



water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

**AMATOLE WATER SUPPLY SYSTEM
RECONCILIATION STRATEGY**

**STATUS REPORT
2011**

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1 PURPOSE OF THE STATUS REPORT

The purpose of this report is to:

- a) Provide an overview of progress in the implementation of the Amatole Water Supply System Reconciliation Strategy (the Strategy); and
- b) Emphasize the actions required to prevent medium- to long-term water supply constraints to meet the growing water requirement from the Amatole Water Supply System (AWSS).

2 INTRODUCTION

2.1 The Amatole Water Supply System

The AWSS provides water to about 1 million people residing in the catchments of the Buffalo, Nahoon and Upper Kubusi rivers, as well as for some 1000 ha of scheduled irrigation along the upper and middle reaches of the Kubusi River. The communities supplied fall primarily within the Buffalo City, Amahlati and Ngqushwa local municipal areas with East London, King Williams Town, Bhisho and Stutterheim being the main urban centres within the supply area.

The main storage dams of the AWSS are the Gubu, Wriggleswade, Rooikrantz, Laing and Nahoon dams (owned by the Department of Water Affairs and operated by the Amatola Water Board) and the Maden and Bridledrift dams (owned and operated by the Buffalo City Metropolitan Municipality). The Gubu and Wriggleswade dams are located on the Kubusi River, the Maden, Rooikrantz, Laing and Bridledrift dams on the Buffalo River and the Nahoon Dam on the Nahoon River.

The supply area of the AWSS is the second largest contributor to the Eastern Cape economy after Port Elizabeth and its immediate surrounds (Nelson Mandela Metropolitan Municipality), and is the economic hub of the Border-Kei Region. Urban water use within the Buffalo City Metropolitan Municipality (BCMM) in general and in East London / Mdantsane in particular, represents the largest use of water from the AWSS (82% and 62% respectively).

The growth in water requirement for the area served by the AWSS is driven primarily by the domestic requirement (increased number and level of housing/services provided) and to a lesser extent by industrial growth, whilst there is no provision to accommodate growth in the irrigation requirement.

2.2 The Amatole Water Supply System Reconciliation Strategy Study

The Reconciliation Strategy Study was completed in March 2008. The key actions and interventions identified to ensure reconciliation of water supply and requirement into the future are as follows:

- Constitute a Strategy Steering Committee, consisting of key stakeholders, to oversee the implementation and maintenance of the Strategy;
- Complete the Wriggleswade - Yellowwoods link to remove system yield constraints;
- Operate the AWSS as an integrated system so as to maximise its yield;

- Implement Water Conservation and Water Demand Management (WC/WDM) measures to reduce water wastage and promote the efficient use of water;
- Investigate schemes to re-use water, with a focus on the water currently being discharged to waste downstream of dams;
- Study new surface water options to augment the yield of the System; and
- Compare all augmentation options and make recommendations to decision makers on the implementation of the preferred ones, as required.

2.3 Implementation of the Strategy

The Amatole System Strategy Steering Committee (ASSSC), comprising of senior representatives of all key stakeholders, was constituted on 24 June 2009 to oversee the implementation and maintenance of the Strategy. Other key interested and affected parties have since been co-opted onto the Committee.

The ASSSC meets twice a year, generally in May and October. A comprehensive review of the Strategy is undertaken annually during the latter meeting, whilst the earlier meeting primarily reviews progress in implementing the Strategy and decision taken during the latter meeting. The ASSSC has to date met on the following occasions:

- 24 June 2009;
- 17 November 2009;
- 19 May 2010;
- 5 October 2010;
- 19 April 2011; and
- 11 October 2011.

An administrative and technical support group comprising of officials of the key stakeholders was formed to assist the ASSSC in all aspects of implementing, monitoring, maintaining and communicating the Strategy. The Amatole System Administrative and Technical Support Group (ASATSG) generally meet 6 weeks before and within 2 weeks after each ASSSC meeting to prepare for the meetings and to react to instructions given by the ASSSC.

3 SYSTEM YIELDS

3.1 Individual Dams

The yields available from each of the AWSS dams, as determined in the study to compile the reconciliation strategy, are presented in Table 1.

Table 1: Yields of the individual dams comprising the Amatole Water Supply System

Dam	Yield (million m ³ /a)
Maden	0.48
Rroikrantz	3.70
Laing	18.27
Bridledrift	29.41
Nahoon	8.41
Gubu	2.87
Wriggleswade	31.80
Combined yield of dams	94.94

Notes:-

- EWRs (environmental water requirements) are not included.
- Transfer losses from Wriggleswade Dam are not included.
- The possible impact of climate change is not included.

3.2 Integrated System

A study to determine rules to optimise the operation of the System has been initiated by DWA and completed by the Operating Rules Study Team. The resultant operating rules, which entail the transfer of water from the Wriggleswade Dam to the downstream dams in the System when water levels in these dams drop to predetermined levels, have been concluded. The transfer rates are such that they sustain the requirements on the dams only and are not used to re-fill the dams. In optimising the system operation, it was reported by the Operating Rules Study Team that the yield of the Integrated System could be higher than the sum of the yields for the individual dams.

The ASATSG has therefore reviewed the system yield, based on the adopted operating rules, using the Water Resources Yield Model, the results of which are presented in Table 2.

Table 2: Yields of the integrated Amatole Water Supply System

Dam	Yield at 98% Assurance of Supply (million m ³ /a)	
	Scenario 1 Transfer when Wriggleswade Dam is Spilling	Scenario 2 Transfer from Wriggleswade Dam only when required
Maden	0.5	0.5
Rroikrantz	3.7	3.7
Gubu	2.9	2.9
Wriggleswade	93.6	87.3
Laing		
Bridledrift		
Nahoon		
Sub-total	100.7	94.4
Total yield including return flows	106.4	100.1

Notes:-

- EWRs are not included.
- Transfer losses from Wriggleswade Dam have been included.
- The possible impact of climate change is not included.

From the above table it can be noted that the yield of the System, when operated as an integrated system, is in fact some 5% greater than the sum of the yields of the individual dams. Integrated system operation is therefore an imperative to ensure a reconciliation of supply and requirement in the short- to medium-term.

It can also be noted that the system yield can be increased by a further 6.3% (to 11.4% in excess of the sum of the yields of the individual dams) by making transfers when Wriggleswade Dam is spilling. The ASATSG will therefore submit a formal recommendation to have the ASSOCC implement this additional operating rule. The progress in formalising and implementing this rule will be reported on in future ASSSC meetings.

3.3 Factors Impacting on System Yield

3.3.1 Environmental Water Requirements

Implementing the environmental water requirements for the respective rivers will have the effect of reducing the system yield.

The environmental classifications (ECs) of the rivers, which ultimately dictate their environmental water requirements (EWR), have been determined based on desk top and field studies for all rivers. Due process still however needs to be followed before the EWRs are finalised and formally adopted.

As the impact of implementing the EWRs on the yield from the AWSS could be a reduction of as much as 25 million m³/a (25% of the system yield), they are not implemented at this stage, but are considered as a scenario in the future reconciliation planning model.

A framework has however been developed for finalising and implementing the EWRs for the Amatole System, which includes the following:

- Finalise the river classifications for all river reaches;
- Finalise the EWR for the reach of the Buffalo River downstream of Bridledrift Dam;
- Determine the estuarine requirements for the Nahoon River;
- Review the need for a compensation release downstream of Wriggleswade Dam, given the short reach of the river before it joins the Toise River (a major tributary);
- Finalise the EWRs for the respective rivers once the protocols currently being piloted by others outside of the Amatole System have been finalised; and
- Phase in the EWRs in accordance with the requirements of the Strategy.

Progress on the implementation of the above will be reported on at subsequent ASSSC meetings.

3.3.2 *Yellowwoods Transfer Constraint*

Previous environmental studies on the kwaNkwebu River, a tributary of the Yellowwoods River, recommend to limit the rate of transfer between the Wriggleswade and Laing Dams, to a rate lower than that for which the transfer system had been designed in order to protect an environmentally sensitive reach of the river. It was initially envisaged that this would limit the yield possible from the System, requiring by-pass infrastructure to circumvent the constraint.

The new operating rules are however such that transfers are undertaken at lower rates but over longer periods, thereby avoiding the need for by-pass infrastructure to ensure the system yield is achievable.

The Amatole Supply System Operation Co-ordination Committee (ASSOCC) is however still required to review the need for the pedestrian bridges across the river.

3.3.3 *Invasive Alien Plants*

Investigations undertaken by the Operating Rules Study Team indicated that previous yield studies may have under-estimated the impact of Invasive Alien Plants (IAP's). The ASATSG, as part of their WRYM study, are investigating this assertion and will report on the outcomes thereof at the next ASSSC meeting.

3.3.4 *Climate Change*

The potential impact of Climate Change on the yield from the System has been investigated by the Operating Rules Study Team at a conceptual level of detail. The findings indicate that the potential long-term impact of Climate Change is not significant to materially impact on the system yield. Climate change is therefore not considered in current reconciliation planning, but its potential impact will continue to be reviewed in terms of this Strategy, as and when more detailed information becomes available.

3.4 System Yield for Reconciliation Planning

Given the level of accuracy involved in hydrological modelling of this nature, the concerns raised regarding the possible impact of IAPs and climate change on system yield, and given that the recommended operating rule to transfer from Wriggleswade Dam when it is spilling has not as yet be formalised, a system yield of 95 million m³/a has been used for current reconciliation planning (but without the need to account for transfer losses as a requirement). The higher possible yield of 106 million m³/a (as per Scenario 1 in Table 2 of this report) is however considered as a scenario in the reconciliation planning.

4 WATER REQUIREMENTS

4.1 Background

Various future water requirement scenarios have been developed based on current and predicted future population data from various sources, coupled with predictions of progressively increasing levels of water services being provided, as well as current and projected industrial and agricultural water requirements.

The irrigation requirement is currently based on compensation releases and existing rights only, with no provision for future growth.

The water requirement scenarios do not include future WC/WDM measures, which are considered interventions that could be implemented to reduce the water requirement.

4.2 Historical Water requirements

4.2.1 Background

The combined domestic, industrial and irrigation historical water requirements from 2003 to 2011 are presented in **Figure 1**, together with the assumed system yield of 95 million m³/a. See **Appendix A** for the historical water requirements graphs on the respective dams and sub-systems.

The requirement profiles are characterised by:

- The System as a whole:
 - An increase in requirement between 2005 and 2008.
 - A decrease in requirement between 2008 and 2011.

- By Sub-systems:
 - Lower Buffalo
 - A 10.9% per annum increase in raw water requirement between 2006 and 2008 but only a 3.7% per annum increase in potable water requirement over the same time period.
 - A 10.2% per annum decrease in raw water requirement between 2008 and 2011 with a 0.1% per annum decrease in potable water requirement over the same time period.
 - A 1.4% per annum decrease in potable water requirement between 2010 and 2011.

 - Upper and Middle Buffalo
 - A 7.3% per annum increase in raw water requirement between 2005 and 2011 with a 5.9% per annum increase in potable water requirement over the same time period.
 - A 12.2% per annum increase in raw water requirement between 2005 and 2009 with a 10.7% per annum increase in potable water requirement over the same time period.
 - A 1.7% per annum decrease in raw water requirement between 2009 and 2011 but a 3.0% per annum decrease in potable water requirement.

4.2.2 Evaluation of Historical Requirements

➤ Lower Buffalo

Raw water requirements

The sharp increase in water requirement between 2006 and 2008 is primarily attributed to inefficient operating procedures in the raw water releases between Bridledrift Dam and the downstream Umzonyana pick-up weir, resulting in spillages over the weir, as well as losses through the Umzonyana Water Treatment Plant (UWTP). Measures put in place by BCMM have resulted in the sharp reduction in requirement between 2008 and 2011, and initiatives to further reduce losses at the UWTP and to raise the height of the weir (to reduce the risk of spillages) are ongoing.

The reductions achieved to date in the raw water requirements are therefore considered sustainable going forward and the requirement projections have been adjusted accordingly.

The losses recorded for 2010/2011 for the respective dams and water treatment plants are presented in Table 3.

Table 3: Lower Buffalo : Raw water losses for 2011

Dam/WTP	Conveyance		Treatment		Total	
	million m ³ /a	%	million m ³ /a	%	million m ³ /a	%
Bridledrift/Umzonyana	0.994 ¹	2.7 ¹	3.479	8.9	4.155	11.3 ¹
Nahoon	N/A	N/A	0.320	3.4	0.320	3.4

Notes:

1. For 11 months only. Dam was spilling during June 2011.

The above losses are considered to be within acceptable limits, but treatment losses at the UWTP could be brought down further to 6%.

Potable water requirements

The nominal increase (0.4% per annum) in requirement between 2005 and 2011 indicates that the increase in raw water requirement during this period was primarily attributed to raw water losses, as opposed to “real” increases in raw water requirement.

The reasons for the 1.4% per annum decrease in requirement between 2010 and 2011 are uncertain but could be attributed to the drought situation (no restrictions but heightened awareness of water scarcity during the severe drought) and/or BCMMs ongoing WC/WDM interventions in the Mdantsane and Duncan Village areas.

➤ *Middle and Upper Buffalo*

The increase in water requirement 2004 and 2009 is attributed to the significant housing development that took place in the area during this period. Development in the area has however since slowed, which together with the BCMMs WC/WDM interventions could

account of the 3.0% per annum decrease in potable water requirement between 2009 and 2011.

The general divergent trend in raw and potable water requirement and in particular that between 2010 and 2011 is attributed to increased water treatment losses at the Laing Dam WTP.

4.3 Projected Water Requirements

BCMM is responding to development pressures to the west of East London (West Bank, Kidds Beach and Kaysers Beach) and is implementing infrastructure to feed this area from the AWSS. Therefore, the projected water requirements now include the projected requirements for this increased supply area, which were originally treated as a scenario in terms of the Strategy.

The Amathole District Municipality (ADM) has initiated feasibility studies to service the Great Kei Local Municipality area (to the east of East London) from the AWSS. As the recommendations of the All Towns Reconciliation Strategy Study are that supplies to the Great Kei area be augmented via local sources, the supply to this area from the AWSS is only treated as a scenario in terms of this Strategy. It has been determined that it would take at least 6 years to implement the supplies to the Great Kei area from the AWSS, in which case the impact of this supply on the System would only be noted after 2017, if implemented.

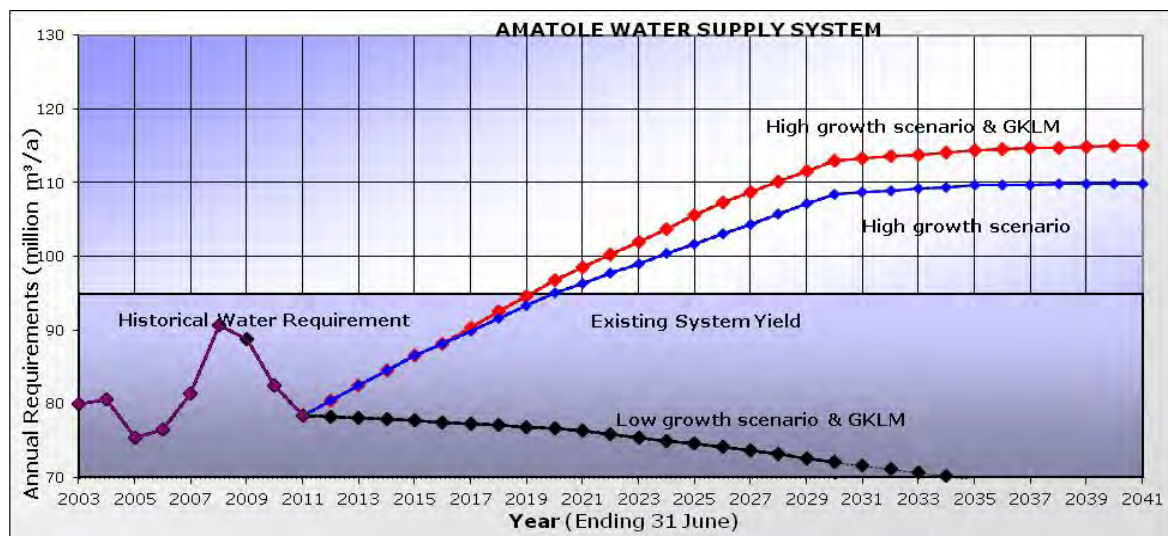
The low growth water requirement scenario, which includes supplies to the west and east of East London, indicates a decline in water requirement over time due to the predicted impact of HIV/Aids and expected population migration.

The projected water requirements for the AWSS are presented in **Figure 1** of this report.

5 WATER BALANCE

Figure 1 shows the current high- and-low-growth water requirement scenarios against supply available from the System.

Figure 1: Amatole Water Supply System: Water Balance 2011



Notes

- GKLM = Great Kei Local Municipality

Based on the high-growth water requirement scenario, measures to reduce the requirement or to increase the System yield would have to be implemented by 2020 (was 2016 in the 2010 Status Report).

Based on the low water requirement scenario, the System has adequate yield to meet the requirements, inclusive of supplies to the Great Kei area.

6 RECONCILIATION OPTIONS

The following options to reconcile the projected water requirements with supply from the AWSS are prioritised for implementation in terms of the Strategy:

- Operation of the AWSS as an integrated system so as to maximize System yield;
- Water conservation and water demand management (WC/WDM);
- The re-use of water;
- Stream flow enhancement through the removal of invasive alien plants in river catchments;
- The development of new surface water supplies; and
- Desalination of sea water.

It is also required in terms of the Strategy that water quality concerns be addressed at source, to prevent the need to operate the System to address water quality concerns by means of releases from dams for dilution purposes.

The status in implementing the above recommendations is described in more detail in Sections 7 to 13 of this report.

7 SYSTEM OPERATION

7.1 Background

The responsibility to co-ordinate system operation resides with the Amatole Supply System Operations Co-ordination Committee (ASSOCC), which comprises of the owners and operators of the various dams within the System.

7.2 Developments

Long-term operating rules for the System have been determined, but are not being fully implemented by all ASSOCC member institutions at present. Initiatives are however underway between DWA and BCMM to conclude agreements for the operation of Bridledrift Dam in accordance with the operating rules, the outcomes of which will be reported on at subsequent ASSSC meetings.

As stated in Section 3.2 of this report, changes to the current operating rules to further increase System yield have been recommended, and progress in the finalisation and implementation thereof will be reported on at future ASSSC meetings.

8 WATER CONSERVATION / WATER DEMAND MANAGEMENT

8.1 Background

Water conservation and water demand management (WC/WDM) is the key reconciliation intervention identified in terms of the Strategy.

The ASSSC resolved in 2010 that the planning of new surface water supply schemes would be based on achieving at least 75% of the savings targeted through WC/WDM measures.

The ASSSC also resolved in 2010 that BCMM:

- Develop a WC/WDM strategy in 2011;
- Implement the funded WC/WDM projects already identified, which seek to achieve a saving of 4.7 million m³/a over 2 years (2012-2013); and
- Identify additional projects, which should be ready for implementation by 2014 and which should seek to achieve a further average savings of 1.2 million m³/a per year over an eight year period.

8.2 Developments

8.2.1 Buffalo City Municipality

BCMM is in the process of reviewing their WC/WDM strategy. The draft strategy requires that some R131 million be invested over a 5 year period to achieve an estimated savings of 6.2 million m³ per annum and focuses on:

- Enhancing the institutional capacity to implement WC/WDM interventions on a sustainable basis;
- Reducing non-revenue water;
- Increasing billed metered consumption;
- Reducing raw water treatment losses;
- Developing the ability to undertake detailed water balances; and
- Promoting of water use efficiency.

See **Appendix B1** of this report for the executive summary of the Strategy.

BCMM in 2010, committed to fund projects which seek to achieve a total saving of 4.7 million m³ over the next 2 years. The savings and costs of the committed project are presented in Table 5.

Table 5: Preliminary estimates of savings and costs of committed WC/WDM projects

Project	Targeted Saving (million m ³ /a)	Unit Reference Value (2010)	Estimated Cost		Time to Implement (years)
			Capital (R Million)	O&M (R Million/a)	
Buffalo River Weir and Pump Station Upgrade	2.48	0.14 ¹	4.0	0.02 ^{1,2}	2
Umzoniana WTP upgrade	1.69 ³	0.20 ¹	4.0 ³	0.02 ^{1,2}	1
Mdantsane: Replacement of mid-blocks and installation of meters	0.06 ³	2.61 ¹	2.0 ³	0.005 ^{1,2}	1
Duncan Village: Replacement of mid-blocks, installation of meters and new ablution blocks	0.73 ³	0.11 ¹	1.0 ³	0.003 ^{1,2}	1

Notes:-

1. Excludes cost savings due to a reduction in the losses.
2. Includes additional maintenance costs only.
3. Additional savings and costs only. Costs and savings realised in previous years are excluded.

The ASATSG are however of the opinion that savings targeted via the planned upgrades of the Buffalo River weir and pump station, as well as the Umzonyana water treatment plant are no longer possible, given the success of the measures already implemented to address these conveyance and treatment losses. These savings have therefore not been incorporated in the current reconciliation planning. The projects are however still required to address operational and future infrastructure capacity requirements.

See **Appendix B1** for a report on the WD/WDM interventions recently implemented/being implemented by BCMM.

The current level of planning and understanding/monitoring of the supply networks is such that the saving achievable through WC/WDM interventions cannot be determined with any degree of

certainty at present. The ASATSG is of the opinion that savings of between 4.0 and 7.2 million m³/a on the 2011 domestic requirement of 66.9 million m³/a can be readily achieved, with the upper saving being made up as follows:

- Upper & Middle Buffalo (conveyance losses) = 1.55 million m³/a;
- Lower Buffalo (treatment losses) = 0.81 million m³/a; and
- Lower Buffalo (conveyance losses) = 4.84 million m³/a.

The above represent a saving of between 6.0% and 10.8% on the current requirement. However, as savings in excess of 15% have been targeted in other municipal areas where WC/WDM planning and implementation is advanced (e.g. Nelson Mandela Metropolitan Municipality), the ASATSG saving figures could be considered conservative.

Given the above, it was agreed at the October 2011 ASSSC meeting that reconciliation planning must be based on achieving 100% of the 10.8% target, pending more detailed information being made available.

8.2.2 *Amatola Water*

There is limited potential to achieve savings on the infrastructure operated by Amatola Water to materially impact on reconciliation planning. The upward loss trend at the Laing Dam WTP does however warrant urgent attention. Therefore, apart from routine activities, Amatola Water should focus on matters at Laing Dam.

See **Appendix B2** for a report on initiatives AW currently has in hand, as well as the losses on Amatola Water operated infrastructure.

8.2.3 *Amathole District Municipality*

There is also only limited opportunity to achieve savings on the infrastructure owned by Amathole District Municipality (ADM) that would materially impact on reconciliation planning. The focus of ADM is therefore primarily on local WC/WDM interventions.

8.2.4 *Kubusi Irrigation Board*

There is similarly nominal opportunity to achieve significant savings on the Kubusi Irrigation Board (KIB) operations. The KIB will nevertheless continue promoting water use efficiency among its members.

Metering on KIB infrastructure is however inadequate to effectively measure losses and the Board needs to effect improvement in this regard.

9 WATER RE-USE

9.1 Background

There are 13 waste water treatment works (WWTW) within the AWSS, 7 of which currently discharge some 28.4 million m³ per annum of treated effluent to waste directly into the sea or into

rivers downstream of dams (less than 1% of the effluent discharged from these coastal WWTWs is currently being re-used). All these WWTWs are owned and operated by BCMM.

The ASSSC resolved during the 2010 review of the Strategy that BCMM:

- Develop a Water Re-use Strategy in 2011; and
- Commence studying potential water re-use schemes as from 2012, which seek to deliver an additional yield of 2.9 million m³/a per year over 5 years, starting from 2016.

9.2 Developments

BCMM are in the process of drafting/adopting a Water Re-use Strategy. The draft strategy document has been made available to the ASATSG for review and comment prior to it being submitted to BCMM Council for approval. Further details on the approval and implementation of the Strategy will be provided at future ASSSC meetings.

BCMM are also investigating treated effluent re-use opportunities, entailing in-direct potable re-use from the upgraded Reeston Regional waste water treatment works. The proposals are to upgrade the existing works in phases to a 36 Ml/day facility, with the option for recovery of effluent after pre-treatment, to the raw water supply to the Umzonyana water treatment plant. The first phase upgrade of the Reeston WWTW to 10 Ml/day is scheduled to commence before the end of 2011. Further details in this regard will be provided at subsequent ASSSC meetings.

The ASATSG has recommended to the DWA:RO and BCMM that consideration be given to exchanging a portion of the agricultural allocation from Laing Dam, intended for irrigation of macadamia nuts in the Ncera area, with treated effluent from the Mdantsane and/or Potsdam waste water treatment works.

The information on these projects is however still insufficient at this stage to incorporate into the reconciliation planning as specific projects and re-use is still only addressed in terms of yield available from the various WWTW's. More specific details of these projects will be obtained and reported on at future ASSSC meetings.

10 SURFACE WATER SUPPLIES

10.1 Background

A number of surface water augmentation schemes have already been identified and investigated at varying levels of detail in previous studies. It was however resolved by the ASSSC during the 2010 review of the Strategy, that the planning of new surface water augmentation schemes be based on achieving at least 75% of the savings targeted through WC/WDM (i.e. latest study start date of 2014), and that any supply shortfalls prior to achieving these savings needs to be met either through restrictions and/or the re-use of water.

The Department of Water Affairs: Options Analysis (DWA:OA) have therefore to date not initiated any studies to further investigate possible surface water supply options and is waiting instructions from the ASSSC to proceed in this regard.

10.2 Developments

The ASATSG has undertaken a conceptual (desktop) review of the Sandile/Binfield Park Dams supply augmentation option, identified in the Strategy Study as one of the more favourable augmentation options due to its low URV and short lead time (no need to construct a dam; it uses surplus yields from these existing dams). The findings of the review however indicated that the surplus yields available from these dams to augment supplies to the AWSS are lower than previously anticipated. The findings also indicate that the surplus yields are sensitive to the effectiveness of others in implementing WC/WDM measures in the supply areas of these dams (outside of the supply area of the AWSS), that more detail investigations are required to confirm the dam yields and that there is a need to register and monitor water use from these dams. It can however be reported that as a result of this review, the Department of Agriculture and Rural Development DoARD are reviewing the agricultural water requirements from these dams, whilst DWA have initiated processes to develop operating rules for the respective dams. The outcomes of these initiatives will be reported on at future ASSSC meetings.

It has also been resolved that a screening workshop, to shortlist options for DWA:OA to take forward for more in depth feasibility studies, be held on 5 March 2012. The outcome of the screening workshop will be reported at future ASSSC meetings.

See **Appendix C** of this report for the preliminary estimates of yields from and costs of possible surface water supply augmentation schemes.

11 STREAMFLOW ENHANCEMENT

11.1 Background

The findings of the Strategy Study indicated that the potential impact of invasive alien plant removal from the catchments of the AWSS would not be significant to materially impact on the system yield. Hence, the focus of Working for Water (DWA:WfW) in terms of this Strategy, is purely one of maintenance, i.e. not allowing the situation to worsen.

11.2 Developments

Details on recently completed and ongoing initiatives being undertaken by DWA:WfW in the catchments of the AWSS have not been made available.

12 DESALINATION OF SEAWATER

12.1 Background

Desalination of seawater was not identified as a preferred reconciliation option in the Strategy Study for the foreseeable future. It has however been accepted that the findings of studies being

undertaken by other coastal Metros will be made available to the ASATSG for review and consideration in the AWSS context, once they become available.

12.2 Developments

BCMM have indicated that they will only consider desalination investigations once the above findings have been made available.

13 WATER QUALITY

13.1 Background

The Strategy requires that the System be operated so as to maximize the yield from the system, and that water quality concerns be addressed at the source of the pollution, i.e. water quality concerns will not be addressed by dilution through system releases. Identified water quality interventions include:

- Reduction of saline effluent sources (industrial effluent discharges);
- Elimination of sewer leaks;
- Reduction of phosphate loading from point sources, e.g. enhance waste water treatment; and
- Control of diffuse pollution from informal settlements to reduce bacterial loading.

The responsibility of addressing water quality issues resides with ASSOCC, the owners and operators of WWTWs, the local authorities and DWA as regulator. Water quality is however of interest to the ASSSC to the extent to which it could impact on reconciliation planning.

13.2 Developments

The ASATSG have assisted ASSOCC members in developing a simplified mechanism to report to ASSSC on water quality matters. See **Appendix D** for a copy of the most recent water quality report, which highlights the following:

- The water quality (as defined by conductivity) in the System has improved following the recent rains;
- The effluent from the majority of the WWTWs within the System is non-compliant in respect of F-coli levels;
- Da Gama Textiles effluents continue to impact negatively on water quality; and
- Sewer blockages in Mdantsane are still of concern in terms of water quality in the lower reaches of the system and require attention.

The ASATSG have recommended that more decisive action be taken by DWA:RO in addressing non-compliant effluent discharges at the Da Gama Textiles Factory in Zwelitsha. Reports on efforts undertaken in this regard will be reported on at subsequent ASSSC meetings.

BCMM are planning to decommission the 3 smaller waste water treatment works in the King Williams Town area and to establish a regional waste water treatment works in Zwelitsha, with

enhanced capacity (35 Ml/day) and treatment processes (activated sludge with biological nutrient removal). This will address water quality concerns as a result of non-compliant discharges from the existing 3 WWTWs in the Upper and Middle Buffalo. It is envisaged that the WWTW upgrade and associated works will commence in 2012/13 and take 3 years to complete.

BCMM is currently addressing pollution from rural settlements as part of its rural sanitation backlog eradication programme, whilst the housing backlog eradication programme will address the pollution impacts from informal settlements. Further details on these programmes will be provided at subsequent ASSSC meetings.

13.3 Conclusions

Despite not requiring water releases from dams for dilution purposes at present, water quality remains a concern in the area and efforts by all responsible parties to address pollution at source needs to be significantly enhanced. The DWA, in its capacity as regulator, needs to more actively monitor the situation and act decisively where non-compliance is confirmed.

14 COMMUNICATION STRATEGY

14.1 Background

The adopted communication strategy makes provision to communicate issues related to the Strategy and progress with its implementation to the following persons/institutions, via a variety of mechanisms:

- Primary stakeholders/individuals (directly involved in water resources planning);
- Secondary stakeholders/individuals (affected by water planning); and
- General public.

The mechanism used and level of detail provided differs for each targeted group.

14.2 Developments

14.2.1 Press Releases

One press statement was released in 2010, whilst a further statement was prepared earlier in 2011 but not released. A release is however scheduled for later in 2011. See **Appendix E** for the press release issued in 2010, as well as a copy of the statement awaiting release pending stakeholder approval.

14.2.2 News Letters

Two newsletters have been circulated to date, one during 2010 and one during 2011. Two further newsletters are scheduled for release, later in 2011 and early in 2012, see **Appendix F** for the newsletters circulated to date, as well as the frameworks of the newsletters still to be circulated.

14.2.3DWA

DWA has made certain documentation available for distribution, including the 2010 and 2011 Situational Analysis on Integrated Water Resource Planning for South Africa. These reports are available on the DWA website <http://www.dwa.gov.za/documents>.

15 RECONCILIATION PLANNING

The following reconciliation scenarios have been considered to meet the high growth water requirement scenario:

- Without EWRs
 - System yield of 95 million m³/a
 - WC/WDM 100% effective
 - WC/WDM 100% effective and re-use
 - WC/WDM 0% effective and re-use
 - WC/WDM 100% effective and surface water augmentation
 - System yield of 106 million m³/a
 - No WC/WDM
 - WC/WDM 100% effective

- With EWRs (implemented over 8 years)
 - System yield at 106 million m³/a
 - WC/WDM 100% effective, re-use & surface water augmentation.

The graphs of the various reconciliation scenarios are included in **Appendix G** of this report.

The following observations can be made from the above analysis:

- If the “larger” system yield is achievable, then:
 - Reconciliation can be achieved to beyond 2041 with WC/WDM being 100% effective.
 - Additional augmentation of the system yield is required to meet the EWRs, even if WC/WDM is 100% effective.
- If only the “lower” system yield is achievable (i.e. the System is not operated as an integrated system) then:
 - Measures to augment system yield will be required by 2025 if WC/WDM is 100% effective and by 2020 if WC/WDM is not effective.

16 CONCLUSIONS

The following conclusions can be drawn from the above:

- Integrated system operation, including the transferring of water to the lower dams in the System when Wriggleswade Dam is spilling, is an imperative for short- to medium-term reconciliation.
- The effective and sustained implementation of WC/WDM interventions remains a pre-requisite for the supply reconciliation the AWSS, in that:
 - WC/WDM is the most cost effective reconciliation intervention; and

- WC/WDM projects have short implementation lead periods (i.e. provide greater reconciliation implementation flexibility).
- Planning for the implementation of the next surface water augmentation scheme, which will trigger the requirement to implement the EWRs, is based on BCMM achieving a saving of 10.8% on the current requirement. This implies a latest study start date of 2015 for the surface water supply augmentation scheme if the system yield is not optimised or later if system yield is optimised.
- The failure to effectively operate the System and/or to implement WC/WDM is likely to result in supply shortfalls in the short-to medium-term. These supply short falls will need to be met by way of water re-use and/or supply curtailment (restrictions);
- The effective operation of the System and implementation of WC/WDM could allow for the early phased implementation of the EWRs;
- Water quality remains a concern in the System in general and in the upper reaches of the System in particular; and
- The level of reporting to the ASSSC is not as yet of the required standard.

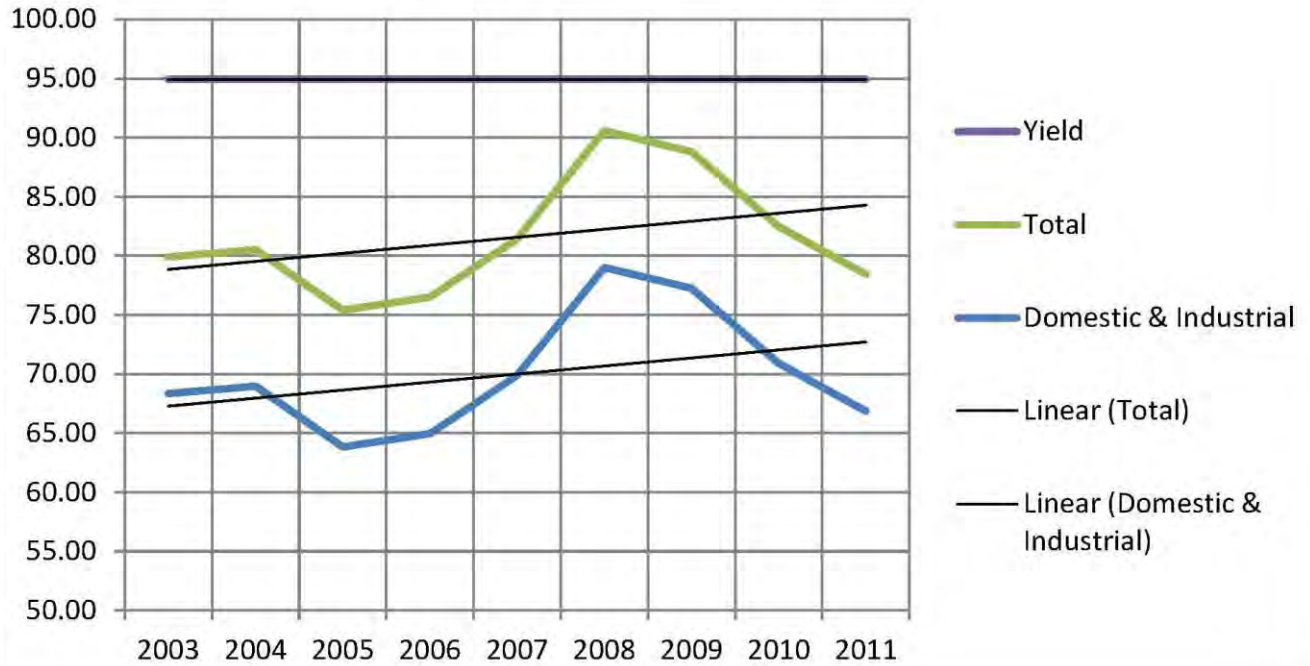
17 RECOMMENDATIONS

In light of the above, the following recommendations are made:

- ASSOCC formalise and implement the System Operating Rules that optimise system yield;
- BCMM plan and implement WC/WDM projects, which should seek to achieve a requirement savings of at least 1.2 million m³/a per year for 8 years, as from 2012;
- BCMM study potential water re-use schemes, which should seek to deliver an additional yield of 2.9 million m³/a per year over 5 years, effective from 2020 i.e. latest study start date of 2014;
- DWA, DoARD and BCMM investigate the opportunity to exchange the agriculture/irrigation allocation from the Laing Dam for the Ncera Macadamia Nuts project, in lieu of treated effluent from the Mdantsane and/or Potsdam Waste Water Treatment Works;
- BCMM be in a position to provide more comprehensive information on specific WC/WDM and Water re-use projects in time for the 2012 review of the Reconciliation Strategy;
- DWA: OA be in a position to commence planning for the next surface water augmentation scheme by at least 2015;
- DWA ensure greater levels of compliance by the licensed effluent discharges;
- BCMM and AW enhance their level of reporting on WC/WDM interventions / initiatives;
- DWA:WfW: Enhance their level of reporting to the ASSSC on their ongoing initiatives in the Amatola catchments;
- BCMM enhance their level of reporting on effort to address water quality concerns; and
- Processes to finalise/formalise the EWRs be initiated.

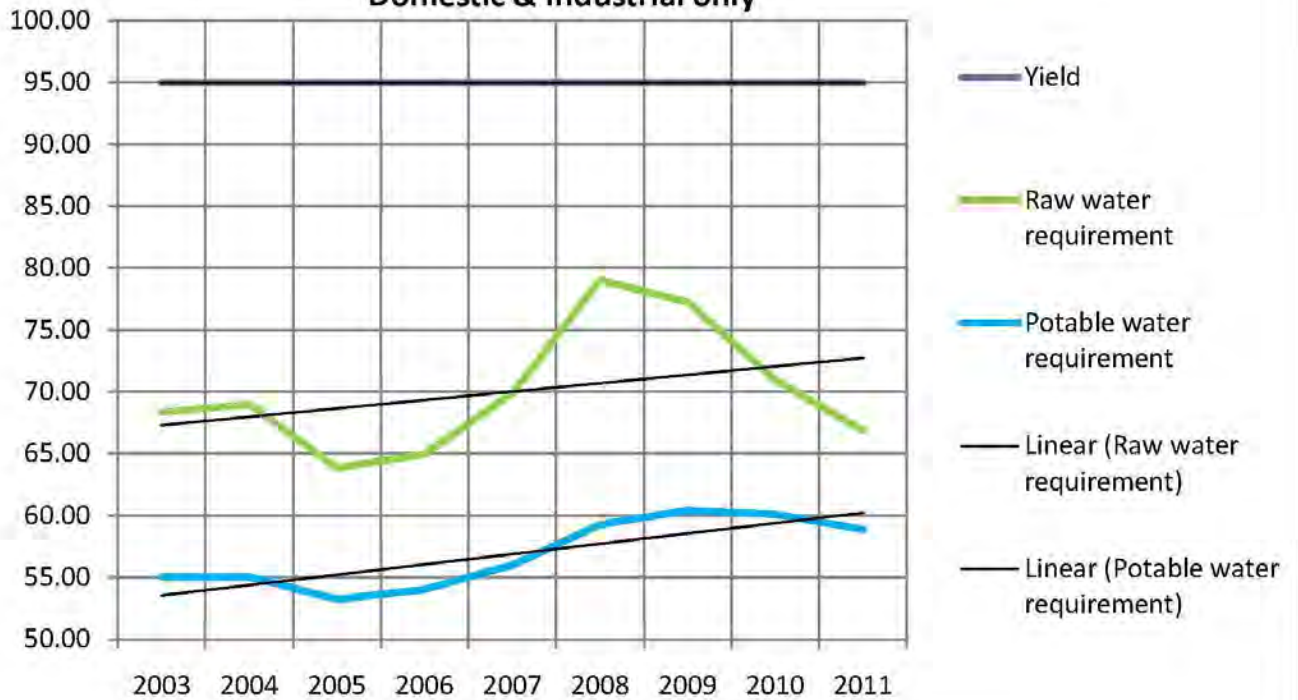
APPENDIX A
REQUIREMENT GRAPHS FOR THE KEY DAMS
AND
SUB-SYSTEMS OF THE AWSS

System Requirements Domestic, Industrial & Agriculture

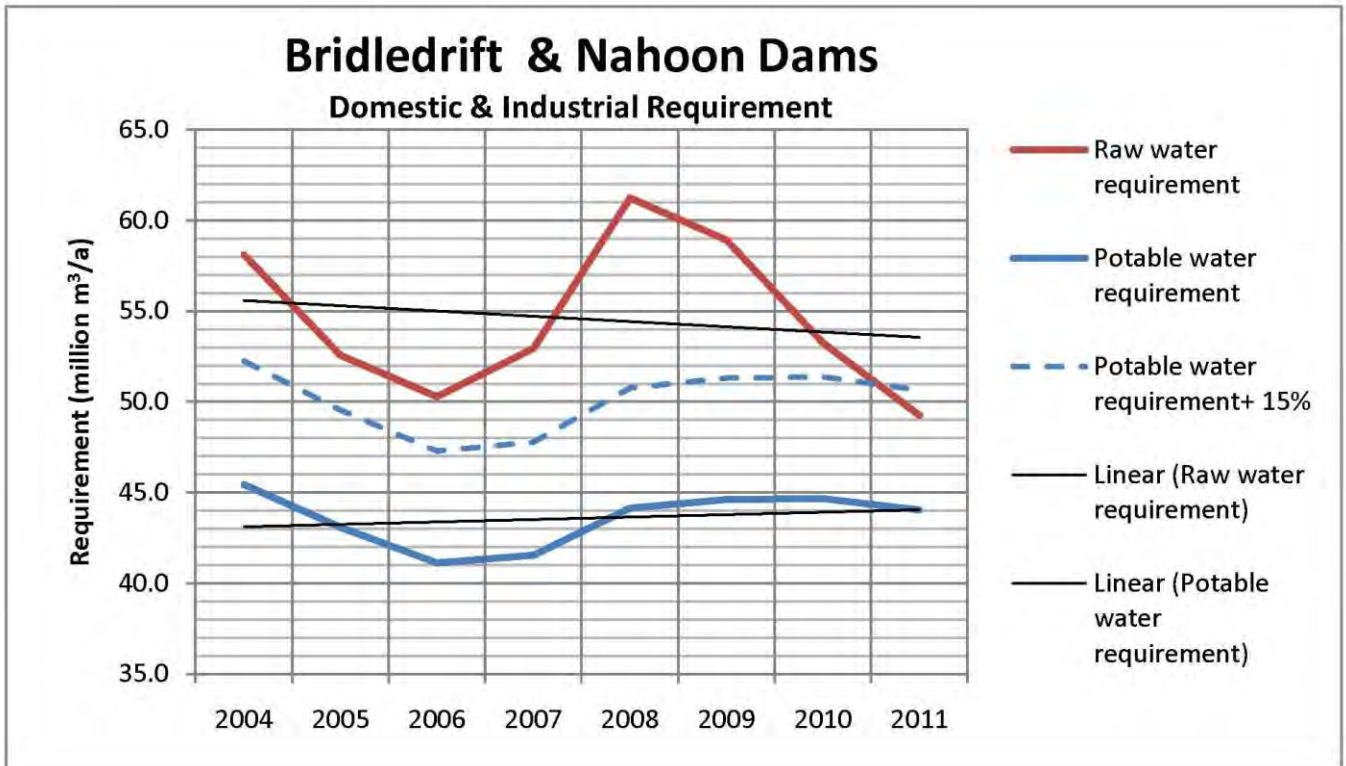


Appendix A1 (above)

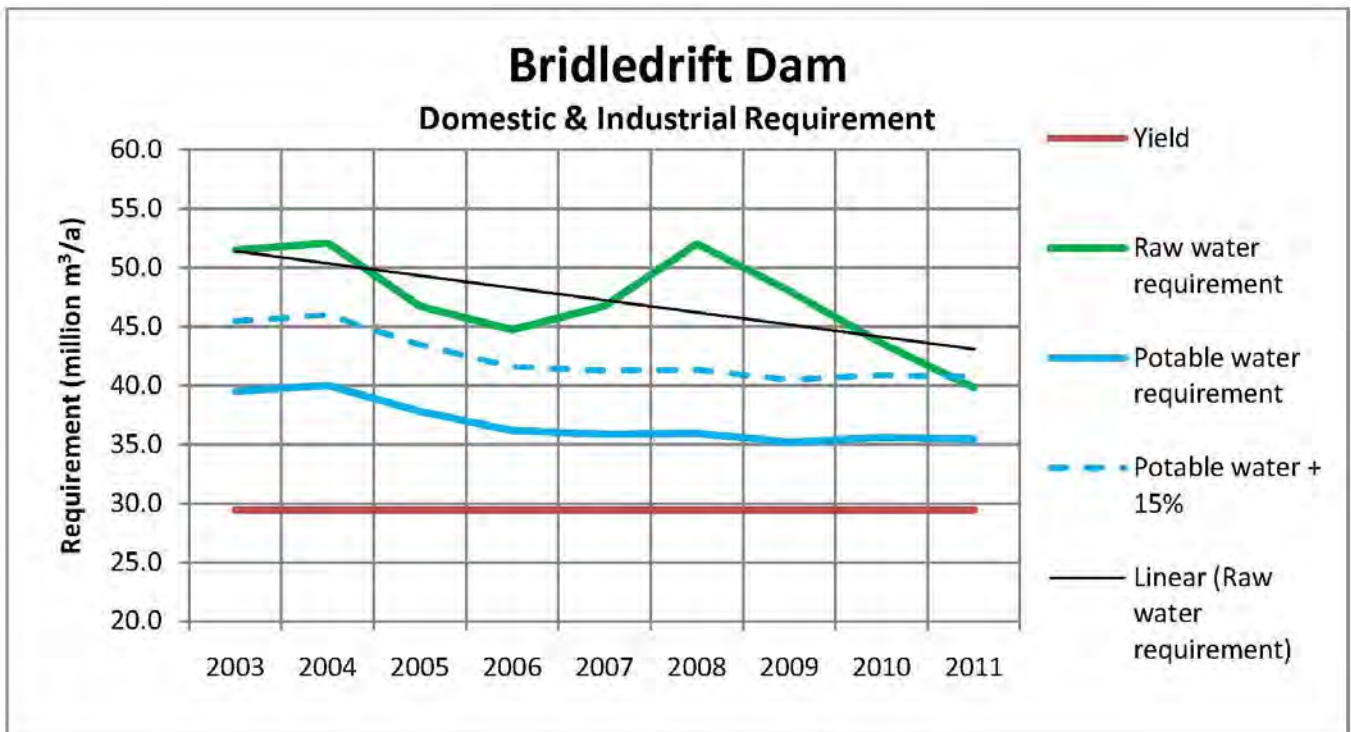
System Requirement Domestic & Industrial only



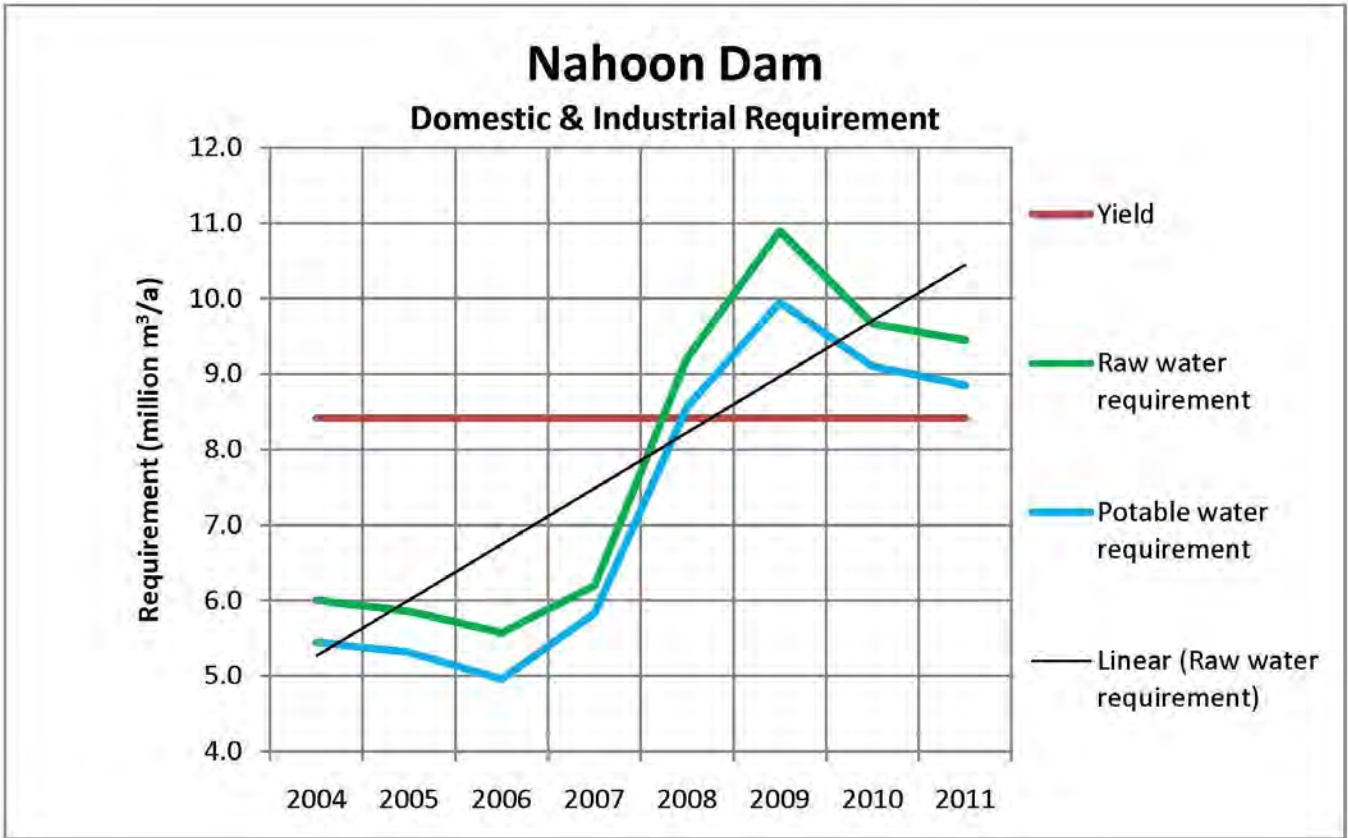
Appendix A2 (above)



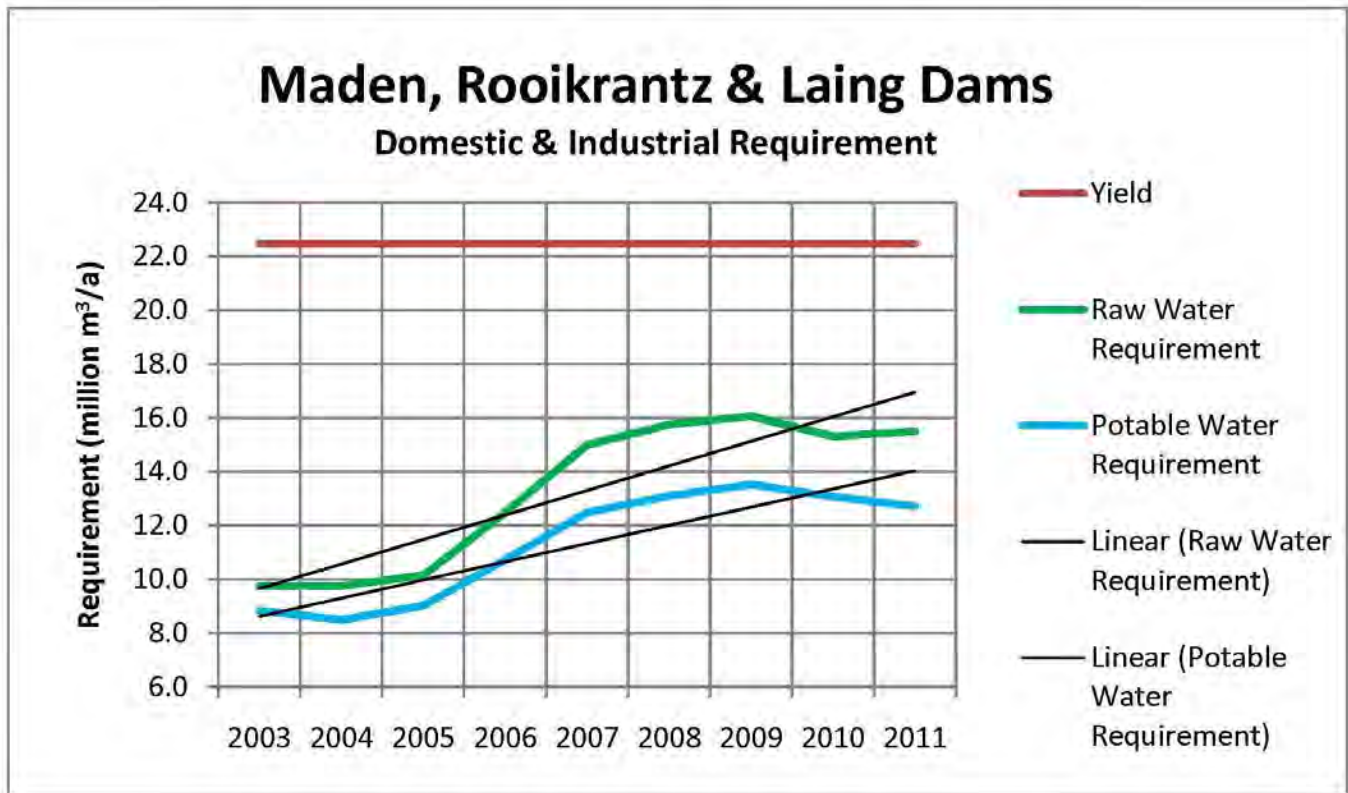
Appendix A3 (above)



Appendix A4 (above)



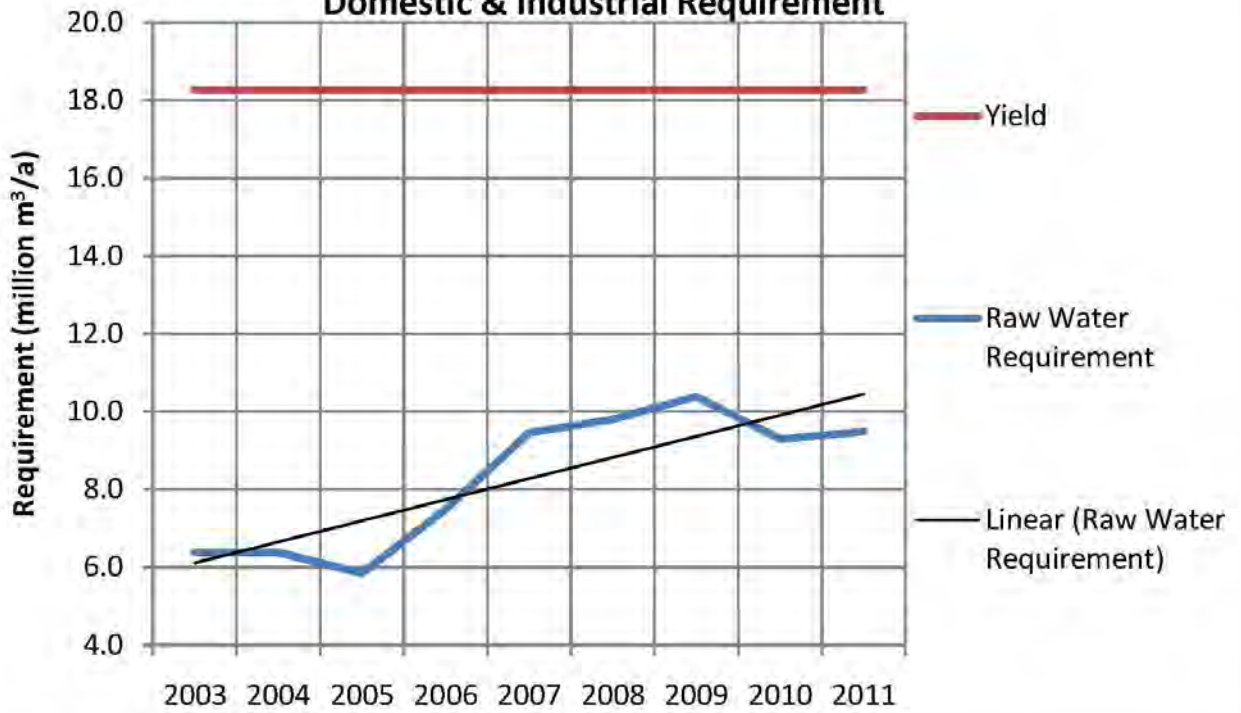
Appendix A5 (above)



Appendix A6 (above)

Laing Dam

Domestic & Industrial Requirement



Appendix A7 (above)

APPENDIX B

WC/WDM REPORTS FROM STAKEHOLDERS

B1 : Buffalo City Municipality

B2 : Amatola Water

B1: Buffalo City Municipality

EXECUTIVE SUMMARY

Overview:

Buffalo City Municipality's (BCM) non-revenue water for the 2009/2010 financial year amounted to 40% of the total volume of the potable water supplied for consumption, or an average 68Mℓ/day, the retail cost of which amounted to R129 million. Non-revenue water comprises of "unbilled unmetered" water consumption (illegal connections, fire fighting flows & watering of public open spaces), "apparent losses" (administrative and meter inaccuracies) and "real losses" (water leaks and pipe bursts).

This Water Conservation and Water Demand Management (WC/WDM) Strategy, which focuses primarily on reducing the level of non-revenue water to enhance both the financial viability of and water supply sustainability to BCM, is for the 5-year period 2012/2013 to 2017/2018 and requires some R132 million to implement over this period. The Strategy targets a raw water savings of some 1.61 million m³/a (4.4 Mℓ/day) and a potable water savings of at least 4.67 million m³/a (12.8 Mℓ/day), which equate to an direct annual cost savings of some R15 million.

This Strategy, which will be reviewed and updated annually as part of the Water Services Development Plan review process, is based on a high level review of the WC/WDM Strategy and Implementation Plan developed in 2004 (but never adopted by Council) and is aligned with the following ongoing parallel initiatives:

- Revenue Enhancement Strategy; and
- Amatole Reconciliation Strategy.

The level of metering and billing within BCM at present is such that it is not possible to readily/accurately assess the source of the non revenue water. Based on the information readily available and first order estimates, the potable water "losses" are as follows:

- | | | |
|--|---|-----------|
| • Unbilled–unmetered water consumption | : | 4 Mℓ/day |
| • Apparent losses | : | 9 Mℓ/day |
| • Real losses | : | 55 Mℓ/day |

The unbilled–unmetered water consumption and apparent losses will be addressed concurrently with the Revenue Enhancement Strategy, whilst addressing the "real losses" is the key focus of this Strategy. It is estimated that the "real losses" can be reduced by

between 12 Mℓ/day and 20 Mℓ/day, depending on the accuracy of the deemed / “flat rated” water consumption, which is considered to be significantly understated at present.

The goals set in terms of this Strategy, are the following:

1. Reduction of non-revenue water:

Reduction from the current level of 39.6% of the total volume of water supplied to:

- 32.5% within 2 years.
- 27.5% within 3 years.
- 22.5% within 5 years.

2. Increased billed metered consumption:

Increased from its current level of 49.5% of the total volume of water supplied to:

- 55% within 2 years.
- 57.5% within 3 years.
- 62.5% within 5 years.

3. Reduction of raw water treatment losses:

Reduce losses to less than 5% of the raw water input volume:

- Within 1 year at the Umzonyana Water Treatment Plant.
- Within 2 years at the King Williams Town Water Treatment Plant.

4. Ability to undertake detailed water balances:

Able to conduct detailed (bulk & reticulation) water balances:

- Per water treatment plant supply zone within 2 years.
- Per reservoir supply zone within 3 years.
- Per sub-zone within 5 years.

5. Promotion of water use efficiency

- Routine community awareness programmes within 1 year.
- Routine schools education programmes within 2 years.
- Routine Provincial Government engagement within 1 year.
- Appropriate plumbing by-laws / design standards, specifically for low income households, within 1 year.

6. Enhanced WC/WDM institutional capacity

- WC/WDM Strategy adopted within 1 year.
- Budget allocated on 3 year MTEF within 1 year.
- Political champion appointed within 1 year.
- Official champion appointed within 1 year.

- Interdepartmental task team to oversee the implementation and review of the Strategy established within 1 year.
- Reporting structures and requirements established within 1 year.
- Appropriately structured and resourced Water Services Department within 2 years.

Basis of Strategy:*Water Supply Perspective:*

The need to conserve water and to use it more efficiently is a national imperative and legal requirement. The Amatole Water Supply System Reconciliation Strategy, developed jointly by DWA, BCM and other key stakeholders to ensure that there are adequate raw water supplies to support socio-economic development, environmental sustainability and equity within the broader BCM area, has identified WC/WDM as the key intervention to ensure a reconciliation of predicted water requirements with available supplies over a 30-year planning horizon.

The committee established to oversee the implementation of the Reconciliation Strategy resolved in 2010 that BCM:

- Develop a Water Conservation and Water Demand Management Strategy in 2011;
- Implement the funded WC/WDM projects already identified by the BCM, which seek to achieve a saving (requirement reduction) of some 4.7 million m³/a (12.9Mℓ/day) over a 2 year period (2011/12-2012/13); and
- Identify further WC/WDM projects that need to be ready for implementation as from 2013/14 and which need to achieve a requirement saving of at least 1.2 million m³/a (3.3Mℓ/day) per year over an 8 year period.

The committee also resolved that planning of the next surface water augmentation scheme would be based on BCM achieving at least a 75% of the savings deemed possible through WC/WDM, and that any supply deficit prior to this date would need to be addressed via other augmentation measures (e.g. water re-use) and/or supply curtailment (restrictions).

It is to be noted that this specific strategy focuses on Water Demand Management as the Water Conservation (WC) aspects are addressed in terms of the Reconciliation Strategy. This Strategy also only focuses on WDM aspects directly related to infrastructure owned and operated by BCM, as WDM interventions on the infrastructure owned and operated by the

Amatola Water Board are also addressed in terms of the Reconciliation Strategy. Finally, it is also to be noted that this Strategy does not consider water re-use, as this is addressed in terms of a stand-alone BCM Water Re-use Strategy.

Financial Sustainability Perspective:

Outstanding water services debts in BCM are currently in the order of R 192 million, which impacts significantly on BCM's ability to ensure effective service delivery going forward. In order to address this situation, BCM have initiated a Revenue Enhancement Strategy. Apart from enhanced credit control, debt collection and indigent management, which is the focus of the Revenue Enhancement Strategy, WC/WDM will facilitate the increase of municipal revenue streams by reducing operating costs (not paying for water wasted or used inefficiently) and delaying investment in water and waste water capital infrastructure (upgrades can be delayed as a result of reduced flows/loading).

Objectives of WDM

The key objectives of Water Demand Management in the BCM context are therefore the following:

- Reduction of water wastage to increase water supply availability and to enhance the financial viability of the institution;
- Promotion of water use efficiency to increase water availability; and
- Reduction of non-revenue/unaccounted for water to enhance the financial viability of the institution.

BUFFALO CITY MUNICIPALITY
 IWA WATER BALANCE
 2009/2010 Financial Year

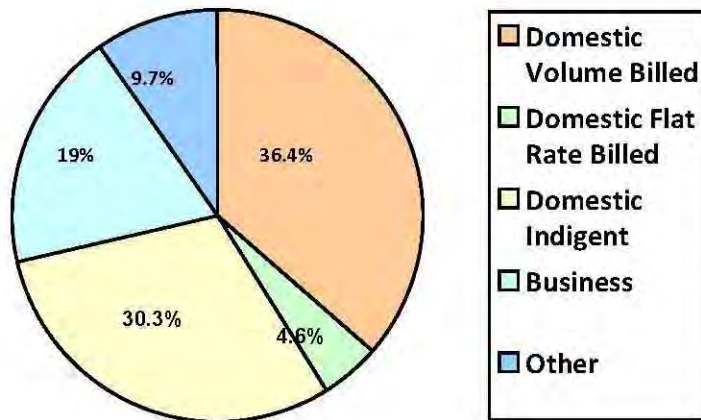
	1	2	3	4	5
System Volume Input 170.62 MI/day (106.40MI/day) [64.22 MI/day]	AUTHORISED CONSUMPTION 107.29 MI/day (62.9%)	BILLED AUTHORISED CONSUMPTION 92.72 MI/day (54.3%)	BILLED METERED 84.46 MI/day (49.5%)	FREE BASIC WATER 33.09 MI/day (19.4%)	
		Unbilled Authorised Consumption 14.58 MI/day (8.5%)	BILLED UNMETERED 8.26 MI/day (4.8%)	POTENTIAL REVENUE WATER 74.20 MI/day (43.5%)	RECOVERED REVENUE 65.08 MI/day (38.1%)
	Unbilled metered 10.35 MI/day (6.1%)		Non-Payment 4.56 MI/day		
	Water Losses 63.33 MI/day (37.1%)	Apparent Losses 8.45 MI/day (5.0%)	Unbilled unmetered 4.22 MI/day (2.5%)	Non-Revenue Water 67.55 MI/day (39.6%)	
			Unauthorised consumption unknown MI/day		
		Real Losses 54.88 MI/day (32.2%)	Consumer Meter Inaccuracies unknown MI/day		
			Leakage on mains 28.48 MI/day		
			Leakage on service conn. to meter 22.68 MI/day		

() BCMM
 [] AW

**BUFFALO CITY METROPOLITAN MUNICIPALITY
 WATER CONSERVATION AND WATER DEMAND MANAGEMENT
 REPORT OCTOBER 2011
 (DRAFT)**

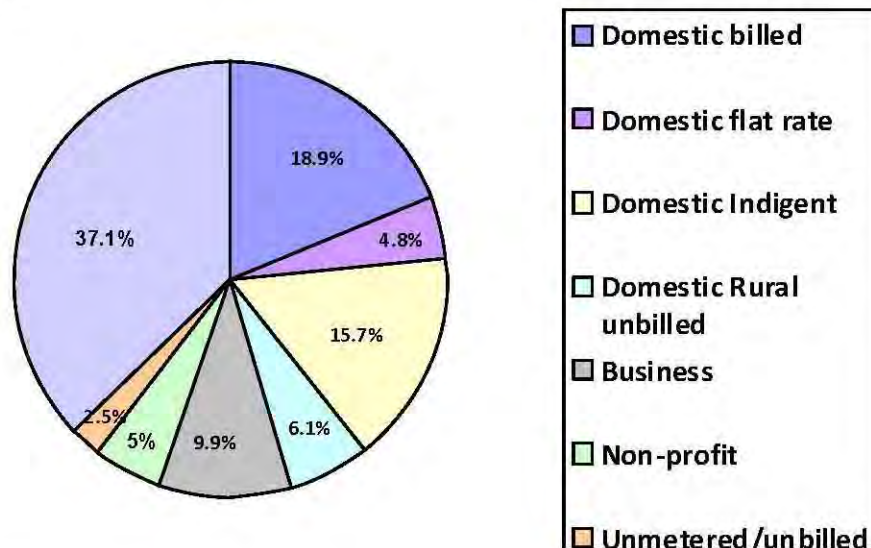
1. OVERVIEW

**1.1 Customer Profile (Billed Consumption)
 2009/2010**



2010/2011

**1.2 Water Use Profile
 2009/2010**



2010/2011

2. DEMAND PROJECTIONS

2.1 Growth trends

The maximum potable water requirement, as per the BCM Bulk Water Master Plan of 2011, which is based on BCM's current spatial planning, amounts to 274 Mℓ/day. Allowing for 15% treatment and river conveyance losses, this equates to a raw water requirement of 115.3 million m³/a.

The rate of increase in the demand is however uncertain at this stage, given the current economic climate (impacts on the rate of private sector development) and the lack of clarity regarding the social housing delivery (impacted on by infrastructure constraints).

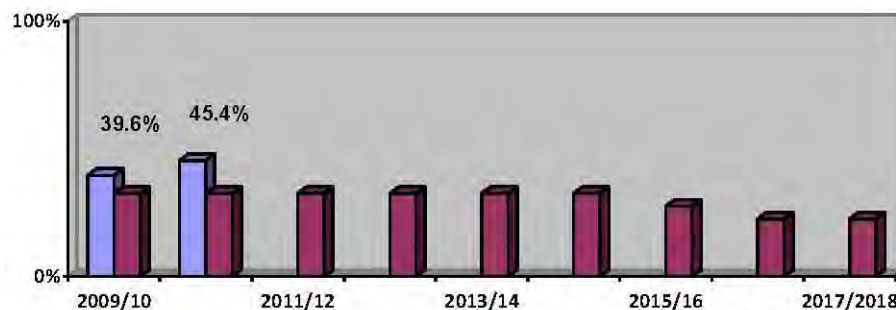
3. GOALS

3.1 Reduction in non-revenue water to:

32.5% by 2015

27.5% by 2016

22.5% by 2018

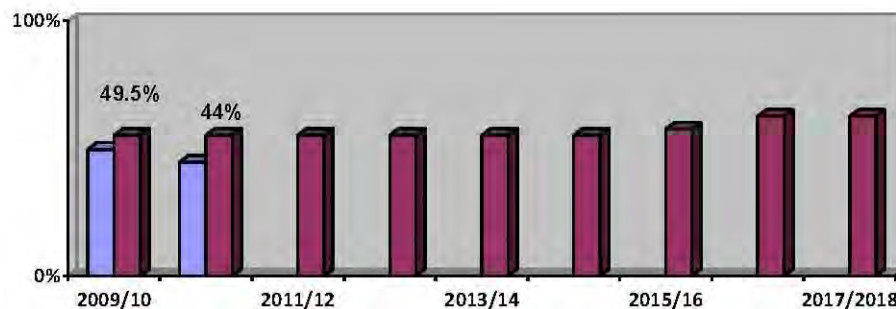


3.2 Increase in billed metered consumption

55% by 2015

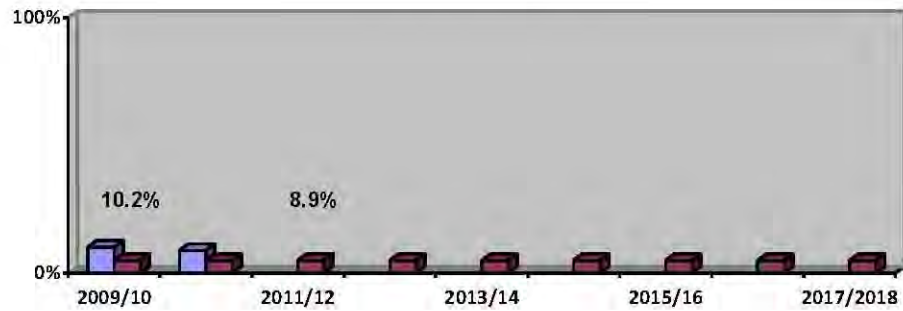
57.5% by 2016

62.5% by 2018

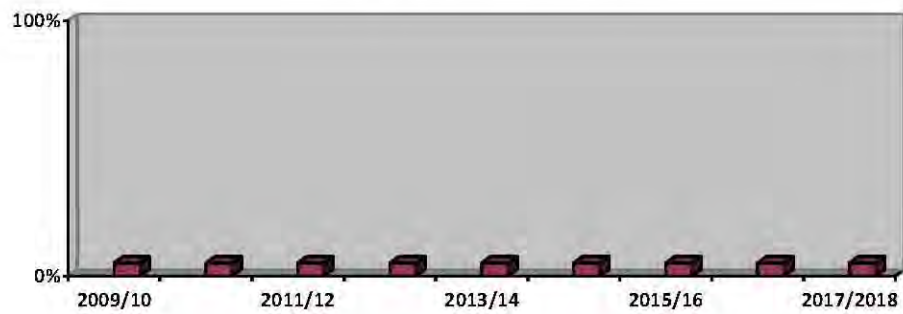


3.3 Reduced raw water treatment losses to 5% of input volume

Umzonyana WTP



King Williams Town WTP



3.4 Ability to undertake Water Balances

By WTP supply zone system (annual): by 2014

2009/2010 = No

2010/2011 = No

By Reservoir supply zone (monthly): by 2016

2009/2010 = No

2010/2011 = No

By sub-supply zone (monthly): by 2018

2009/2010 = No

2010/2011 = No

3.5 Promotion of water use efficiency

Routine community awareness: by 2013

2009/2010 = No

2010/2011 = No

Routine schools education: by 2015

2009/2010 = No

2010/2011 = No

Routine provincial government: by 2013

2009/2010 = No

2010/2011 = No

By-laws/design standard: by 2012

2009/2010 = No

2010/2011 = No

3.6 Enhanced WC/WDM institutional capacity

- *Adopted WC/WDM Strategy and Implementation Plan: by 2012*

2009/2010 = No

2010/2011 = No

- *Budgets on MTEF as per implementation Plan: by 2012*

2009/2010 = No

2010/2011 = No

- *Champions appointed: by 2012*

2009/2010 = No

2010/2011 = No

- *Management and Reporting Structures established: by 2012*

2009/2010 = No

2010/2011 = No

- *Water Services Department adequately resourced: by 2014*

2009/2010 = No

2010/2011 = No

4. WC/WDM ACTION PLAN

4.1 Actions to meet targets

4.1.1 Increased billed metered consumption

Universal Retail metering, billing, credit control and debt collection

Meter maintenance/replacement

Meter audits/align data bases

4.1.2 Reduction of non-revenue water

Mains replacement

Leakage control

4.1.3 Reduce raw water treatment losses (Umzonyana and KWT WTP)

Wash water recovery

Operational control and metering

4.1.4 Able to undertake water balances

Bulk metering

Sectorisation

Zone metering

Systems for data collection, collation and conversion to data

4.1.5 Promotion of water use efficiency

Community awareness

Schools education

Leaks beyond the meter

Schools

Government buildings

Low income households

Appropriate plumbing for low income household

Design and construction approval protocols

Consumption audits

Enhance WC/WDM institutional capacity

4.2 Risks

Allocation of appropriate budgets

4.3 Contingency Plans

Nil

5. PROGRESS ON ACTION PLAN

5.1 Current interventions

5.1.1 Increased billed metered consumption

5.1.2 Reduction of non-revenue water

5.1.3 Reduce raw water treatment losses (Umzonyana and KWT WTP)

5.1.4 Able to undertake water balances

5.1.5 Promotion of water use efficiency

5.2 Results

5.3 Cost benefits

5.4 Budgets

5.4.1 Budget allocations

5.4.2 Budget expenditure

6. LESSONS LEARNT

7. WAY FORWARD

7.1 0-1 years

7.2 1-3 years

8. CONCLUSIONS

8.1 Meeting targets

8.2 If not, what actions are being taken

B2: Amatola Water

Appendix B2

Amatola Water System

Amatole Water Supply System - Scheme Losses (2009/2010)

Scheme	Treatment Losses		Distribution Losses		Total Losses million m ³ /a
	million m ³ /a	%	million m ³ /a	%	
Laing	0.75	8.1	-0.76	-9.0	-0.02
Nahoon	0.46	4.7	0.46	5.0	0.92
Rooikrantz	0.06	10.4	0.06	11.5	0.11
Total	1.26		-0.24		1.02
Sandile	0.13	1.6	0.11	1.4	0.23

Amatole Water Supply System - Scheme Losses (2010/2011)

Scheme	Treatment Losses		Distribution Losses		Total Losses million m ³ /a
	million m ³ /a	%	million m ³ /a	%	
Laing	1.37	14.3	-0.05	-0.6	1.32
Nahoon	0.32	3.4	0.46	5.1	0.78
Rooikrantz	Taken out of operation				
Total	1.69		0.41		2.11
Sandile	0.32	4.3	0.93	13.0	1.25
Binfield	0.21	12.4	0.37	25.2	0.58
Total	0.53		1.30		1.83

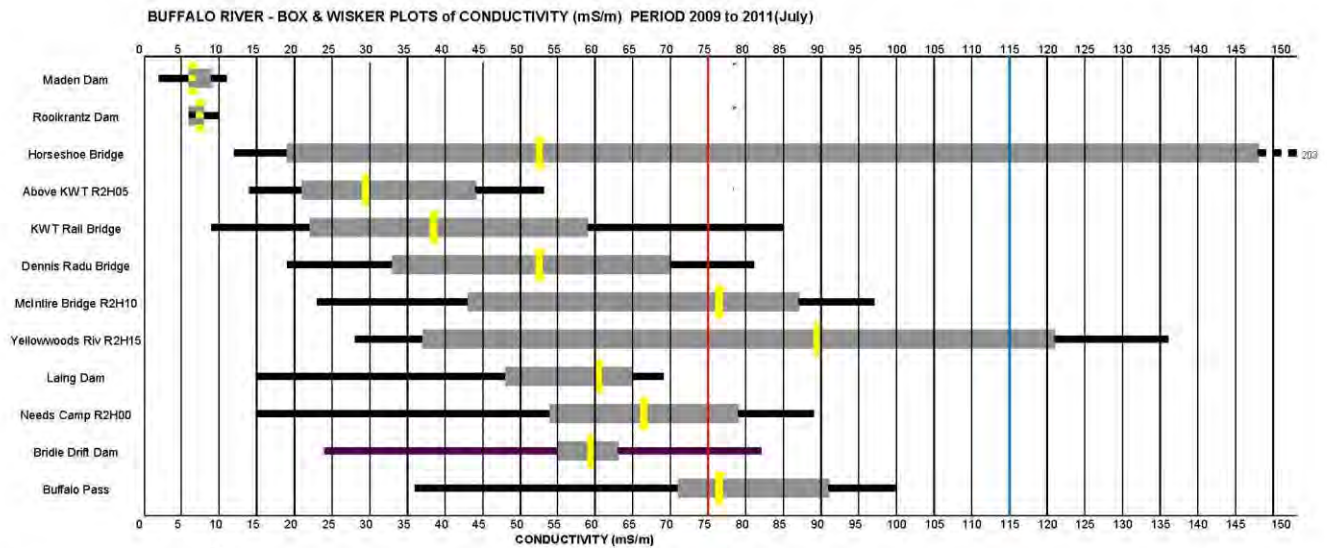
APPENDIX C
PRELIMINARY YIELDS AND COSTS OF
POSSIBLE SURFACE WATER SUPPLY SCHEMES
AS WELL AS RE-USE SCHEMES

Appendix C

Potential Augmentation Option	River	Available Yield *	Unit Reference Value – 2006	Estimated Cost 2006		Timeline Years
		(million m3/a)	(R/m3)	Capital	O&M	
				(R million)	(R million/a)	
Lower Buffalo Reclamation Scheme – Stage 1	N/A	23.4	2.9	355	30.8	13
East Bank Re-use Scheme	N/A	10	1.8	100	5.4	6
Stone Island	Nahoon	5.3	2.8	132	2.5	5
Sandile/Binfield Park	Keiskamma	8.7	3.4	220	8	4
Groothoek/ Waterfall	Gqunube	12.1	3.5	343	8.6	7
Mhalla's Kop	Gqunube	7.9	3.6	235	8.7	7
Wesselshoek	Kwelera	10.9	3.8	343	7.7	7
Matola	Kubusi	15.8	4	490	17.5	10
Ravenswood	Keiskamma	21.3	4.1	607	26.6	10
Thornwood	Keiskamma	29.5	4.4	897	23.9	10
nGutu	Great Kei	55	6.1	1804	74.1	15
Junction (Tyume)	Keiskamma	9	6.3	495	11.6	10
Blackpool (Clachlan)	Thorn	3.4	6.5	210	4.4	10
Fairways	Buffalo	1.1	6.7	75	1	10
North Slope	Toise	2.1	6.8	142	1.6	10
Allandale	Thomas	1.7	8.8	148	1.6	10

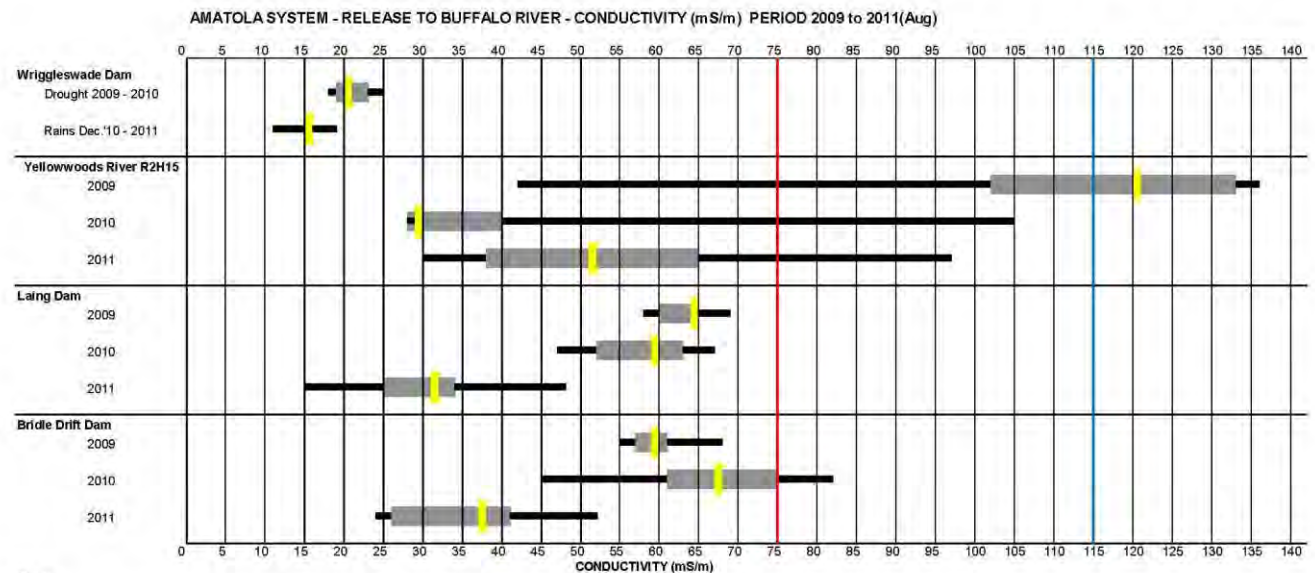
APPENDIX D
WATER QUALITY REPORT

Appendix D



Comments

1. This graph showing box and whisker plots (Minimum, 25%tile, Median, 75%tile & Maximum) is drawn from monthly data over three calendar years.
2. Maden Dam & Rookkrantz Dams are in upper Buffalo Catchment with mostly Forestry activities upstream of the dams.
3. Horseshoe bend Bridge shows poor quality from local catchment impacts - agricultural, community & geological (marine origins). No releases are made from Rookkrantz dam for the Ecological Reserve or downstream users.
4. R2H05 Weir immediately above KWT shows improved quality due to inflow from un-regulated tributaries.
5. KWT Rail Bridge is mid-way through KWT. It shows deterioration of 9mS/m due to Urban pollution and shows quite wide variability showing periodic events.
6. Dennis Radu Bridge shows further deterioration of 15 mS/m. Site is down stream of KWT and Shorrville WWTW. Less variability shows impact of sewer works.
7. Weir R2H10, near McIntire Bridge shows further deterioration of 25 mS/m. Site is down stream of Zwellitsha, Zwellitsha WWTW and DaGama Factory (irrigation of textile effluent)
8. Yellowwoods River Tributary info, measured at weir R2H15. Pollution sources include urban pollution from Bisho, Breidbach, Ilitha and others. Pollution from Bisho & Breidbach sewage works. Very Variable as also receives excellent quality water from Wriggleswade when transfers are effected.
9. Laing Dam in the mid-reaches, receives pollution from urban & industrial activities. Has a partial closed loop as supplies water to the Urban communities and receives the sewage return flows upstream of the abstraction. No releases are made for the ecological reserve.
10. Needs Camp weir. Shows deterioration of 6 mS/m due to impacts from human settlements at Pottsdam and Industrial activities at Fort Jackson area.
11. Bridle Drift Dam is similar to Laing Dam. Receives urban runoff from Mdantsane and Needs Camp. No releases are made for the ecological reserve or the estuarine reserve.
12. Buffalo Pass Bridge. Shows further water quality deterioration. Receives urban runoff from communities of Reeston and treated sewage effluent from Pottsdam, Mdantsane and Reeston WWTWs.



Notes

Eastern Cape experienced 3 to 4 year drought. Drought broken with good rains & runoff since December 2010 - January 2011
 Water was released from Wriggleswade to the Buffalo River via Yellowwoods River at 1.3 CuSecs from May/June 2010 to Dec 2010
 Improvement in Catchment Management 2010 / 2011 - BCM improved conditions at WWTW due to Green Drop initiatives (including irrigation of Bisho WWTW effluent).

Comments

1. Yellowwoods river 2009 shows poorer water quality due to impact of drought and pollution (Diffuse pollution from Bisho, Breidbach & Human settlements, agricultural activities and Point source pollution from Bisho WWTW (OD Ponds & irrigation) and Breidbach WWTW (OD ponds & irrigation).
2. Yellowwoods river 2010 shows great improvement from the good quality water from Wriggleswade, but still some months of poor water (Januart to April May). 2011 shows return to more normal quality as transfer is stopped but following good rains.
3. Laing Dam 2009 shows poorer water as a result of drought and catchment impacts, no overflow to Buffalo River. 2010 shows some limited improvement from transfer of good quality of water from Wriggleswade Dam, Laing Dam started to overflow to feed Bridle Drift Dam with the released water.
4. Laing Dam 2011 shows much improved quality due to inflow and parshal flushing due to high inflows following good rains.
5. Bridle Drift 2009 shows poorer water as a result of drought and catchment impacts. 2010 shows further deterioration, as dam level was extremely low and initial transferred water from Laing Dam was poor due to poor water from Laing Dam.
6. Bridle Drift 2011 shows much improved quality due to inflow and parshal flushing due to high inflows following good rains.

Water Quality reporting : Amathole System
 Compliance with existing permits and exemptions

	Start	End	Quarter
Period	Jan-11	Mar-11	Q1

Compliance level

	Discharge point	Catchment	Conductivity	Ammonia	COD	TSS	F. coli	Flow m ³ /d
1	King Williams Town	Buffalo	Green	Green	Green		Red	6591
2	R2H016 Weir	Buffalo	Red	Green	Red			
3	Zwelitsha	Buffalo	Green	Green	Green	Green	Red	8812
4	Bisho	Buffalo	Green	Green	Red	Red	Red	2076
5	Breidbacht	Buffalo	Green	Red	Red	Red	Red	1562
6	Potsdam	Buffalo	Green	Green	Green	Green	Red	4625
7	Mdantsane	Buffalo	Green	Green	Green	Green	Red	12307
8	Reeston	Buffalo						891
9	Berlin	Nahoon	Green	Green	Green	Green	Red	671
10	Border Combing	Nahoon						
11	Nahoon Dam	Nahoon	Green	Green	Green	Green	Red	14
12	Stutterheim	Cumakala	Green	Green	Green	Green	Green	

ISSUES

PREVIOUS QUARTER	
THIS QUARTER	Feacal Coliforms at WWTW in the middle Buffalo & high conductivity at R02H16 weir.

INTERVENTIONS

PREVIOUS QUARTER	
THIS QUARTER	Buffalo City notified of the results. And were to take action.

EXPLANATIONS

PREVIOUS QUARTER	
THIS QUARTER	Buffalo City reported that chlorination system at Zwelitsha WWTW got stolen; Bisho ponds an irrigation system got installed ; Breidbacht ponds an irrigation system got installed however it is not operating fully and there is discharge back into Yellowwoods river. And R2H016 weir the run-off is as result of saline effluent disposal at Jan Tshatshu lands. This is getting high attention and the industry. Da Gama is phasing out irrigation by installing an ETP which is currently treating 500 cub.m per day of effluent and re-using it back in the factory.

Water Quality reporting : Amathole System
Compliance with existing permits and exemptions

		Start	End	Quarter				
Period		Apr-11	Jun-11	Q2				
Compliance level								
	WWTW Discharge point	Catchment	Conductivity	Ammonia	COD	TSS	F.colli	Flow m ³ /d
1	King Williams Town	Buffalo	Green	Green	Green	Green	Red	7231
2	R2H016 Weir	Buffalo	Red	Green	Red		Red	
3	Zwelitsha	Buffalo	Green	Green	Green	Green	Green	8078
4	Bisho	Buffalo						2076
5	Breidbacht	Buffalo	Red	Red	Green	Red	Green	1347
6	Potsdam	Buffalo	Green	Green	Green	Green	Red	5456
7	Mdantsane	Buffalo	Green	Green	Green	Green	Red	11842
8	Reeston	Buffalo	Green	Green	Green	Green	Green	536
9	Berlin	Nahoon	Green	Green	Green	Green	Red	826
10	Border Combing	Nahoon						
11	Nahoon Dam	Nahoon	Green	Red	Green	Red	Red	14
12	Stutterheim	Cumakala	Green	Green	Green	Green	Green	

ISSUES

PREVIOUS QUARTER	Feacal Coliforms at WWTW in the middle Buffalo & high conductivity at R02H16 weir.
THIS QUARTER	Breidbacht Ponds effluent quality.& Reeston low flows

INTERVENTIONS

PREVIOUS QUARTER	Buffalo City notified of the results. And were to take action.
THIS QUARTER	Buffalo City were notified and their explanation is the long term solution their busy with is the Middle Buffalo Regional WWTW to link all sewage in the Middle Buffalo. Currently at Breidbacht Ponds the irrigation system is sized at 1000 cub.m per day. And the balance of 500 cub.m per day gets discharged into Yellowwoods river and its a non-compliance issue. In regard to low volumes at Reeston WWTW, Buffalo City confirmed that the problems in the area is the sewer lines as they vary from 160 - 200 mm diameter and hence sewer blockages. And the Municipality is working around this problem.

EXPLANATIONS

PREVIOUS QUARTER	Buffalo City reported that chlorination system at Zwelitsha WWTW got stolen; Bisho ponds an
THIS QUARTER	Long term solution is the Regional Works for Middle Buffalo of which is currently being installed i.e Phase No.1 - link 2000 cub.m per day to Zwelitsha WWTW and get ROD and Water Affairs approval done; Then Breidbacht & Bisho Ponds will be linked in Phase 2.

APPENDIX E
PRESS RELEASES



DEPARTMENT OF WATER AFFAIRS

Press Release

Draft (1) October 2011

ENSURING LONG TERM WATER SUSTAINABILITY IN THE AMATOLE WATER SUPPLY REGION:

PLANNED SAVING OF 15% OF THE WATER USE THROUGH WATER CONSERVATION AND DEMAND MANAGEMENT IN THE AMATOLE WATER SUPPLY REGION

The Department of Water Affairs, Buffalo City Metropolitan Municipality, Amatola Water and the other strategic partners have been hard at work addressing the medium to long-term needs of water sustainability for the Amatole System Supply Area. Despite the good winter rains, planning initiatives and projects to ensure water sustainability remain essential.

The Amatole Water Supply System Reconciliation Strategy, completed in 2008, sets out how the various relevant water authorities are to achieve the sustainability of the water supply in the region. The Reconciliation Strategy has prioritized the interventions as follows:

1. Operation of the AWSS as an integrated system to maximize system yield;
2. Water conservation and water demand management (WC/WDM);
3. The re-use of water;
4. Stream flow enhancement through the removal of invasive alien plants in river catchments;
5. The development of new surface water supplies; and
6. Desalination of sea water.

It is also required in terms of the Strategy that water quality concerns be addressed at source

In 2010 the Strategy Steering Committee resolved that the primary focus for water sustainability in the short- to medium-term must be on Water Conservation and Water Demand Management (WC/WDM), due to the short lead periods and cost effectiveness of these projects.

The Strategy Steering Committee further resolved that the planning of any new surface water supply schemes would only be based on the achievement of at least 75% of the targeted WC/WDM savings.

Water Conservation and Water Demand Management is essentially about the relevant Water Services Authorities taking steps to eradicate water wastage and ensuring that all consumers use water wisely and efficiently. This involves fixing leaks, replacing old infrastructure where it is prone to breakage and leaking, educating consumers to use water more efficiently and metering, monitoring and managing water use to ensure water used is paid for and particularly excessive use by consumers is addressed. Free basic water supplied to indigent water users must also be monitored in order to prevent wastage and use above assigned limits.

Recent assessments carried out by the Department and the relevant Water Service Authorities have determined that up to 15% of the current water use can be saved through implementing effective Water Conservation and Water Demand Management measures. In Buffalo City Metropolitan Municipality it is estimated that savings of between 4.0 and 7.2 million m³/annum of water on the 2011 domestic water requirement of 66.9 million m³ per annum, can be readily achieved.

In this regard the Amatole Water Supply Scheme Reconciliation Strategy Steering Committee is particularly pleased to note that both Buffalo City Metropolitan Municipality and the Amathole District Municipality are in the process of developing WC/WDM Strategy Plans and that both municipalities have already launched a number of WC/WDM projects.

In Buffalo City, where the most significant savings can be made, these projects include the upgrade of the Umzomyana Water Treatment Works; the installation of water meters in Mdantsane and Duncan Village, and the upgrading of the reticulation system through the replacement of old mid-block mains in Mdantsane and Duncan Village. However it is clear that an ongoing commitment to WC/WDM initiatives is required.

Achieving the water savings targets will mean considerable direct financial savings, particularly to the Buffalo City Metropolitan Municipality and its consumers. Furthermore, effective Water Conservation and Water Demand Management programmes will delay the need for capital investment in water and waste water infrastructure, implying that these programmes are substantially cheaper to the Water Services Authorities than the cost of implementing other supply augmentation options, and particularly cheaper than the cost of building a new surface water scheme. Without effective WC/WDM a new water supply scheme could be required as early as 2020, but with effective WC/WDM it is estimated that the Amatole Water Supply area would have a sustainable water supply with its current supply resources for at least a further 5 years.

The Strategy Steering Committee would like to remind all consumers that, despite the recent rains, an assured water supply cannot simply be taken for granted.

If any stakeholder or member of the public would like further information or a copy of the latest information Newsletter of the *Amatole Water Supply System Reconciliation Strategy*, please provide your request (indicating reference: AWSS Reconciliation Strategy) and contact details to the Communication's Manager, Mr Mandilike Zenzile, Department of Water Affairs, at zenzilem@dwa.gov.za or telephonically on 043-6045400.

APPENDIX F
NEWS LETTERS

Appendix F

Framework for Newsletter Number 2/2011

In the Administrative and Technical Support Group meeting held in July 2011 it was agreed that two further newsletters would be drafted for release in late 2011. The focus of these newsletters was to be on:

- a) Water Conservation and Demand Management: With a specific focus on the key objectives and activities of the anticipated BCMM WC/WDM Strategy, as well as on recent projects/successes in WC/WDM from BCMM and ADM initiatives.
- b) Water Re-use: With a focus on the potential gains through water re-use, and planning initiatives through the National Water Re-Use Strategy and the BCMM Water Re-Use Strategy.

Much of the contents of the newsletters would have been around the BCMM Strategy documents as well as on projects initiated. Unfortunately the finalization of the two Strategies has been delayed, and it is unlikely that the Council will get to approve the Strategies until the end of the year. This has required a re-think on the focus of the next newsletter. It is therefore now proposed to focus a 2nd and final newsletter in 2011 on progress in activities around WC/WDM, and address the issue of the formal Strategies in early 2012 once the strategies are formally approved.

The main focus of the newsletter will be to show progress being made in terms of water savings in general, including:

- Water requirement savings achieved to date;
- Development of a WC/WDM Strategy; and
- Development of a Water Re-Use Strategy.

Much of the information will be used from the Status Report.

The outline and bullet points below set out the approach, but is not to be taken as the exact order of issues or wording. Additional information will be added from BCMM and AW reports to the SSC, and at least one success story case should be 'box' highlighted with pictures added. The points below of course exclude 'presentation' and 'readability' issues.

Comments and suggestions appreciated!

Newsletter Contents (2/2011)

Progress on Achieving Water Sustainability in the Amatole Water Supply Area

The Work of the Strategy Committee

- The Strategy to ensure water sustainability in the Amatole area was completed and adopted in 2008.
- Since then the Strategy Steering Committee (comprising ...) has been driving the process of ensuring sustainability. Meets twice a year, supported by tech team.
- The work of the SSC is guided by the objectives and prioritized options of the Strategy (list).
- The planning must not only deal with savings on current use, but envisaged increases in use.
- While water use is currently not growing rapidly, BCMM have experienced periods of rapid growth e.g. 2004-2009.
- Important to note that the current system will have to shortly supply coastal settlements along the western side of East London (West Bank, Kidds Beach, Kaysers Beach), and supplying water to the Great Kei area is also under consideration by relevant authorities.
- Conclusions: that while water supply is good at present due to the recent good rains, we need to continue saving water, as the demand for water supply grows, the likelihood of having to implement water restrictions increases. However activities highlighted in this newsletter indicate the initiatives undertaken to date and successes being achieved in the effort to ensure water sustainability.

Water Conservation/Water Demand Management

- In 2010 the SSC resolved that planning for a new surface water supply scheme must be preceded by the achievement of significant water savings through WC/WDM. It was agreed that at least 75% of the savings target must be achieved first. In response BCMM and AW have initiated WC/WDM planning and projects.
- Reminder of what WC/WDM involves.
- BCM is busy completing and adopting its WC/WDM strategy. It is anticipated that a savings target of some 6.2 million cubic meters per annum can be achieved, but will cost up to R131 million over a 5 year period.
- In the past financial year BCM has initiated a number of WC/WDM projects which could result in savings of up to 4.7 million cubic meters [insert table of projects].
- AW has also initiated a number of local projects [insert examples]

Water Re-Use

- Large scale potential to increase the supply of water through re-use. For example some 28.4 million cubic meters of treated effluent currently being discharged into the sea or into river downstream of dams. Less than 1% of effluent is being re-used. Most of this water being used is used by golf courses and agriculture for irrigation.
- Highlight the National Water Re-Use Strategy.
- In 2010 the SSC resolved that planning for water re-use should commence immediately, and an initial target of achieving a usable yield of water through re-use treatment of some 2.9 million cubic meters per annum should be achieved.
- BCMM have drafted a Water Re-Use Strategy which is in the process of being finalized and adopted.
- As part of their initiatives BCMM is investigating water re-use potential from the Reeston Regional Water Water Treatment Works.

Water Quality

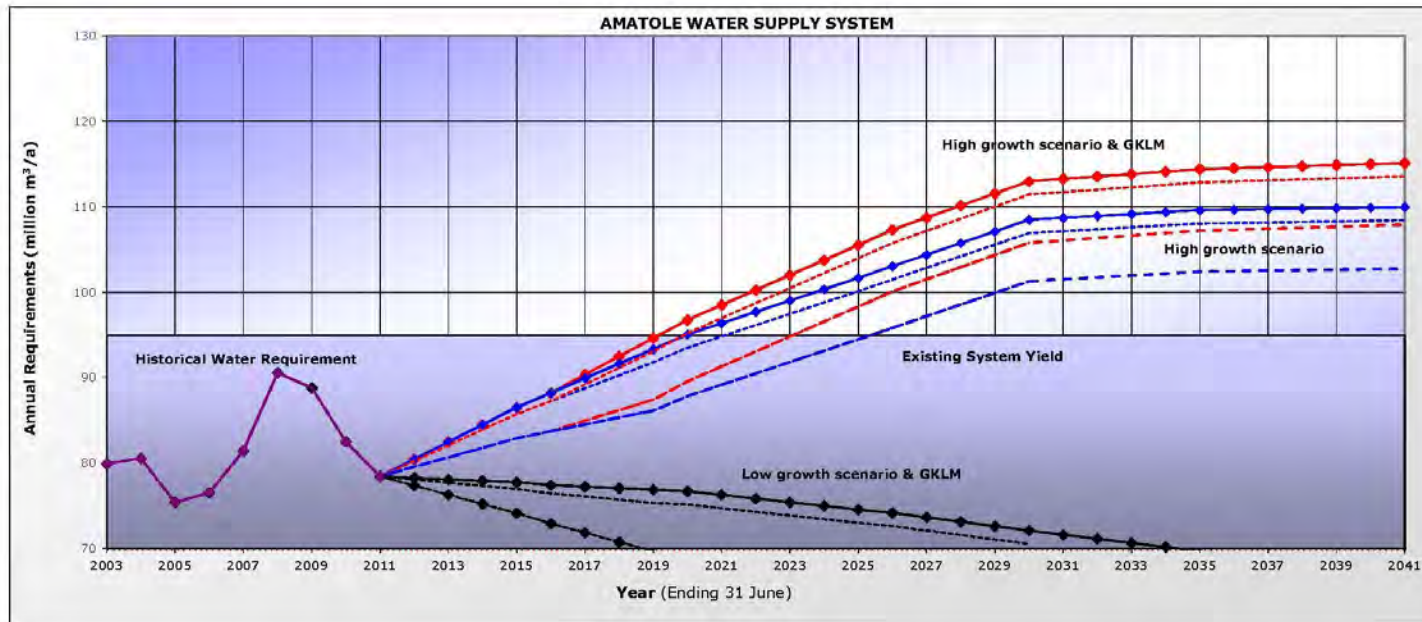
- While water quality is not directly about the amount of water in the supply system, water quality does affect operating costs and potentially even the amount of usable water. Poor water quality in rivers may require releases from dams to 'flush' the rivers clean, resulting in wastage of available water.
 - The key is to address water pollution as source (i.e. the cause of the pollution) as opposed to having to treat the pollution.
 - The SSC is working with the relevant authorities tasked with monitoring water quality to improve monitoring and information availability.
 - BCMM is currently tackling problems at its Waste Water Treatment Works where the Works have been identified as 'non-compliant' in terms of water quality. Old plants are to be decommissioned and a new regional Treatment Works constructed at Zwelitsha.
 - Progress in the sanitation and housing backlog programmes remain essential to the elimination of pollution, not only for the environment, but also for our drinking water.
-

APPENDIX G
RECONCILIATION SCENARIO GRAPHS

APPENDIX G1

NO EWR, "LOWER" SYSTEM YIELD, WC/WDM 100% EFFECTIVE

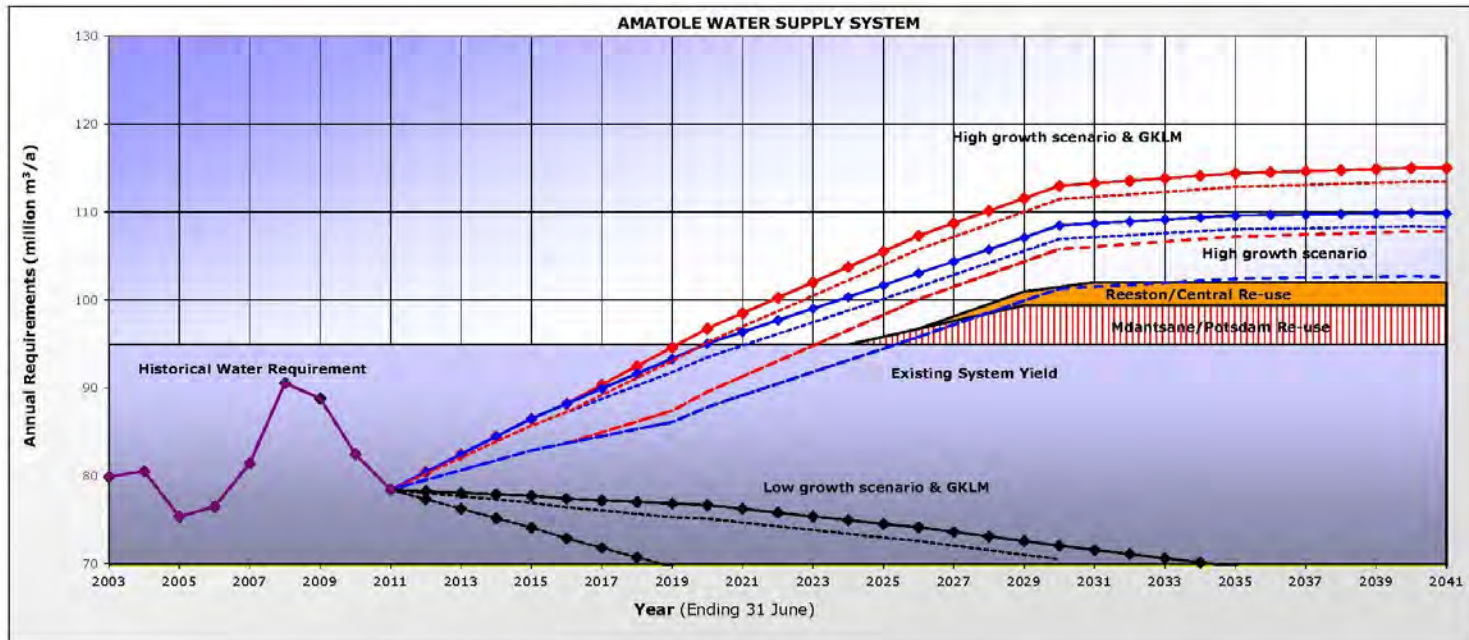
Appendix G1



APPENDIX G2

NO EWR, "LOWER" SYSTEM YIELD,
WC/WDM 100% EFFECTIVE, RE-USE

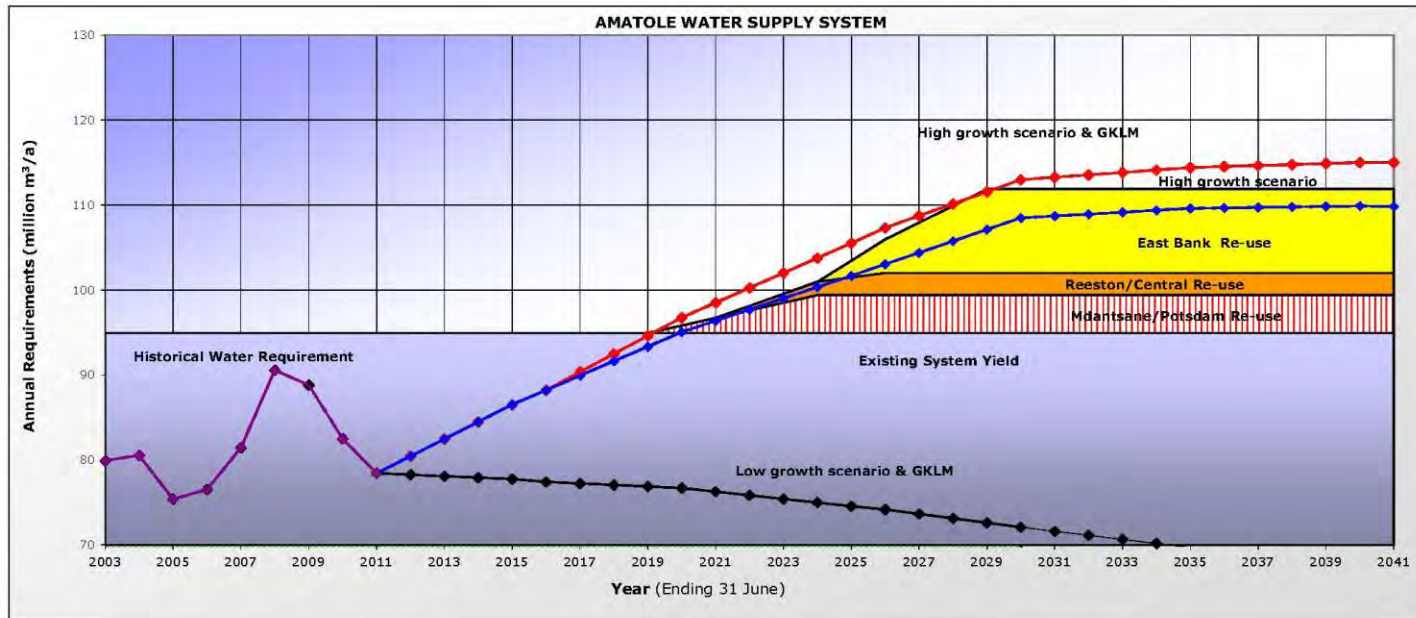
Appendix G2



APPENDIX G3

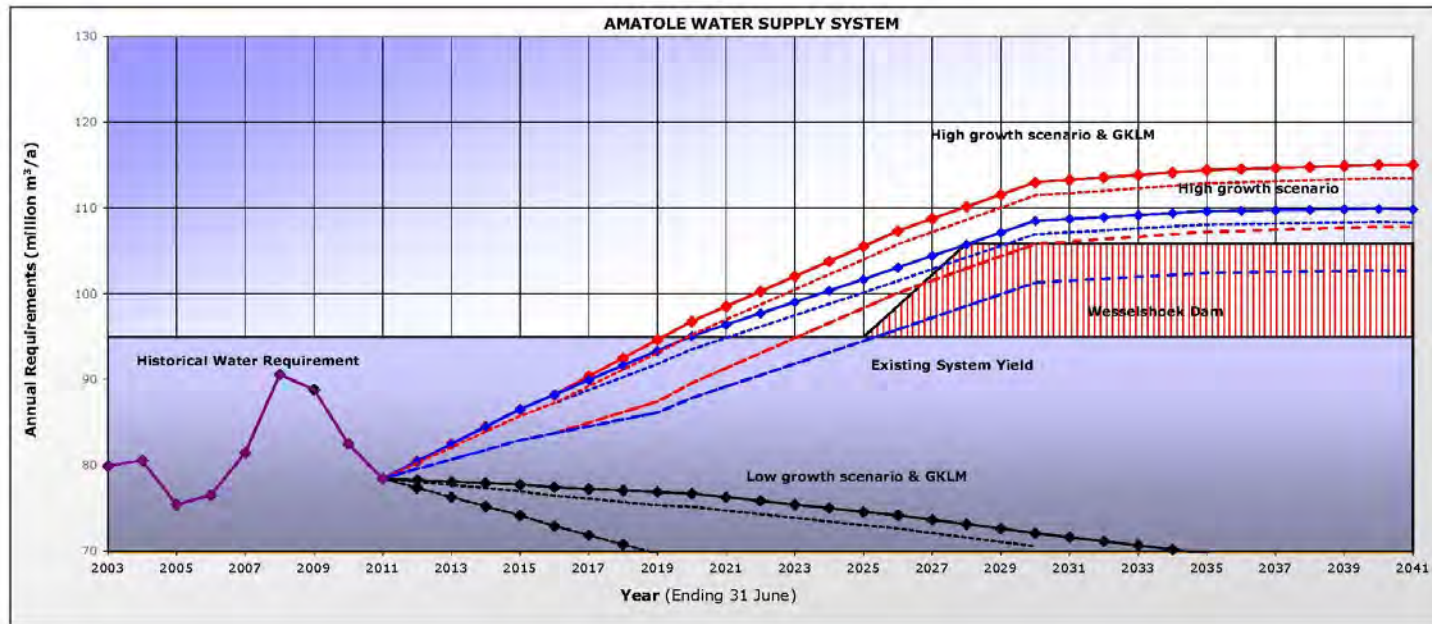
NO EWR, "LOWER" SYSTEM YIELD,
WC/WDM 0% EFFECTIVE, RE-USE

Appendix G3



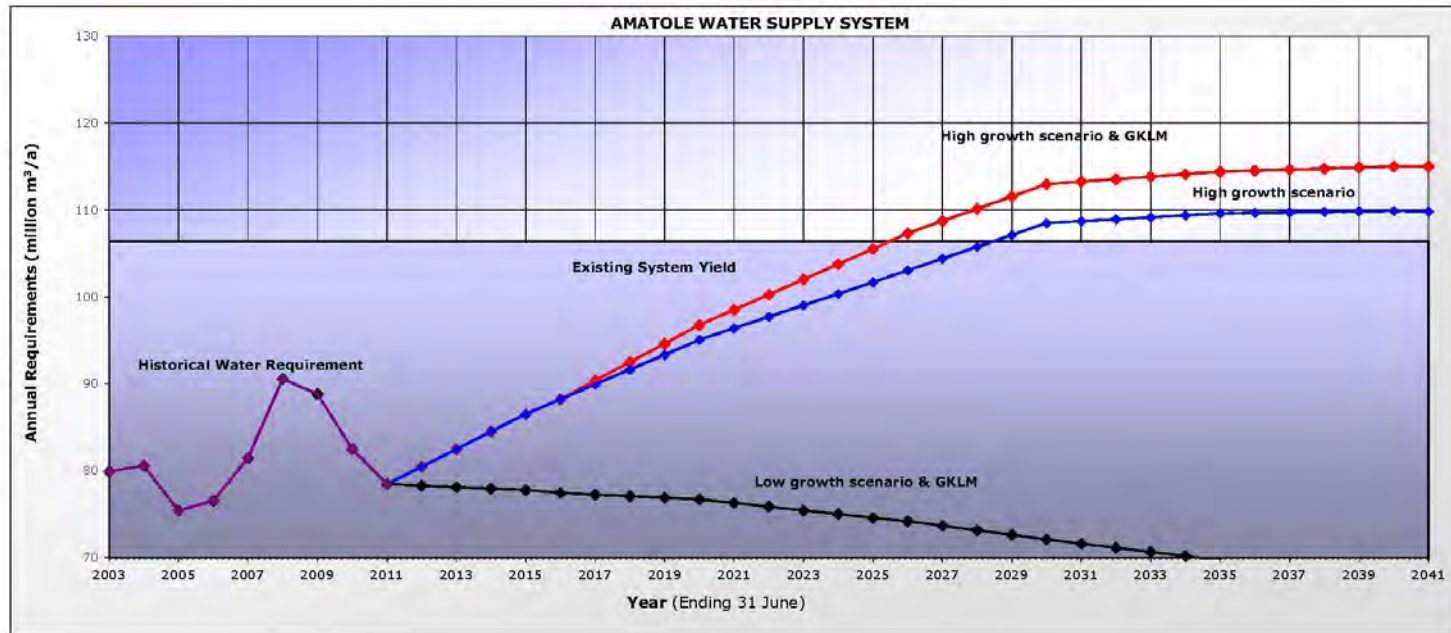
APPENDIX G4
NO EWR, "LOWER" SYSTEM YIELD,
WC/WDM 100% EFFECTIVE, SURFACE WATER

Appendix G4



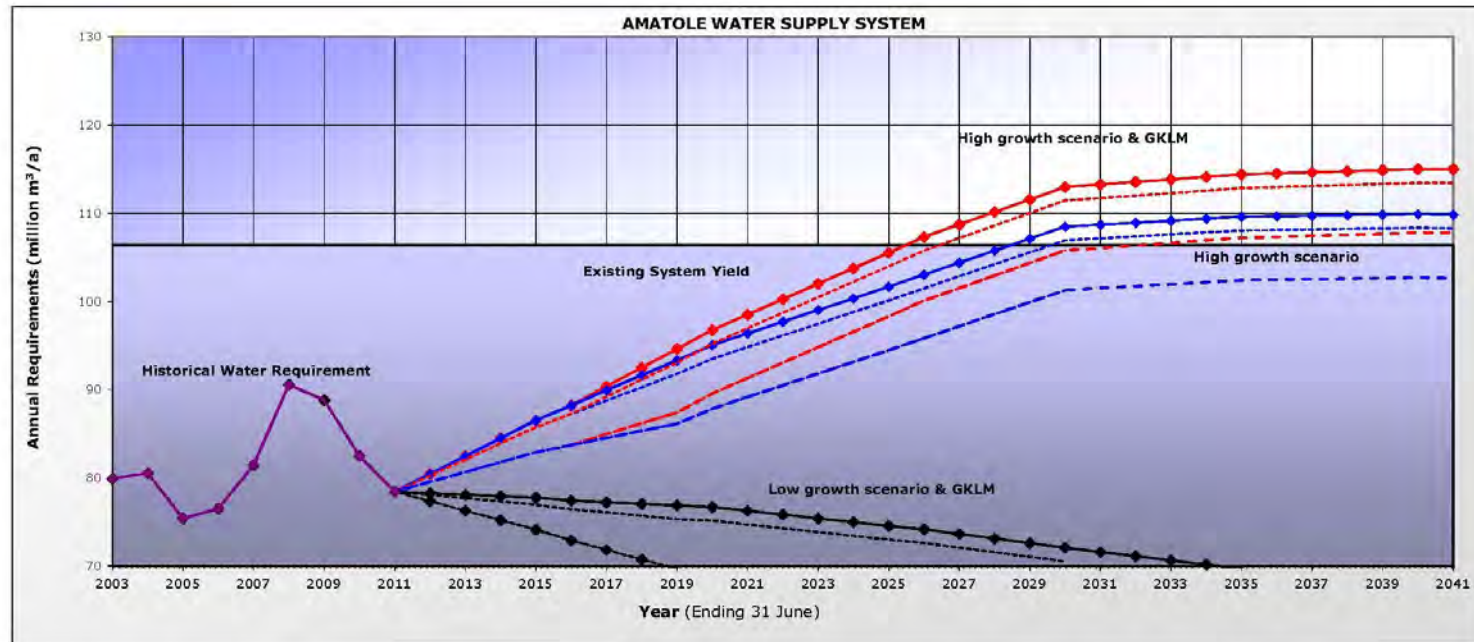
APPENDIX G5
NO EWR, "HIGHER" SYSTEM YIELD,
WC/WDM 0% EFFECTIVE

Appendix G5



APPENDIX G6
EWR, "HIGHER" SYSTEM YIELD,
WC/WDM 100% EFFECTIVE

Appendix G6



APPENDIX G7
EWR, "HIGHER" SYSTEM YIELD,
WC/WDM 100% EFFECTIVE, RE-USE, SURFACE WATER

Appendix G7

