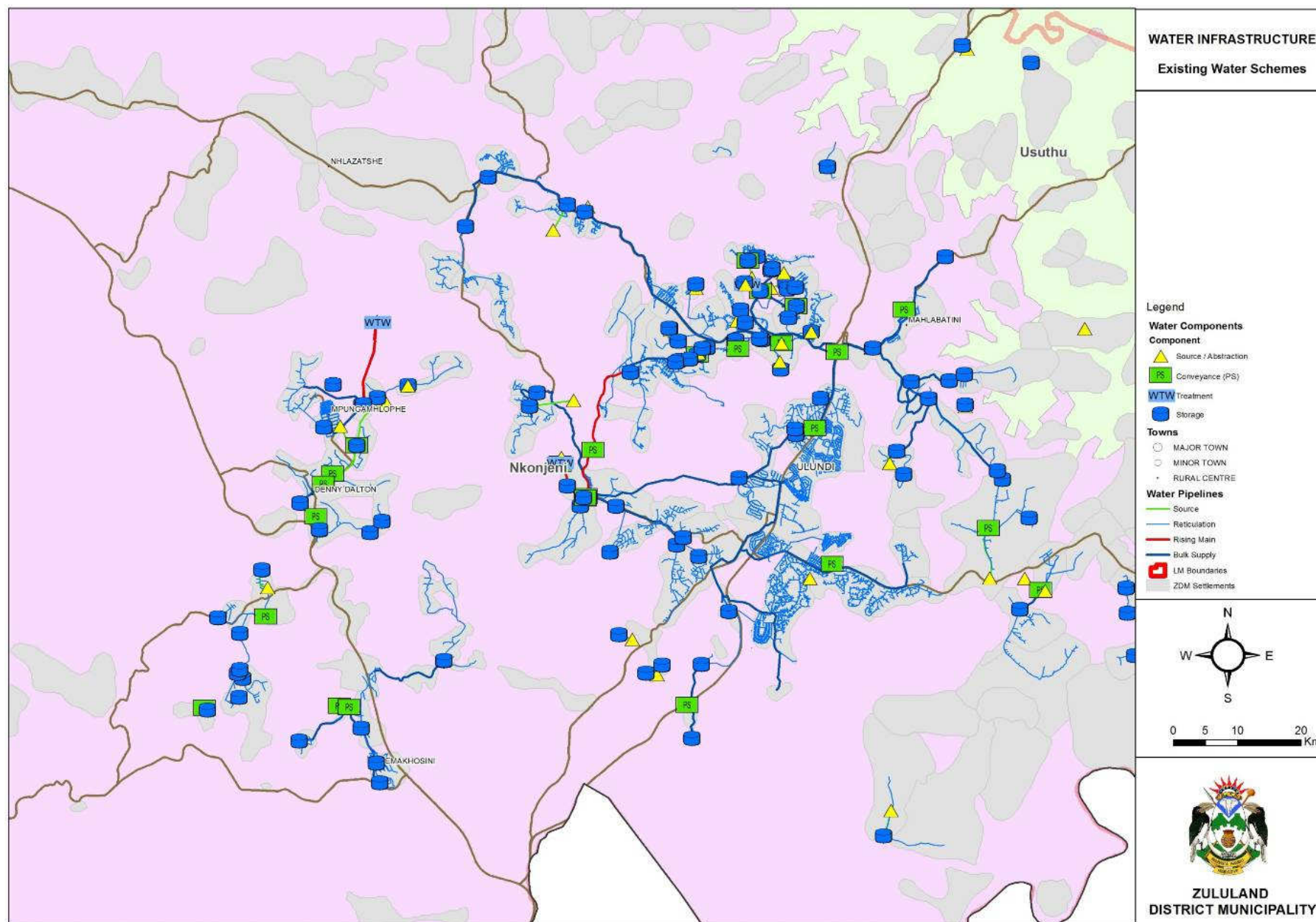
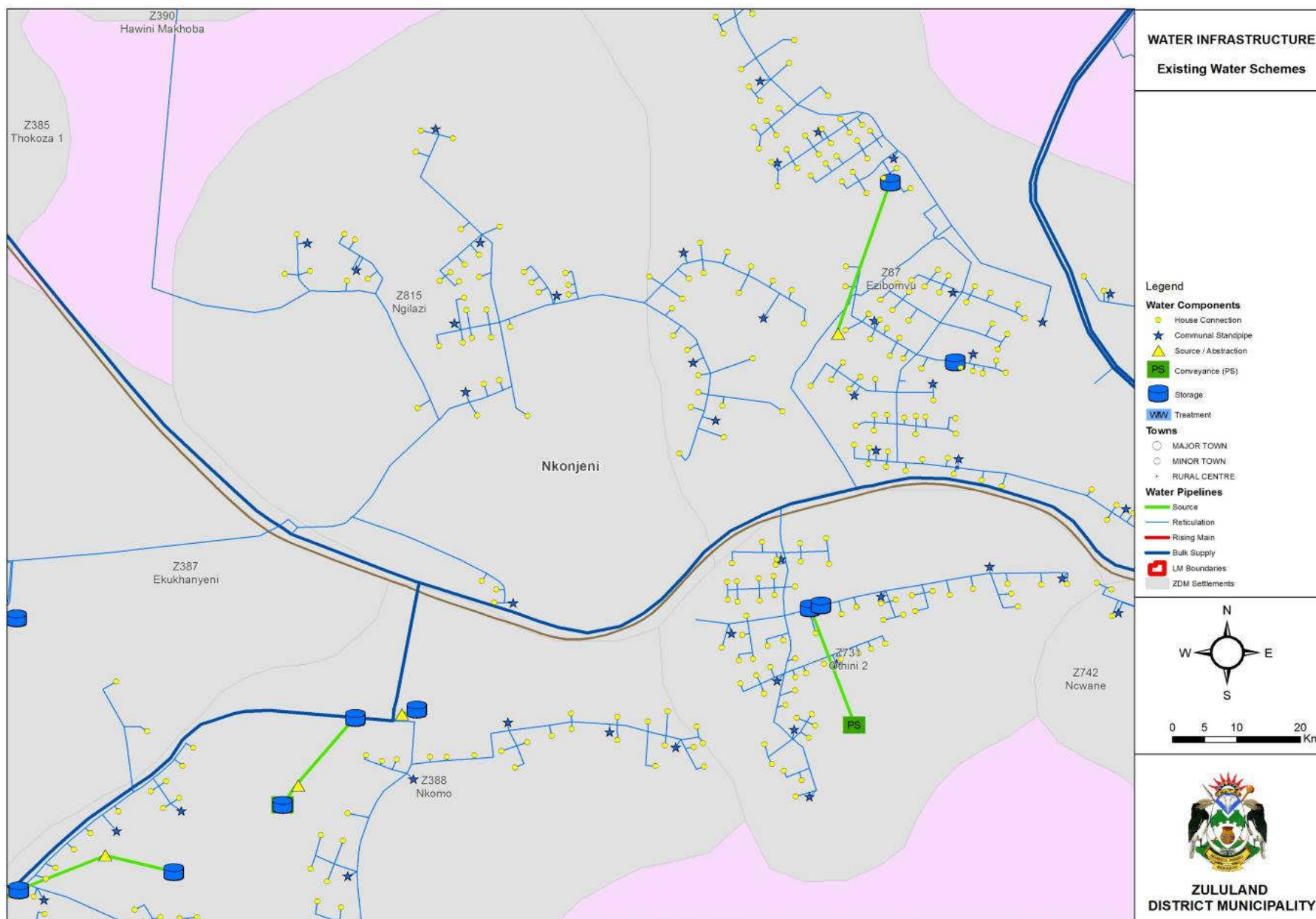
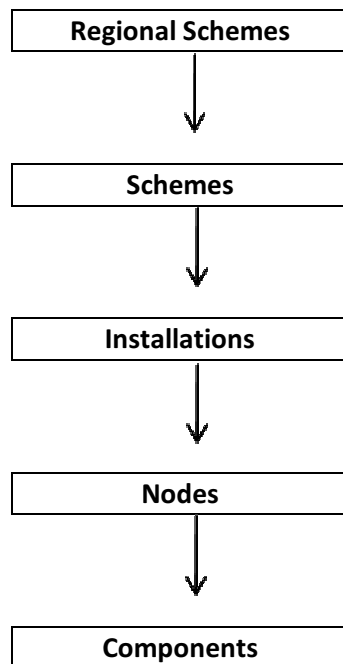


Figure 5.1 (c): Typical Water Reticulation details available on the ZDM GIS database (Nkonjeni Regional Scheme Area)



The asset data in the MANZI system has been structured in a specific data hierarchy as indicated below:

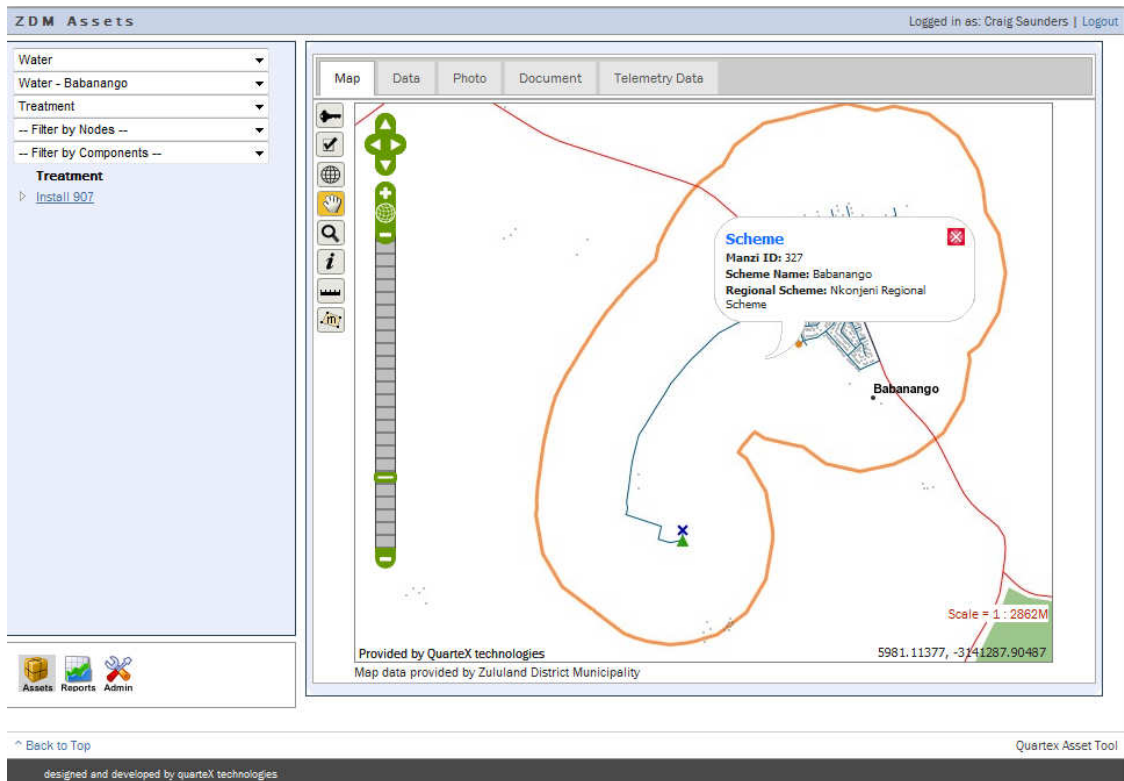


Different asset groups have been identified for water and sanitation infrastructure and these could be either listed as installations, nodes or components. Asset data forms have been developed for each asset group and this is used to capture asset information in the database. The asset data forms provide an overview of the type of information that is available on each asset group. Examples of such asset groups are:

- Water treatment works
- Sewage works
- Pump stations
- Pipelines
- Reservoirs
- Meters
- Valves
- Electrical equipment, etc

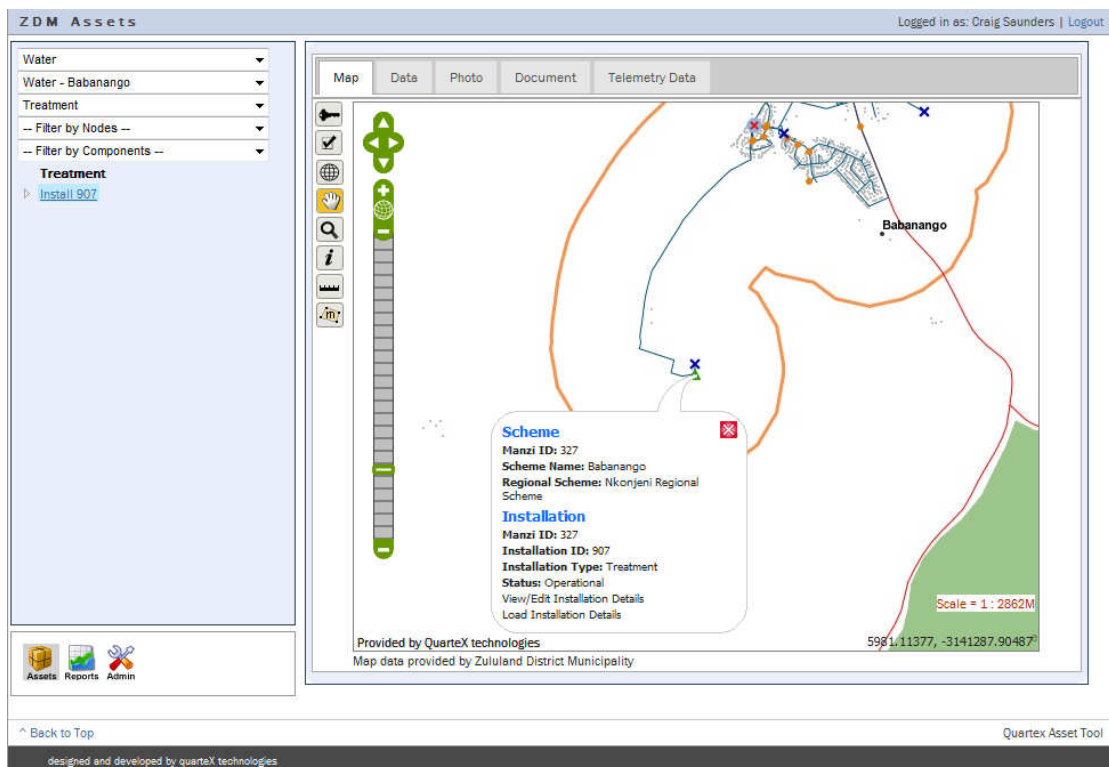
The Nkonjeni Regional scheme is again used as an example to illustrate the data hierarchy that has been used. Inside the Nkonjeni Regional scheme footprint there currently exists a number of schemes, varying from RDP to rudimentary schemes. Each of the schemes are allocated a scheme ID number by the system that is used to identify the scheme in all reporting that is used and to link different assets to the scheme. One of the schemes within this footprint is the Babanango scheme and the information captured at “scheme” level is shown in Figure 5.1 (d) below:

Figure 5.1 (d): Babanango scheme: Map interface showing scheme detail



The Babanango water treatment works is one of the installations on this particular scheme and the asset data form captured at “installation” level is shown below in Figure 5.1 (e):

Figure 5.1 (e): Babanango water treatment works: Map interface showing “installation” location



Within the Babanango water treatment works a number of nodes are listed, for example the raw water storage, sedimentation tanks, clarification process, sand filters, etc. The high lift pumping process is used as an example in this case and the asset data form captured at “component” level is shown in Figure 5.1 (f) below:

Figure 5.1 (f): Babanango water treatment works: High lift pumping process: information captured at “component” level – Component details

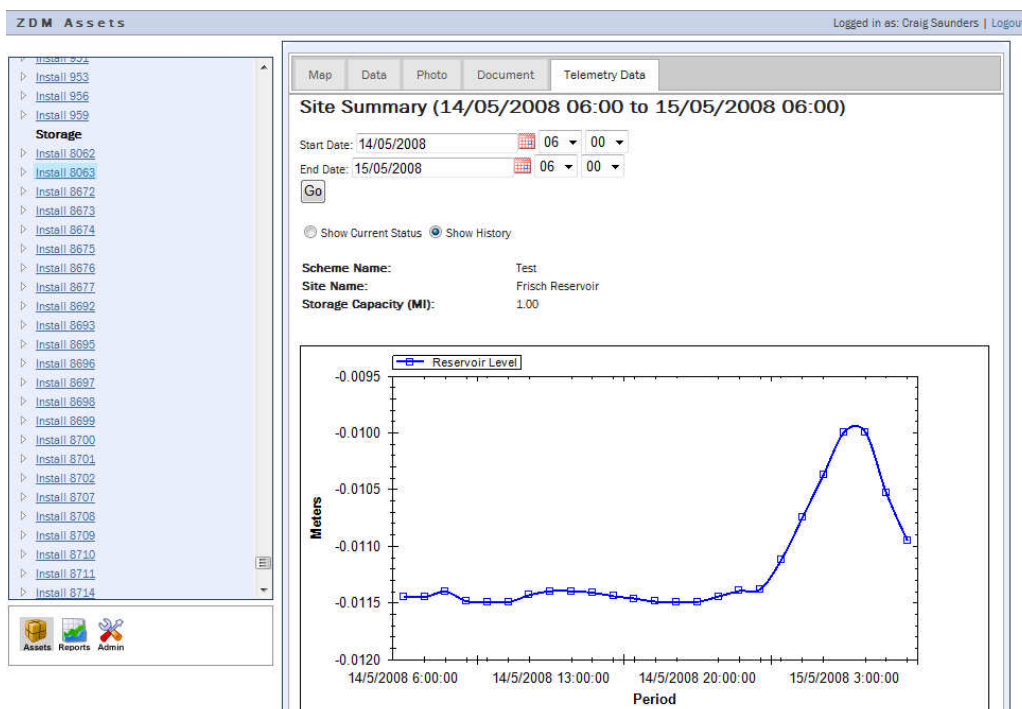
The screenshot displays the 'ZDM Assets' web application interface. On the left is a tree view of asset categories: Install (3078-3091), Source/Abstraction (3081-3082), Storage (908), and Treatment (907). Under Treatment > Install 907, the 'High Lift Pump Station' is expanded, showing 'High Lift Pump 1' selected. The main panel shows the 'High Lift Pump 1' component details form. The form has tabs for Map, Data, Photo, Document, and Telemetry Data. The 'Data' tab is active, showing 'Pump - General Information' and 'Pump - Drive' sections. The 'General Information' section includes fields for Item Name (High Lift Pump 1), Item Type (Pump Component), Duty, Controls, Pump_FunctionID (Final water), Pump_MakeID (KSB), Pump_TypeID (WKLn 65/4), and Pump_MakeID. The 'Drive' section includes fields for Power_factor, Drive_typeID (Electricity), Drive_Speed (2800), Drive_Kw (45), Drive_MakeID (GEC Alstom Electrical Machin), Ave_Hours (0), Fuel_Tank_Cap, and Starting. A 'Submit' button is at the bottom. The footer shows 'Quartex Asset Tool' and 'designed and developed by quartex technologies'.

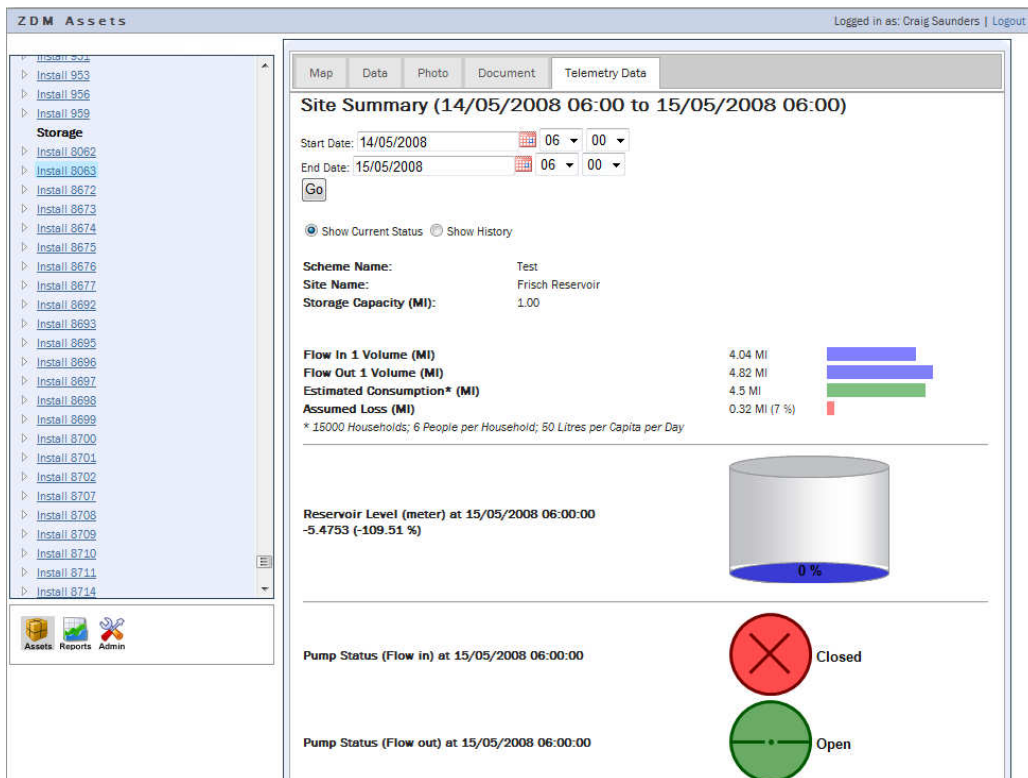
The different nodes within the Babanango water treatment works comprise of a number of components. The clear water pump station is such a node that comprises of various components such as the high lift pumps, electrical equipment, etc. The asset data form captured for the clear water pump station at “component” level is shown in Figure 5.1 (g) below:

Figure 5.1 (g): Babanango water treatment works: High lift pumping process: information captured at “component” level - Photographs

The screenshot shows the ZDM Assets web application interface. On the left, a sidebar lists various assets under the 'High Lift Pump Station' category. The main content area is titled 'Photo' and displays three photographs of blue industrial pumps. The top navigation bar includes 'Map', 'Data', 'Photo', 'Document', and 'Telemetry Data'. The bottom status bar shows 'Quartex Asset Tool' and 'designed and developed by quartex technologies'.

In the same way documents specific to any level of the scheme map can be uploaded to the system. Telemetry has also been linked to the system and where data logging devices are installed, the outputs are presented, an example of the outputs for the telemetry at the Frischgewaagd Plant is shown in the figure below:

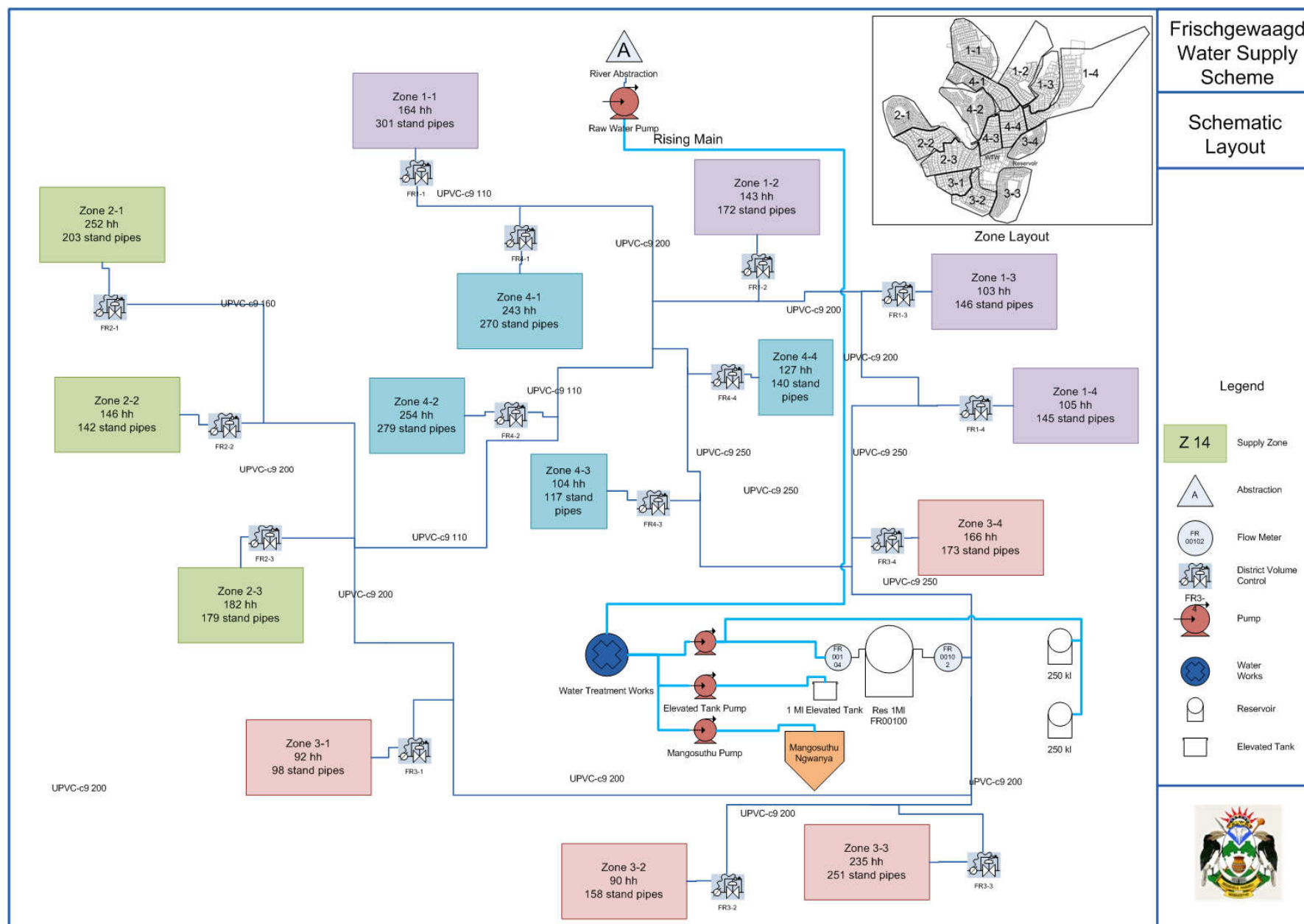




Schematic diagrams are also compiled for each scheme and basically summarises the main installations and nodes that make up the scheme. The diagram also shows how the installations and nodes are connected to make up the scheme and the direction of flow of the water or sewage.

The schematic diagram also forms the basis for the development of a water balance and telemetry installation for the scheme. The Frischgewaagd scheme is used as an example and the schematic diagram is attached herewith in Figure 5.1 (h) below:

Figure 5.1 (h): Schematic layout of Frischgewaagd water scheme



5.2 Asset management assessment

As mentioned above ZDM is well advanced with the development of MANZI, the ZDM asset management system. The system currently comprises mostly asset data and work is being done to develop operational and maintenance procedures for the assets, which will guide the activities for the ongoing upkeep of asset conditions. Assessments have already been done on certain issues related to asset management and further work needs to be done on other issues, as summarised below:

- **Human resources** - The ZDM Section 78 investigation was finalised in 2007 and identified the most appropriate water services provider arrangement for the ongoing O&M of water services infrastructure in the district. Current staff organograms were compiled and compared with the minimum required staff resources needed to perform the O&M duties adequately. Shortages in staff numbers were identified and are being addressed over time within the ZDM financial means. Training of existing staff was also identified as a crucial element to ensure highly efficient personnel and this is being addressed annually as part of the ZDM Skills Development Plan. Certain functions have also been identified that cannot cost effectively be developed in-house and will rather be contracted in externally.
- **Materials, tools & equipment, transport** – The Section 78 investigation has also identified shortcomings in this regard and has listed vehicles and equipment to be purchased in order to have fully functional O&M teams. The need for additional stores has also been identified throughout the district and these are progressively being addressed with the available funding.
- **Budget** – The Section 78 investigation has identified the funding requirements at present and in the future to adequately operate and maintain existing assets and new assets to be added over time. This information guides the preparation of the annual O&M budget, although available financial resources are not sufficient.
- **Asset information** – The locality information on assets is very good and particularly the water assets are viewed to be more than 80% covered. Sewerage information is still lacking but is being addressed. Asset information that also still needs further work includes as-built information, design reports, operating manuals, safety plans, etc. Assessments were also done on asset conditions to determine a brief overview of the status of assets and start identifying where urgent work needs to be done. Photographs were taken of each asset visited and have been included into the MANZI system.
- **Risk management** – ZDM realises that available resources will never really be sufficient to address all needs at once and therefore work has started on the development of a risk based approach to asset management. This model will consider the risk of failure of an asset, the consequence of such a failure and the probability of a failure occurring. This will all be compared to ensure that resources are applied where really needed most.
- **Reporting** – The ZDM WSP reporting system will feed back valuable information to management regarding O&M activities and asset performance. This information will be used to adjust asset management priorities if needed and also track the efficiency of asset management projects that are being implemented.

5.3 Schemes to be transferred

All schemes and related staff that were identified to be transferred from DWA and Department of Works to ZDM have been concluded. There are other schemes in the district still being operated by National Department of Works, e.g water services at prisons, but no formal or informal request have yet been entered into for the transfer of these schemes.

5.4 Schemes to be rehabilitated

There are currently a number of investigations underway to determine the refurbishment requirements of water services infrastructure in the district. The refurbishment requirements at bulk plants are receiving first priority since it is perceived that the most urgent interventions are required at these assets. Investigations are also being commissioned to determine the condition of urban infrastructure and the refurbishment needs in the towns. Whilst new infrastructure has been rolled out in the rural areas to previously neglected communities, the infrastructure in towns have received very little attention and funding since 1994 and it can be expected that most of the refurbishment requirements will be in these areas. The above mentioned investigations have not yet been fully completed and the results will be included once available.

Assessment of the bulk water and sewage works:

During June 2009 consultants were appointed to assess the Water and Waste Water Works in Zululand District Municipality. The assessments included recommendations and cost estimates to refurbish and/or upgrade these works in the short term and medium to long term. These assessments also recommended emergency interventions.

This Technical report was compiled to secure funding for the emergency interventions, short term refurbishment and medium to long term upgrading.

Emergency interventions are needed where work is needed to attend to fatal problem areas, such as settlements consuming raw untreated water, sewer water spilling directly into rivers and structures that is almost collapsing. Short term refurbishment (not critical work) is needed to refurbish and upgrade the existing works in order to meet the current demands and also to enable the works to function at its design capacity. These short term refurbishments were prioritised using criteria such as cost per capita and current demand versus current capacity.

Medium to long term upgrading (not critical work) is needed to upgrade the existing works in order to meet the future demands. These long term refurbishments were prioritised using criteria such as cost per capita and future demand versus the capacity after short term refurbishment. Some of these works will become redundant in future (As they will be incorporated into larger regional schemes). This was also taken into account.

Table 5.4 (a): The list of Waste Water Treatment works that were assessed

Waste Water Treatment Works		Current Delivery	Regional Area	Local Municipality
		ML/d		
1	Frischgewaagd WWTW	0.08	Sim West	eDumbe
2	Paulpieterburg WWTW	0.30	Sim West	eDumbe
3	Vryheid Town WWTW	9.00	Hlahlindlela	Abaqulusi
4	eMondlo WWTW	2.40	Hlahlindlela	Abaqulusi
5	Nkongolwane WWTW	0.25	Coronation	Abaqulusi
6	Alpha Mine WWTW	0.00	Khambi	Abaqulusi
7	Hlobane WWTW	0.35	Coronation	Abaqulusi
8	Coronation WWTW	1.00	Coronation	Abaqulusi
9	Itshelejuba Hospital WWTW	0.09	Sim Central	uPongola
10	Pongola Town WWTW	2.50	Sim East	uPongola
11	Thulasizwe Hospital WWTW	0.03	Usuthu	Nongoma
12	Holinyoka/Nongoma WWTW	1.80	Usuthu	Nongoma
13	Ceza WWTW	0.14	Usuthu	Nongoma
14	James Nxumalo WWTW	0.08	Nkonjeni	Ulundi
15	Nkonjeni Hospital WWTW	0.20	Nkonjeni	Ulundi
16	St Francis Hospital WWTW	0.06	Nkonjeni	Ulundi
17	Ulundi Town WWTW	2.60	Nkonjeni	Ulundi
18	Enyathi WWTW	0.00	Coronation	Abaqulusi

Table 5.4 (b): The list of Water Treatment works that were assessed

Water Treatment Works		Current Delivery	Regional Area	Local Municipality
		ML/d		
1	Frischgewaagd WTW	2	Sim West	eDumbe
2	eDumbe WTW (Paulpietersburg)	3	Sim West	eDumbe
3	Ophuzane WTW	0.5	Sim West	eDumbe
4	Tholakele WTW	0.5	Sim West	eDumbe
5	Klipfontein WTW	10	Hlahlindlela	Abaqulusi
6	Bloemveld WTW	5	Hlahlindlela	Abaqulusi
7	Mondlo WTW	9	Hlahlindlela	Abaqulusi
8	Mvuzini WTW	0.5	Hlahlindlela	Abaqulusi
9	Purim WTW	0.24	Hlahlindlela	Abaqulusi
10	Hlobane WTW	2	Coronation	Abaqulusi
11	Louwsburg WTW	0.72	Coronation	Abaqulusi

Table 5.4 (b): The list of Water Treatment works that were assessed (continued)

Water Treatment Works		Current Delivery	Regional Area	Local Municipality
		ML/d		
12	Coronation WTW	0.4	Coronation	Abaqulusi
13	Khambi WTW	0.2	Khambi	Abaqulusi
14	Mountain View WTW	0.05	Khambi	Abaqulusi
15	Belgrade WTW	1.1	Sim Central	uPongola
16	Msibi WTW	0.03	Sim Central	uPongola
17	Khiphunyawo WTW	0.37	Sim Central	uPongola
18	Nkosentsha WTW	0.13	Sim Central	uPongola
19	Spekboom WTW	1.8	Sim East	uPongola
20	Pongola WTW	6.3	Sim East	uPongola
21	Osingisingini WTW	0.04	Usuthu	Nongoma
22	Thulasizwe Hospital WTW	0.2	Usuthu	Nongoma
23	Vuna WTW	4.2	Usuthu	Nongoma
24	Ceza WTW	0.4	Usuthu	Nongoma
25	Khangela Palace WTW	0.01	Usuthu	Nongoma
26	Enyokeni Palace WTW	0.02	Usuthu	Nongoma
27	Ulundi WTW	18	Nkonjeni	Ulundi
28	Mpungamhlope WTW	0.63	Nkonjeni	Ulundi
29	Babanango WTW	0.33	Nkonjeni	Ulundi
30	Enyathi WTW		Coronation	Abaqulusi
31	Mandlakazi WTW	1.7	Mandlakazi	Nongoma
32	Sidinsi WTW		Mandlakazi	Nongoma
33	Kombusi WTW		Mandlakazi	Nongoma
34	Embile WTW		Usuthu	Nongoma
35	Masokaneni WTW		Nkonjeni	Ulundi
36	Nkonjeni Hospital WTW		Nkonjeni	Ulundi

The results of the assessments are shown in Tables 5.4 (c) & (d) below:

Table 5.4 (c): Assessment of Water Treatment works

Water Treatment Works		Current Delivery	Cost Estimate Emergency Work	Cost Estimate Short Term	Cost Estimate Long Term (Excludes short term)
		ML/d	ex VAT and Prof fees	ex VAT and Prof fees	ex VAT and Prof fees
1	Frischgewaagd WTW	2	R -	R 1 040 000	R 45 000 000
2	eDumbe WTW (Paulpietersburg)	3	R -	R 2 490 000	R 20 000 000
3	Ophuzane WTW	0.5	R -	R 540 000	R -
4	Tholakele WTW	0.5	R -	R -	R -
5	Klipfontein WTW	10	R -	R 8 870 000	R 4 415 000
6	Bloemveld WTW	5	R -	R 3 640 000	R 5 200 000
7	Mondlo WTW	9	R 480 000	R 180 000	R 2 400 000
8	Mvuzini WTW	0.5	R -	R -	R -
9	Purim WTW	0.24	R -	R -	R 250 000
10	Hlobane WTW	2	R 450 000	R 1 590 000	R -
11	Louwsburg WTW	0.72	R 320 000	R 2 500 000	R -
12	Coronation WTW	0.4	R 850 000	R 1 140 000	R 22 000 000
13	Khambi WTW	0.2	R -	R -	R 150 000
14	Mountain View WTW	0.05	R -	R -	R 265 000
15	Belgrade WTW	1.1	R 226 000	R 95 300	R 12 500 000
16	Msibi WTW	0.03	R 74 000	R 2 055 000	
17	Khiphunyawo WTW	0.37	R 18 000	R 4 140 000	
18	Nkosentsha WTW	0.13	R 77 000	R 1 680 000	
19	Spekboom WTW	1.8	R 334 500	R 1 607 200	
20	Pongola WTW	6.3	R 215 000	R 110 200	R 20 000 000
21	Osingisingini WTW	0.04	R 14 000	R 672 000	
22	Thulasizwe Hospital WTW	0.2	R 16 100	R 42 000	R 800 000
23	Vuna WTW	4.2		R 323 500	
24	Ceza WTW	0.4	R 2 000	R 2 030 000	
25	Khangela Palace WTW	0.01	R 800	R 1 335 000	
26	Enyokeni Palace WTW	0.02	R 36 700	R 28 000	
27	Ulundi WTW	18		R 530 000	
28	Mpungamhlope WTW	0.63	R 17 600	R 35 000	R 20 000 000
29	Babanango WTW	0.33	R 3 400	R 2 335 000	R -
30	Enyathi WTW	No assessments scheduled			
31	Mandlakazi WTW	Assessment outstanding			
32	Sidinsi WTW	Assessment outstanding			
33	Kombusi WTW	Assessment outstanding			
34	Embile WTW	No assessments scheduled			
35	Masokaneni WTW	No assessments scheduled			
36	Nkonjeni Hospital WTW	No assessments scheduled			
37	Usuthu WTW	0.00			R 100 000 000
			R 3 135 100	R 39 008 200	R 252 980 000

Table 5.4 (d): Assessment of Waste Water Treatment works

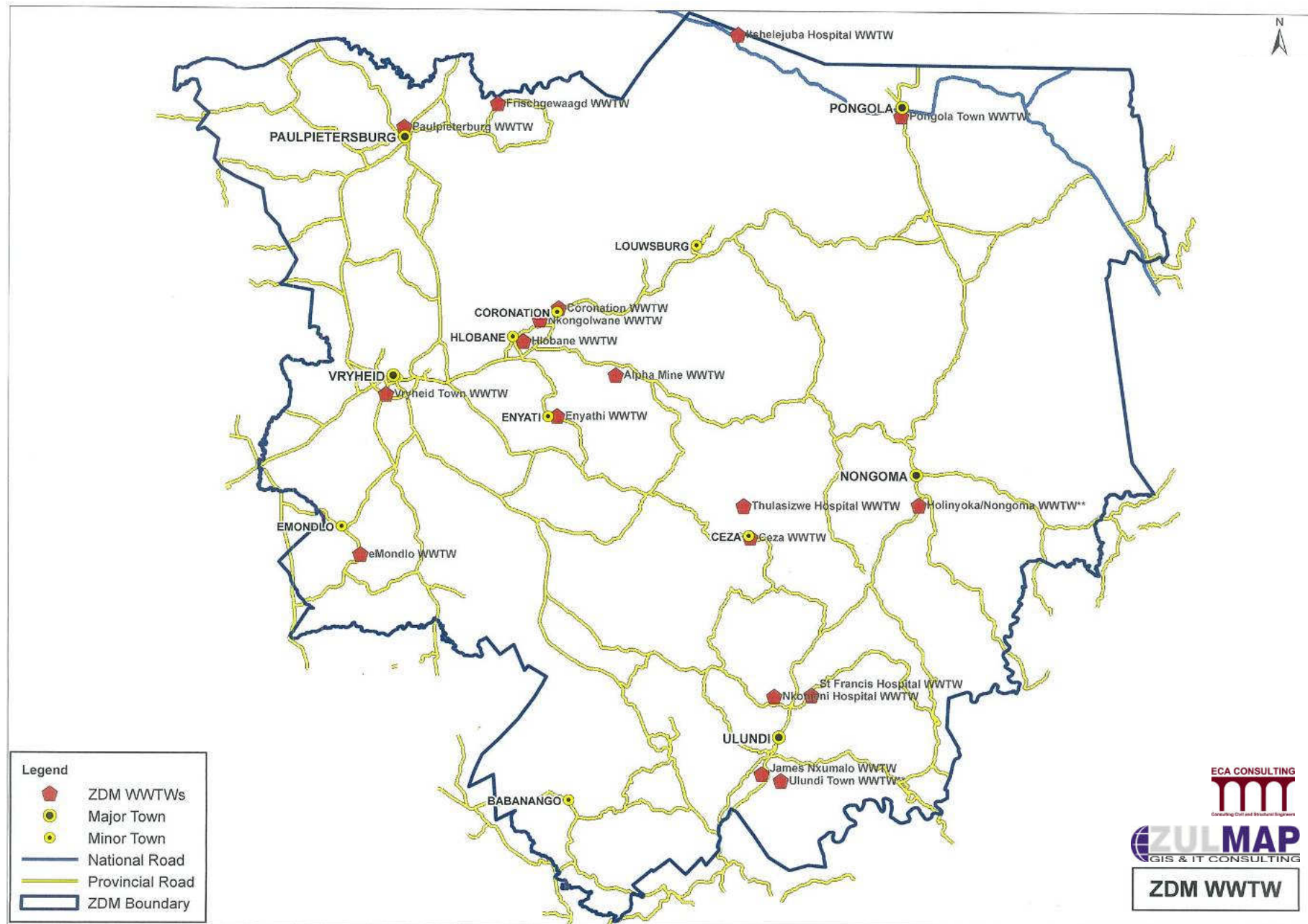
Waste Water Treatment Works		Current Delivery	Cost Estimate Emergency Work	Cost Estimate Short Term	Cost Estimate Long Term (Excludes short term)
		ML/d	ex VAT and Prof fees	ex VAT and Prof fees	ex VAT and Prof fees
1	Frischgewaagd WWTW	0.08	R 0	R 300 000	R 40 000 000
2	Paulpieterburg WWTW	0.30	R 550 000	R 1 800 000	R 0
3	Vryheid Town WWTW	9.00	R 0	R 0	R 0
4	eMondlo WWTW	2.40	R 725 000	R 3 630 000	R 5 500 000
5	Nkongolwane WWTW	0.25	R 0	R 0	R 990 000
6	Alpha Mine WWTW	0.00	R 0	R 300 000	R 0
7	Hlobane WWTW	0.35	R 900 000	R 3 150 000	R 450 000
8	Coronation WWTW	1.00	R 850 000	R 3 980 000	R 6 000 000
9	Itshelejuba Hospital WWTW	0.09		R 70 000	R 800 000
10	Pongola Town WWTW*	2.50	R 13 000	R 363 500	R 1 390 000
11	Thulasizwe Hospital WWTW	0.03		R 220 000	R 50 000
12	Holinyoka/Nongoma WWTW**	1.80		R 1 719 753	R 4 310 000
13	Ceza WWTW	0.14		R 660 000	R 2 000 000
14	James Nxumalo WWTW	0.08		R 270 000	R 890 000
15	Nkonjeni Hospital WWTW	0.20		R 70 000	R 1 770 000
16	St Francis Hospital WWTW	0.06		R 75 000	R 840 000
17	Ulundi Town WWTW**	2.70		R 600 000	R 2 900 000
18	Enyathi WWTW	0.00	No assessments Scheduled		
Total			R 3 038 000	R 17 208 253	R 67 890 000

The above assessments are currently in the process of being reviewed and updated for further interventions.

Figure 5.4 (a): Locality map of the Water Treatment Works



Figure 5.4 (b): Locality map of the Sewage Works



5.5 Blue Drop / Green Drop Assessments

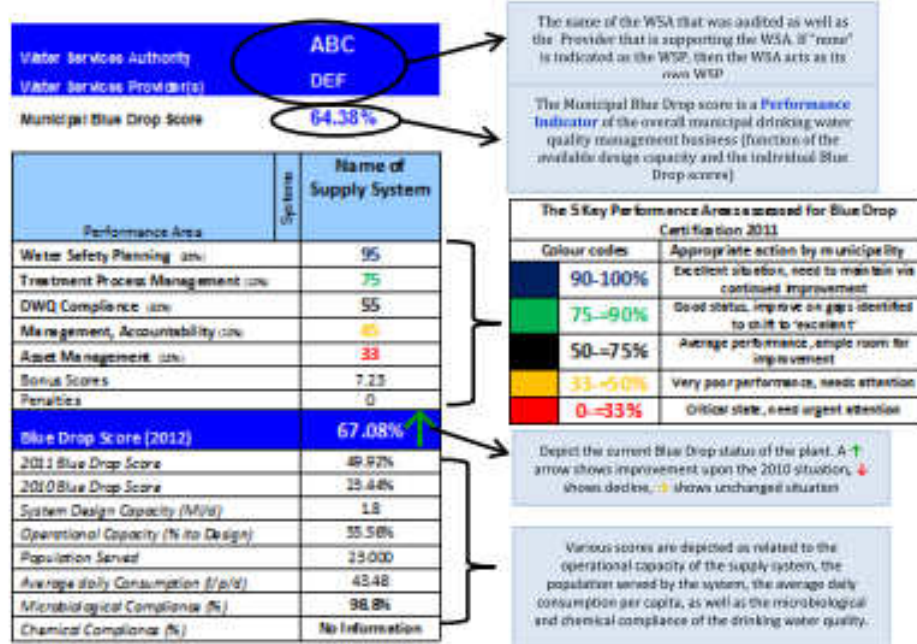
The Blue Drop Report Card and Scoring Criteria


Assessments are conducted by a panel consisting of a qualified drinking water quality professional as Lead Inspector, 2-4 Inspectors (Assessors) and a Learner Assessor who also coordinates the logistical arrangements of the assessments.

The team selection is done based on the outcomes of a Blue Drop Examination which tests the assessor's knowledge and competence in the subject field. Virtual assessments were done in cases where municipalities uploaded their Portfolio of Evidence (or parts of) onto the Blue Drop System. The following scorecard outlines the key requirements of the Blue Drop assessment and indicates the Portfolio of Evidence that was required by each municipality to calculate a Blue Drop score per water supply system.

How to read the Report Card

The following is an example of a typical municipal Blue Drop report card. Results are provided in colour-coded format – each colour has a specific meaning and performance reference.



Quality of Drinking Water	
Colour Drop	Indication of Drop
	Blue Drop Certified, water safe to drink; complied excellently with national standards throughout the reporting period; Must have scored 95% on adherence to Blue Drop Requirements; Water must comply excellently with SABS 241; Water safe to drink.
	Water complied excellently with standard; safe to drink Micro > 97% Chemical > 95%
	Water safe to drink but some chemical parameter compliance requires improvement Micro > 97% Chemical < 95% (or no information)
	Water generally safe to drink but with recorded some microbiological failures Micro < 97% Chemical > 95%
	Water did not comply according to expected standard targets Micro > 90% < 95% Chemical > 90% < 95%
	Compliance levels too low; there were extended periods when the water did not comply with standard / or no monitoring to confirm actual quality of tap water Micro < 90% Chemical < 90%

Blue Drop Requirements 2012		
(1) WATER SAFETY PLANNING 35% (weighting)	(1.1) WATER SAFETY PLANNING PROCESS (10%)	<p>a.) The Water Safety Planning Process is steered by a group of people which includes the technical, financial and management staff of the municipality. Where a WSP arrangement exists the WSA and WSP should participate in this process.</p> <p>b.) There should be clear indication that the water services institution conducted a water safety planning process and not only drafted the document.</p> <p>c.) There should be clear reference to the specific water supply system at hand and not only global risk management measurements put in place.</p>
	(1.2) RISK ASSESSMENT (30%)	<p>a.) The Risk Assessment must cover catchment, treatment and reticulation .</p> <p>b.) The Water Services Institution (WSI) must provide information on findings of the Risk Assessment (and detail Risk Prioritisation method followed) for the specific water supply system, including water resource quality. Format not important but it should not to be a desktop study.</p> <p>c.) The Water Safety Planning process must include adequate Control Measures for each significant hazard or hazardous event identified.</p> <p>d.) A Water Quality Risk Assessment conducted for at least 80% of the SANS 241 list of determinands. This is to verify whether treatment technology is adequate to treat the raw water to comply with national standard limits.</p>
	1.3) RISK-BASED MONITORING PROGRAMME (25%)	<p>a.) Operational Monitoring is:</p> <ul style="list-style-type: none"> i) Informed by Risk Assessment ii) Required sites to monitor: Raw water, after filtration (per process unit) and final water. iii) Determinants (minimum): pH, turbidity and disinfectant residual iv) Frequency of analyses: at least once per shift v) Equipment used + calibration records <p>b.) Compliance Monitoring is:</p> <ul style="list-style-type: none"> i) Informed by Risk Assessment. ii) Monitoring programme is registered on BDS. iii) Actual monitoring occur according to registered BDS monitoring programme (80%). iv) Required sites monitored: Water works final & distribution network + Frequency of analyses: Water works final according SANS 241; distribution monthly. v) Coverage of population served must at least be 80%
	1.4) CREDIBILITY OF DWQ DATA (20%)	<p>a) Certificate of Accreditation for applicable methods OR Z-scores results (z-scores must be ≥ -2 & ≤ 2 are acceptable) in a recognised Proficiency Testing Scheme.</p> <p>b) DWQ Data credibility on the BDS (Blue Drop Certified Data)</p>
	(1.5) INCIDENT MANAGEMENT (15%)	<p>Protocol to specify:</p> <ul style="list-style-type: none"> (1) alert levels, (2) response times, (3) required actions, (4) roles & responsibilities, (5) communication vehicles/methods and (6) must include response on possible risks identified in the Risk Assessment of the Water Safety Planning process <p>Incident Register to include :</p> <ul style="list-style-type: none"> (7) Date, location and description of incident (8) Action taken and date of resolution (9) Outcome of cause investigation
	SAMPLER'S BONUS:	<p>To be eligible for this bonus, WSI's must provide proof of training of samplers or Sampling Quality Control measures (Name the Sampling Training Course, Duration, Service Provider, and detail of Attendees)</p> <ul style="list-style-type: none"> 1) Evidence of relevant sampling training that will ensure credibility of the sampling process; or 2) Evidence of control measures to ensure sampling credibility





(2) DWQ PROCESS MANAGEMENT & CONTROL 10% (weighting)	(2.1) WORKS CLASSIFICATION COMPLIANCE (15%)	Works classified according to Regulation 2834 requirements. Evidence uploaded on BDS or Copy presented at the assessment.
	(2.2) PROCESS CONTROL REGISTRATION COMPLIANCE (50%)	a) Process Controllers must be Registered according to Regulation 2834. b) The Process Controllers' Classification must comply with legislative requirements i.t.o.: i) Number of Process Controllers ii) Complying with the required Classification levels. c) The Supervisor complying with legislative requirements.
	(2.3) AVAILABILITY OF WATER TREATMENT WORKS LOGBOOK (35%)	a) A logbook is in place to record all incidents at the water treatment works. b) Evidence is presented that the logbook process is being implemented. (It is NOT required to be implemented for the entire assessment period)
	PROCESS CONTROL BONUS	BONUS: Proof of Process Controller staff being subjected to relevant training the past 12 months
(3) DRINKING WATER QUALITY COMPLIANCE 30 % (weighting)	(3.1.1) DWQ COMPLIANCE (MICROBIOLOGICAL) (50%)	The Microbiological Quality of water supply must comply with the South African National Standard (SANS241) as per the Excellent Requirements set by the Blue Drop Programme.
	(3.1.2) DWQ COMPLIANCE (CHEMICAL) (40%)	The Chemical Quality of water supply must comply with the South African National Standard (SANS241) as per the Excellent Requirements set by the Blue Drop Programme. a) Chemical - Acute Health: - Excellent Comp. (97% for <100 000 population) & (99% for >100 000 population) - Good Compliance (95% for 100 000 population) & (97% for >100 000 population) b) Chemical - Chronic Health: -Excellent Compliance (95% for <100 000 population) & (97% for 100 000 population) -Good Compliance (93% for <100 000 population) & (95% for 100 000 population)
	(3.2) RISK REFINED COMPLIANCE (5%)	The Compliance of all Determinants identified during the Risk Assessment Process to be included in the risk-defined monitoring programme, must comply with the requirements set in the SANS 241. a) Excellent Compliance (95% for <100 000 population & 97% for >100 000 population) b) Good Compliance (93% for <100 000 population & 95% for >100 000 population)
	(3.3) OPERATIONAL EFFICIENCY INDEX (5%)	The compliance of operational determinants as monitored at the Final Water sampling point must comply with the SANS 241 Requirements. a) Excellent Compliance (93% for <100 000 & 95% for >100 000) b) Good Compliance (90% for <100 000 & 93% for >100 000)
	PENALTY (1): Data Difference	Should there be a difference between data available on BDS and that which is presented in hardcopy for verification the penalty will apply.
	PENALTY (2): <11 Months' Data	Less than 11 months data available to assess Microbiological and Chemical compliance
	PENALTY (3) Notification Failure	If there is any significant (sustained) failure with no evidence of a Water Quality Alert Notice (Boil Water Notice) being issued, this penalty will apply. NB! This may have an implication on qualification for certification.





(4) MANAGEMENT, ACCOUNTABILITY, & LOCAL REGULATION 10% (weighting)	(4.1) MANAGEMENT COMMITMENT (40%)	Management's commitment to effective Drinking Water Quality Operations and Management should be portrayed by Proof of signature approval of the: a) Water Safety Plan; b) DWQ Monitoring Programme c) Water Treatment Plant Logbook d) Operations and Maintenance Budget e) Water Services Development Plan
	(4.2) PUBLICATION OF PERFORMANCE (30%)	Evidence should be provided on the various means of drinking water quality information made public to the constituencies supplied with drinking water from this specific water supply system. Forms of Publication: >Newspaper publication >Municipal Billing >Annual Report >Posters & Pamphlets >Population and Promotion of "My Water" >Electronic Webpage The Water Services Authority must ensure that evidence of adequate marketing of Existing Blue Drop Certified water supply systems are presented during the audit.
	(4.3) SERVICE LEVEL AGREEMENT/ PERFORMANCE AGREEMENT (15%)	Should there be an institutional arrangement between Water Services Authority and Water Services Provider, it is essential that the legislatively (Section 19 of the Water Services Act) required Service Level Agreements between the two entities. A copy of this document is required, OR Should the Water Services Authority fulfil the function of Water Services Provider as per Section 78 arrangements, it is required that the responsible manager (official) have a Performance Agreement (Workplan) in place which stipulates Drinking Water Quality Management Responsibilities.
	(4.4) SUBMISSION OF DWQ DATA (15%)	a) 12 months of data submitted on the Blue Drop System (BDS). WSI's must ensure that 12 months' sets of results are recorded on the BDS (DWA will only consider data available on the BDS) b) Note: All Compliance Monitoring test results are required to be submitted.
	Bonus: Publication of Performance	Availing information on Drinking Water to relevant public in 3 or more forms listed.
	Bonus: Performance Agreement	Workplans of Process Controllers aligned to Operations and Maintenance Manual.
	Penalty: Submission of DWQ Data	Penalty will apply should the Department find proof during or post assessment that the WSI are guilty of an offence as per Section 82 of the Water Services Act, by only submitting partial information in order to present a false impression of DWQ Performance and/or compliance.
(5) ASSET MANAGEMENT 15%	(5.1) ANNUAL PROCESS AUDIT (20%)	Process Audit Report on technical inspection/assessment of treatment facility and evidence of implementation of findings This process assessment should've been done within the 12-month assessment period

(weighting)	(5.2) ASSET REGISTER <i>(15%)</i>	The Institution must present a complete Asset Register. The asset register must : a) detail relevant equipment and infrastructure b) indicate asset description c) indicate location d) indicate condition (remaining life), and e) indicate replacement value
	(5.3) AVAILABILITY & COMPETENCE OF MAINTENANCE TEAM <i>(15%)</i>	a) The Institution must present evidence of a competent Maintenance Team (in the form of Organogram; Contract or Invoice); Logbook with maintenance entries will serve as adequate evidence. b) Additional proof required on team competency (e.g. Qualification & Experience & Trade-test)
	(5.4) OPERATIONS & MAINTENANCE MANUAL <i>(15%)</i>	O&M manual to contain: a) civil, mechanical, electrical detail of plant, b) design capacity of plant, c) reference to drawings, d) operational schedules, maintenance schedules, e) process detail and control, f) instrumentation specification/type, g) fault finding, h) monitoring, i) pump curves, and g) supportive appendices
	(5.5) OPERATIONS & MAINTENANCE BUDGET AND EXPENDITURE <i>(20%)</i>	The Institution must present credible evidence of: a) Maintenance Budget (as part of Operations Budget) b) Maintenance Expenditure (as part of the Operations Expenditure), and c) Maintenance Expenditure should be more than 5% of the Operations Expenditure in Total for the preceding Financial Year.
	(5.6) DESIGN CAPACITY vs.. OPERATIONAL CAPACITY <i>(15%)</i>	Proof to be submitted of the documented design capacity and documented daily operating capacity over the past 12 months. Groundwater dependant systems must have an acceptable plan which stipulates abstraction patterns that will prevent aquifer damage. Flow meters must be calibrated at least annually.

Water Services Authority	Zululand District Municipality
Water Services Provider(s)	Abaqulusi Local Municipality¹; WSSA²





Municipal Blue Drop Score: **83.05%**





Performance Area	Systems	Babanango 	Belgrade 	Ceza 	Coronation ³ 
Water Safety Planning (35%)		80	79	78	73
Treatment Process Management (10%)		75	75	75	75
DWQ Compliance (30%)		86	100	36	45
Management, Accountability (10%)		92	92	92	77
Asset Management (15%)		95	96	96	86
Bonus Scores		4.56	3.42	9.23	5.92
Penalties		0	0	0	-1.64
Blue Drop Score (2012)		89.35% (↑)	92.03% (↑)	78.47% (↓)	71.41% (↑)
2011 Blue Drop Score		80.07%	80.07%	80.07%	51.31%
2010 Blue Drop Score		93.00%	69.00%	91.00%	34.55%
System Design Capacity (Ml/d)		0.3	0.7	0.4	8
Operational Capacity (% ito Design)		40.00	85.71	22.50	25.00
Population Served		3 050	9 359	3 101	9 964
Average daily Consumption (l/p/d)		39.34	64.11	29.02	200.72
Microbiological Compliance (%)		96.2%	>99.9%	88.9%	64.3%
Chemical Compliance (%)		>99.9%	>99.9%	>99.9%	>99.9%





Performance Area	Systems	eDumbe 	eMakhosini Rudimentary 	eMondlo Town ⁴ 	Enyathi Town 
Water Safety Planning (35%)		83	38	81	48
Treatment Process Management (10%)		88	88	75	60
DWQ Compliance (30%)		100	45	45	78
Management, Accountability (10%)		100	92	84	84
Asset Management (15%)		96	70	83	85
Bonus Scores		1.86	10.74	5.38	7.88
Penalties		0	0	0	0
Blue Drop Score		94.10% (↑)	65.99% (↓)	75.50% (↑)	75.04% (→)
2011 Score		79.07%	69.88%	54.81%	Not assessed
2010 Score		89.00%	76.38%	29.38%	Not assessed
System Design Capacity (Ml/d)		5	0.3	12	1
Operational Capacity (% ito Design)		58.00	120.00	75.00	140.00
Population Served		16 871	4 725	59 965	279
Average daily Consumption (l/p/d)		171.89	76.19	150.09	5017.92
Microbiological Compliance (%)		>99.9%	89.3%	94.3%	>99.9%
Chemical Compliance (%)		98.7%	>99.9%	>99.9%	95.7%





Performance Area	System	Enyokeni Palace Rudimentary	Frischgewaagd Bilanyoni	Hlobane [*]	Itshelejuba Rudimentary
Water Safety Planning (35%)		44	87	47	70
Treatment Process Management (10%)		75	75	75	75
DWQ Compliance (30%)		55	89	100	100
Management, Accountability (10%)		92	100	84	92
Asset Management (15%)		76	96	63	96
Bonus Scores		5.99	2.68	8.54	2.18
Penalties		0	0	0	0
Blue Drop Score		66.03% (↓)	91.52% (↑)	80.09% (↑)	87.64% (↑)
2011 Score		71.41%	78.93%	66.78%	84.08%
2010 Score		86.00%	88.00%	36.63%	84.00%
System Design Capacity (Ml/d)		0.216	1.5	4.5	0.3
Operational Capacity (% to Design)		112.04	73.33	100.00	50.00
Population Served		787	47 838	2 257	376
Average daily Consumption (l/p/d)		307.50	22.99	1993.80	398.94
Microbiological Compliance (%)		>99.9%	99.3%	>99.9%	>99.9%
Chemical Compliance (%)		93.1%	96.9%	>99.9%	>99.9%





Performance Area	System	Khambi	Khangela Palace	Khiphunyawo [*]	Kombuzi
Water Safety Planning (35%)		78	78	60	71
Treatment Process Management (10%)		75	75	75	75
DWQ Compliance (30%)		78	0	100	78
Management, Accountability (10%)		92	77	84	84
Asset Management (15%)		95	95	41	41
Bonus Scores		2.78	6.49	1.62	1.80
Penalties		0	0	0	0
Blue Drop Score		84.24% (↑)	63.21% (↓)	74.58% (↑)	71.86% (↓)
2011 Score		83.76%	80.33%	60.76%	80.80%
2010 Score		78.50%	91.00%	58.43%	81.43%
System Design Capacity (Ml/d)		0.72	0.01	0.37	0.5
Operational Capacity (% to Design)		48.61	80.00	108.11	16.00
Population Served		1 647	295	3 836	2 166
Average daily Consumption (l/p/d)		212.51	27.12	104.28	36.93
Microbiological Compliance (%)		>99.9%	85.7%	99.9%	99.9%
Chemical Compliance (%)		95.8%	90.6%	99.9%	95.5%

	Systems	Louwsberg ^a	Mandlakazi ^b	Mountain View ^c	Mpungamhlope ^c
Performance Area					
Water Safety Planning (35%)		75	71	68	73
Treatment Process Management (10%)		50	75	75	75
DWQ Compliance (30%)		45	100	100	100
Management, Accountability (10%)		61	84	84	84
Asset Management (15%)		64	71	61	72
Bonus Scores		7.15	2.81	3.20	2.68
Penalties		-0.60	0	0	0
Blue Drop Score (2012)		66.84% (↑)	84.05% (↑)	81.88% (↑)	84.84% (↑)
2011 Blue Drop Score		63.73%	80.33%	75.16%	82.20%
2010 Blue Drop Score		39.80%	91.00%	66.50%	91.00%
System Design Capacity (Ml/d)		1.1	1.2	0.2	0.63
Operational Capacity (% Ito Design)		25.45	80.83	550.00	93.65
Population Served		5 227	1 562	No information	7 991
Average daily Consumption (l/p/d)		53.57	621.00	No information	73.83
Microbiological Compliance (%)		91.7%	99.9%	99.9%	99.9%
Chemical Compliance (%)		99.9%	99.9%	99.9%	99.9%

	Systems	Msibi ^b	Mvuzini ^b	Nkonjeni ^b	Nkosentsha ^b
Performance Area					
Water Safety Planning (35%)		66	77	77	77
Treatment Process Management (10%)		60	75	60	60
DWQ Compliance (30%)		100	100	89	45
Management, Accountability (10%)		84	84	69	69
Asset Management (15%)		62	62	62	62
Bonus Scores		3.49	2.69	3.65	5.62
Penalties		0	0	-0.73	-2.43
Blue Drop Score		80.21% (↑)	84.75% (↑)	78.61% (↓)	65.74% (↑)
2011 Score		73.28%	75.16%	81.56%	60.59%
2010 Score		81.43%	83.43%	87.00%	78.43%
System Design Capacity (Ml/d)		0.3	0.8	0.5	0.13
Operational Capacity (% Ito Design)		156.67	55.00	4.80	42.31
Population Served		7 382	6 663	256	4 167
Average daily Consumption (l/p/d)		63.67	66.04	93.75	13.20
Microbiological Compliance (%)		99.9%	99.9%	99.9%	82.6%
Chemical Compliance (%)		99.9%	99.9%	96.8%	99.9%

Performance Area	Systems	Nongoma ^b	Ophuzane ^b	Osingisingini ^b	Pongola ^b
					
Water Safety Planning (35%)		81	75	77	81
Treatment Process Management (10%)		88	75	75	88
DWQ Compliance (30%)		100	86	45	100
Management, Accountability (10%)		100	84	84	100
Asset Management (15%)		96	62	82	96
Bonus Scores		2.05	3.41	7.55	2.05
Penalties		0	0	0	0
Blue Drop Score		93.50% (↑)	80.65% (↑)	76.11% (↑)	93.50% (↑)
2011 Score		81.32%	68.06%	75.12%	80.33%
2010 Score		91.00%	78.50%	83.43%	86.00%
System Design Capacity (Ml/d)		5	0.5	0.06	6.5
Operational Capacity (% to Design)		90.00	82.00	51.67	112.31
Population Served		21 701	6 466	1 956	68 085
Average daily Consumption (l/p/d)		207.36	63.41	15.85	107.22
Microbiological Compliance (%)		99.9%	96.6%	92.3%	>99.9%
Chemical Compliance (%)		99.0%	99.9%	97.9%	>99.9%

Performance Area	Systems	Purim ^b	Sidinsi: Nongoma ^b	Spekboom: Pongola ^b	Tholakele ^b
					
Water Safety Planning (35%)		77	79	68	79
Treatment Process Management (10%)		60	60	75	75
DWQ Compliance (30%)		78	100	100	23
Management, Accountability (10%)		84	84	61	84
Asset Management (15%)		62	72	72	72
Bonus Scores		6.29	2.59	3.26	9.36
Penalties		0	0	-0.33	0
Blue Drop Score		80.10% (↑)	85.35% (↑)	81.22% (↑)	70.37% (↑)
2011 Score		76.91%	68.23%	72.13%	68.02%
2010 Score		78.00%	77.43%	73.00%	78.50%
System Design Capacity (Ml/d)		0.5	0.3	1.2	0.5
Operational Capacity (% to Design)		86.00	40.00	77.50	66.00
Population Served		6 271	5 970	18 720	5 050
Average daily Consumption (l/p/d)		68.57	20.10	49.68	65.35
Microbiological Compliance (%)		>99.9%	>99.9%	>99.9%	82.8%
Chemical Compliance (%)		95.8%	97.5%	>99.9%	95.7%

Performance Area	System	Thulasizwe: Ulundi ^b 	Ulundi ^b 	Vryheid: Abaqulusi ^a 	Masokaneni: Nongoma ^b 
Water Safety Planning (35%)		73	84	81	73
Treatment Process Management (10%)		75	88	35	60
DWQ Compliance (30%)		100	73	73	23
Management, Accountability (10%)		84	100	76	69
Asset Management (15%)		62	96	59	62
Bonus Scores		4.64	3.83	5.41	10.94
Penalties		0	0	0	-3.65
Blue Drop Score (2012)		85.30% (↑)	87.88% (↑)	75.37% (↑)	61.71% (↓)
2011 Blue Drop Score		79.61%	81.25%	67.45%	81.32%
2010 Blue Drop Score		86.50%	85.00%	30.36%	91.00%
System Design Capacity (Ml/d)		0.2	27	17.5	0.1
Operational Capacity (% Ito Design)		85.00	68.15	85.71	90.00
Population Served		3 021	95 817	55 932	516
Average daily Consumption (l/p/d)		56.27	192.03	268.18	174.42
Microbiological Compliance (%)		>99.9%	95.4%	96.8%	90.9%
Chemical Compliance (%)		>99.9%	97.4%	>99.9%	95.5%

Regulatory Impression

The Department commends Zululand District Municipality during this Blue Drop assessment period. Supported by Abaqulusi Local Municipality and WSSA, DWA found the municipal officials well prepared and eager to improve drinking water quality management within the 37 supply systems again presented for evaluation. Continued improvements and address of the shortcomings identified during the assessment cycle will soon result in the municipality achieving Blue Drop status.

Zululand presented evidence that the water safety planning process has commenced in most of the supply systems. While the municipality continues the process of defining specific hazards and not just hazardous events per supply system, the DWA also wants to encourage the WSA and WSP's to ensure a full SANS 241 analyses in each of the supply systems. Data available to the Department suggests that different determinands might threaten the suitability for use of the drinking water in the various supply systems. While the complete SANS 241 analyses again has to be repeated at least once this year in all the supply systems, the WSA should also use the current information to improve and revise site-specific compliance monitoring programmes. Monitoring should however increase without delay for determinands identified during the risk assessment process, also found to exceed the standard for drinking water.

Management support is required to address asset management deficiencies identified in some of the systems, funds also needs to be available to address reasons for process control deficiencies in particularly the systems discussed below where data infers that drinking water poses a risk to human health.

The Green Drop Report Card

Water Services Authority: Zululand District Municipality				
Assessment Areas	Ceza Hospital	Coronation	eDumbe-Paul Pietersburg	eMondlo
Technology	Oxidation ponds	Biofilters + anaerobic digestion	Oxidation ponds	Activated sludge + Aerobic digestion
Design Capacity (MI/d)	0.14	1.0	0.45	4
Operational % i.t.o. Design Capacity	14.3%	100%	66.7%	60.0%
ixcii) Microbiological Compliance	92.0%	58.0%	50.0%	33.0%
ixciii) Chemical Compliance	71.0%	52.0%	27.0%	92.0%
ixciv) Physical Compliance	92.0%	83.0%	83.7%	100%
Annual Average Effluent Quality Compliance	85.0%	64.0%	53.6%	75.0%
Wastewater Risk Rating (%CRR/CRRmax)	35.3% (↓)	58.8% (↑)	64.7% (↑)	41.2% (↑)
Highest Risk Area	Final effluent, microbiological	Final effluent	Final effluent	Final effluent, microbiological
Risk Abatement Process	Rough W ₂ RAP	W ₂ RAP not in place	Rough W ₂ RAP	W ₂ RAP not in place
Capital & Refurbishment expenditure in 2010/2011	NI	nil	NI	Nil
Description of Projects' Expenditure	No projects	No projects	No projects	No projects
Assessment Areas	Hlobane	Itshelejuba Hospital	James Nxumalo College	Klipfontein-Vryheid
Technology	Oxidation ponds	Oxidation ponds	Oxidation ponds	Activated sludge + biofilters+ Anaerobic digestion + drying beds
Design Capacity (MI/d)	3	0.11	0.11	11.5
Operational % i.t.o. Design Capacity	11.7%	72.7%	72.7%	78.3%
Microbiological Compliance	100%	84.0%	67.0%	42.0%
Chemical Compliance	87.5%	46.0%	48.0%	52.3%
Physical Compliance	91.7%	74.7%	66.7%	70.0%
Annual Average Effluent Quality Compliance	93.1%	68.2%	60.6%	54.8%
Wastewater Risk Rating (%CRR/CRRmax)	35.3% (↓)	58.8% (↑)	52.9% (↑)	59.1% (↑)
Highest Risk Area	Final effluent, chemical	Final effluent	Final effluent	Final effluent
Risk Abatement Process	W ₂ RAP not in place	Rough W ₂ RAP	Rough W ₂ RAP	W ₂ RAP not in place
Capital & Refurbishment expenditure in 2010/2011	NI	NI	R0.002mil	nil
Description of Projects' Expenditure	No projects	No projects	Skimming of Ponds	No projects
Assessment Areas	Nkonjeni Hospital ponds	Nongoma	Pongola	St Francis Hospital
Technology	Oxidation ponds	Activated sludge	Oxidation ponds	Oxidation ponds

Design Capacity (Ml/d)	0.12	3.0	3.6	0.12
Operational % i.t.o. Design Capacity	58.3%	60.0%	50.0%	50.0%
(xxxv) Microbiological Compliance	75.0%	76.0%	75.0%	92.0%
(xxxvi) Chemical Compliance	48.0%	27.0%	31.0%	64.0%
(xxxvii) Physical Compliance	86.0%	77.3%	72.0%	82.7%
Annual Average Effluent Quality Compliance	69.7%	60.1%	59.3%	79.6%
Wastewater Risk Rating (%CRR/CRRmax)	58.8% (↑)	58.8% (↑)	52.9% (↑)	41.2% (↑)
Highest Risk Area	Final effluent	Final effluent	Final effluent	Final effluent, chemical.
Risk Abatement Process	Rough W ₂ RAP	Rough W ₂ RAP	Rough W ₂ RAP	Rough W ₂ RAP
Capital & Refurbishment expenditure in 2010/2011	R0.02mil	NI	NI	nil
Description of Projects' Expenditure	Skimming of Ponds			
Assessment Areas	Thulasizwe		Ulundi	
Technology	Oxidation ponds		Activated sludge + Biofilters + Anaerobic digestion + lagoons	
Design Capacity (Ml/d)	0.06		2.5	
Operational % i.t.o. Design Capacity	50.0%		80.4%	
Microbiological Compliance	NI		25.0%	
Chemical Compliance	NI		92.9%	
Physical Compliance	NI		100%	
Annual Average Effluent Quality Compliance	NI		72.6%	
Wastewater Risk Rating (%CRR/CRRmax)	70.6% (↑)		52.9% (↑)	
Highest Risk Area	Flow monitoring, no effluent compliance monitoring & technical skill		Final effluent, microbiological	
Risk Abatement Process	Rough W ₂ RAP in place		Rough W ₂ RAP in place	
Capital & Refurbishment expenditure in 2010/2011	nil		NI	
Description of Projects' Expenditure	No projects		No projects	
Wastewater Risk Abatement planning	A rough outline to a risk abatement process has been conceptualised			
Additional Notes	None			

Regulatory Impression

It is of concern that the risk ratings of eleven of the wastewater treatment plants have increased since the previous assessment. Only four plants are now categorised as low risk and twelve plants as medium risk plants. The key risk parameter is the poor effluent quality and low level of compliance. However, no specific actions are identified by the Municipality to address this current situation.

The Zululand District Municipality confirmed their commitment to improving the performance of their plants and have initiated a process to develop a W₂RAP. The Department encourages the Municipality to finalise the development of a W₂RAP for each of their plants to facilitate the implementation of risk based interventions to improve compliance and to reduce the risk rating of the plants.

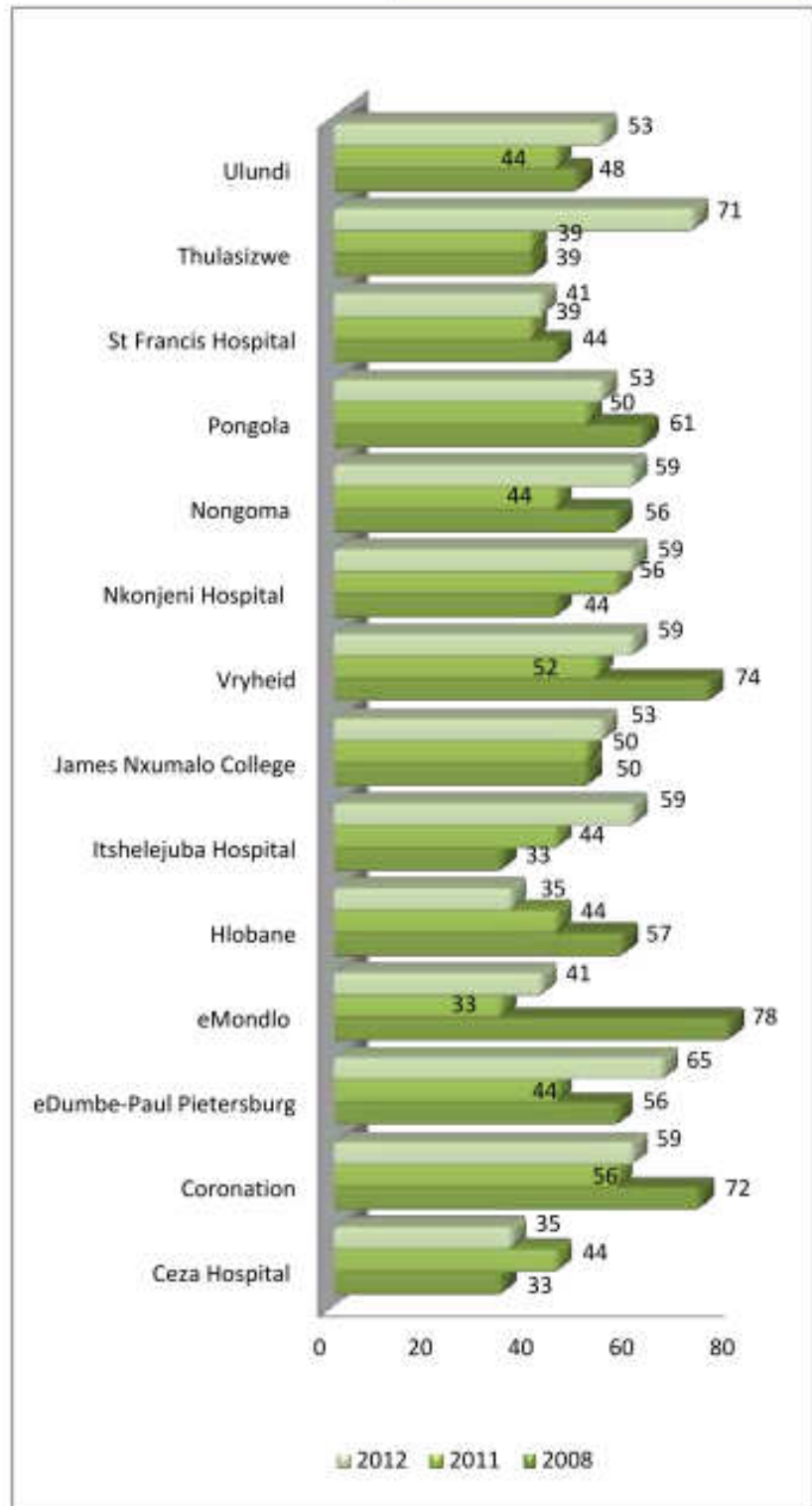
Risk Trend Analysis 2008 - 2012

Performance trend 2011-2012 (as CRR/CRR _{max} %)	Systems
Improve	2
No change	0
Digress	12

Progress Indicator



Risk trend per plant as CRR/CRR_{max}



5.6 New infrastructure to be built

Water infrastructure:

During 2004 the ZDM started a comprehensive water master planning exercise to determine the most appropriate methods of providing previously neglected communities with water services. In all cases the main drivers were to obtain the technical solution that will not necessarily be the lowest in terms of capital requirements to implement, but rather that will provide a sustainable service throughout the year (sustainable water source) at the lowest possible water tariff (R/kl). The first step was to identify sustainable water sources in the district that could be used to provide water supply even during extreme drought situations and then to determine the most cost efficient way of supplying communities from these sources. The planning methodology that was used can be summarised as follows:

- Identify logical supply footprints
- Identify all possible options for supplying water to supply footprints
- Determine the capital and operational costs associated with each option
- Evaluate each option
- Decide on most appropriate solution

From the above planning process the entire district was covered with 10 back-to-back Regional Schemes, which are listed below and indicated on Figure 5.5 (a) attached herewith:

- Nkonjeni Regional Scheme
- Usuthu Regional Scheme
- Mandlakazi Regional Scheme
- Mkhuze Regional Scheme
- Simdlangentsha East Regional Scheme
- Simdlangentsha West Regional Scheme
- Simdlangentsha Central Regional Scheme
- Coronation Regional Scheme
- Khambi Regional Scheme
- Hlahlindlela Regional Scheme

Also indicated herewith on Figure 5.5 (b) is the planned future bulk infrastructure that was identified from the above planning process.

Sanitation infrastructure:

Further planning work is still required in the urban areas to confirm the suitability of the bulk infrastructure, especially with regards to increased pressures on this infrastructure due to an increasing urbanisation trend that has been occurring and also to allow for future growth in population.

Sanitation infrastructure being provided in rural areas (previously unserved communities) is limited to household VIP toilets. The units are being implemented as per sanitation prioritisation model.

Pre-cast Manufacturing Plants

As part of the Rural Sanitation Programme rollout, a Local Economic Development initiative was envisaged by ZDM, to establish a local manufacturing plant producing the pre-cast material for the rural sanitation units. Two locations were initially proposed for manufacturing plants, namely Ulundi and Vryheid.

The manufacturing plant in Ulundi was erected and established in 2008 via the Rural Sanitation Project funding. At present it is managed by Conloo, a division of Conrite Walls. The objective is that the manufacturing plant will be handed over to local business partners, and in doing so promote local economic development.



Premises for the Vryheid plant is currently being investigated.

Estimated costs:

Table 5.6 (a) below summarises the estimated costs to provide sufficient water services infrastructure to all households in future:

Table 5.6 (a): Cost of new infrastructure to be built

WATER	Capital requirements	2013/14	2014/15	2015/2016	2016/2017	2017/2018
Regional bulk Pipes	R 1 136 675 096	R 81 618 822	R 11 584 808	R 76 405 893	R 127 159 412	R 839 906 161
Regional bulk Components	R 763 556 689	R 138 002 602	R 97 645 428	R 45 699 845	R 44 267 521	R 437 941 293
Secondary bulk	R 1 315 814 251	R 95 981 010	R 57 291 804	R 44 491 516	R 26 385 475	R 1 091 664 446
Reticulation Connections	R 137 022 280	R 6 666 220	R 8 939 760	R 8 484 820	R 10 699 920	R 102 231 560
Total capital: water	R 3 353 068 316	R 322 268 654	R 175 461 800	R 175 082 074	R 208 512 328	R 2 471 743 460

SANITATION	Capital requirements	2013/14	2014/15	2015/2016	2016/2017	2017/2018
Bulk infrastructure	R -	R -	R -	R -	R -	R -
Reticulation	R -	R -	R -	R -	R -	R -
VIP toilets	R 383 771 900	69 232 500	79 150 750	79 150 750	79 150 750	77 087 150
Total capital (new)	R 383 771 900	R 69 232 500	R 79 150 750	R 79 150 750	R 79 150 750	R 77 087 150

Funding sources and budget allocations:

Table 5.6 (b) below summarises the funding sources, implementation programmes and budget allocations for each programme:

Regional Scheme	% Overall	MIG 2013/2014	MIG 2013/14 (Committed funds)	RBIG 2013/14	MWIG 2013/14	MIG 2014/2015	RBIG 2014/15	MWIG 2014/15
Budget Allocation		R 261 545 000	R 261 545 000	R 55 341 000	R 37 000 000	R 221 622 000	R 55 000 000	R 39 000 000
SANITATION								
AbaQulusi	11.70%	R 6 120 153	R 6 120 153					
eDumbe	1.00%	R 523 090	R 523 090					
uPhongolo	5.60%	R 2 929 304	R 2 929 304					
Nongoma	44.60%	R 23 329 814	R 23 329 814					
Ulundi	37.10%	R 19 406 639	R 19 406 639					
Phase 2 (New Infrastructure)	20.00%	R 52 309 000	R 52 309 000			R 44 324 400		
AbaQulusi	9.46%	R 1 237 758	R 1 237 758					
eDumbe	22.23%	R 2 907 223	R 2 907 223					
uPhongolo	20.61%	R 2 695 274	R 2 695 274					
Nongoma	21.23%	R 2 776 337	R 2 776 337					
Ulundi	26.46%	R 3 460 659	R 3 460 659					
Phase 3 (Replacement Programme)	5.00%	R 13 077 250	R 13 077 250			R 11 081 100		
RUDIMENTARY								
Rudimentary Scheme (N)								
- Drilling bh's, testing, springs, hp's	1.00%	R 2 615 450	R 2 615 450			R 2 216 220		
- Rudimentary schemes	3.00%	R 7 846 350	R 7 846 350			R 6 648 660		
Rudimentary Scheme (S)								
- Drilling bh's, testing, springs, hp's	1.00%	R 2 615 450	R 2 615 450			R 2 216 220		
- Rudimentary schemes	5.00%	R 13 077 250	R 13 077 250			R 11 081 100		
	10.00%	R 26 154 500	R 26 154 500			R 22 162 200		
INTERMEDIATE STAND ALONE SCHEMES								
RBIG funding	10.00%	R 26 154 500	R 26 154 500		R 37 000 000	R 22 162 200	R 55 000 000	R 39 000 000
	10.00%	R 26 154 500	R 26 154 500			R 22 162 200		
RWSS								
Nkonjeni RWSS	9.96%	R 14 321 747	R 21 321 747			R 12 135 633		
Usuthu RWSS	46.51%	R 18 490 473	R 18 490 473	R 48 413 000		R 56 691 130		
Mandlakhazi RWSS PH 3	12.56%	R 18 061 348	R 18 061 348	R 6 928 000		R 15 304 410		
Gumbi Emergency	0.16%	R 232 763	R 2 500 000			R 197 234		
Simdi East	2.42%	R 3 475 109	R 15 000 000			R 2 944 658		
Simdi Central	2.78%	R 4 006 172	R 12 000 000			R 3 394 658		
Simdi West	6.53%	R 9 388 317	R 22 235 234			R 7 955 257		
Khambi	3.33%	R 4 790 949	R 4 790 949			R 4 059 644		
Coronation (Enyathi)	6.23%	R 8 965 231	R 6 000 000			R 7 596 752		
eMondlo	9.53%	R 13 704 641	R 23 450 000			R 11 612 724		
	55.00%	R 143 849 750	R 143 849 750			R 121 892 100	R 55 000 000	R 39 000 000
median	6.38%							
Total Budget Available	100.00%	R 261 545 000	R 261 545 000			R 221 622 000		

Implementation rollouts:

Figures 5.6 (a) to (f) below provide an overview on each of the implementation programmes. Detailed maps and project rollout lists can also be reviewed in Section 10.

Figure 5.6 (a): Map of the 10 back-to-back Regional Water Schemes

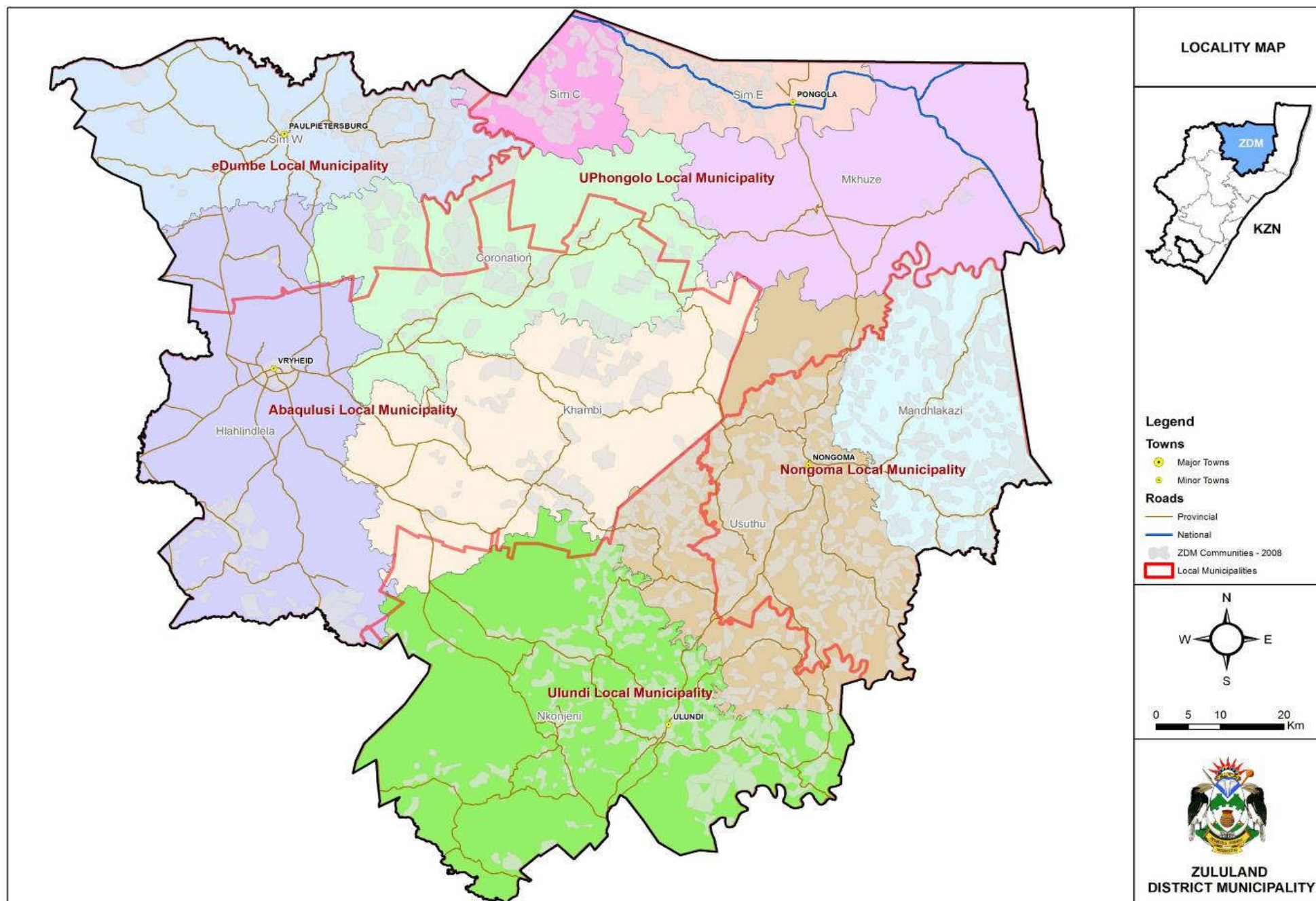


Figure 5.6 (b): Planned future Bulk Infrastructure

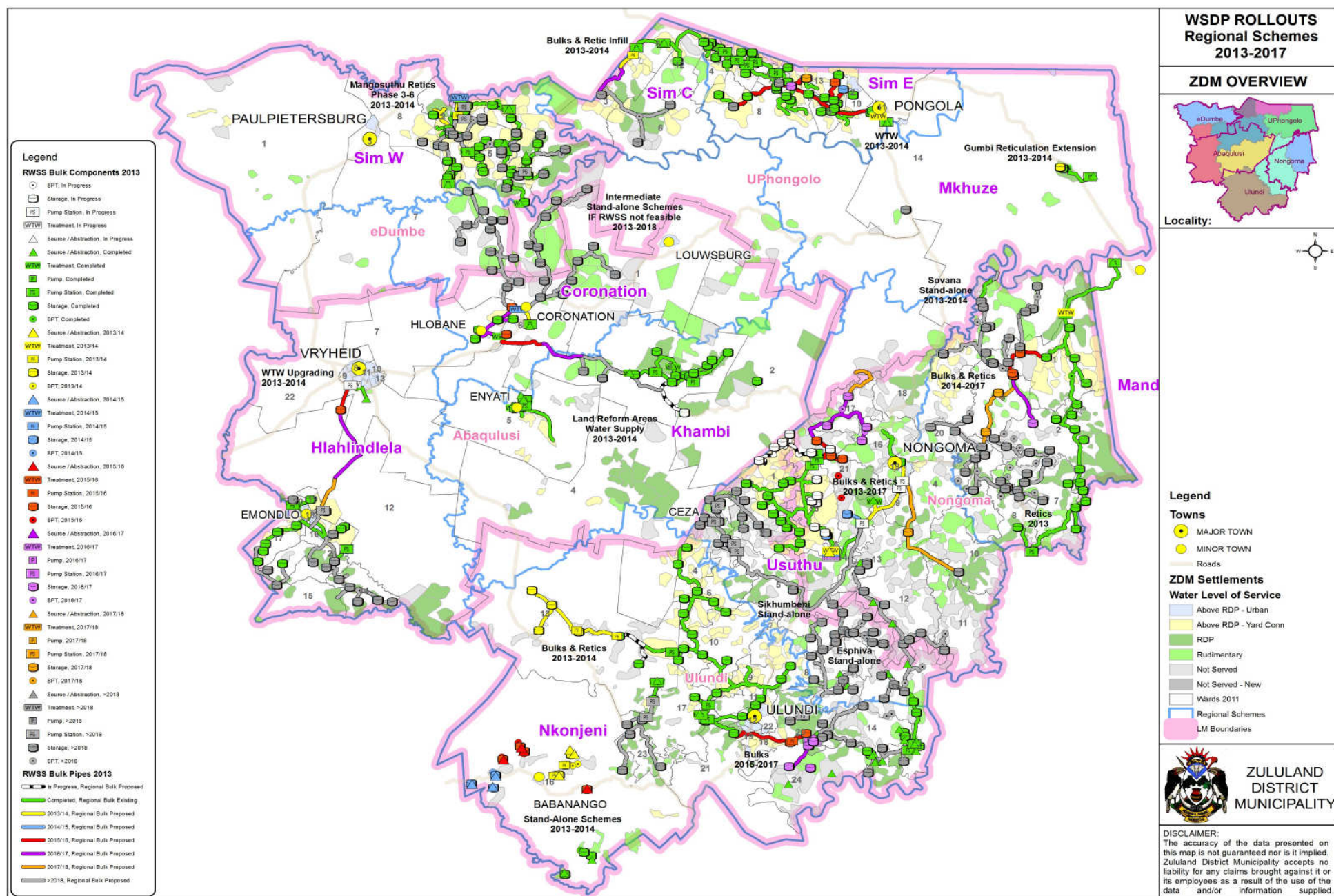


Figure 5.6 (c): Planned future Stand-Alone Schemes to be implemented

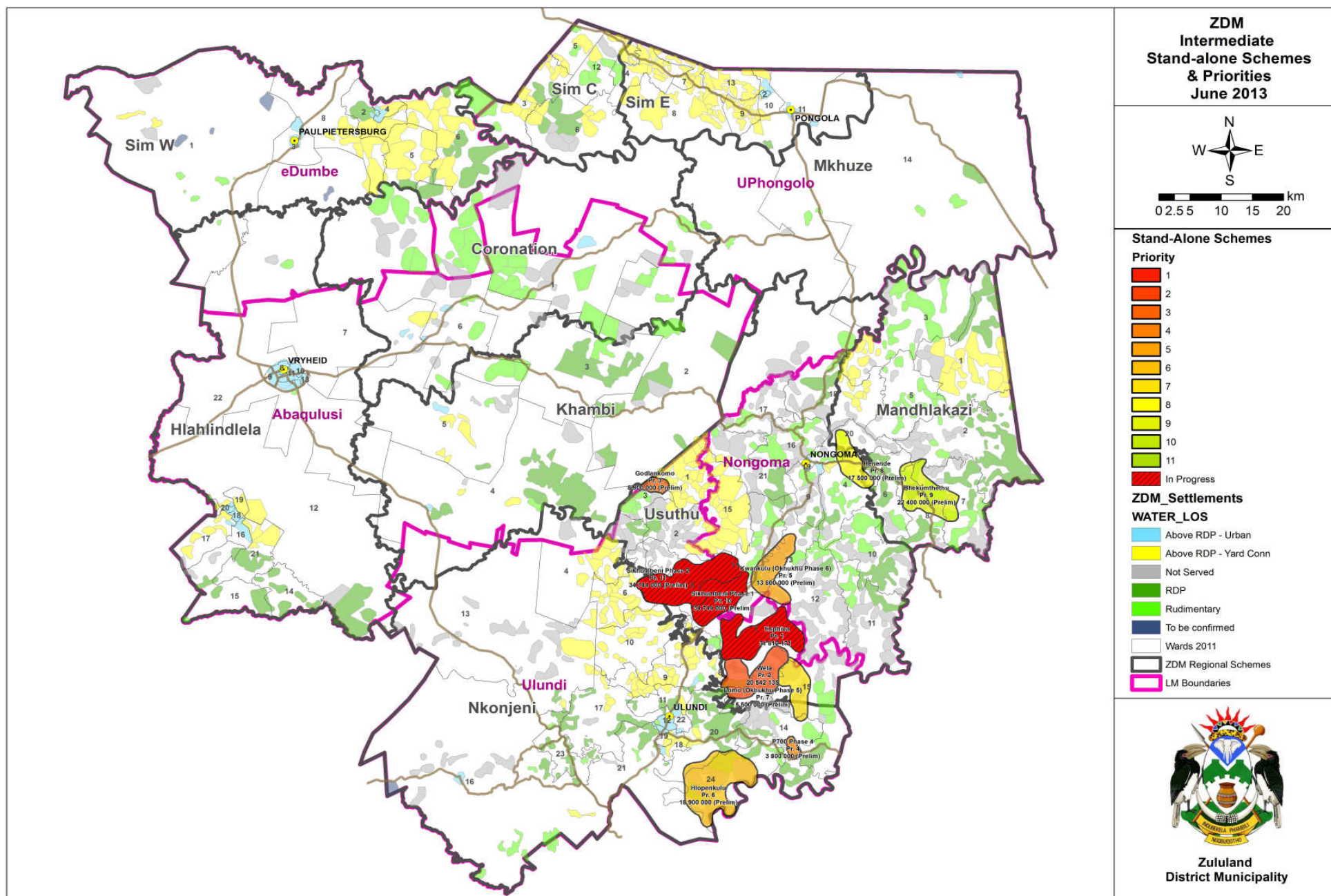


Figure 5.6 (d): Planned rudimentary infrastructure rollouts.

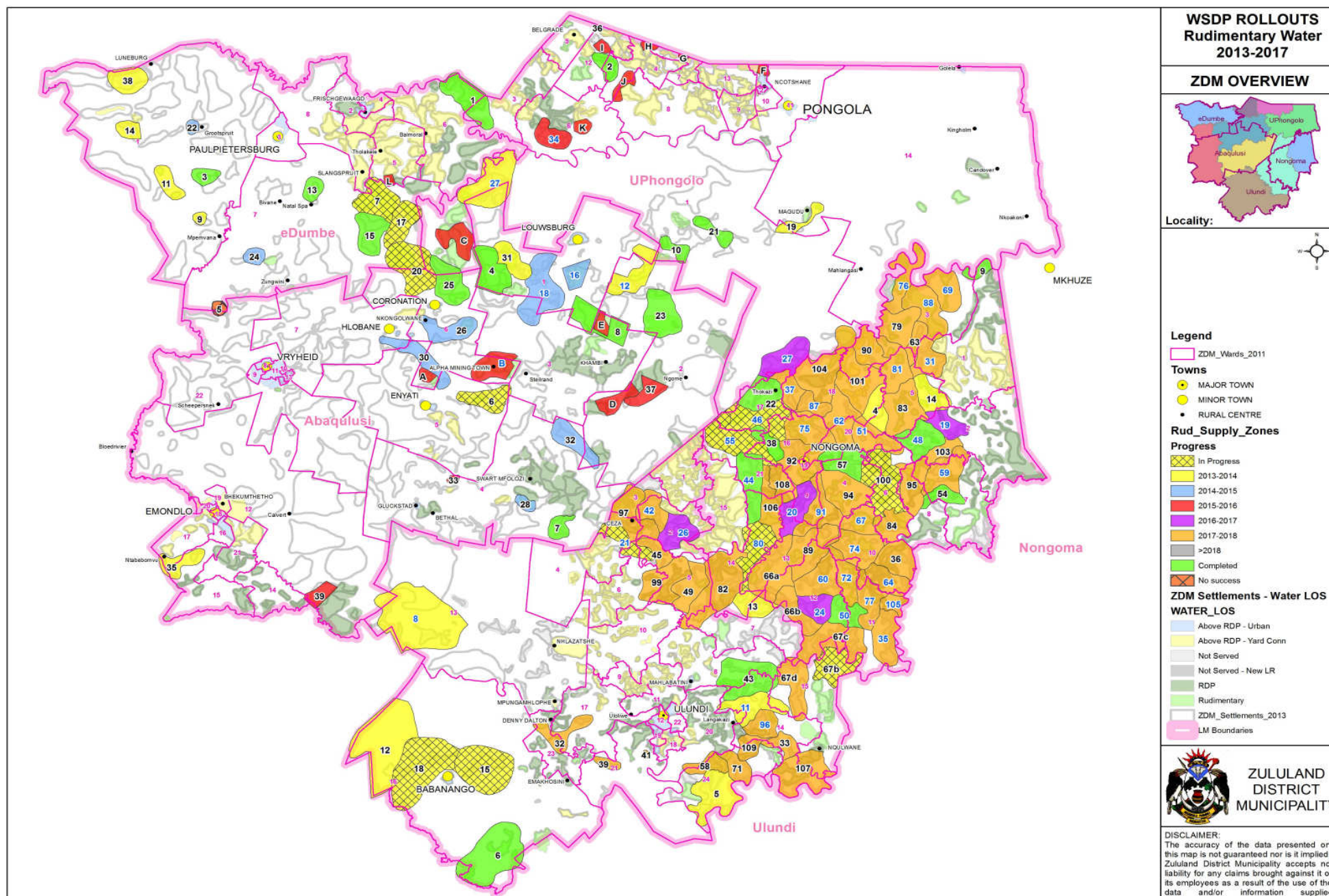


Figure 5.6 (e): Planned rural sanitation infrastructure rollouts.

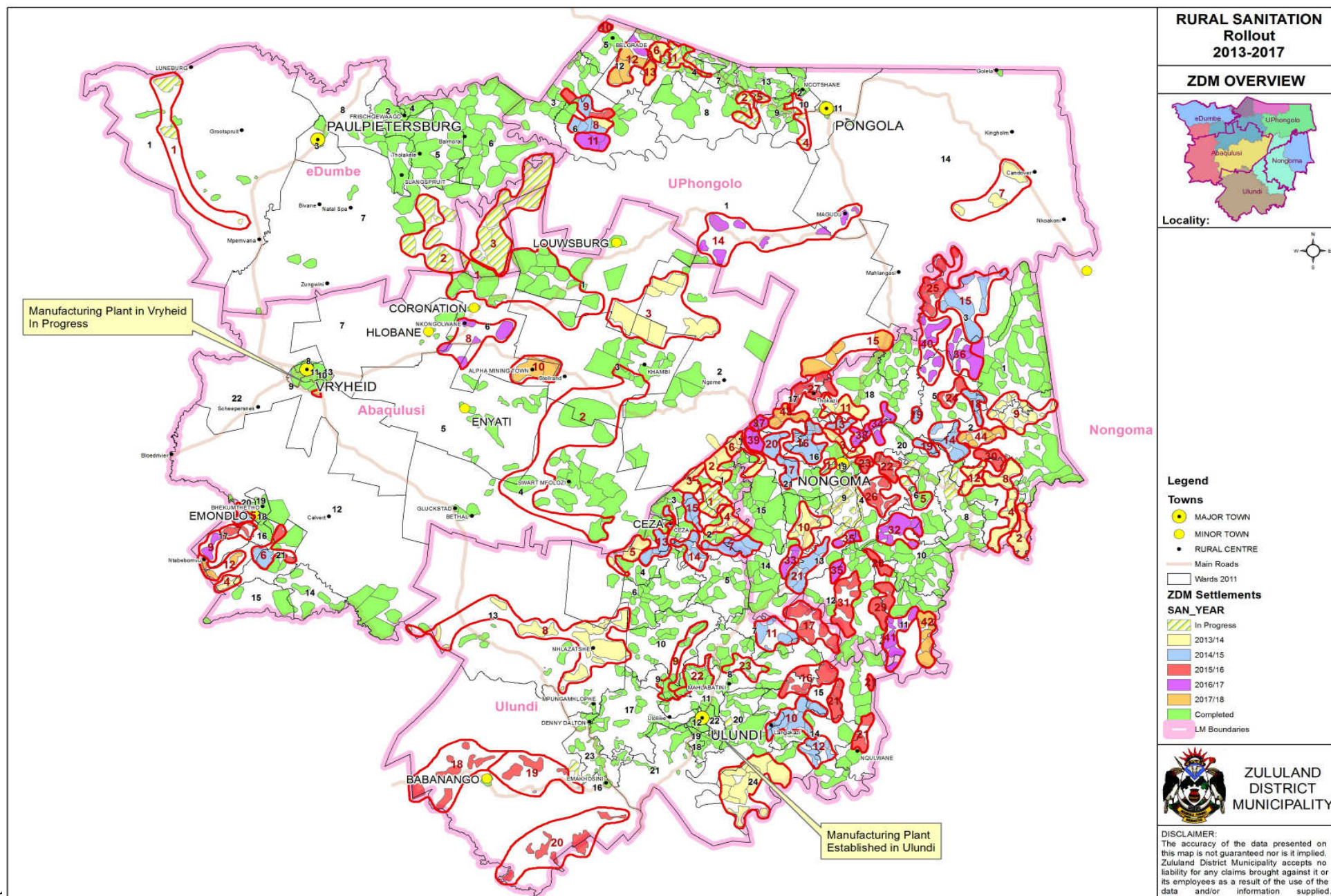


Figure 5.6 (f): Existing sanitation services to be reviewed for the Sanitation Replacement Programme.

