REPORT NO: P WMA 07/000//00/0304

DEPARTMENT OF WATER AFFAIRS AND FORESTRY
Directorate: National Water Resource Planning

Internal Strategic Perspective

Thukela
Water Management Area

Version 1

NOVEMBER 2004

Tlou & Matji

WTP
WATER RESOURCE PLANNING AND CONSERVATION

DMM

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

DIRECTORATE: NATIONAL WATER RESOURCE PLANNING

INTERNAL STRATEGIC PERSPECTIVE: THUKELA WATER MANAGEMENT AREA

Version 1: November 2004

DEPARTMENT OF WATER AFFAIRS AND FORESTRY
DIRECTORATE NATIONAL WATER RESOURCE PLANNING

INTERNAL STRATEGIC PERSPECTIVE

THUKELA WATER MANAGEMENT AREA

APPROVAL

Title		**Thukela WMA: Internal Strategic Perspective**
DWAF Report No	:	P WMA 07/000/00/0304
Consultants	:	Tlou & Matji (Pty) Ltd in association with WRP (Pty) Ltd and DMM cc
Report Status	:	Version 1: November 2004
Version Controller	:	Mr N Ward
Date	:	November 2004

STUDY TEAM:

Approved for Tlou & Matji (Pty) Ltd

……..
SJL Mallory
Director

DEPARTMENT OF WATER AFFAIRS AND FORESTRY
Directorate National Water Resource Planning
Approved for Department of Water Affairs and Forestry

……..
NJ Van Wyk
Project Manager

……
J A Van Rooyen
Manager: NWRP

REFERENCE

This report is to be referred to in bibliographies as:

Department of Water Affairs and Forestry, South Africa. 2004. Internal Strategic Perspective: Thukela Water Management Area : Prepared by Tlou & Matji (Pty) Ltd, WRP (Pty) Ltd, and DMM cc on behalf of the Directorate: National Water Resource Planning (East). DWAF Report No. P WMA 07/000/00/0304.

INVITATION TO COMMENT

This report will be updated on a regular basis until it is eventually superceded by the Catchment Management Strategy. Water users and other stakeholders in the Thukela WMA and other areas are encouraged to study this report and to submit any comments they may have to the Version Controller (see box overleaf).

ELECTRONIC VERSION

This report is also available in electronic format as follows:

- DWAF website:
  - Internet: http://www.dwaf.gov.za/documents/
- iiOn CD which can be obtained from the DWAF Map Office at:
  157 Schoeman Street, Pretoria (Emanzini Building)
  +27 12 336 7813
  mailto:apm@dwaf.gov.za

or from the Version Controller (see box overleaf)

The CD contains the following reports (all available on DWAF website)

- Thukela Internal Strategic Perspective (*This Report*) (Report No: P WMA 07/000/00/0304
- The National Water Resource Strategy
- The Thukela WMA – Overview of Water Resources Availability and Utilisation (Report No: P WMA 07/000/00/0203
- The Thukela WMA – Water Resources Situation Assessment (Report No: P WMA 07/000/00/0301)

LATEST VERSION
This report is a living document and will be updated on a regular basis. If the version of this report is older than 12 months, please check whether a later version is not available. This can be done on the DWAF website: http://www.dwaf.gov.za/documents/ or by contacting the Version Controller (see box)

VERSION CONTROL	
THUKELA WMA INTERNAL STRATEGIC PERSPECTIVE	
Version 1	November 2004
(List of Previous Versions)	(Dates)
Current Version Controller	N Ward DWAF KwaZulu-Natal Regional Office P O Box 1018 DURBAN 4000 +27 31 336 2700 WardN@dwaf.gov.za
The most significant amendments included in the latest version will be indicated here.	

EXECUTIVE SUMMARY

1. INTRODUCTION

This Internal Strategic Perspective (ISP) aims to ensure synergy within the Department of Water Affairs and Forestry (DWAF) regarding water resources management in the Thukela WMA. The ISP presents a common and consistent departmental approach to guide officials when addressing water management related queries and evaluating water licence applications.

2. BACKGROUND AND APPROACH

Water is one of the key and most fundamental and indispensable of all our natural resources. It is fundamental to life (and the quality of life), the environment, food production, hygiene, industry, and power generation. Water can be the limiting factor when it comes to economic growth and social development, especially in South Africa where it is a relatively scarce resource that is distributed unevenly both geographically and through time as well as socio-politically. Prosperity for South Africa depends upon sound management and utilisation of our many natural and other resources, with water playing a pivotal role.

DWAF is striving for an integrated planning and management approach, referred to as Integrated Water Resource Management (IWRM). The ultimate aim of this IWRM process is to arrive at:

- an allocation schedule that meets the requirements of the National Water Act (NWA) (Act 36 of 1998);
- water resources yield and other models that are representative of the flow regime of the river systems in the area;
- management class scenarios for the river (i.e. Reserve and Resource Quality Objectives set);
- a catchment management strategy

These deliverables can only be finalised once the Catchment Management Agencies (CMA) assume responsibility for managing the water resources of their respective Water Management Areas (WMA). In the interim, DWAF's Regional Offices will continue to manage the water resources in their area of jurisdiction until such time as they can hand over these management functions to established and fully operational CMAs. In accordance with the NWA, DWAF (the Minister) will still remain ultimately responsible for the management of the water resources.

In light of this responsibility, DWAF's corporate perspective (including all relevant Directorates in the Department) on how the water resources should be managed needs to be formally expressed in order to manage the water resources in a consistent and predictable manner. The purpose of the ISP is to document these perspectives and offer sound motivation to demonstrate proper and reasonable governance.

3. OVERVIEW OF THE THUKELA WMA

The Thukela Water Management Area (WMA) consists of the entire catchment of the Thukela River, also referred to as the 'V' Hydrological Drainage Region (Midgeley et al, 1994). The Thukela River rises in the Drakensberg mountains very close to the border with Lesotho and meanders through central KwaZulu-Natal and discharges into the Indian Ocean (see **Figure 2.1**). The Little Thukela, Klip, Bloukrans, Bushmans, Sundays, Mooi and Buffalo rivers are the

major tributaries of the Thukela, which together make up the WMA with its 88 quaternary catchments. The total area of the Thukela River catchment is approximately 30 000 km^2 in extent.

Due to the mountainous nature of the Thukela WMA and its proximity to the Indian Ocean, the rainfall is high by South African standards, ranging from over 1 500 mm per annum in the mountains to about 650 mm per annum in the central parts of the catchment. As a result of the high rainfall, there is substantial runoff from the Thukela catchment, with the Mean Annual Runoff (MAR), estimated at 3 799 million m^3/a (DWAF, 2002a). Rainfall is however erratic and years of prolonged drought in the central and lower catchment alternate with very wet periods.

For analysis and reporting purposes, the Thukela WMA was divided into catchment areas, referred to in this report as Key Areas. These Key Areas are defined as follows:

- Upper Thukela (tertiary catchments V11, V12, V14 and quaternaries, V60G, H and J);
- Little Thukela (tertiary catchment V13);
- Bushmans (tertiary catchment V70);
- Sundays (quaternary catchments V60A, B, C, D, E and F);
- Mooi (tertiary catchment V20);
- Buffalo (tertiary catchments V31, V32 and quaternaries, V33A and B);
- Lower Thukela (tertiary catchments V40, V50 and quaternaries, V33C, D and V60K);
- The locations of the various Key Areas are shown **Figure 3.1**. This figure also shows the four sub-areas as defined and used for the balance calculations in the NWRS.

The Upper Thukela Key Area

The Upper Thukela Key Area lies in the upper reaches of the Thukela River upstream of the confluence with the Bushmans River and includes the towns of Bergville, Ladysmith, Colenso and Weenen. The Thukela and Klip Rivers are the main rivers in this catchment. This area is the source of water for the Thukela-Vaal Transfer Scheme, which, *inter alia*, transfers water to the Vaal River System. The transfer capacity of this scheme represents a large portion (about 30%) of the water resources available in the Upper Vaal WMA, which is the economic heart of South Africa.

The proposed **Jana Dam**, which forms part of the Thukela Water Project, will also be located in this area on the Thukela River should this project proceed. It is important that the optimal long-term benefits be derived from the development of Thukela, and that both the national and local interests be appropriately addressed.

Due to the strategic nature of the Upper Thukela, it is not surprising that by far the largest use of the water derived from this catchment is for transfer to the Vaal System. With the infrastructure in place, consisting primarily of Woodstock Dam, Driel Barrage, canals and the Eskom Pumped Storage scheme, it is possible to transfer on average 530 million m^3/a to the Vaal System. In contrast to this, local use within the Upper Thukela is estimated to be only 114 million m^3/a, with irrigation making up the bulk of this use (87 million m^3/a) while urban use in the towns of Ladysmith, Colenso and Bergville are also significant (17 million m^3/a).

Despite the huge demands on the water resources of the Upper Thukela Key Area, there is surplus water available. This is due to the under-utilisation of the Spioenkop Dam which was constructed to supply local water requirements. New allocations can therefore be made in this

Key Area, provided they are downstream of the Driel Barrage, so as not to impact on the Thukela-Vaal transfer.

The Little Thukela Key Area

The Little Thukela Key Area consists of the catchment of the Little Thukela River, a tributary of the Thukela River. The catchment is characterised by large irrigation requirements (36 million m^3/a) while the water resource remains relatively undeveloped. Other water use is insignificant. The only significant dam in this Key Area is the small Bell Park Dam. The upper areas of the Key Area are located in a nature reserve with the implication that no development in this area is likely. Areas adjacent to the nature reserve have however developed rapidly into popular tourist resorts in recent years with the concomitant pressures of human habitation.

Due to limited water resources in the catchment and the large irrigation requirements, this Key Area is considered to be stressed, with the water requirement far in excess of the sustainable yield. As a result there is no scope for any additional water allocations in this Key Area. The construction of farm dams would be acceptable however since this would improve the assurance of supply to water users in this area.

Due to the stressed nature of this Key Area, the implementation of the ecological Reserve will be problematical and it is recommended that this be done in a phased manner. Compulsory licencing may be required in order to implement the Reserve fully.

The Bushmans Key Area

The Bushmans Key Area consists of the Bushmans River catchment. This river rises in the Drakensberg Mountain range and flows in a north-easterly direction past the town of Estcourt to join the Thukela River near the town of Weenen.

Water use in this Key Area is dominated by irrigation, with an estimated requirement of 31 million m^3/a. The only significant town in the area is Escourt, with a water requirement of 4 million m^3/a.

The Wagendrift Dam, with a full supply capacity of 56 million m^3, is situated in the Bushmans River Key Area. It was constructed to supply irrigation and the town of Escourt but is currently underutilised. The surplus could be allocated to emerging farmers, but this decision will need to be carefully analysed in the light of the new allocations to the Fairbreeze mine and the ecological Reserve of the lower Thukela, which will required support from either the Wagendrift or the Spioenkop Dam, or both.

Potential for further development of surface water resources exists and a site downstream of the Wagendrift Dam has been earmarked for the Mielietuin Dam which forms part of the Thukela Water Project.

The Sundays River Key Area

The Sundays River Key Area comprises the Sundays River catchment. The Sundays River flows in a south-easterly direction from the eastern escarpment to its confluence with the Thukela River near the Bushmans River confluence.

Commercial dryland agriculture dominates the area and there are also fairly large tracts of tribal / communal land in the lower reaches of the catchment. By far the largest water use in this Key Area is irrigation, with an estimated requirement of 26 million m^3/a. This is supplied from small farm dams or from run-of-river flows. Other than the Slangdraai Dam, which has a full supply capacity of 10,3 million m^3, there is no significant storage in this Key Area.

Coal mining abounds in the upper areas of the catchment which causes water quality problems.

As with the Little Thukela Key Area, the water requirements of the Sundays River Key Area is far in excess of the sustainable yield and the catchment is considered to be stressed. There is some doubt as to the balance in this Key Area, however, due to the huge discrepancy between the registered irrigation water use and the irrigation water use estimated in other studies. This issue must be resolved before any further water allocations can be considered to the irrigation sector in this Key Area.

The Buffalo River Key Area

The Buffalo River is the main northern tributary of the Thukela River and flows in a south-easterly direction from the eastern escarpment (Newcastle area) to its confluence with the Thukela River near Nkandla. The area includes the towns of Dundee, Newcastle, Danhauser, Utrecht and Madadeni.

There are two major dams in the Buffalo River Key Area. These are the Ntshingwayo Dam (previously known as Chelmsford) with a full supply capacity of 199 million m^3, and the Zaaihoek Dam with a full supply capacity of 193 million m^3. The Ntshingwayo Dam supplies water to Newcastle while water is transferred out of the WMA from the Zaaihoek Dam to the Upper Vaal WMA.

While the largest water use in the Buffalo Key Area is again irrigation, with a requirement of 50 million m^3/a, domestic and industrial use are also significant in the Key Area, as are the transfers out to the Upper Vaal WMA, estimated at 55 million m^3.

There is surplus water available in the Buffalo River Key Area that can be allocated. Priority must be given to redressing of inequities and poverty eradication. Allocations must however be dealt with cautiously and the location of the surplus identified before making allocations. New allocations should not be made upstream of the Zaaihoek or Ntshingwayo dams.

Water quality is a major concern in the Buffalo Key Area and the water quality in the Buffalo River all the way down to its confluence with the Thukela is considered to be very poor.

The Mooi River Key Area

The Mooi River rises in the Drakensberg Mountains and flows parallel to the Bushmans River in a north-easterly direction to join the Thukela River near Muden. The only town of any significance in the catchment is Mooi River. The predominant land use in the catchment is commercial agriculture and there is large-scale irrigation of pastures and summer cash crops, with an estimated water requirement of 49 million m^3/a. The other large water use is transfers out to the Mgeni WMA. The transfer scheme situated at Mearns can transfer water at a rate of up to 3.2 m^3/s to the Mgeni River System.

The only major dam in this Key Area is Craigieburn Dam, with a capacity of 23.5 million m^3. The dam supplements water supplies to approximately 2 000 ha of predominantly citrus farming irrigation downstream of the dam and along the Mooi River at Muden. However, there is an abundance of farm dams in the Key Area, especially in the upper reaches of the Mooi River.

The catchment currently experiences a small deficit, with the water requirements slightly in excess of the available resource. There is a strong possibility that additional allocations are possible for summer use only, but this will need to evaluated in more detail.

The Mooi River has long been recognised as the most feasible source from which to augment the Mgeni System. The first phase of the two-phase Mooi-Mgeni Transfer Scheme has already

been implemented, this being the construction of the Mearns Weir and this is expected to be followed shortly with the construction of the Spring Grove Dam.

The Lower Thukela Key Area

The Lower Thukela Key Area consists of the Thukela River catchment from the Bushmans River confluence down to the river mouth at the Indian Ocean. The area includes the town of Mandini and the Isithebe industrial area, both located close to the river mouth.

Unlike all the other Key Areas in the Thukela WMA, irrigation in the Lower Thukela is not the largest water requirement, although still significant at an estimated 22 million m^3/a. The largest water use in this area is that of the Sappi paper mill, with an estimated water requirement of 24 million m^3/a.

Water sourced from the Lower Thukela is transferred out of the WMA to the Mhlathuze Catchment to augment the water supply to Richards Bay. The impact of this transfer on the available resource of the Lower Thukela Key Area is estimated at 38 million m^3/a.

A large allocation has recently been made for the proposed Fairbreeze mine - 32 million m^3/a allocated for the mine and a further 15 million m^3/a (at a lower assurance) allocated for proposed new irrigation along the pipeline route.

A reconciliation of the water requirements and the available water resource of the Lower Thukela Key Area indicates a large deficit, but this reconciliation allows for the allocation to the Fairbreeze mine which is not yet being abstracted. This allocation will be supported by releases from the Spioenkop Dam or Wagendrift Dam, or both.

4. RECONCILIATION OF WATER REQUIREMENTS AND AVAILABLE WATER RESOURCES

A reconciliation of the water requirements and available water resources in the Thukela WMA is shown in **Table 1**. This differs in many respects from the reconciliation given in the NWRS. Based on the detailed analysis of the water requirements and resource given in Chapter 4, the following major differences to the NWRS strategy are noted and motivated:-

1. The irrigation requirement used in this ISP is much higher than that of the NWRS and the registered water use by the irrigation sector. This ISP sourced its irrigation requirements from the latest study in the area, namely, the Thukela Reserve Determination Study. However, considering the large discrepancy between this estimate and the registered irrigation water use, verification of the irrigation water requirements is clearly required.

2. The water resource of the Thukela WMA, as determined for this ISP using the Water Resources Yield Model setup for the Thukela WMA is higher than given in the NWRS. This is mainly due to the reduction in yield due to the ecological Reserve, as used in the NWRS (which was based on desktop estimates), being much higher than that recently determined through the Thukela Reserve Determination Study (DWAF, 2004a). The latter Reserve has been approved by DWAF and hence is the accepted Reserve for the WMA.

Table 1: Reconciliation of water requirements and available water resources for the Thukela WMA for the year 2005 (million m^3/a).

Key Area	Available water			Water requirements/allocations			Balance
	Local yield	Transfers In	Total	Local requirements	Transfers out	Total	
Upper Thukela	506	0	506	114	377+11[1]	502	**4**
Little Thukela	8	0	8	38	0	38	**(30)**
Bushmans	80	0	80	40	29[1]	69	**11**
Sundays	8	0	8	32	0	32	**(24)**
Mooi	64	0	64	52	22	74	**(10)**
Buffalo	174	0	174	96	55	151	**23**
Lower Thukela	105	40[2]	145	58	87	145	**0**
Total	**945**	**0**	**945**	430	541	971	**(26)**
Allocable							**38[3]**

Notes:

1. Releases to support the Lower Thukela Key Area.
2. Supplied from Spioenkop and Wagendrift dams.
3. Since it is not feasible to supply the shortages in the Little Thukela, Sundays or Mooi Key Areas from the surpluses in the Upper Thukela, Buffalo or Bushmans Key Areas, there is at least 38 million m^3/a available for allocation in the Thukela WMA.

5. WATER RESOURCES MANAGEMENT ISSUES AND STRATEGIES

The following are the most pressing issues which have been identified through this ISP study, as well as proposed broad strategies to deal with these issues:

- The resources of the Thukela River are predominantly used to support requirements for water in other parts of the country, with large transfers of water to all three neighbouring water management areas. The need for increased and additional transfers in future have been identified and investigated in detail although no decision on this has as yet been made.
- Nevertheless, there are surpluses which can be allocated. These surpluses are located in the Ntshingwayo, Spioenkop and Wagendrift dams and can be allocated either directly from the dams, or released to users downstream of these dams. Preference should be given to poverty alleviation and the redressing of inequities in allocating these surpluses.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ANNEXURES

Annexure A: Summary of previous water resource planning studies

Annexure B: Registered dams in the Thukela WMA

LIST OF ABBREVIATIONS

CEIMP	Consolidated Environmental Implementation Management Plan
CMA	Catchment Management Agency
CMS	Catchment Management Strategy
DWAF	Department of Water Affairs and Forestry
IDP	Integrated Development Plan
IFR	Instream Flow Requirement
ISP	Internal Strategic Perspective
IWRM	Integrated Water Resource Management
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
mamsl	meters above mean sea level
MSAT	Mgeni System Allocation Tool
NEMA	National Environmental Management Act
NWA	National Water Act 36 of 1998
NWRS	National Water Resource Strategy
PLC	Provincial Liaison Committee
RDM	Resource Directed Measures
RQO	Resource Quality Objectives
SFRA	Stream Flow Reduction Activity
TWP	Thukela Water Project
WARMS	Water use Authorisation and Registration Management System
WMA	Water Management Area
WRSA	Water Resources Situation Assessment
WSDP	Water Services Development Plan
WSP	Water Sector Plan
WUA	Water User Association