

## 10. List of projects

### 10.1 Introduction

ZDM has the following implementation programmes in terms of water and sanitation provision:

- **WATER**

- **Regional Water Supply Schemes**

There are 10 back to back Regional Water Supply Schemes, as follows:

- Nkonjeni
    - Usuthu
    - Mandlakazi
    - Mkhuze
    - Simdlagentsha East
    - Simdlagentsha Central
    - Simdlagentsha West
    - Coronation
    - Khambi
    - Hlahlindlela

Each regional scheme footprint has a sustainable water source from where infrastructure is progressively being rolled out to all households within the supply area. The supply footprints have been identified in such a way that water can be provided to all households within the area in a sustainable manner and at the lowest possible cost (R/kl).

- **Intermediate Stand-alone Schemes**

Due to time and budget constraints with implementation of costly bulk infrastructure, ZDM has initiated an intervention to alleviate the severe water shortage in areas where a sustainable local source can be developed. These water sources will supply several settlements in the surrounding area, and will become part of the Regional Scheme infrastructure in future. Implementation will be done according to the ZDM Prioritisation Model for water services within each Regional Scheme.

- **Rudimentary Water Supply**

In areas where settlements cannot be served in the near future by the Regional Schemes or Intermediate Schemes, local water sources will be used to provide a survival level of water on a rudimentary level. Implementation is done according to the ZDM Prioritisation Model for water services.

- **RURAL SANITATION**

Sanitation in the rural areas is being provided in the form of dry-pit VIP toilets. Implementation is done according to the ZDM Prioritisation Model for rural sanitation services.

A Rural Sanitation Replacement Programme has also been initiated in 2013 to replace the old Archloo-, Block- and Zink-type VIP's.

- **SPECIAL PROJECTS**

Special projects are individual infrastructure requirements on a Local Municipal level which are addressed and budgetted for on a needs basis.

Rollout programmes for each of the above can be reviewed at the end of this section.

## **10.2 ZDM Prioritisation Models**

ZDM has initiated prioritisation models for water and sanitation implementation since 2002. The purpose of the prioritisation models are to prioritise settlements and project implementation in an un-biased, objective way. Current Prioritisation Models include:

- 1 Regional Scheme Rollouts
- 2 Intermediate Stand-Alone Schemes
- 3 Rudimentary Water Supply Rollouts
- 4 Rural Sanitation Rollouts
  - 4.1 New Infrastructure
  - 4.2 Phase 3 Replacement Programme
- 5 Budget Allocation Model

The Prioritisation Models are based on a weighted criteria method, whereby criteria for each model is given a weight, which counts up to a total score of 100. The highest score implies the highest priority for implementation. The weighted criteria for each model is presented below:

### **10.2.1 Water Implementation Model**

For water implementation on a rudimentary as well as regional level, the weighted criteria is based on specific characteristics of each settlement within ZDM. Where water needs to be provided to individual settlements, the settlements' individual prioritisation score is used to prioritise implementation.

Where larger areas are involved with several settlements grouped together, eg. within regional bulk reservoir zones, the average score of all settlements within each zone is calculated. This is then used as a zoning score to prioritise zones. The scoring criteria can be seen below:

Table 10.2.1: Scoring criteria for water implementation

FACTOR	CRITERION	VALUE	WGHT
Existing Primary Water Source	Urban & RWSS (with Bulk, Secondary Bulk, Retic) RWSS (with Bulk, Secondary Bulk) RWSS (only Retic) CWSS/Stand alone Potable BH/Spring/H.Pump Unprotected Surface Water (River/Dam etc)	0 0.25 0.5 0.5 0.75 1	30
Project Cost / Capita Project Cost / HH	> R 40,000 R30,000 - R40,000 R20,000 - R30,000 R10,000 - R20,000 < R10,000	0.2 0.4 0.6 0.8 1	15
Walking Distance to Water	< 1 km 1 – 3 km > 3 km	0 0.7 1	20
Within 4 km of a Dev. Corridor/RSC	Primary / Service Centre Secondary Tertiary None	1 0.75 0.5 0	5
Existing Sanitation	Less than 5% 25% 75% More than 95%	1 0.75 0.25 0	5
Existing Use / Level of Service	Nothing (> 3km walking) Survival (< 3km walking) Rudimentary ≥ RDP	1 0.75 0.5 0	15
Linkages to other projects< (supplyable) All settlements within 5km of existing Regional Scheme Layouts	Yes No	1 0	5
History of Water Borne Disease	Yes No	1 0	5
		<b>Total</b>	<b>100</b>

### 10.2.2 Rural Sanitation Implementation Model

Rural sanitation implementation is based on the same principle as with water, however different criteria and weights are used to address specific rural sanitation needs. Two prioritisation models are used for sanitation implementation:

- **Phase 1 & 2 (New projects)**

These phases provide sanitation to settlements having not received any form of sanitation from previous sanitation projects.

- **Phase 3 (Replacement Programme)**

Phase 3 was initialised towards the end of 2013 to replace old VIP-type structures, especially the Archloo-type structures which have proofed to have a very short lifespan. Old VIP-types where pits are full and the top structure cannot be moved to a new location will also be replaced.

The scoring criteria for both these two programmes can be seen below:

Table 10.2.2: Phase 1 and 2 scoring criteria for rural sanitation implementation

FACTOR	CRITERION	VALUE	WEIGHT
<b>Water Implementation</b>	Catch-up	1	40
	Current Water Implementation (2008-2014)	0.5	
	Future Water Projects	0	
<b>Distance to downstream open groundwater</b> (Pollution potential)	<50m	1	25
	100m	0.6	
	250m	0.4	
	500m	0.2	
	>500m	0	
<b>Settlement density in relation to HH count.</b> (Susceptability to diseases)	> 10	1	15
	5 - 9.99	0.6	
	2 - 4.99	0.4	
	1 - 1.99	0.2	
	<1	0.1	
<b>Settlement type</b> (Susceptability for diseases to surrounding urbanised area)	Urban Fringe	1	10
	Peri-urban	0.5	
	Rural	0.1	
<b>Rural Development Nodes</b> <b>Development Corridors</b> <b>Centres</b> <b>Service</b>	Yes	1	10
	No	0	
		<b>Total</b>	<b>100</b>

Table 10.2.3: Phase 3 scoring criteria for rural sanitation implementation

FACTOR	CRITERION	VALUE	WEIGHT
<b>Existing households not covered by previous project</b>	76-100%	1	35
	51-75%	0.67	
	26-50%	0.33	
	0-25%	0.01	
<b>Sanitation Top Structure Type</b>	Archloo	1	25
	Zink	0.67	
	Block	0.33	
	Pre-cast	0.01	
<b>Condition</b>	Need replacement	1	20
	Need repairs	0.5	
	New	0.01	
<b>Year built</b>	<2000	1	5
	2001-2006	0.5	
	>2007	0.01	
<b>Settlement density</b>	High	1	15
	Medium	0.6	
	Low	0.3	
	Very low	0.01	
		<b>Total</b>	<b>100</b>

### 10.2.3 Budget Allocation Model

The annual funding allocations are split proportionally between the various implementation programmes for ZDM. Each implementation programme area is allocated a percentage in proportion to the overall budget requirement for eradicating the total backlog in that particular category of infrastructure projects.

Due to backlogs being eradicated continuously, these percentages are revised on an annual basis to ensure that the allocations reflect the revised backlogs for a particular programme and area.

## 10.3 Project Details

The ten Regional Water Supply Schemes require the largest portion of external funding due to costly bulk infrastructure. Due to this, ZDM augment the bulk reservoir zones with intermediate stand-alone schemes as well as survival-level rudimentary water supply. Each rollout is prioritised as described above.

Since the master planning was done for the regional schemes, ZDM has experienced some unique challenges concerning the sustainability of the water sources to be used for the regional schemes. Land reform areas have seen an unexpected high household growth in certain areas, which increases the water demand for regional schemes drastically. Critical issues related to the above have been identified for each regional scheme, and project progress and interventions to these issues are discussed in more detail below.

### 10.3.1 Nkonjeni

- **Background**

The Nkonjeni regional scheme is in the privileged position of having a well-developed and sustainable water source. Therefore the bulk of the available funding can be applied towards the progressive roll-out of water services to the respective communities.

- **Key Issues and Interventions**

The sustainability of the scheme is threatened by water losses in existing networks and excessive water usage from unmetered consumers. A water audit was done in 2006 (Ulundi Water Audit – October 2006) that indicated the inefficiency of water usage in Ulundi town to be 68% of the volume of water put into the system. ZDM has initiated a waterloss management programme where these waterlosses are systematically been addressed.

Due to limited spatial information that was available for planning purposes at the start of the Regional Schemes, the area around Babanango was not covered initially under Nkonjeni Regional Scheme. During 2008 a demographic verification process was done which allowed ZDM to identify existing settlements footprints in the Babanango area. A business plan was submitted to DWA and MIG in 2009 which included these settlements under MIG funding, and implementation of water supply is in

progress to address the severe lack of water in this area in alignment with the Prioritisation Model for the Regional Schemes.

- **External Support**

Funding for Nkonjeni Regional Scheme is provided through MIG.

### 10.3.2 Usuthu

- **Background**

The Usuthu Regional Scheme is the largest water supply scheme in the district and also represents the biggest portion of the total backlogs. The scheme required the development of a new water source from the Black Mfolozi river and expensive bulk infrastructure to be rolled out over vast distances to scattered rural communities.

- **Key Issues and Interventions**

The biggest challenge with this scheme is the funding of the enormous capital investment of more than R500m that is required to provide the required infrastructure. ZDM has aquired additional DWA funding to fast-track the implementation of bulk services for this scheme.

The huge capital investment required eradicating the backlogs through the regional scheme infrastructure and the resulting slow progress with the roll-out of services requires an intermediate solution to be developed to alleviate immediate water supply needs. The existing rudimentary supply programme, whereby local groundwater sources are developed within 800m walking distance from households, was hampered in Usuthu area due to difficulty in finding reliable and good quality water sources close to communities. ZDM has initiated intermediate, stand-alone water schemes to address the delay in providing reticulation to communities. These intermediate schemes are developed from production boreholes where available, and are designed in such a way that they can easily be integrated into the bulk services network in future.

The sustainability of the main water source of Nongoma town is under severe strain and no longer sustainable during drought periods. The installation of a bulk pipeline from the Black Mfolozi river to Nongoma is currently in progress to address this issue.

Nongoma town frequently experiences intermittent water supply to consumers and businesses, even outside of drought periods. Excessive water usage by unmetered consumers and high water losses contribute to the problem. A water loss study conducted in 2003 indicated that unaccounted water supply in Nongoma was in excess of 41%. A waterloss and water demand strategy is in progress as part of the Usuthu Regional Scheme planning.

- **External Support**

Funding is provided by MIG as well as DWA.

### 10.3.3 Mandhlakazi

- **Background**

The Mandlakhazi Regional Scheme represents the second largest supply area in the district and also the second biggest portion of the total backlogs of the municipality. There are no towns in the supply area and the communities are sparsely scattered and vast distances apart. The provision of water services to all communities are therefore extremely expensive and will take a long time to conclude.

Water supply problems in the neighbouring Hlabisa area has resulted in a change of priorities and the construction of a bulk supply pipeline to supply the eastern side of Mandlakazi and eventually reach the Hlabisa communities.

The scheme is supplied with raw water from a privately-owned dam outside of the Zululand municipal area. The dam is supplied by the owner from the Pongolapoort Dam, which is a very reliable water source. Bulk water supply agreements are in place with the owner and the supply is secured. Long-term security of supply could however be improved by ZDM obtaining an individual allocation and raw water abstraction permit from DWA for abstraction from the dam.

- **Key Issues and Interventions**

The Mandlakazi area is also in need of an intermediate solution to accelerate the provision of services to households until the regional scheme bulk infrastructure can eventually reach all the communities. Drought problems are frequent in the area and the rudimentary programme has limited success in finding sustainable and potable local sources. However, success has been achieved in finding good production boreholes throughout the scheme and this will be targeted and developed as intermediate stand-alone schemes which will be integrated into the regional scheme in future.

- **External Support**

The regional scheme is funded by MIG as well as an allocation from DWA to accellerate the implementation of the bulk services needed for the Hlabisa water supply.

### 10.3.4 Mkhuze

- **Background**

The Mkhuze Regional Scheme area comprises of mostly formal farm areas and a small number of sparsely scattered rural communities. The construction of a single regional scheme to supply the entire footprint is not feasible, but rather individual schemes from local sources.

- **Key Issues and Interventions**

An existing land reform project at the Gumbi settlement has resulted in a dramatic influx of families that settled without any water or sanitation infrastructure being in place. This resulted in the construction of an emergency supply from the neighbouring Pongolapoort Dam. The project is almost completed. The abstraction point at the dam is however not ideal and in future a second abstraction point from a more ideal position should be investigated.

There is huge potential for economic development on the western side of the Pongolapoort Dam but abstraction on that side of the dam is unfortunately very difficult. Groundwater sources in the area are also of poor quality and insufficient yield to sustain large scale development.

- **External Support**

Funding is provided by MIG.

### 10.3.5 Simdlangentsha East

- **Background**

The Simdlangentsha East Regional Scheme is a well-served area and consist of the lowest backlogs in the district. The scheme supplies Pongola town as well as a vast rural area. Water is abstracted from irrigation channels next to the Pongola river and with an emergency supply that is available further down at the Pongola river. The irrigation channels are managed by DWA and the supply is mostly reliable, except when the channels are closed for maintenance. ZDM also pays DWA a raw water charge for water abstracted from the channels.

- **Key Issues and Interventions**

Water supply in the rural areas is under severe pressure with frequent interruptions to the supply. Excessive water usage and high waterlosses due to illegal and unmetered connections are the main contributors to the problem. Apart from the above problems the bulk infrastructure is also in need of upgrade as a result of population growth since the inception of the scheme. The challenges on the scheme therefore require a combination of water demand management interventions and the upgrade of bulk infrastructure to address the long-term sustainability of the scheme. The waterloss

managagement programme initiated by ZDM is addressing this at present, and the upgrading of the existing infrastructure from the abstraction works to the water treatment works is in progress.

Pongola town has experienced significant development over the recent years and this was hampered by especially the absence of waterborne sanitation throughout the town. There is a need to compile a sewerage master plan for the area and plan upgrade requirements systematically.

- **External Support**

Funding is provided by MIG.

### **10.3.6 Simdlangentsha Central**

- **Background**

The planning of the Simdlangentsha Central scheme is complete and the first phases of the bulk infrastructure have been completed. The project also requires a substantial investment in bulk infrastructure before communities will be reached with water supply. The area is however quite well served with localised schemes from local sources. The challenge is to keep these schemes operational until the bulk scheme can reach all the areas.

- **Key Issues and Interventions**

The Simdhlangentsha East Regional Scheme experienced water pressure problems, and the Simdhlangentsha Central Regional Scheme is used to augment water supply to these settlements.

The Simdlangentsha Central scheme contributes a small portion to the total backlogs of the ZDM and therefore also receives a small portion of the available capital funds, although a substantial capital investment is still required to provide the necessary infrastructure.

Although the area is generally well-served, all schemes are old and the regional scheme planning will include infills to provide water to additional households.

- **External Support**

Funding is provided by MIG.

### 10.3.7 Simdlangentsha West

- **Background**

Simdhlagentsha West Regional Scheme mainly consists of rural areas to the east of Paulpietersburg town. The area is generally well-served although existing networks are old and infills and waterloss management is required.

The current capacity of the rising main line from the existing weir in the Pongola River to the existing Water Treatment Works at Frischgewaagd Township is 2ML/day (Supplies Frischgewaagd and Mangosuthu with raw water), and the current capacity of the existing Water Treatment Works at Frischgewaagd town is 3ML/day. New networks were installed at Frischgewaagd during 2007/2008. and the water demand was reduced from the maximum possible supply of 2ML/day to 0.7ML/day. The balance of the water (1.3ML/day) is consumed by Mangosuthu (with only 20% of the population of Frischgewaagd). A new rising main line from the Pongola weir to Frischgewaagd will be constructed. The Frischgewaagd Water Treatment Works will be relocated to the Pongola River Weir, and will provide treated water to Ezimbomvu, Tholakela, Mangosuthu and Opuzane.

- **Key Issues and Interventions**

High waterlosses are evident, especially in the Mangosuthu area. ZDM has addressed this issue and the construction of new networks at Mangosuthu is currently under implementation. Completion is expected by 2014. Construction includes metered yard connections and consumers will be restricted to 200 litres per household. Consumers will be able to register for a higher level of service, but will be billed for the balance.

In the near future Frischgewaagd will also be restricted to 200 litres per day, with the option to register and pay for a higher level of service.

The biggest challenge is to obtain funding for the proposed bulk infrastructure. Funding of more than R120M will be needed just to supply Frischgewaagd and Mangosuthu with treated water.

- **External Support**

ZDM negotiated additional funding from Netherland to fast-track the implementation of bulk services. This was not successful and ZDM is currently reviewing the annual budget allocation for this regional scheme to fast-track implementation. Existing funding is provided by MIG.

### 10.3.8 Khambi

- **Background**

The Khambi Tribal Authority area is well-served with several small stand alone schemes. (Esihlengeni, Kwamakweshe, Ngenetsheni, Cibilili and Ntumbane Community Water Supply

schemes). Not all of these schemes however have had a sustainable water source. The clinic at Ntumbane is often without water during the dry winter periods.

An interim weir was constructed in the KwaMthazi River and a new water treatment works was constructed. This supplies water in the medium term to the Khambi Tribal Authority and the integration of all the stand-alone schemes to this bulk service is almost completed.

The integration of the remaining stand-alone schemes will be completed this year, after which the focus will be on the implementation of stand-alone schemes to the Land Reform Areas of Khambi.

- **Key Issues and Interventions**

The long-term planning is to supply water from the Coronation Dam to the Khambi area, but an in-depth study by ZDM concluded that the Coronation Dam will not be a sustainable solution for the long-term additional demand. ZDM is currently investigating the possibilities to locate sustainable local sources closer to Khambi area, which will result in a substantial saving in bulk infrastructure.

- **External Support**

Funding is provided by MIG.

### 10.3.9 eMondlo/Hlahlindlela

- **Background**

The eMondlo area is well-served with existing stand-alone schemes. eMondlo town receives water from the Mvunyane dam. These existing sources are however not sustainable for future use, and will receive water in future from the Klipfontein dam situated next to Vryheid town. Mvunyane dam is silted up to such an extent that it is no longer a sustainable source for eMondlo town.

- **Key Issues and Interventions**

During 2000 a new water reticulation network at eMondlo A and B was installed in order to lessen the water demand from 12 MI/day to 4 MI/day. The eMondlo water treatment works can supply 8 MI/day. This meant that 4 MI/day would have been available towards the settlements surrounding eMondlo A and B after the installation of the new networks. Networks were installed at these settlements and connected to eMondlo A and B. The old network at Emondlo A and B was never decommissioned and expected savings of 4MI/day never realised. The residents of eMondlo also connected the new network to the old network with pipes in their yards.

The eMondlo water treatment works has been refurbished and upgraded to supply 12MI/day, but the water demand has grown from 8MI/day in 2000 to 16 MI/day currently. With the refurbishment

completed there is still a shortfall of 4 Ml/day. The existing rising main line from Mvunyane Dam to eMondlo Water Treatment works can furthermore only supply 12 Ml/day.

The above issues will all be addressed with the bulk services implementation through the Hlahlindlela Regional Scheme. In future water will be supplied from Klipfontein Dam to Vryheid Water Treatment works. Water will then be pumped from the Vryheid Water Treatment works to Hlahlindlela (including eMondlo Township).

The funding available to implement the Hlahlindlela Regional water supply is not adequate, but ZDM has reviewed the annual budget allocation for this scheme to fast-track the implementation of bulk services. The estimated cost to implement the water supply from Klipfontein Dam to eMondlo is well over the R200M.

The ZDM waterloss programme needs to focus on waterlosses at eMondlo A and B. This is crucial towards the sustainability of water supply to the area. All connections must be metered and consumers must pay for water consumed. Consumers must be responsible for waterlosses in their own yards.

- **External Support**

Funding is provided by MIG.

### **10.3.10 Coronation**

- **Background**

The Coronation Regional Scheme consists of a few small and isolated towns and a number of scattered and very isolated rural settlements within formalised farm areas.

- **Key Issues and Interventions**

The towns have a high level of service but the infrastructure is very old and urgent refurbishment is required in most cases. The Coronation scheme however is a small contributor to the total backlogs of the district and receives a small portion of the total capital funds. Refurbishment needs are competing with new infrastructure requirements for limited available funds. There is a need for refurbishment funding over and above funding for the eradication of backlogs.

The original planned regional scheme has been revised during 2013/2014. The Coronation dam is not sustainable to supply Khambi Regional Scheme with additional water, and bulk services to the rural scattered settlements of Coronation area will be too costly to supply from a bulk infrastructure network. A revised Master Plan is currently in progress whereby stand-alone schemes from local

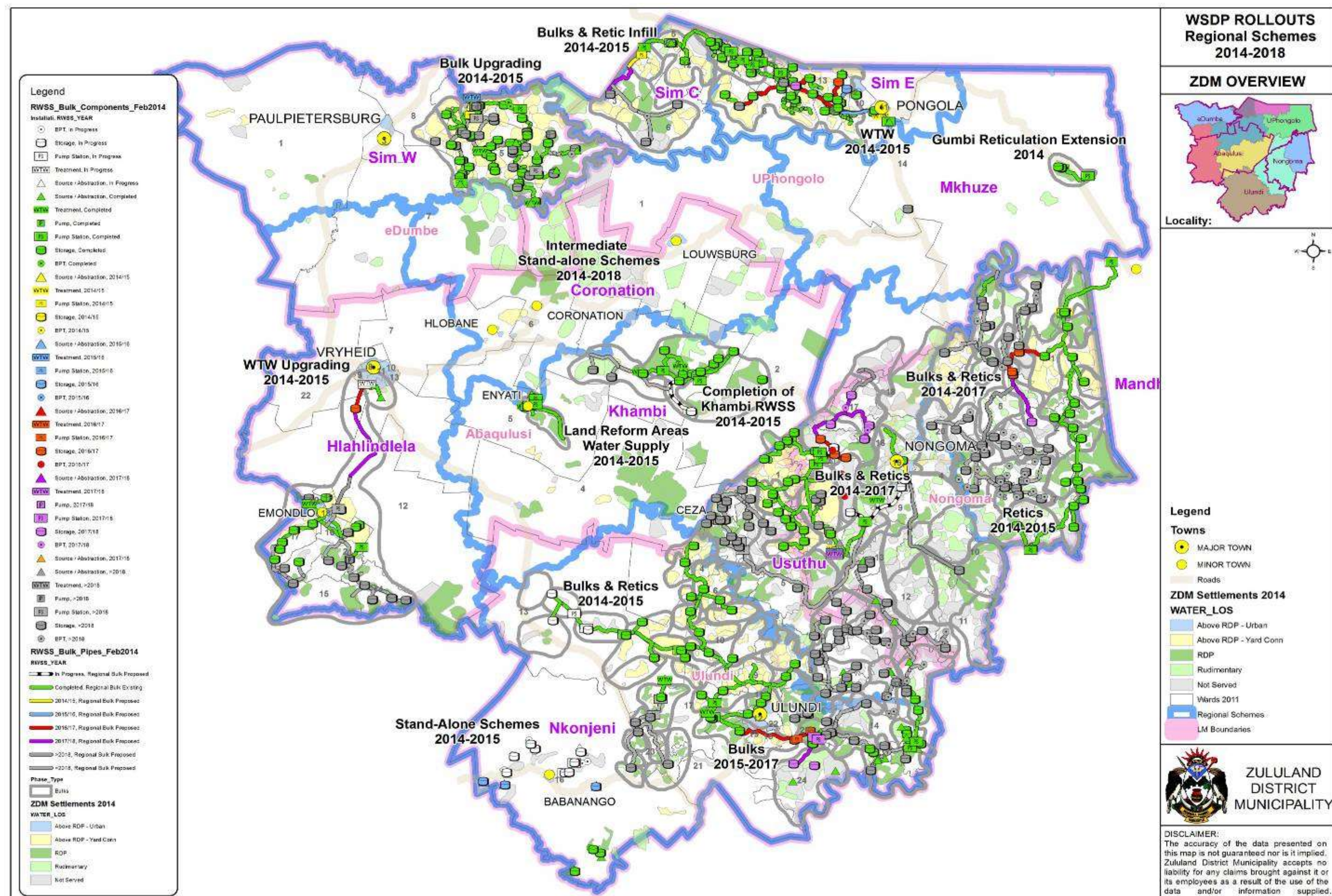
sustainable sources will be developed to cover as many settlements as possible. Khambi Regional Scheme will also receive additional water needed from local sustainable sources.

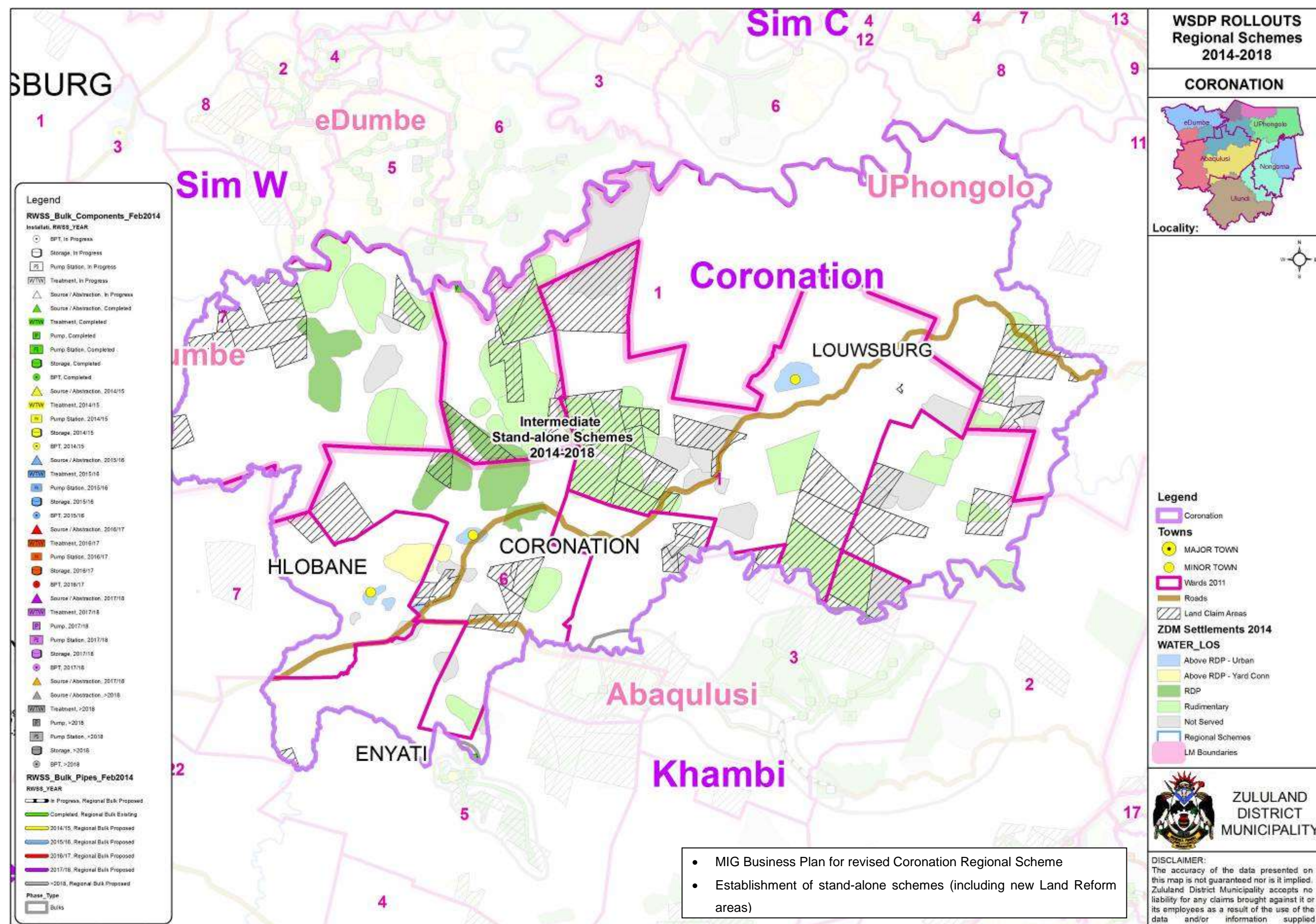
The town of Louwsburg within the Coronation regional scheme area have a water resource challenge that will not be easy to solve. The existing dam has a limited catchment and groundwater is difficult to find due to the locality of the town. Any possible solutions will be very costly and there is insufficient funding at this stage to address the issue. The town is also in need of waterborne sewage, but the water problems receives a higher priority at present.

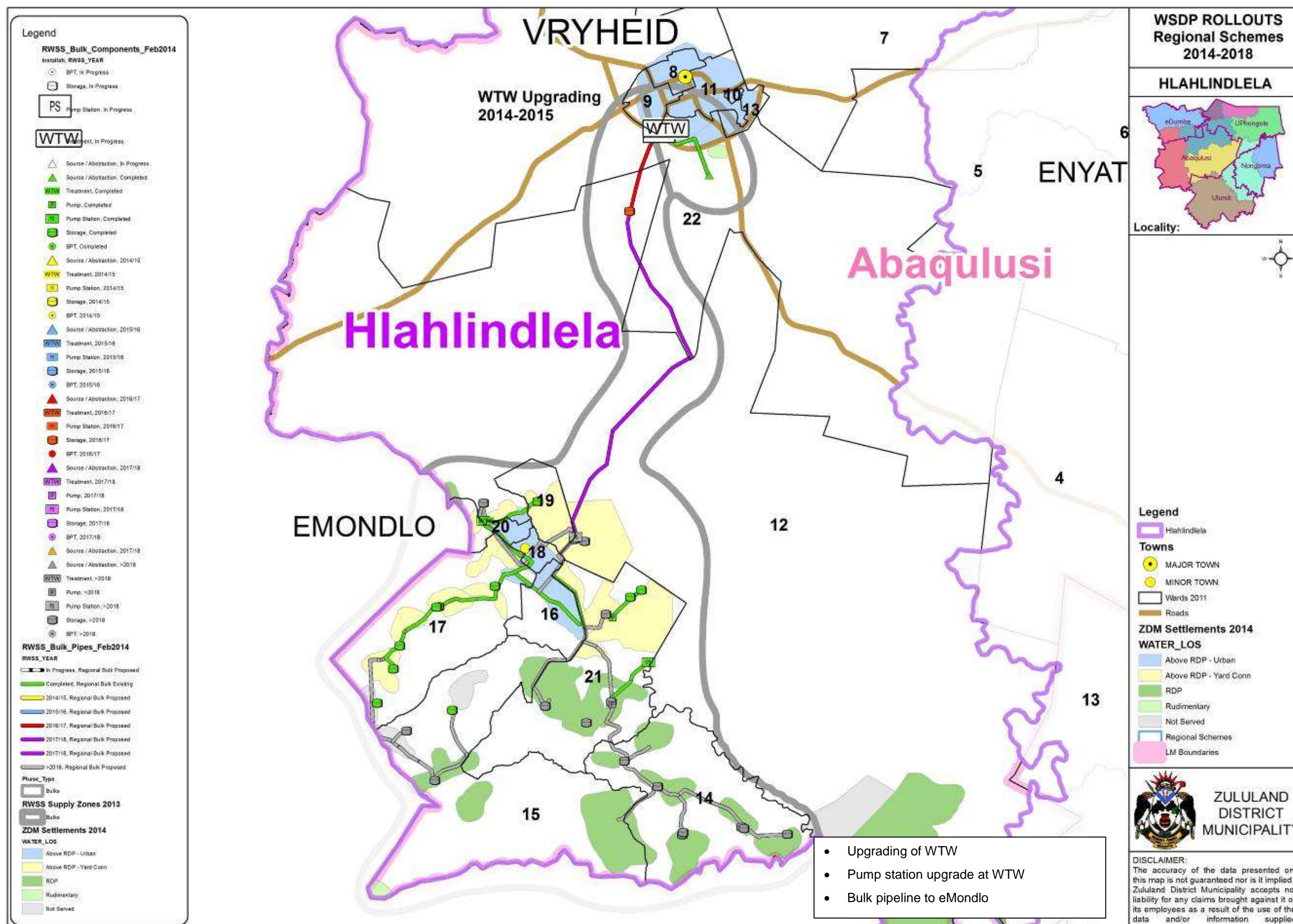
- **External Support**

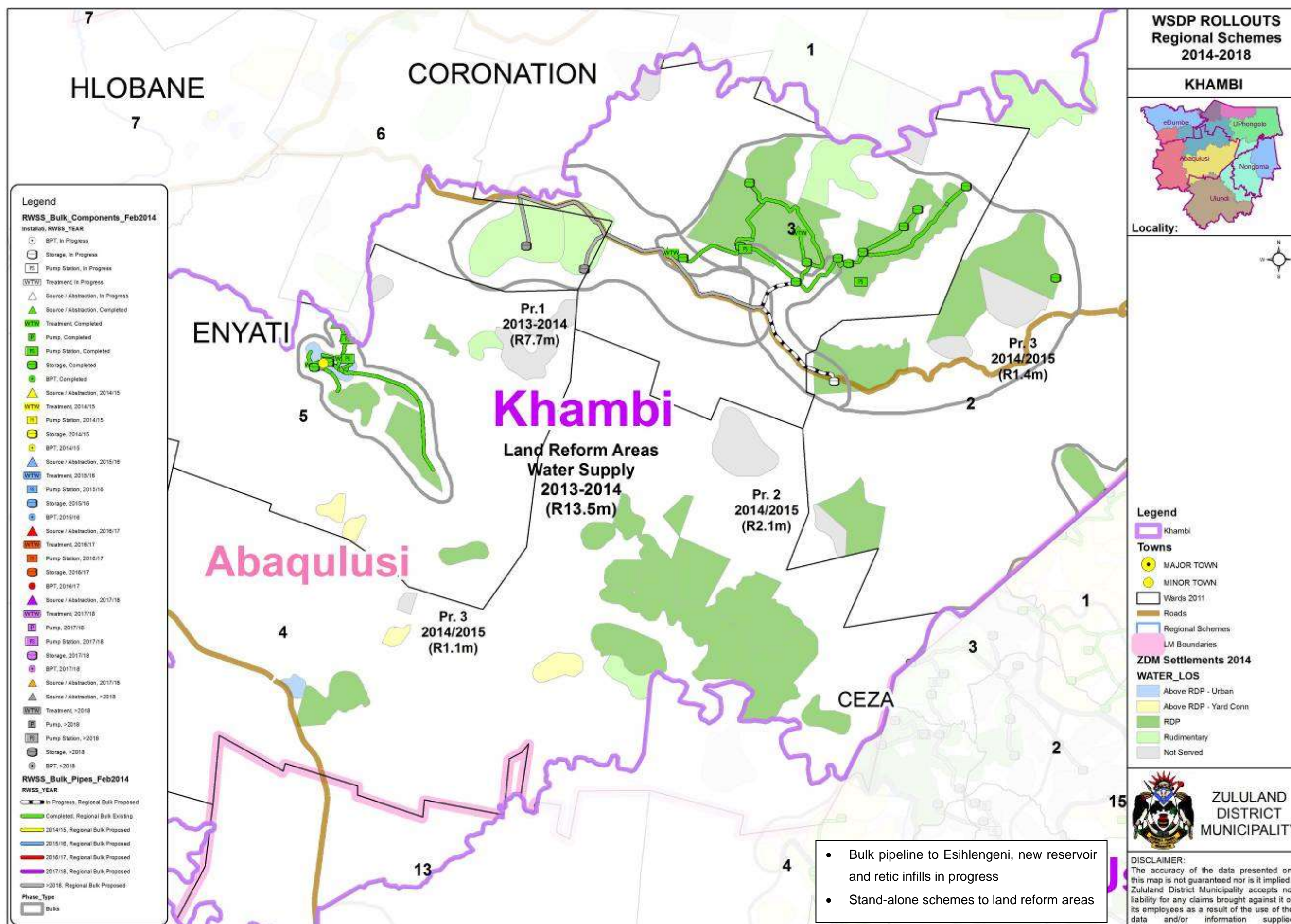
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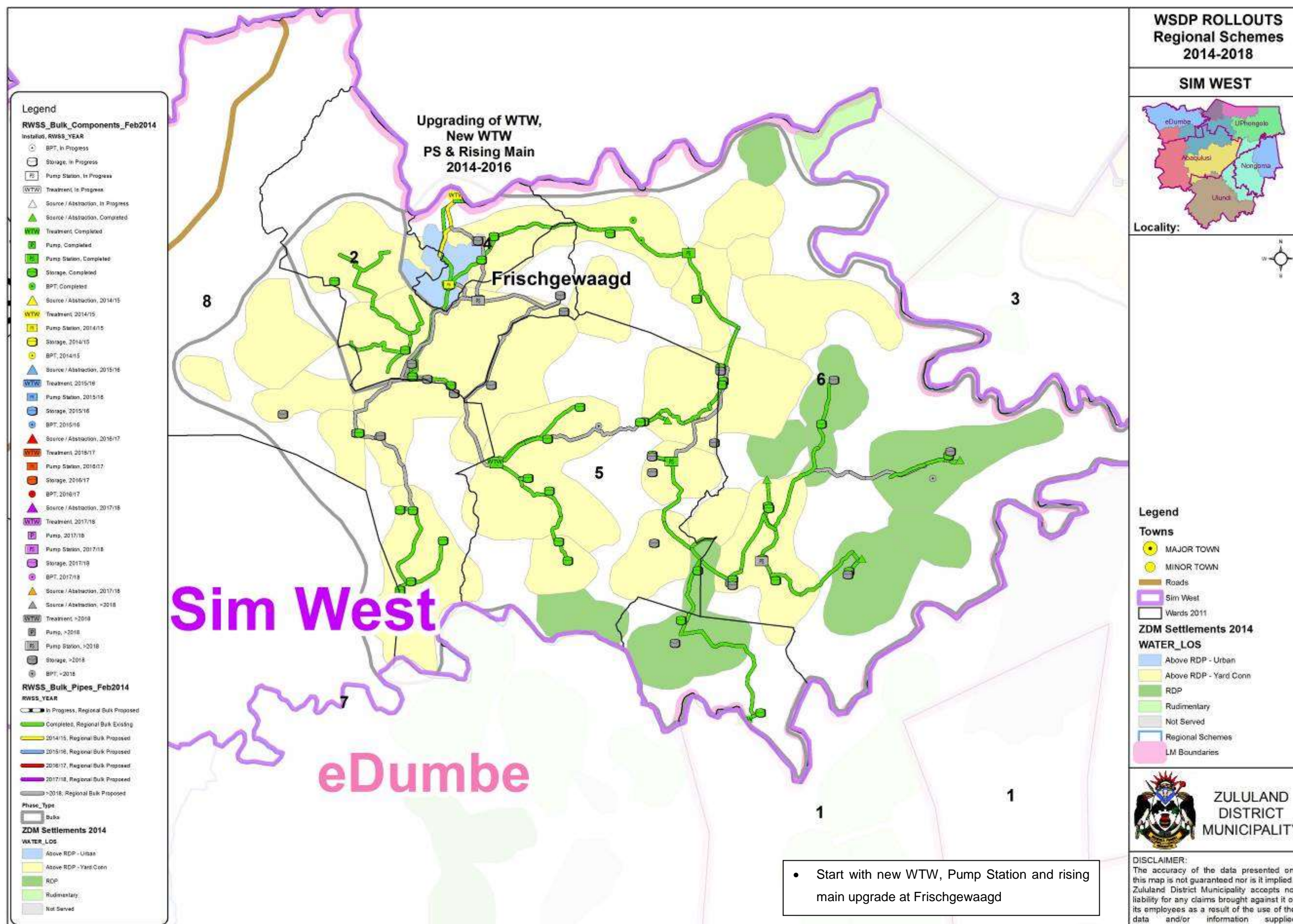
Map 10.1: Roll-out of regional water services in the district over the next 5 years

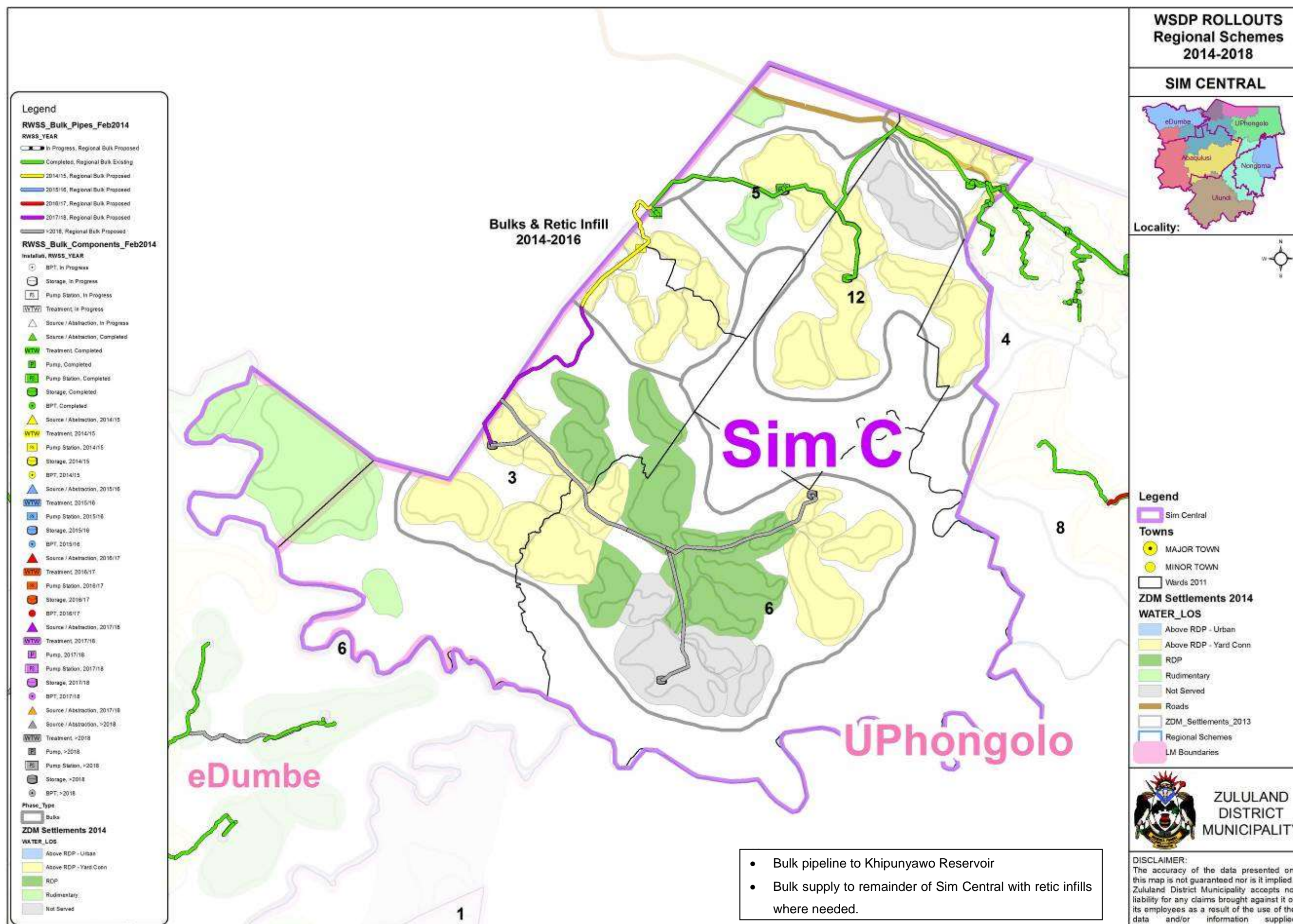


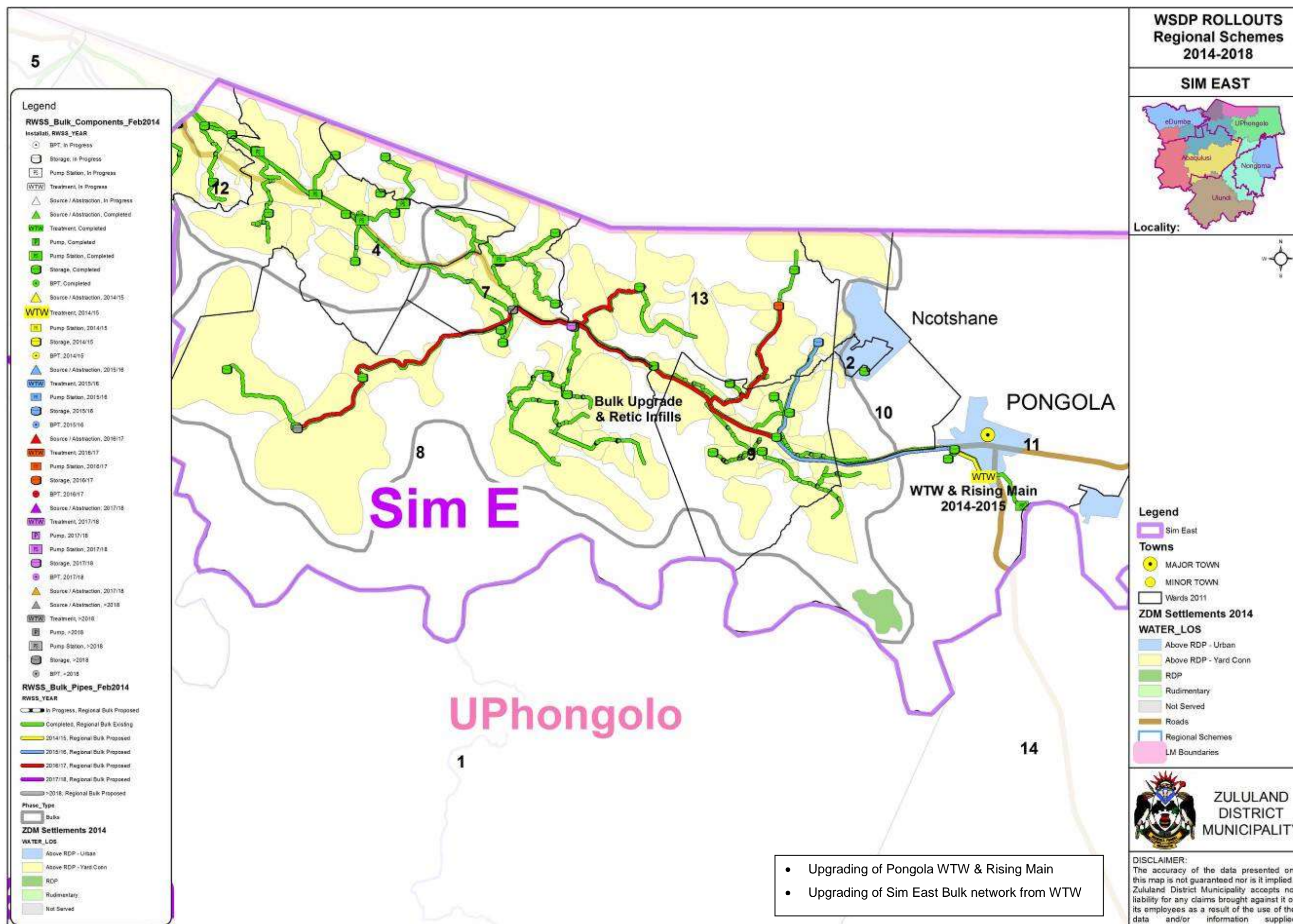


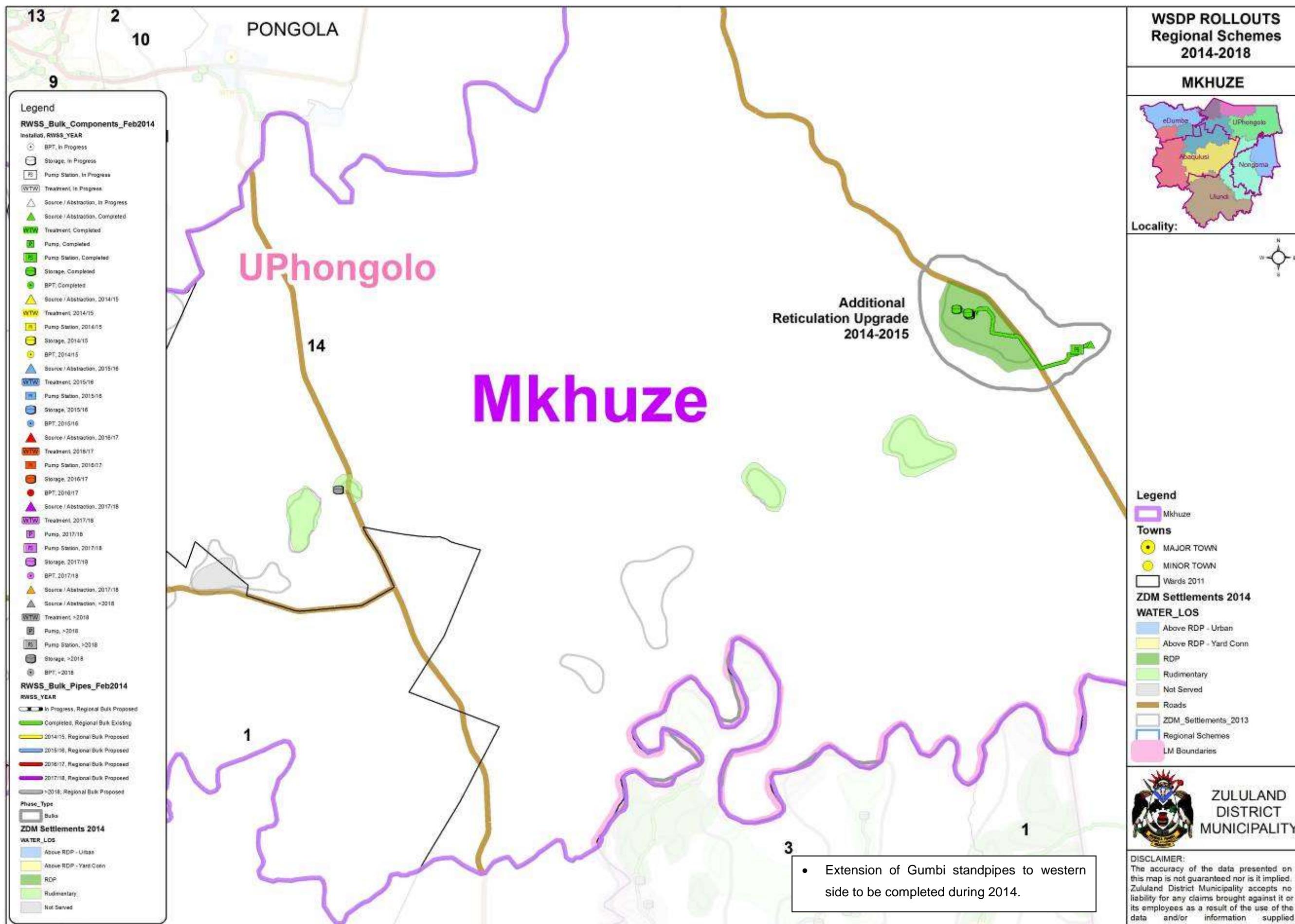


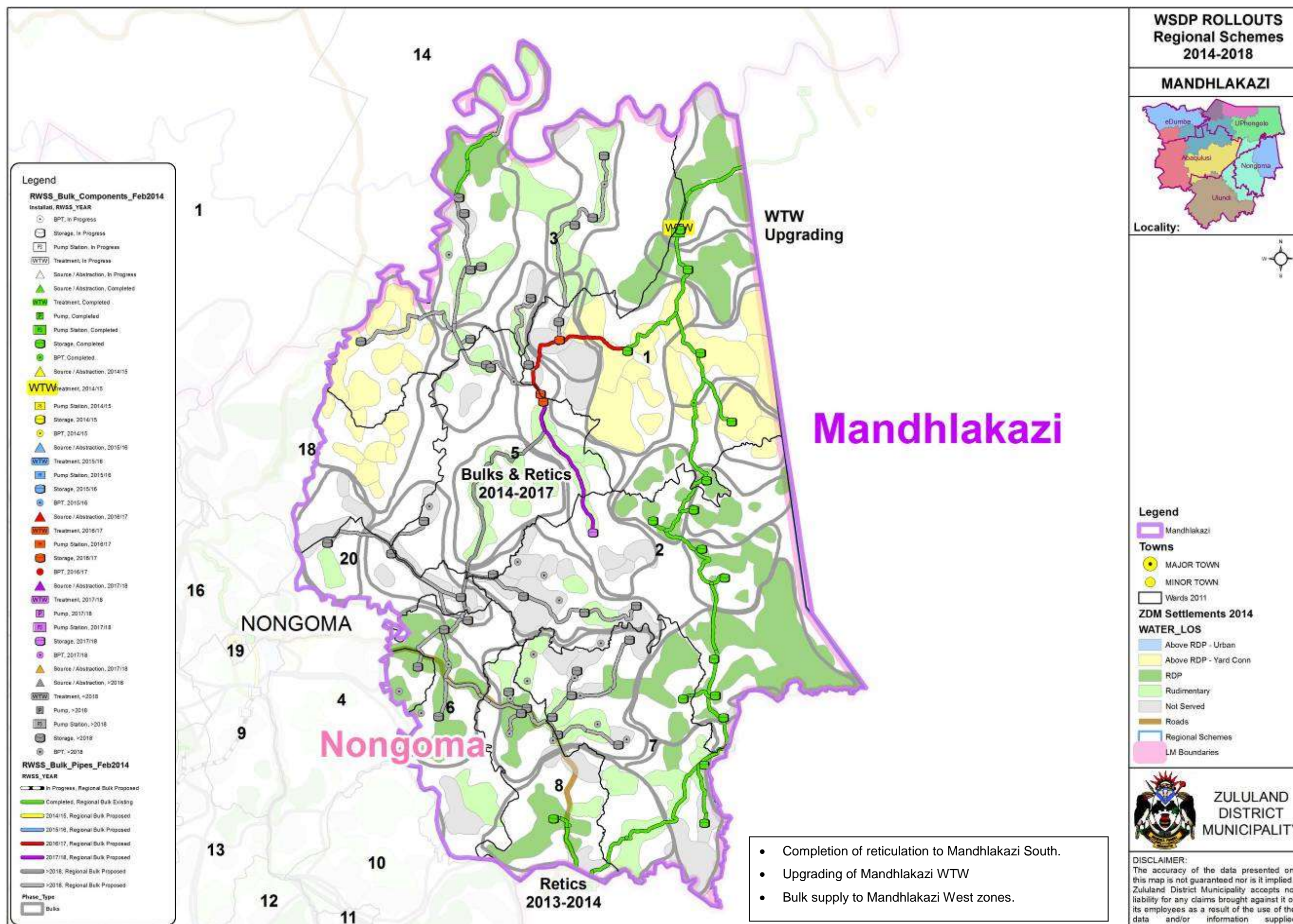


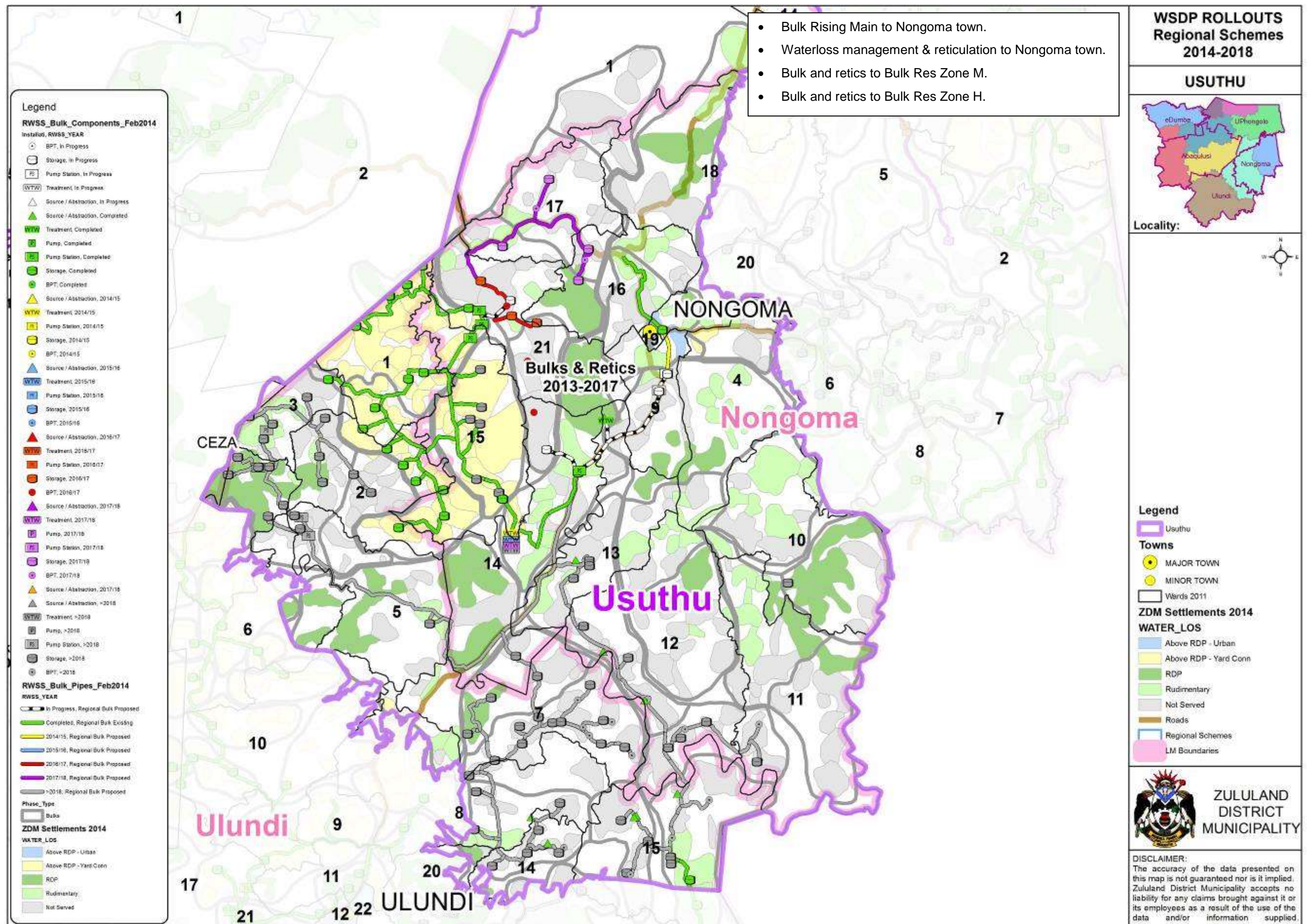


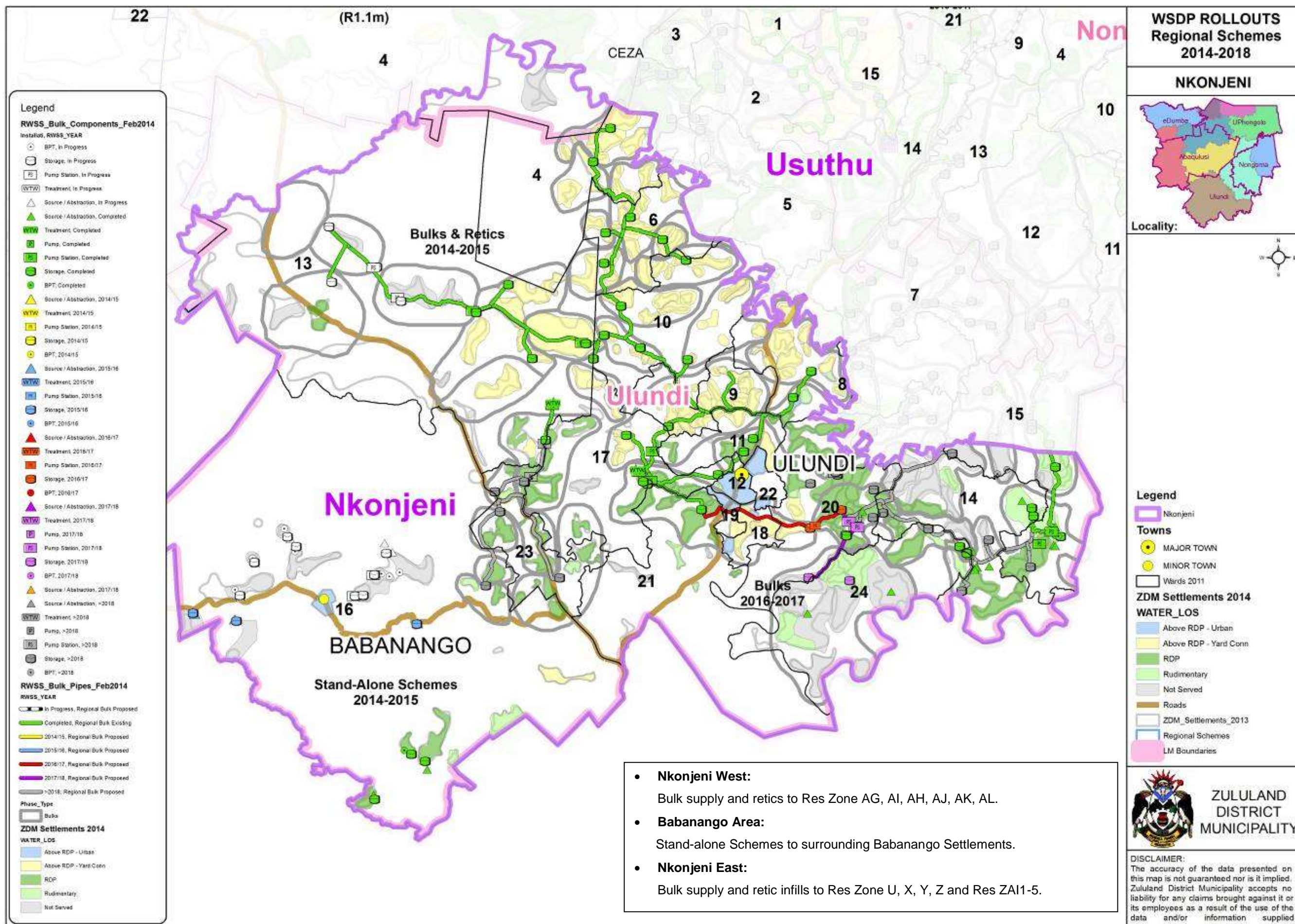




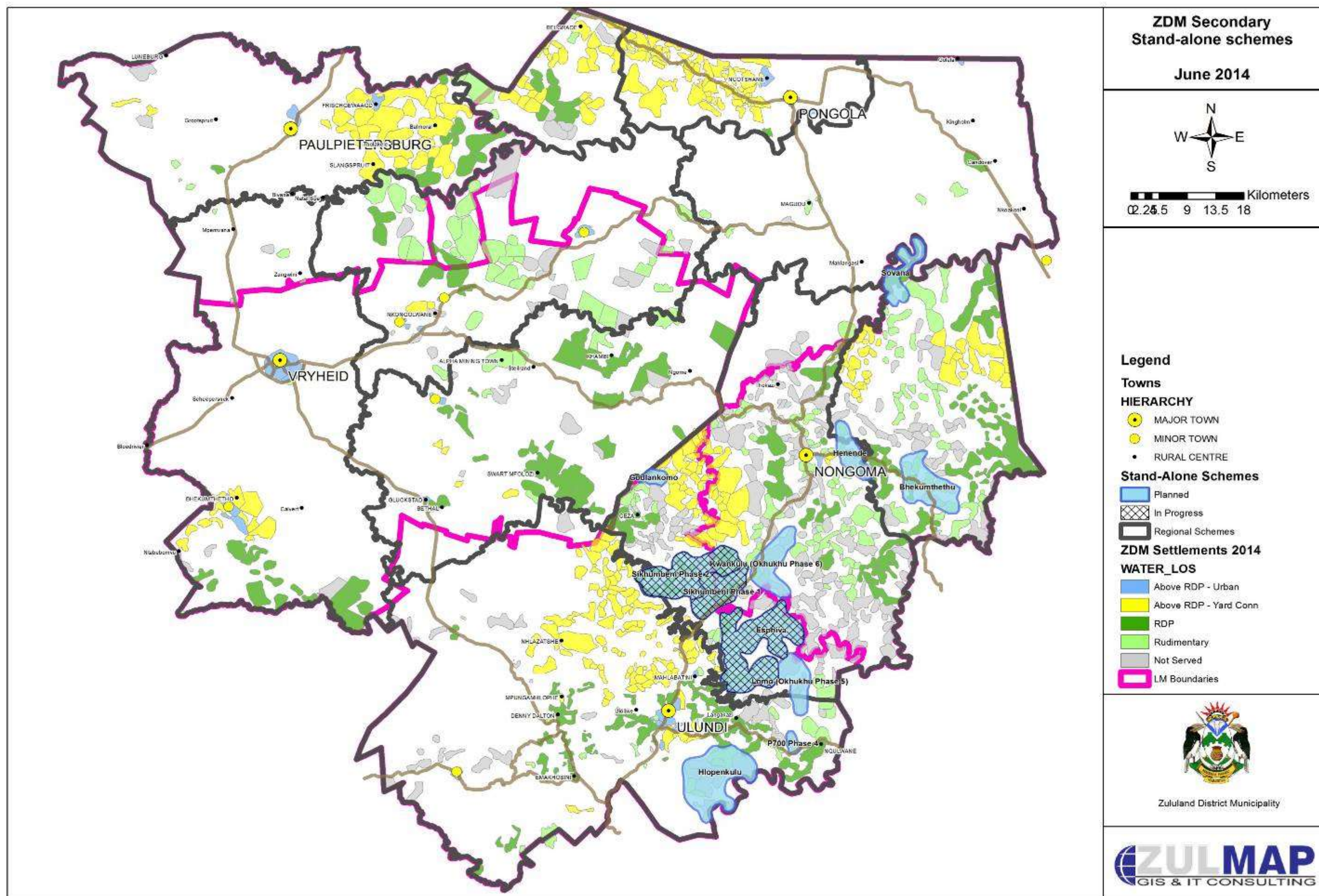




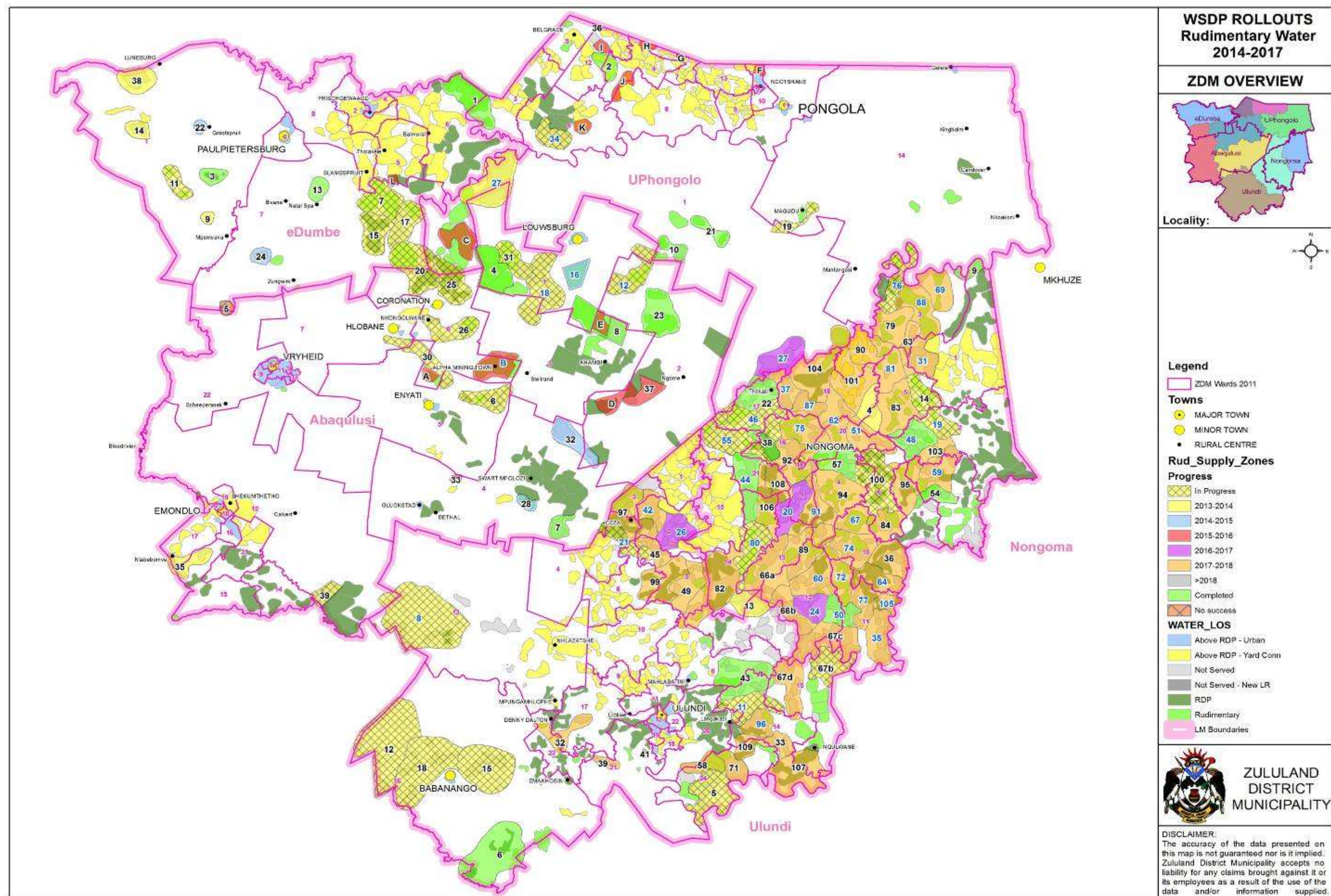




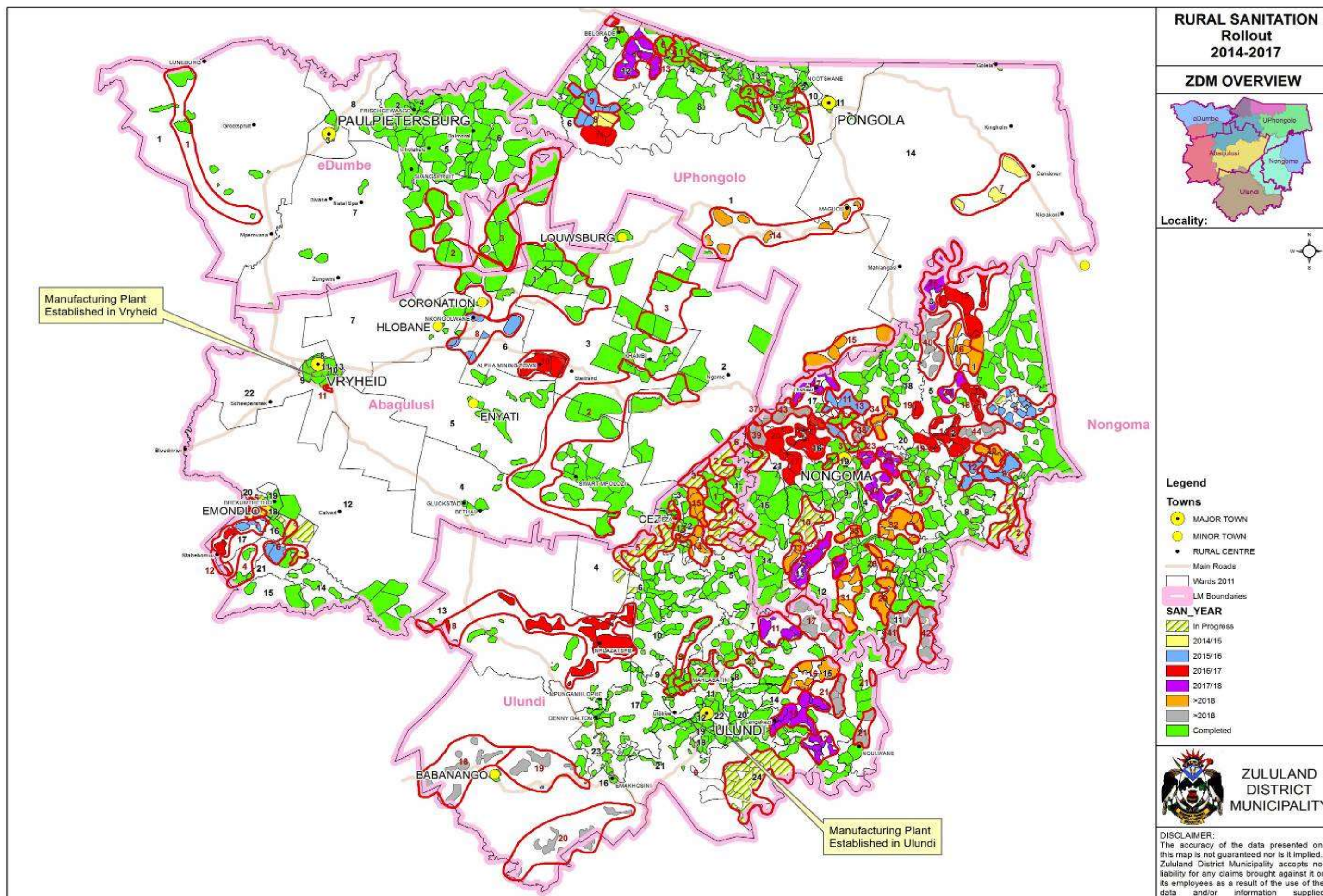
Map 10.2: Identified Stand-alone Schemes



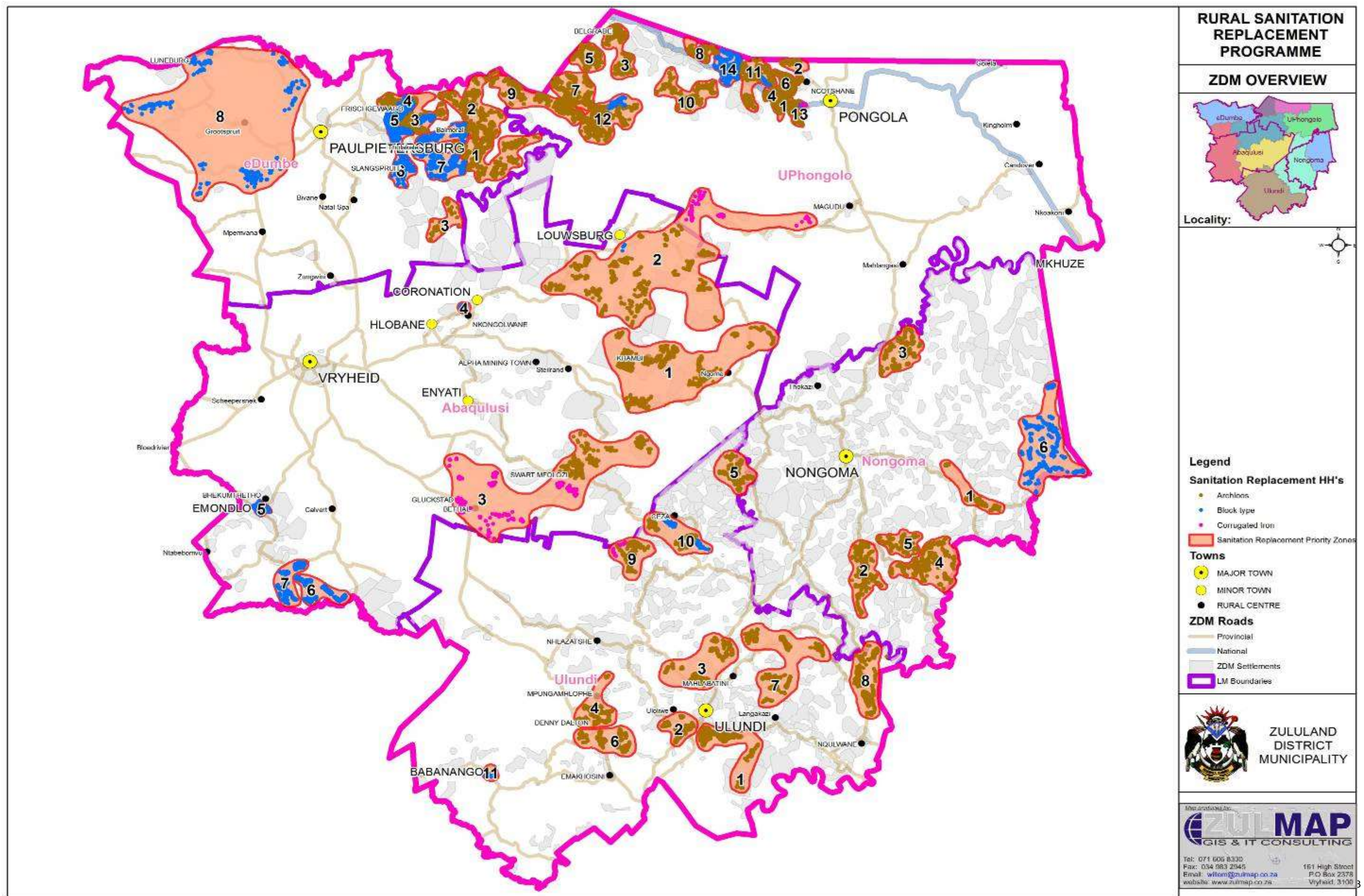
Map 10.3: Rudimentary water supply rollouts



Map 10.4: Roll-out of rural sanitation services in the district over the next 5 years



Map 10.4: Roll-out of replacement programme of existing rural sanitation services in the district over the next 5 years



**Table 10.1: Roll-out of Regional Water Infrastructure**

**Table 10.1: Roll-out of Stand-alone Schemes**

**Table 10.3: Roll-out of Rudimentary Water Services**

**Table 10.4: Roll-out of New Rural Sanitation Services**

**Table 10.4: Roll-out of Replacements of Existing Rural Sanitation Services**