



Water Resource Management Studies Conducted by the
Department of Water Affairs and Forestry (DWAF) in the
Integrated Vaal River System

BACKGROUND INFORMATION DOCUMENT (BID)

An invitation to participate



**PURPOSE OF THIS
DOCUMENT**

The purpose of this Background Information Document (BID) is to inform stakeholders about four water resource management studies that are currently being undertaken by the Department of Water Affairs and Forestry (DWAF) on the Integrated Vaal River System. These studies are: The Development of Large Bulk Water Supply Reconciliation Strategies, Water Conservation and Water Demand Management Potential Assessment, Integrated Water Quality Management Plan and the Vaal River System Continuous Studies - Phase 3.

Stakeholders are invited to participate in the process by contributing information at meetings and workshops, or by corresponding with the public participation office or the technical team at addresses provided below.

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INTRODUCTION

BACKGROUND

Water is one of the most fundamental and indispensable of all natural resources. It is fundamental to life and the quality of life, to the environment, food production, hygiene, industry, and power generation. The availability of affordable water can be a limiting factor for economic growth and social development, especially in South Africa where water is a relatively scarce resource that is distributed unevenly, geographically and socio-politically.

The National Water Act (NWA) provides for the protection, use, development, conservation, management and control of South Africa's water resources in a sustainable manner. The National Water Resource Strategy (NWRS) developed by the Department of Water Affairs and Forestry (DWAF) provides information about ways in which the country's water resources will be managed. The NWRS provides among other things, water balances, quality assessment of water resources, quantitative information about the present and future availability of and requirements for water in each of the 19 Water Management Areas (WMAs).

The water resource of the Integrated Vaal River System is an important asset to the country and its people, supporting major economic activities and a population of about 12 million people. There is an extensive urbanisation, mining (Iron ore, diamonds, manganese, gold and coal) and industrial activities taking place in the system. Farming activities range from extensive livestock

production and dry land cultivation to intensive irrigation enterprises. Therefore, it is important that the water resources of the Integrated Vaal River System are managed to achieve a balance in meeting specific requirements in each WMA as well as fulfilling the transfer obligations between the WMAs.

OBJECTIVES OF THE STUDIES

One of the main objectives of the studies is to promote good governance in water resource management by conducting a consolidated stakeholder engagement process of the various studies that are happening concurrently in the Integrated Vaal River System. The immediate objectives of the individual studies are to:

- Determine the potential for and benefits of Water Conservation and Water Demand Management (WC/WDM) in the various water use sectors with the focus on the Upper and Middle Vaal River System.
- Develop overarching management measures to maintain and improve the water quality in the system for the planning period up to the year 2025.
- Develop strategies for meeting the growing water requirements of the industrial and urban sectors served by the Integrated Vaal River System.
- Provide continuous technical support to DWAF and water users regarding the management and planning of the operations of the Integrated Vaal River System.

AN OVERVIEW OF THE VAAL RIVER SYSTEM

The study area is the Integrated Vaal River System, which is focused around three water management areas (WMA) namely the Upper Vaal (WMA 8), Middle Vaal (WMA 9) and Lower Vaal (WMA 10) but also include the various water resources systems that are linked to the Vaal River WMAs through inter-basin transfers (see **Figure 1**).

Considerable variations in climatic conditions occur over the three WMAs. The Mean Annual Precipitation (MAP) decreases from 800 mm in the Upper Vaal to 500 mm in the Middle Vaal and 100 mm in the Lower Vaal WMA. This tendency is reversed when considering potential annual evaporation, which increases from 1300 mm in the Upper Vaal to 2800 mm in the Lower Vaal WMA.

The land use in the Upper Vaal WMA is characterised by the sprawling urban and industrial areas in the northern and western parts of the WMA. There is also extensive coal and gold mining activities located in the Upper Vaal WMA. These activities are generating substantial return flow volumes in the form of treated effluent from the urban areas and mine dewatering that are

discharged into the river system. These discharges are having significant impacts on the water quality in the main stem of the Vaal River, throughout all three the WMAs.

The Upper Vaal WMA is economically important, contributing nearly 20% of the Gross Domestic Product of South Africa, which is the second largest contribution to the national wealth amongst all nineteen of the WMAs in the country. The potential for future economic growth in this WMA remains strong. Growth will largely be attracted to the already strong urban and industrial areas in the Johannesburg-Vereeniging-Vanderbijlpark complex.

The Middle Vaal WMA is rural in nature with the land use characterised by extensive dry land agriculture. Irrigation is practiced downstream of dams along the main tributaries as well as at locations along the Vaal River. The largest urban areas are Klerksdorp, Welkom and Kroonstad. The economy of the Middle Vaal WMA contributes about 4% of the GDP of South Africa with the most dominant economic activity being the mining sector, generating more than 45% of the GDP in the WMA.

Few of the gold mines in the area have a secure future beyond 2010, although the reserve base could support mining up to the year 2030. The future of gold mining will be strongly influenced by the gold price, exchange rate, operating costs and the tax regime. The declining trend experienced in the recent past is however expected to continue in future in the mining sector. As in the Upper Vaal WMA, mine dewatering and the subsequent discharge to the river system impacts on the water quality.

The land use in the Lower Vaal WMA is primary livestock farming, with some dry land cultivation in the northeast. Intensive irrigation is practiced at Vaalharts as well as locations along the Vaal River. Diamond bearing intrusions occur near Kimberley (the most important urban area) and alluvial diamonds are found near Bloemhof. Iron ore and other minerals are found in the south-eastern parts of the WMA.

Due to the extensive development in the Vaal River System and Crocodile (West) WMA, which are supplied from the Upper Vaal WMA, the local surface water resources in all three the Vaal WMAs have been fully exploited, more than three decades ago.

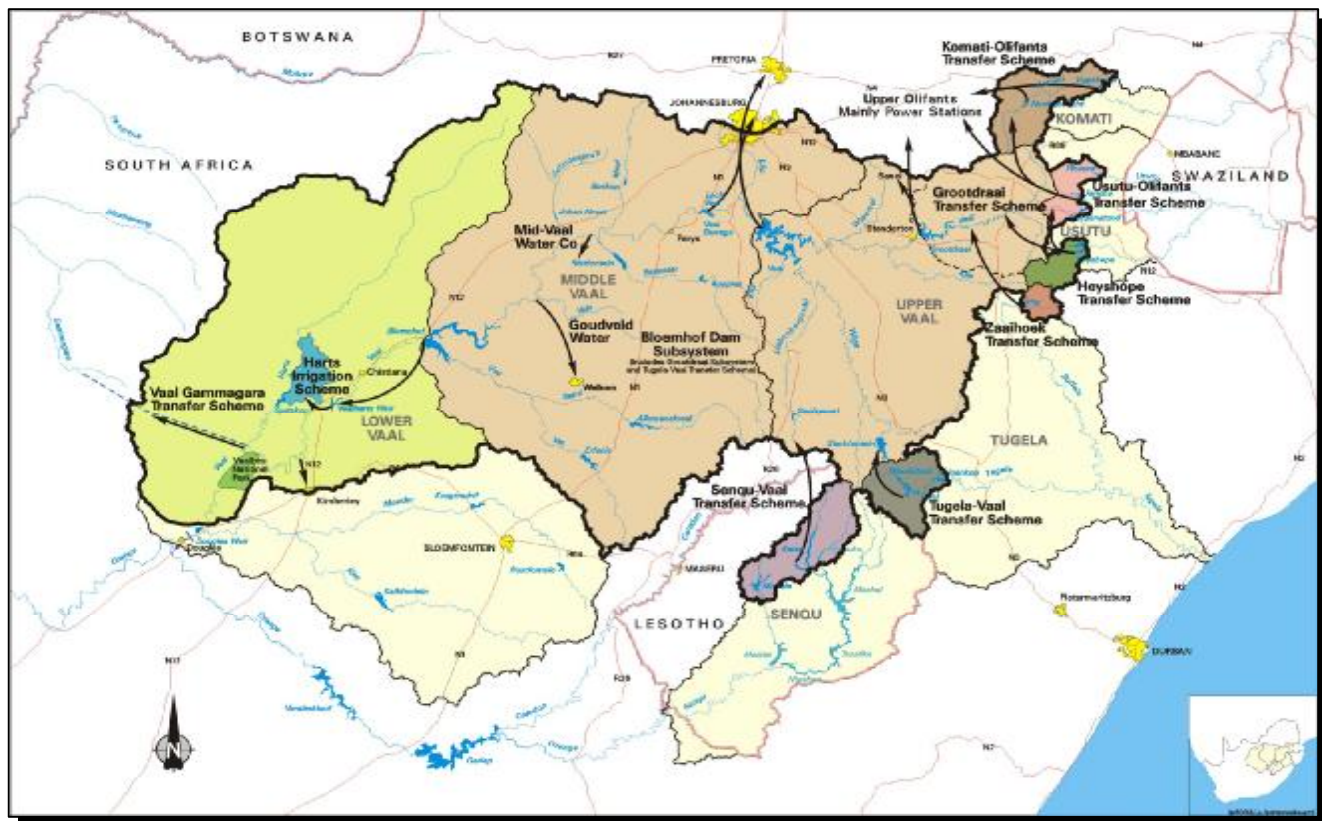


Figure 1: Study Area.

DESCRIPTION OF THE STUDIES

WATER CONSERVATION AND WATER DEMAND MANAGEMENT (WC&WDM)

What is WC&WDM?

Water Demand Management (WDM) is defined as: *The adaptation and implementation of a strategy or a programme by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability.*

On the other hand, Water Conservation is defined as: *The minimization of loss or waste, the care and protection of water resources and the efficient and effective use thereof.*

Link between WC and WDM

A potential difference between WC and WDM is that WC focuses on the efficiency of water resources whereas WDM focuses on achieving the most beneficial solution to water supply from various perspectives, including social and economic considerations. **Figure 2** illustrates various types of WC measures in the whole water supply chain.

Rationale for WC&WDM

The management of water resources and the provision of water services in South Africa call for a new approach in which WC&WDM play an important role in ensuring environmental sustainability, socio-economic equity and efficiency.

The WC&WDM provides a strategic approach to optimise the use of resources by focusing on three key development issues namely, economic efficiency; ecological sustainability and social equity. The WC&WDM supports the Department's mission statement in the following ways:

- It plays a leading role in ensuring the conservation of our water resources in an integrated fashion.
- It supports catchment management agencies (CMAs) to ensure the management of the country's water resources.
- Assist the departmental water services in ensuring that water services are provided in an efficient, cost-effective and sustainable manner.
- Provides a leadership role in ensuring that the people of South Africa are educated in ways to manage, conserve and sustain the country's water resources.

Focus area of the study

According to the Internal Strategic Perspective (ISP) for the Vaal River System, as developed by DWAF (2004) the growth rate of the projected water requirements is low and the impact of even small savings through WC&WDM could result in a substantial postponement of the date augmentation would be required.

Therefore, the WC&WDM study is undertaken with the aim to develop a system-wide plan of how WC&WDM will be implemented and what the impacts will be. The key to this study lies in collating information from the water users on planned WC&WDM measures and compile scenarios of water requirement and return flow for planning purposes.

The five main focus area of the study entails the following aspects:

- Detailed investigations into the potential for reconciling current and future requirements in the system through selection and implementation of sector specific WC&WDM strategies.

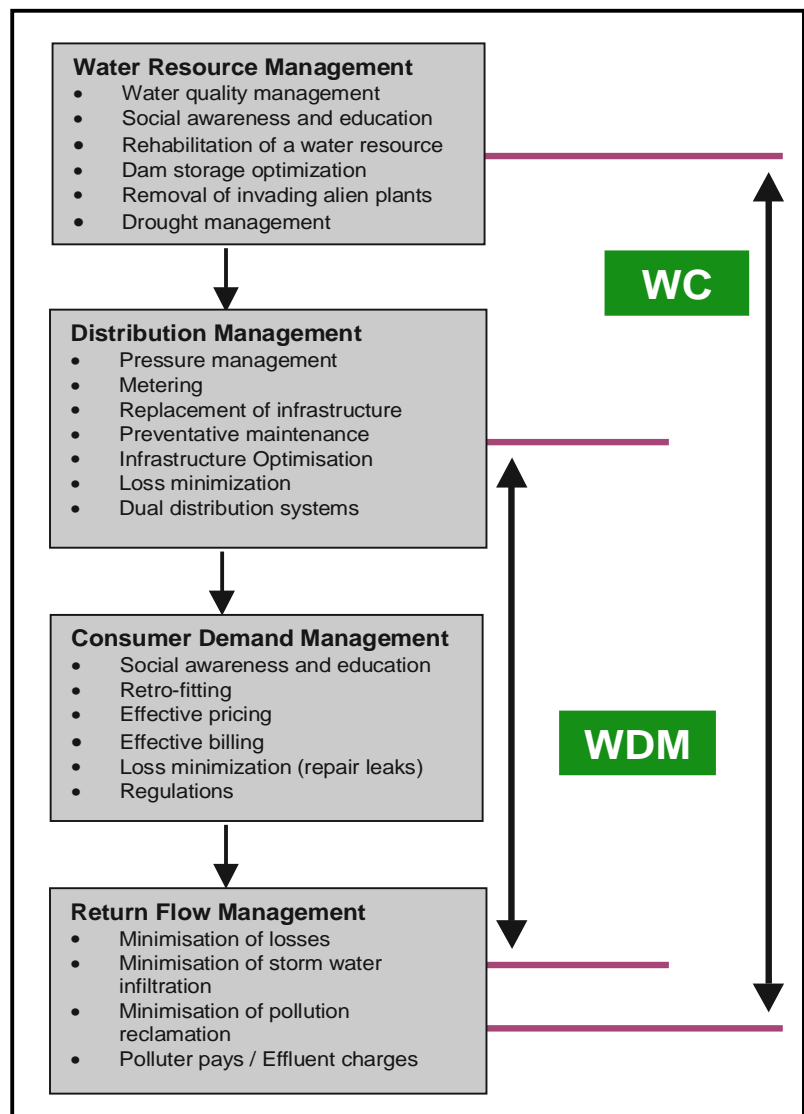


Figure 2: Water Conservation activities throughout the water supply chain.

- Making more effective and efficient use of existing and available water resources in all water sectors.
- Conserving water with an aim of avoiding or delaying further construction of augmentation schemes.
- Assessing the impacts of WC&WDM on cost recovery with respect to the economic impacts on Local Authorities and Service Providers.
- Assessing the current and planned WC&WDM measures with a purpose of developing reliable estimates of the savings that can be expected.
- Establishing how the system complies with the WQOs, which will be determined through analysis of available data and undertaking modelling of possible future scenarios.
- Identifying and developing proposed management measures that will improve the non-compliance cases and utilise the allocatable assimilative capacity to the benefit of the water users in the system. The management measures will be evaluated on the basis of their technical, environmental (range of aspects), social and economic feasibility.

INTEGRATED WATER QUALITY MANAGEMENT PLAN (IWQMP)

Background to IWQM

The approach to water resource protection in the NWA includes consideration of water quantity and water quality. Water quality management deals with source control which includes point sources (such as discharges from sewage treatment works or industrial sites) and diffuse sources (such as settlements without a sewerage system) of pollution by discharges of waste or water containing waste into water resources. WQM also has a resource management component and remediation component.

Decisions about the nature and extent of water quality impacts on the water resource which can be permitted, are guided by a hierarchical decision-making framework, which takes account of the balance between the need to protect water resources for sustainable use, and the need to allow water-impacting activities in order to support social and economic development.

The highest priority in the decision-making framework is to prevent degradation of water resources through waste prevention and reduction, recovery, treatment and final safe disposal. It is however acknowledged that in many cases the discharge of wastes and water containing wastes into water resources is unavoidable, and in these cases the emphasis is on minimising the impacts and its effects on water resources. Where water use has already caused degradation of water resources, or where contaminated land areas pose a threat to water quality, improvements - remediation - will be effected where it is necessary and practical.

Approach to IWQMP

Much of the emphasis in water resource management has revolved around ensuring that users have sufficient quantities of water. However, as more water gets used and re-used, as quantities get scarce and feedback loops get even tighter, it is quality that begins to take on a dominant role.

The main objective of this study is to develop management measures to maintain and improve the water quality in the Vaal River System for the planning period up to the year 2025. The proposed approach for the development of the IWQMP will involve:

- The definition of integrated and balanced Water Quality Objectives (WQOs) that will maintain or improve the systems water quality, using as a point of departure the existing WQOs.

CONTINUOUS STUDIES – PHASE 3

The Vaal River runs through the economic heartland of South Africa whose demand for water has long exceeded the exploitable potential of the system. To meet the extensive water demands, a complex system of reservoirs, pumping schemes, diversion weirs and inter-basin transfer schemes are developed. The main objectives of this study are to:

- Provide technical support to the water resource managers of the Vaal River System consisting of a range of activities, including and relating to system analysis and water resource management.
- Development of water resource management strategies and procedures for the reconciliation of water requirements and water resource availability over the short term.
- Provide project management support and assistance in a range of aspects to ensure effective planning and implementation of water resource management in the Integrated Vaal River System.

DEVELOPMENT OF LARGE BULK WATER SUPPLY RECONCILIATION STRATEGIES

The options for further augmentation of water supply by the development of physical infrastructure are limited. Therefore, long term planning is essential to maintain a balance between water availability and water requirements.

The aim with this study is to develop strategies for meeting the growing water requirements of the industrial and urban sectors served by the Integrated Vaal River System. The study will:

- Update the current and future urban and agricultural water requirements.
- Assess the water resources and existing infrastructure.
- Take into account the Reserve requirements for alternative classifications.
- Formulate reconciliation interventions, both structural and administrative/ regulatory.

The National Water Act requires consultation with “society at large” in the progressive development of the country’s water resources. Stakeholders need to be kept informed during this period. The envisaged public participation process is illustrated in **Figure 3** as follows:

PUBLIC PARTICIPATION PROCESS

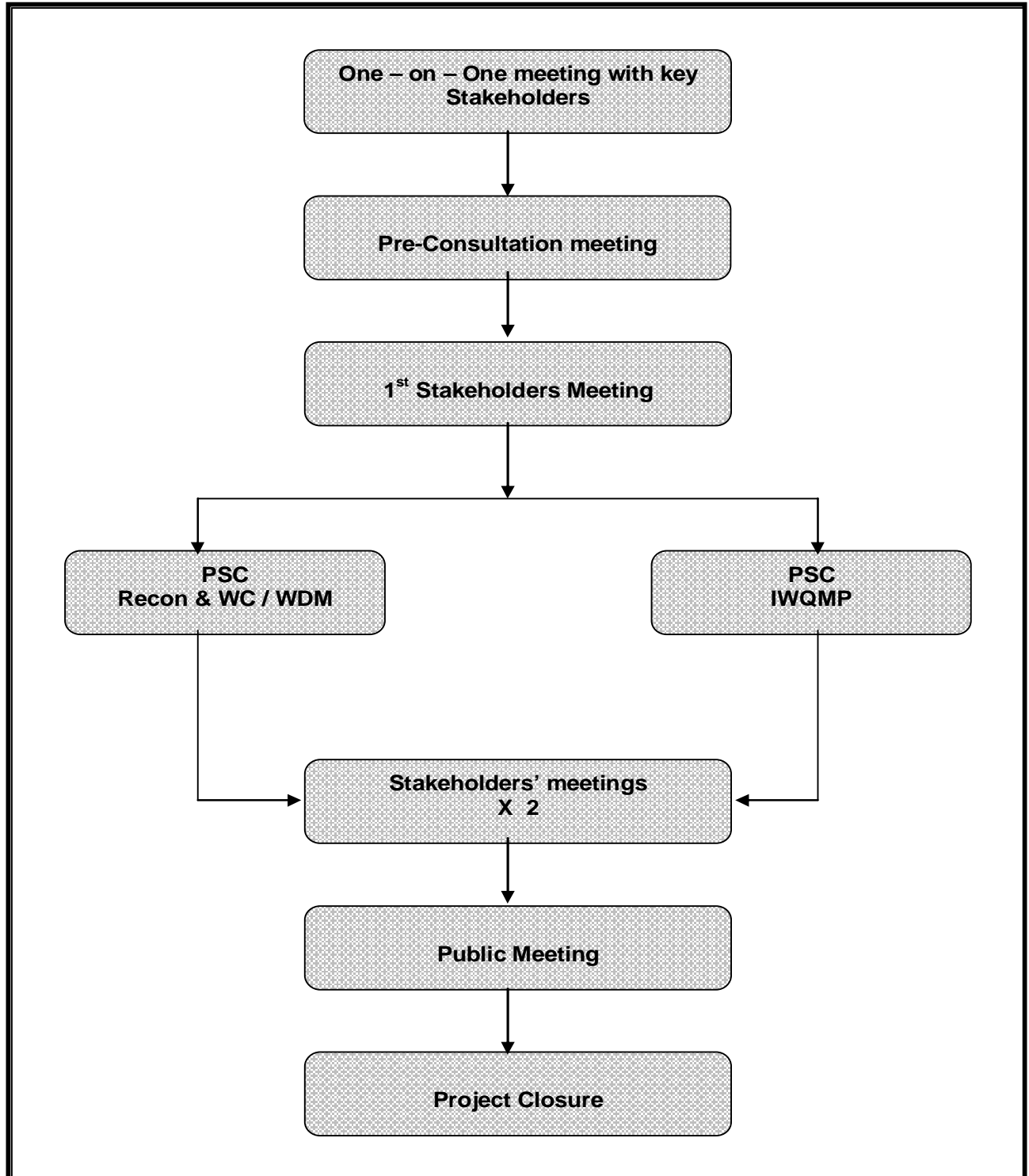


Figure 3: Proposed Stakeholder' engagement process

Identification of stakeholders

'The identification of stakeholders in the Vaal River System will be an ongoing process, refined throughout the process as on-the-ground understanding of affected stakeholders improves through interaction with various stakeholders in the area. Some of the stakeholders categories included in the database include:

- National and provincial government departments.
- Water Services Authorities and Local Municipalities.
- Water Services Providers.
- Organised agriculture.
- Water users associations.
- Industry and mining.
- Business and commerce.
- Environmental bodies, both as authorities and NGOs.
- Catchment management forums.

Project announcement

The project will be announced to the broader stakeholder base in the Vaal River System via the following:

- A letter of invitation personally addressed to all Interested and Affected Parties (I&APs) captured on the data base,

including the Background Information Document (BID) on the study, and including a reply sheet for I&APs to register for participation.
- Telephonic notification to key stakeholders, also to verify contact details.

Pre-consultation meeting

A pre-consultation meeting was held on 29 July 2005 with representatives of leading water institutions in the System. The purpose of the meeting was to clarify some issues between the parties and to establish a common understanding on issues that need to be addressed.

Stakeholders' meetings

Three stakeholders' meetings will be held during the duration of the study. The first stakeholders' meeting will be held on 11 November 2005, in Kroonstad, Free State Province. The purpose of these meetings is to:

- Inform stakeholders about the project and rationale behind the four studies that are taking place in the Vaal River System.
- Afford stakeholders an opportunity to nominate representatives on the two proposed Project Steering Committees (PSCs) – one combined committee for the Reconciliation and WC&WDM studies and another for the IWQMP.
- The remaining two meetings will be held in 2006 and 2007 respectively. These meetings will provide stakeholders with progress on the various studies; present them with interim results and request them to give comment on interim findings.

Public meeting

A public meeting will be held at the end of the study in 2007. The purpose of the meeting would be to present to the general public the outcomes of the study.

On-going consultation with stakeholders

Stakeholders will continue to be informed of progress with the study through a newsletter and will be asked for their inputs on an ongoing basis. All interested and affected parties on the distribution list will receive a personalised letter to report on progress to date, to thank those who commented to date, and to outline the next steps in the process.

They will be advised on the next steps in the process. Prior to and following each milestone, I&APs will receive a personalised letter advising them of the opportunity to comment, the availability of reports at public venues, and, if any, forthcoming meetings.

WHO IS CONDUCTING THE STUDIES?

The DWAF has appointed various consulting companies with vast experiences in the water resource management sector to conduct the four studies. The lead technical consultants are WRP Consulting Engineers (Pty) Ltd and the consolidated public participation process for all four studies is conducted by Zitholele Consulting (Pty) Ltd.

Other companies participating on the projects include:

- Ø SRK (Pty) Ltd
- Ø Golder Associates Africa (Pty) Ltd
- Ø DMM Development Consultants
- Ø PD Naidoo & Associates
- Ø Diversity & Transformation Solutions (Pty) Ltd.