water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

Progress Reports presented at the second meeting on 24 February 2010 of the Strategy Steering Committee of the Vaal River System

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Water Use Compliance Enforcement (Eradication of Illegal Water Use)

BACKGROUND

During the validation and verification process in the Upper-Vaal Water Management Area (WMA) an estimated (possible) unlawful use of 180 million m^3/a in the irrigation sector has been identified. The additional water use that has been identified to date is putting the Vaal River system at risk and should be eradicated by 2011. The Department must thus implement measures to curb this and must speed up the monitoring and enforcement efforts in identified areas. This includes the Middle Vaal and Lower Vaal WMAs.

It should be noted that no legal or other action can be taken against a property owner before the verification process for that property has been completed. Regulations are furthermore required to enforce the measurement of the taking of water for irrigation purposes.

Experience gained in the Upper Vaal WMA showed that the process that must be followed to stop unlawful water use is complicated, both technically and legally. Should the correct processes not be followed meticulously, drawn out legal processes and court cases could defeat the aim of stopping illegal water use within a short space of time.

Additional resources are required to undertake this and the Department is in the process of appointing a Professional Service Provider (PSP) for assisting the Department to manage/conduct:

- overall Project Management;
- overseeing implementation of outstanding and completion of existing validation and verification projects in the Vaal River system (Upper-, Middle- and Lower Vaal WMA);
- the effective and sustainable implementation of Compliance, Monitoring and Enforcement (CME) and ancillary matters including dealing with unlawful water use in the Vaal River system; and
- the development of contingency plans should the desired results not be achieved or take too long.

The Department's Director: Water Resources Management Support is the Project Manager and will be assisted by the three Regional Offices involved, as well as by other relevant Directorates.

PROGRESS

Validation and Verification

This process, which is a prerequisite for further action, is continuing in the Upper Vaal WMA and should be completed by the end of 2010. The validation and verification of agricultural water use in the Middle and Lower Vaal WMAs will be addressed further once the PSP referred to in paragraph 1 has been appointed.

Regulations

Regulations to enforce the measurement of taking water for irrigation purposes is a further prerequisite for action against partially lawful water users. The process for having such regulations published is far advanced. Internal consultations/liaison as well as with the State Legal Advisor has been completed. Preliminary (informal) liaison with Organised Agriculture has been undertaken and a submission will soon be made to the Minister to publish the draft regulations for public comment.

Appointment of PSP

The appointment of a PSP to assist the Department with the project as outlined in paragraph 1 is at an advanced stage. Calls for Expression of Interest (EOI) have been made and those received have been evaluated. Following further internal processes it is anticipated that proposals will be requested from those short listed early in March, that these will be received before the end of March and that the appointment will be made early in May 2010.

PROGRAMME AND WAY FORWARD

In view of the above and of experience gained in the process to date, it is unlikely that the target date for the eradication of all unlawful use by 2011 will be met. Substantial progress has however been made with the most critical activities, i.e. validation and verification of water use in the Upper Vaal WMA and the publishing of regulations to enforce the measurement of water use for irrigation purposes.

The PSP that will be appointed soon will provide the additional capacity required to address the full scope of the project. It is envisaged that once the PSP's Inception Report is submitted and agreed to, a clear programme of action with key milestones will be available. From this the implications of delays (if any) in the eradication of unlawful water use and of contingency measures (if necessary) will be determined and submitted to the Strategy Steering Committee for consideration.

Water Conservation & Water Demand Management

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Introduction

The purpose of this report is to provide feedback on the progress made by Gauteng municipalities on the Water Conservation and Water Demand Management (WC/WDM) in order to meet the 15% reduction in urban water demand by 2013.

Strategic Progress

Workshops and meetings

The following workshops and meetings have been held:

Name	Date	Purpose	Outcomes
Gauteng Water Sector Forum Strategic Workshop Towards Up Scaling WC/WDM Measures In Gauteng Municipalities	17 Sep 2009	Meeting called by Gauteng MEC for Local Government and Housing, Kgaogelo Lekgoro	See milestones and outcomes below
WCWDM task team meeting	5 Aug 2009 9 Sept 2009 2 Oct 2009 16 Feb 2010	Co-ordinate activities on setup of a steering committee. Review Eskom NERT PMU model Develop provincial business plan Mobilize funding	Developed a draft business plan with targets and budgets for all Gauteng municipalities Discussions with DBSA Monitor ACIP funding for CoJ
Technical Sub-Task Team Meeting	19 Nov 2009 15 Dec 2009	Review and define targets for Gauteng municipalities	Developed a draft business plan with targets and budgets for all Gauteng municipalities
Collaboration meetings with municipalities	Various	Review business plans and target setting, funding issues	Meetings held with : CoJ, EMM, CoT, EMF, Mogale City and Randfontein

Steering committees

The following task teams have been setup:

Name	Representatives	Purpose
WCWDM task team towards up scaling the implementation of project 15% water savings in Gauteng municipalities	DWA WUE and Gauteng Region	Support, monitor and audit the implementation of project 15%
WCWDM technical sub-task team towards up scaling the	DWA WUE and Gauteng Region	Target setting

implementation of project 15% water savings in Gauteng municipalities	Rand Water	Business Plan review

Milestones and outcomes

Outcomes and way forward of the workshop called by the Gauteng MEC for Local Government and Housing :

The Department of Local Government and Housing invites all the municipalities working with our communities, private sector and the various sector partners to

- Coordinate efforts between national, provincial and local govt including private sector and consumers
- Accelerate the implementation of the water conservation and demand management initiatives
- Commit to achieve the set targets for their respective municipalities, –– 15% overall water savings
- realign the plans and budgets for water conservation and demand management to the Gauteng provincial 5 year strategic priorities and the municipal plans for 2009 - 2011

The Water Conservation & Demand Management Task Team must set up a coherent programme management support structures to:-

- Define and measure Water Demand Management targets – One provincial plan
- Provide subject matter expertise where required – partnerships with private sector initiatives
- Develop alternative funding models and business cases – learn and share best practices
- Implement integrated performance monitoring, evaluation and reporting – one format for all municipalities
- Establish workgroups to support and capacitate municipalities - PMU
- Implement communication and multi - stakeholder management approach – One Common Ongoing Educational Campaign
- Capacity Building (Artisans and other technical Staff) –
- Monitor, Evaluate and Report on the programme and facilitate the unlocking any bottlenecks.

The Department of Local Government and Housing together with the Dept of Water Affairs will support Municipalities in the implementation of the respective plans.

- Coordinate and link the initiatives to other key Provincial initiatives, in particular
  - Provincial Electricity Efficiency Strategy and Plan
  - Municipal Revenue Enhancement Strategy and Plan
  - Infrastructure Management Plan – cost and budget
  - Government wide Monitoring and Evaluation System
  - Department's Human Settlement Programme Infrastructure Support Programme

The Water Conservation & Demand Management Task Team

- Present overall plan for Gauteng to the Executive Council for approval and endorsement
- Report to DGL&H and Water on monthly basis
- Report to the Member of the Executive Council on Quarterly Basis
- Report progress to every Premier's Coordinating Forum (PCF)

A draft business plan with target, budgets, key activities and timelines have been developed. The document still needs to be finalized and approved.

Municipal Progress

Active programmes

Municipality	Key WC/WDM programmes
City of Johannesburg	• WCWDM Strategy complete • Pressure management, leak detection and hostel retrofitting projects under ACIP programme. • Consumer education and awareness campaigns (Water Warriors) • Operation Gcin'amanzi, suspended in March 2008, planned to resume in next few months. Action plan to revisit 40 000 of existing 100 000 installations for bypasses, malfunction, etc. by end of year. Completion of remaining 60 000 installations set to start in 2011.
City of Tshwane	• Preparation of WC / WDM Strategy • Metering & monitoring water usage to all informal and un-billed areas. • Meter audits for all industrial areas, with subsequent meter installations and meter replacements. • Meter audits for all parks and irrigated road islands, with subsequent meter installations and meter replacements. • Pressure management in selected areas. Some new pressure management installations and some retrofitting of existing PRV installations with smart pressure controllers. • Ad-hoc leak detection and repair activities
Ekurhuleni	• WCWDM Strategy and Business Plan complete • Several programmes completed in 2009 which included pressure management, retrofitting of indigent consumers, network investigations and upgrades in Tsakane, Etwatwa/Daveyton and Katlehong. • Consumer meter audits and retrofitting programme. This programme is focusing on bulk consumers
Emfuleni	• Several programmes completed in 2009 which included pressure management, schools awareness and retrofitting, removal of midblocks and

	new meter installations • Consumer meter replacement programme • Sebokeng / Evaton advanced pressure management programme

The other smaller municipalities are also busy with various WCWDM programmes which include:

- Consumer metering and billing
- Customer awareness
- Training and capacity building

Targets and achievements

Municipalities	Target 2008-09 Losses + Efficiency	Target 2008-09 Losses Mm^3/a	Actual 2008-09	% reduction of target
City of Johannesburg	86.06	86.06	-2.88	-3.3%
City of Tshwane	15.58	15.58	20.57	132.0%
Ekurhuleni	21.08	21.08	-3.63	-17.2%
Emfuleni	21.44	21.44	7.90	36.8%
Mogale	1.39	1.39	-1.43	-102.5%
Westonaria	0.59	0.59	-0.97	-165.3%
Randfontein	0.30	0.30	0.89	293.8%
Lesedi	0.26	0.26	0.33	126.9%
Kungwini	3.72	3.72	-	
Nokeng tsa Taemane	0.18	0.18	2.08	1143.3%
Midvaal	0.92	0.92	1.61	159.0%
Merafong	1.01	1.01	4.60	498.2%
Total	152.53	152.53	8.29	19.1%

Gauteng Key Performance Indicators

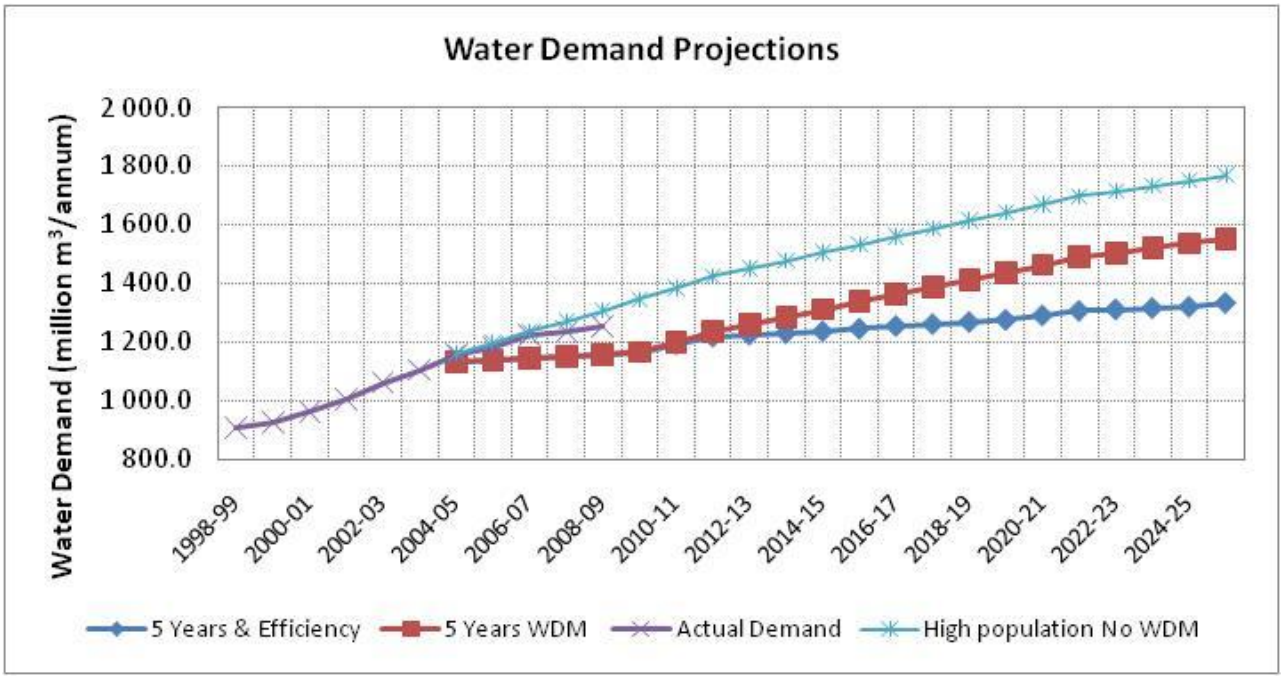

Figure 1: Gauteng municipalities' water demand projection

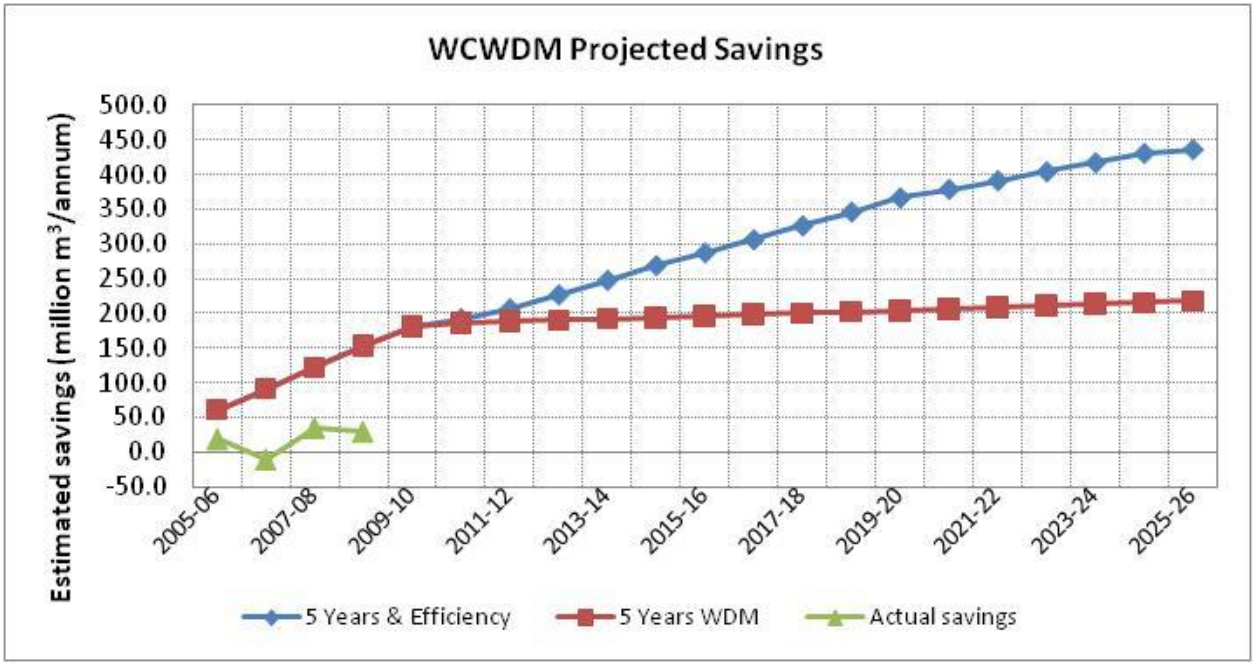

Figure 2: Projected annual savings

The actual water savings are 19% or 29million m^3 of the projected savings for 2008-09. The main contributors in terms of volume to the water savings are as follows :

- City of Tshwane : Tariff setting and water loss control programme saving 20.57million /annum
- Emfuleni : Advanced pressure management project 7.9million / annum

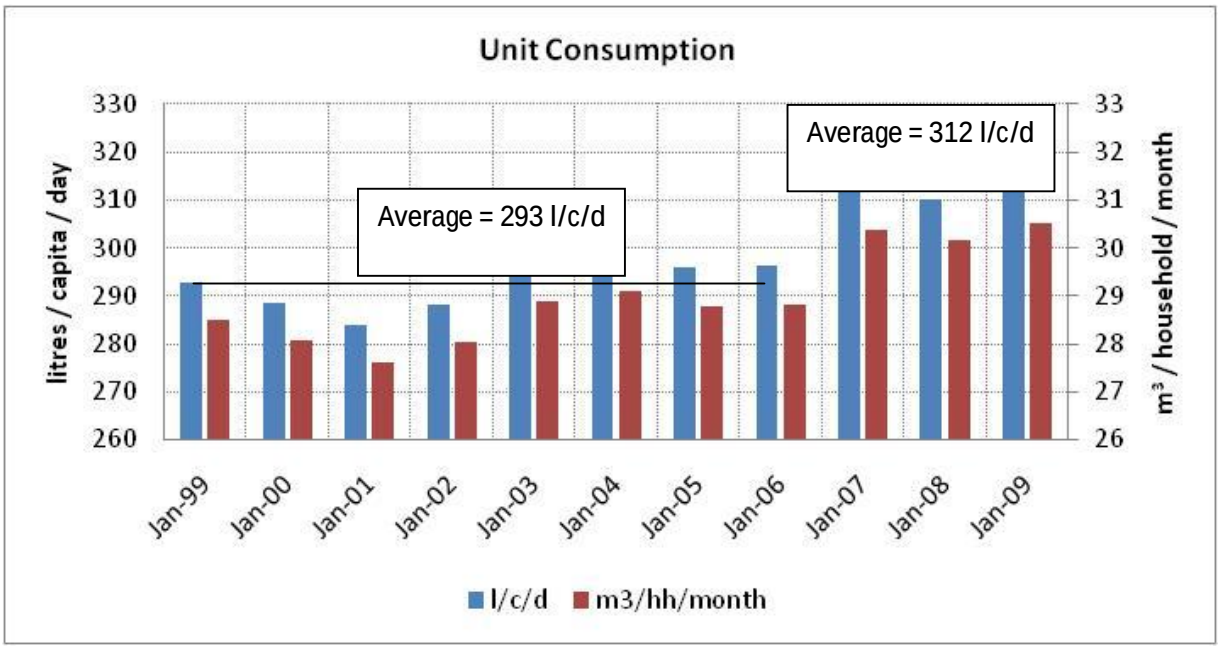

Figure 3: Average unit consumption for Gauteng municipalities

The unit consumption above is based on the total municipal water consumption divided by the total population and number of households as obtained from the DWA: National Information System. There is noticeable increase of 6.5% in average litres/capita / day over the past three years which could be attributed to the following:

- Improved level of service with higher average consumption; or
- Deteriorating water supply infrastructure with increased level of leakages.

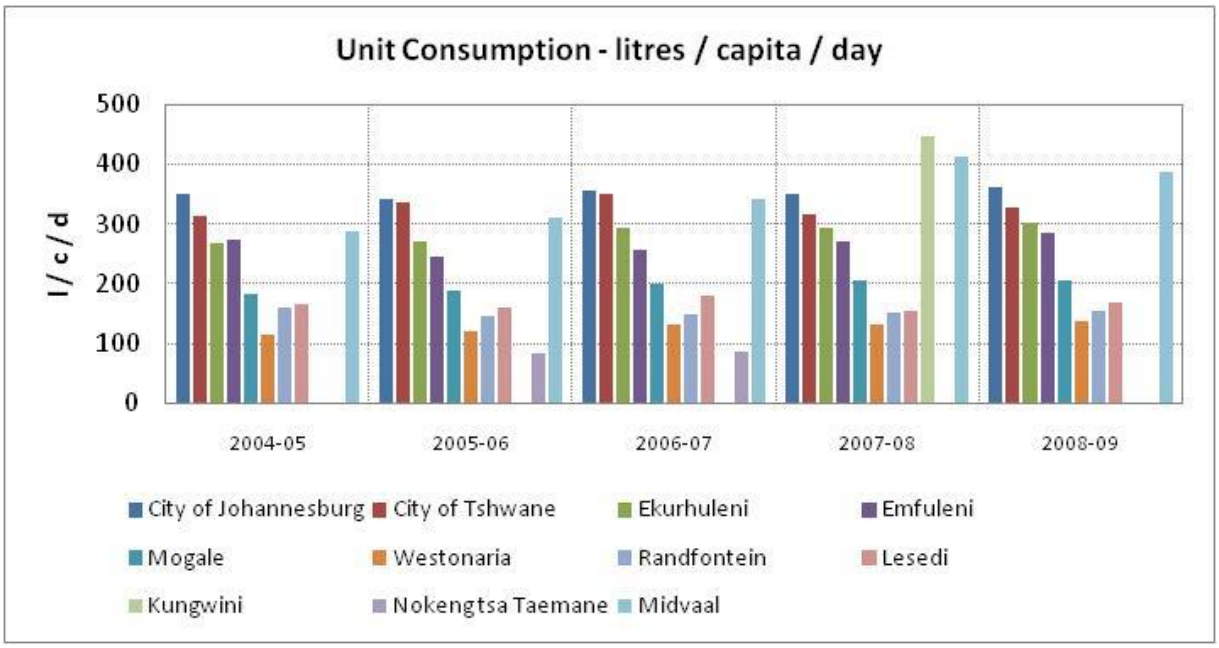

Figure 4: Litres / capita / day unit consumption per municipality

The average consumption in the four big municipalities is 308l/c/d whereas the average for the other municipalities is only 215l/c/d. Johannesburg has the highest average consumption of 362l/c/d although the municipality has very few wet industries. Ekurhuleni has the most wet industries of the three metros but the lowest average consumption.

Despite the reduction of 20% in the water demand, non-revenue water remains high in the municipalities as shown in Figure 5. The average NRW is 38.9%. Water balance data for the municipalities for which data is available is shown which includes the big four in all cases.

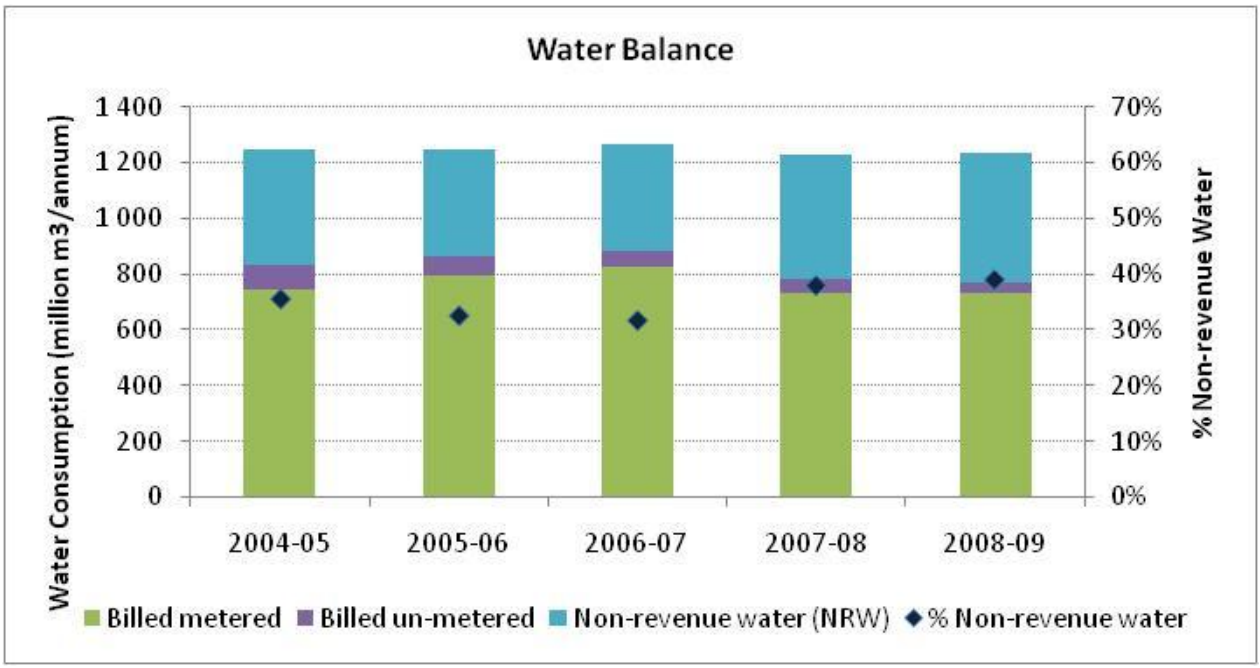

Figure 5: Gauteng Water Balance

Funding

- Remains main stumbling block for implementation

Possible funding sources

- Accelerated community Infrastructure Programme (ACIP) – R33 million to City of Johannesburg
- Rand Water – R 4million to Emfuleni, Ekurhuleni and Lesedi (none confirmed)
- DBSA and the Swedish International Development Cooperation Agency (SIDA) – Phase 3 of the regional (SADC) WDM programme

Planned actions and way forward

- Setup Steering Committee to drive implementation of Project 15%
- Setup regular meeting with municipalities to monitor and report on progress and performance

Implementation of the Infrastructural Augmentation of the Integrated Vaal River System

Stage 2 of the *Lesotho Highlands Water Project Feasibility Study for Phase II*, was completed in 2008 and identified from among various alternatives, the preferred scheme consisting of Polihali Dam to be constructed on the Senqu River, with a gravity tunnel transferring water to Katse Dam. From Katse Dam the water is delivered to the Vaal River System through the existing (upgraded) delivery tunnel system via Muela Dam.

Subsequently Lesotho has been investigating an alternate direct tunnel route between Polihali Dam and Muela Dam that would allow for the generation of significantly increased hydropower. This option would increase capital costs and holds risks of a longer construction period and was shown to be non optimal in the Feasibility Study. However Lesotho is able to access development grants which could make this option viable for them. The inclusion of this option is currently being negotiated with Lesotho to avoid the risk of increased delays or higher costs to the RSA water user.

Some programme milestones

Signing of Treaty Protocol	Sept 2010
Design Tender issue	May 2012
Start Camp Construction	March 2014
Start Dam and Tunnel Construction	April 2016
Water Delivery	Sept 2020

Implementation of the Integrated Water Quality Management Strategy for the Vaal River System

February 2010

Version 1

Compiled by: **J.J. van Wyk**

Sub-Directorate Water Quality Planning

Directorate Water Resource Planning Systems

Chief-Directorate Integrated Water Resource Planning

Department of Water Affairs

CONTENTS

1. DOCUMENT PURPOSE

The purpose of the document is to provide written report-back to the Vaal River Strategy Steering Committee in respect of the implementation of the Integrated Water Quality Management Strategy for the Vaal River System.

2. ABBREVIATED SCOPE OF THE STRATEGY

The Vaal River Integrated Water Quality Management Strategy is being rolled-out for the Upper, Middle and Lower Vaal Water Management Areas (WMAs), and aims to achieve the following:

- Maintaining or improving the water quality of the water resources within the System for all recognized water users as well as beneficial water uses in order to assist in securing ecologically sustainable development, while also promoting justifiable social and economic development;
- Managing the water resources of the System in order to comply with the determined integrated Resource Water Quality Objectives (RWQOs). The said RWQOs are to constitute the basis for the management of the water quality of the System;
- Controlling the salinity, eutrophication and microbiological contamination levels in the System, and major tributaries, as the key water quality issues identified;
- Improving source management controls and measures as a means to limit and control point and diffuse sources that significantly impact on the water resources of the System; and
- Improving management of the water resources of the System by more effective monitoring, assessment and reporting.

3. STRATEGY FOCUS AREAS

Water quality issues had been identified during a water quality status assessment of the Vaal River System. All the identified issues have been grouped into four focus areas; these being:

- salinity;
- eutrophication;
- microbiological pollution; and
- institutional challenges.

The Vaal River Integrated Water Quality Management Strategy is structured such that each of these focus areas receive explicit attention.

4. STRATEGY MATRIX

A synopsis of the Vaal River Integrated Water Quality Management Strategy is given in *Appendix A.* The purpose of Appendix A is to assign responsibility and to report progress on key elements of the integrated strategy.

5. IMMEDIATE PLANNING ACTIONS

The following planning studies have either already been initiated or are in the process of being initiated by the Directorate Water Resource Planning Systems' Sub-Directorate Water Quality Planning:

- Modelling of nutrients (with Qual2K) in the Vaal River System in support of the establishment of a Thematic Strategy for Eutrophication Management;
- Investigation of the effect of flow in the Middle Vaal River aimed at managing and preventing the occurrence of algal blooms; and
- Calibration of the WQT Salinity Model for the Orange River System and integration with the Water Resource Planning Model (WRPM) in order to enable integrated salinity management in the Vaal and Orange River Systems.

In addition to the above, it is also planned to investigate the application of lessons-learned in the Upper Olifants River Basin to the Upper Vaal WMA, specifically in order to manage and curb the expected mining impacts that are likely to manifest should pro-active interventions not be implemented timeously in order to protect the strategically important water resources of the Upper Vaal WMA.

6. FUNCTIONAL INTEGRATION

As there are various departmental role-players designated to fulfill different, but supporting functions that collectively make up Water Quality Management in the Department, the challenge, firstly, in the Vaal River System is to ensure that all these efforts are directed towards common goals in a coordinated fashion. The Vaal River Strategy Steering Committee is an attempt to direct, co-ordinate and harmonize all Water Resource Management efforts, specifically also the water quality management efforts, within the Vaal River System in a coherent manner.

7. CONCLUSION

Effective water quality management constitutes a prerequisite for sustainable development and growth in the supply area of the Vaal River System. Implementation of the strategy needs to be effected in an iterative fashion focusing on priority issues first.

8. REFERENCES

Directorate National Water Resource Planning. Department of Water Affairs and Forestry, South Africa, October 2008. INTEGRATED WATER QUALITY MANAGEMENT PLAN FOR THE VAAL RIVER SYSTEM: Water Quality Management Strategy. Report Number: P RSA C000/00/2305/7.

STRATEGY MATRIX

FOCUS AREAS	OBJECTIVES	ACTIONS	RESPONSIBILITIES	STATUS
1. Salinity	**1.1** The current salinity status in the Vaal Dam and Grootdraai Dam Catchments should be maintained. This will involve careful and diligent management of the upstream mining activities, in particular post closure.	Exploratory discussions are being held with the Regional Office on aspects relating to pro-active planning in respect of mining in the sub-region.	IWRP	Underway
	1.2 The short term strategy for the middle reaches from Vaal Barrage to Bloemhof Dam is to implement Scenario 1a, *i.e.* the release of dilution water from Vaal Dam to dilute the outflow from the Vaal Barrage to 600 mg/ℓ. The implementation of this scenario does not meet the initial set of Resource Water Quality Objectives (RWQOs) set for the Vaal River main stem, but does result in an improvement in the water quality in the middle reaches of the Vaal River. The water users will incur economic dis-benefits due to the salinity levels and a waste discharge charge should be used to compensate for these dis-benefits.	The short term strategy as per Scenario 1a should be implemented *i.e.* the releases of dilution water should continue to be released from Vaal Dam to maintain the outflow from the Vaal Barrage at 600 mg/ℓ		
		The waste discharge charge system (WDCS) is an important component of the water quality management strategy. The charge is proposed to compensate the middle Vaal water users and will be used to change behaviour or raise money to treat the selected saline streams. Progress has been made in formulating the waste discharge charge system. The system was planned to be piloted on the Vaal River System by the Department. The pilot WDCS study still needs to take place to set the foundations for the implementation of the system in the Vaal River. This study needs to take place.		

FOCUS AREAS	OBJECTIVES	ACTIONS	RESPONSIBILITIES	STATUS
		The findings of the WDCS pilot project on the Vaal River System must be implemented on a permanent basis.		
	1.3 The release of Vaal Dam dilution water is feasible until 2014, after which excess water will accumulate in Bloemhof Dam. By 2014, a plan to use the excess water needs to have been developed. The plan could be to support the lower Orange from Bloemhof Dam, transfer to the Crocodile West catchment or treat and re-use in the Vaal River System. The use of the excess water, which includes the saline mine water streams should be the subject of a feasibility study.	A feasibility study is required to determine the management strategy for the excess water. This study will determine how the excess water is best utilized. This study will investigate transfers to the Crocodile West catchment, treatment and reuse of mine and industrial effluent, and support to the lower Orange River. The study will incorporate mine planning, the latest treatment technologies, design, costing, institutional and funding mechanisms for the schemes.		
	1.4 The short term RWQOs for the Vaal River main stem and for the tributaries should be established and compliance monitoring reported against the RWQOs. The tributary catchments must be managed to meet the RWQOs established at the downstream point of the catchment.	The set of RWQOs that are proposed in this study for the main stem of the Vaal River and the major tributaries need to be accepted by the Catchment Forums and stakeholders, and implemented. Compliance reporting needs to be done against the RWQO and the implementation of the short term strategy measured against the RWQO.		

FOCUS AREAS	OBJECTIVES	ACTIONS	RESPONSIBILITIES	STATUS
		The Department must continue with licensing, the development of Integrated Waste and Water Management Plans and participation in EIA/ EMP processes. This will ensure that the various strategies of the Department are implemented and the Department has a say in the water management of mines and industries. The set of RWQOs can be used in setting up the licence conditions for discharges.		
	1.5 The current water quality monitoring program must be expanded, according to the monitoring program developed and detailed in the Task 7 Report produced as part of the IWQM Strategy study.	The improved monitoring program requires the installation of continuous monitoring equipment at key stations in the system as well as expanding the current grab sampling program. This program needs to be implemented as soon as possible. The monitoring program has been developed to include compliance monitoring so that the effectiveness of the short term strategy can be monitored.		
	1.6 The planning and engineering design of the next Vaal River System augmentation scheme should be completed. The water quality of the water proposed for transfer should be considered in the final selection of the augmentation scheme.	The necessary studies should be undertaken to select the next augmentation scheme. Once the scheme has been selected the designs should be completed so that the scheme is ready for implementation once clarity on the augmentation date is available.		

FOCUS AREAS	OBJECTIVES	ACTIONS	RESPONSIBILITIES	STATUS
	1.7 The impact of the salinity management strategy selected for the Vaal River on the Orange River must be investigated. Before a final decision is made, consideration must be given to the water quality impact on the Lower Orange River of the preferred management option and the RWQOs established. The impact of the releases to support the Lower Orange River reaches on water quality needs to be investigated as well as the impact of the next augmentation scheme.	Calibration of the WQT Salinity Model for the Orange River System and integration with the Vaal River Planning Model (VRPM).	IWRP (WRPS:WQP)	To be initiated in the 2010/ 11 financial year
		The projects resulting from the feasibility study will need to be implemented. The projects could include the construction of desalination plants and supply infrastructure for treatment and re-use of mine and industrial effluent and transferring excess water for use in the Crocodile West catchment		
2. Nutrients	**2.1** The Waterval Catchment Management Strategy developed by the Department which includes the improved management of the wastewater treatment works to meet the phosphorus RWQO set for the Waterval River should be implemented. This will reduce the nutrient loads reporting to Vaal Dam and should protect the trophic status of Vaal Dam.			

	2.2	Flow manipulation along the Middle Vaal during the months of September through October will be used to manage the risk of algal blooms in the middle reaches of the Vaal River from Vaal Barrage to Bloemhof Dam in the short term. The Vaal Dam release will be piloted, the impacts monitored and the release protocols documented. This will involve the release of water from the Vaal Barrage (augmented from Vaal Dam) to reduce residence times and improve mixing. The initial release proposed is- Base flow 15 m^3/s for 28 days - giving a total release volume of 36.3 million m^3; and 100 m^3/s for 48 hours - giving a total release volume of 17.3 million m^3. Total of 53.6 million m^3 will be released during the annual flow manipulation program. The flow manipulation recommended will be considered with the Reserve scenarios to ensure the alignment to the ecological water requirements.	The flow manipulation will be piloted to determine its effectiveness in controlling algal blooms. The pilot will be used to provide input to the protocols for the releases to be applied in the short term to manage the trophic conditions in the middle reaches of the Vaal River.	IWRP (WRPS:WQP)	To be initiated in the 2010/ 11 financial year
	2.3	Phosphorus has been selected as the limiting nutrient for the management of eutrophication. A set of RWQOs for phosphorus was developed for the main stem of the Vaal River. The proposed RWQOs are based on an analysis of the available nutrient and algal database.	The Department must continue to use licensing as the tool to achieve the RWQOs set for the Vaal main stem. The licence conditions will be drawn from the phosphorus reduction program and nutrient balance modeling.		

	2.4 The operations and maintenance (O&M) of many of the wastewater treatment works are poor and poor quality effluents are discharged. In many cases, the treatment plants are not able to handle the hydraulic or the organic loads. As a result, the installed treatment technology is not always working to specification. An audit of the wastewater treatment works, especially draining to the Vaal Barrage, is required to determine the works that are not working to specification and develop a program to retrofit and upgrade these works. It is essential to address the issue of insufficient O&M resources in this process.	The wastewater treatment works identified by the Department's Regional Offices that are not meeting licence conditions and are not functioning to specification should be listed. The works should be audited, repairs and retrofitting required determined and a program agreed with the local municipalities to implement the work.		
		The wastewater treatment plant upgrades and retrofitting planned during the planning and feasibility study should be implemented.		

	2.5	The medium to long term strategy will be the further management of phosphorus by reducing the load discharged from point sources. A better understanding of the nutrient balance in the Vaal Barrage and the Vaal River main stem from the Vaal Barrage to Bloemhof Dam is required, before revised discharge standards can be set. A nutrient balance study is therefore proposed which will result in a better understanding of the sources and fate of nutrients (phosphorus and nitrogen) and will provide the rationale for revising the current 1 mg/ℓ phosphorus discharge standard.	The monitoring required to better understand the nutrient balance will be implemented as part of the monitoring program. The data collected should be used to better understand the nutrient balance and should be used to set up a planning level model for phosphorus. The idea being to apply the model to develop a nutrient management strategy and to determine the phosphorus discharge standard. The economics of Eutrophication will be used in setting of the discharge standard. The results will be used to develop a phosphorus reduction program which will result in achieving the RWQO for phosphorus. The use of phosphorus free soaps and detergents will be considered as part of the program.	IWRP (WRPS:WQP)	Underway
			The further removal of phosphorus from the wastewater and industrial discharges will probably be the use of chemical phosphorus removal as an additional polishing step in the treatment train. The implications on wastewater treatment costs could be high. Therefore a study to investigate the feasibility of installing further phosphorus removal treatment steps at selected works in the Vaal River System is proposed.		
	2.6	A perspective is needed on the extent and costs of the measures needed (such as banning phosphorus containing detergents) to reduce the phosphorus loads received at the wastewater treatment works.			

	2.7	The results of the current Water Research Commission project aimed at developing a perspective on the economics of eutrophication on the water users. This should include recreational impacts as well as water treatment costs.			
3. Microbiological	**3.1**	The strategy for improving the microbiological water quality is related to getting the wastewater treatment works operating to their specifications and meeting their licence conditions specifically in terms of discharge quality. The strategy is similar to the nutrient management strategy in that the wastewater treatment works must be audited and the "hot spot" areas identified. Plans must be developed in consultation with the local municipalities to retrofit the works in these target areas.	The actions are similar to the nutrient strategy. The auditing, development and retrofitting of the wastewater treatment works should be undertaken as part of the same process as for the assessment of the plants for the removal of nutrients.		
4. Institutional	**4.1**	The implementation of the WQM strategy will have to be aligned to the institutional development process of the Department and the requirements of the National Water Act 36:1998, as Catchment Management Agencies for the Vaal River WMAs are in progressive stages of establishment. The individual CMS's development is in different phases and the continued evolution of the institutional arrangements must be monitored to ensure that the actions of this strategy are included in catchment management planning; resource management priorities and regional economic development strategies.			

	4.2	In implementing this strategy, the Department will specifically have to consider the role of the catchment committees/ organizations and the extent to which they can take responsibility and accountability for specific actions. These organizations could play key roles in communication, co-ordination and providing capacity where necessary.			
	4.3	The role of local government is critical to the success of this strategy. This relates primarily to the management of the discharges of wastewater treatment works. A specific agreement or institutional arrangement has to be entered into between the Department and local government regarding this issue. The problem of non-compliant wastewater treatment works cannot be accepted as a “business as usual” anymore.			
	4.4	A strategy steering committee is to be established to oversee the further development and implementation of the reconciliation and the water quality management strategies. The details and proposed functions of the strategy steering committee are discussed under implementation. In association with the strategy steering committee the timeframes associated with implementation actions will be specified by the Department (*i.e.* the decision on the management actions, the final RWQOs adopted, the implementation of the RWQOs, etc.).			

Comprehensive Reserve Determination Study of the Integrated Vaal River System

BRIEF PROJECT DESCRIPTION

The primary purpose of the Comprehensive Reserve determination study for the Integrated Vaal River System is to assist the Department of Water Affairs (Chief Directorate: Resource Directed Measures) with the coordination of all the activities required to initiate, undertake and complete a high confidence (comprehensive) Reserve determination study for the Integrated Vaal River System (surface and groundwater).

A secondary purpose of the study is the transfer of project management and technical skills to historically disadvantaged individuals (HDIs) and to create the necessary opportunities for collective learning through participation during the execution of the technical studies. This will be achieved by training of selected individuals, and staff members seconded from the DWA in the day-to-day management and coordination of activities that will be undertaken by the Project Management and Technical teams when undertaking these comprehensive Reserve determination studies.

1. INTRODUCTION

The main objective of the Integrated Vaal River system comprehensive Reserve determination is to assist the RDM chief directorate with the co-ordination of all the activities required to achieve the objectives of the technical components of the Comprehensive Reserve Determination Study of the Integrated Vaal River System (surface and groundwater).

This progress report summarises information about the progress with tasks performed by the project management and technical teams from project initiation to January 2010.

2. SCOPE OF WORK

The comprehensive Reserve determination study for the Integrated Vaal River System consists of a number of components/sub-studies, namely:

i. Project Management

ii. Technical surface water
   - Upper Vaal
   - Middle Vaal
   - Lower Vaal
   - Water Quality
   - Water Resource Modelling

iii. Technical groundwater
   - Upper Vaal
   - Middle Vaal
   - Lower Vaal

The study is conducted in five distinctive phases:

Phase 1: Study Inception (project management component)

Phase 2: Compilation of Terms of References and Procurement

Phase 3: Technical Reserve Determination Studies Initiation

Phase 4: Technical Reserve determination Studies (surface water and groundwater)

Phase 5: Project Closure

Phase 1 was the appointed project management team initiation phase before the technical studies were initiated. Phases 2 to 5 are the tasks and activities undertaken by the technical study teams to ensure the successful determination of the Reserve for the Integrated Vaal River System.

Phase 1 of the study has been completed with the approval of the inception report of the project management component. Phases 2 and 3 have been completed with the successful appointment of technical PSP teams to conduct all components of the technical studies (surface and groundwater) and the completion and approval of the inception reports for the surface water and groundwater sub-studies. The project is currently finalising phase 4 and the project closure phase will be initiated in June 2010 with project closure scheduled for September 2010.

3. PROGRESS TO DATE

Phase 1

The overall objectives for the study inception phase were to:

- Investigate the study area in order to determine the nature and scope of the proposed technical Reserve determination studies,
- Assist the Client with the compilation of the technical Terms of References and the appointment of the Technical PSPs through a tender process;
- Initiate the process to build a common understanding between the Client, Project Management (PM) team and eventually the appointed Technical PSPs;

- Set-up of the Information Framework;
- Establishment of a Project Steering Committee; and
- Compilation of a Project Management Inception report.

Phase 2

The overall objective of phase 2 was to assist the Client with the compilation of the technical Terms of References and the appointment of the Technical PSPs through a tender process. The following teams (see Table 1) were appointed for each of the eight sub-studies identified.

Table 1: Technical teams appointed

SUB-STUDY	**PSP TEAMS**
1. Surface water quantity – Upper Vaal	Koekemoer Aquatic Serves, Water for Africa & Econ@UJ
2. Surface water quantity – Middle Vaal	Golder Associates & EcoSun
3. Surface water quantity – Lower Vaal	Golder, EcoSun & PDNA joint venture
4. Water Resources Yield Model	WRP, DMM & Innovative Solutions
5. Surface water quality	Golder & EcoSun
6. Groundwater – Upper Vaal	CSIR
7. Groundwater – Middle Vaal	CSIR
8. Groundwater – Lower Vaal	AGES

Phase 3

The objective for this phase was to initiate the technical studies and provide input on the technical inception reports. Table 2 gives a summary of the main deliverables of Phase 3.

Table 2: Main deliverables for Phase 3

	DELIVERABLE	COMPONENTS
1	Technical meetings	A number of technical meetings were held to discuss the tasks and activities to be undertaken: o Initiation meeting (finalise tasks to be undertake, liaison between teams, capacity building requirements) o Approach to be followed for the wetlands and pans desktop assessment o The use of historical Reserve information and finalisation of the number of EWR sites o EWR site selection and field surveys o Use of updated hydrology in the WRPM o Socio-economic approach
2	Requirements of Inception reports	Detail requirements to be addressed in the Inception reports were specified during the technical meetings.
3	Review of Inception reports	The technical Inception Reports were reviewed by the project management team, officials from the CD: RDM and the Steering committee members before approval

Phase 4

The objective for this phase is to assist and manage the technical Reserve determination studies. Table 3 gives a summary of the progress of the technical studies up to date.

Table 3: Progress of technical studies

ACTIVITY	PROGRESS
Reconnaissance field surveys, desktop eco-classification and EWR site selection	Reconnaissance field visits undertaken. Desktop eco-classification completed and final reports available. EWR site selection completed and discussed with Gauteng, Free State and Northern Cape Regional Offices.
Field surveys, finalisation of EWR sites, eco-classification and EWR workshops	All field surveys (wet and dry season), selection of EWR sites, eco-classification and EWR workshops have been completed. Delineation (resource units) reports are available. EWR reports are being finalised.
Wetland typing	Development of a wetlands inventory has been finalised using all available data Classification of the wetlands (typing) has been completed. Literature surveys were undertaken to gather information on the reference conditions, present state and ecological importance and sensitivity of the wetlands. Draft reports are available.
Water Quality	Assessment of all available water quality data has been completed and initial water quality sub-units identified. Reconnaissance field visit undertaken. Water quality information provided to the NWRP study to determine Resource Water Quality Objectives. Water quality information provided during the eco-classification workshops.
Water Resources Modelling	The review of the existing information for the various systems where updated hydrological data is available has been completed and the WRPM has been updated. Provided water use information for the desktop eco-classification task. A draft report detailing the system operation and physical constraints has been

ACTIVITY	PROGRESS
	completed. The setup of the WRPM has been completed with the necessary additional nodes to provide information at the EWR sites. Scenario workshops held with representatives from DWA to identify scenarios to be analysed. Initial scenarios (baseline, present state with and without EWR and future state with EWR) have been completed.
Socio-economics	This task has been initiated and information from the scenario workshops and WRPM are being analysed.
Basic Human Needs	The final reports are available.
Surface water/ groundwater Integration workshop	The approaches adopted in RDM for integration were: o Inter-discipline data is required for surface water and groundwater modelling; o Data is required from surface and groundwater for wetland Reserve determinations. Some of the main outcomes of the workshop were: o Resource units to be determined by both the surface and groundwater teams at the beginning of the study; o The hydrology being used should be the same for the surface and groundwater teams; o Stressed areas for groundwater to be determined to provide the possible impacts on the surface water. This will provide focus areas for more detailed studies.
Training	Integrated capacity building plan was developed that caters for the technical training of specialists on the Vaal, Outeniqua, Crocodile (West and East) and Mokolo studies and DWA officials . Water quality (TEACHA and PAI) training was provided. SPATSIM training (initial and a follow-up) provided to hydrologists on specialist

ACTIVITY	PROGRESS
	teams WRPM training (yield modelling background a pre-requisite) was provided. Capacity building is ongoing with the specialist trainees on the various technical teams. A 2-day wrap-us training session was held to summarise the 8-step Reserve process and to define the linkages between these steps.

4. TASK TO BE UNDERTAKEN

The following workshops and activities will conclude phase 4 of the study:

- Ecological consequences workshops for the Upper, Middle and Lower Vaal are scheduled for April and May 2010;
- The ecological specifications and monitoring workshops for the Upper, Middle and Lower Vaal are scheduled for March and July.
- Finalisation of the WRP modelling activities and interpretation of socio-economic information are scheduled for March and April.

5. PHASE 5 (PROJECT CLOSURE)

The project closure phase will be initiated in June 2010 with the final activities scheduled for June to September:

- Finalisation and approval of all outstanding reports for the various sub-studies;
- Scheduling of a stakeholder workshop to provide feedback on the project and discuss the scenarios analysed and results obtained;
- Feedback meeting with DWA managers to present the final results of the study and discuss a implementation strategy for the Reserve requirements; and
- Finalisation of the Reserve documentation (templates, strategy for implementation and letters to Regional offices) for approval by DWA.

Approach to developing an Effluent Re-use Strategy

The following actions need to be undertaken as regards re-use of the mining and treated sewage effluent volumes in the Vaal River System:-

- The locations, volumes and qualities of current and future effluent discharges need to be confirmed.
- Many of the mines are investigating re-use of mine water. Some mines have piloted treatment processes and are discussing distribution with the local water service providers. The plans of the mines need to be collated and reviewed.
- The locations and volumes where the effluent can be re-used need to be determined. This assessment should include re-use for potable and industrial purposes as well as treatment and discharge. The use of the effluent may involve transfers to adjacent catchments such as the Crocodile West and Olifants.
- Develop water quality requirements for the treatment of effluent if the water is to be discharged into an adjacent catchment. The water quality requirements could be dictated by the receiving water quality of the adjacent catchment or the discharge requirements of the local catchment.
- Develop, design and cost re-use scenarios. Build on work that has been undertaken to date.
- Analysis of proposed schemes using the WRPM to assess impacts on the Vaal River System.
- Develop a framework for the financing of the re-use schemes. The following questions must be addressed:-
    - Does the Vaal River Tariff apply?
    - Determine the division of the liability between mines and state. This is relevant to the central and eastern basins
    - The role that waste discharge charges will play in the financing of the schemes.
    - Payment for transfer schemes by the receiving catchment.
- The institutional structures to be adopted for the re-use schemes.
- The outcome will be the plan to use the excess water and will lead to feasibility studies or tender processes.