



water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

**AMATOLE WATER SUPPLY SYSTEM
RECONCILIATION STRATEGY**

**STATUS REPORT
2012**

REV 3

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- Appendix B : EWR implementation framework discussion documentation.
- Appendix C : Historical water requirement graphs of the systems and sub-systems of the AWSS.
- Appendix D : WC/WDM: Stakeholder reports.
- Appendix E : Surface water screening of supply options workshop Summary Report.
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- Appendix I : Reconciliation scenario graphs.

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 from the system fall primarily within the Buffalo City, Amahlati and Ngqushwa 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. Domestic 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 (83% and 65% 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. There is at present no provision to accommodate growth in the irrigation/agricultural 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 in the Study to ensure a reconciliation of water supply and requirement into the future were 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 to 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 or directly into the ocean;
- 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 first meeting of the year primarily reviews progress in implementing the Strategy and the decisions taken during previous meetings. 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;
- 11 October 2011;
- 27 March 2012; and
- 13 September 2012.

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 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 individual dams	94.94

Notes:-

1. Yields are at 98% assurance of supply.
2. EWRs (environmental water requirements) are not included.
3. Transfer losses from Wriggleswade Dam are not included.
4. 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 operating rules, which have since been approved by DWA, entail a transfer of water from the Wriggleswade Dam to dams downstream in the System, when the water levels in these downstream dams drop to predetermined levels. The transfer rates are such that they sustain the requirements on the dams only and are not used to re-fill the dams.

The ASATSG has reviewed the system yield, based on the adopted operating rules and 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 (million m ³ /a)	
	Scenario 1 ⁶ Transfer when Wriggleswade Dam is Spilling	Scenario 2 ⁵ 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:-

1. Yields are at 98% assurance of supply.
2. EWRs are not included.
3. Transfer losses from Wriggleswade Dam are included.
4. The possible impact of climate change is not included.
5. Current approved operating rules.
6. Operating rule put forward to DWA for consideration for implementation.

The ASATSG has further reviewed the system yield, based on varying operating rules, the results of which indicate that the system yield could be further increased to 108.1 million m³/a, by adjusting the transfer trigger dam levels of the downstream dams under Scenario 1.

The yield of the System, when operated as an integrated system in accordance with the current approved operating rules, is some 5.2 million m³/a (5.4%) greater than the sum of the yields of the individual dams. Integrated system operation is therefore an imperative to ensure reconciliation of supply and requirement going forward and is discussed as a reconciliation option in **Chapter 7** of this report.

Refer to **Appendix A** for water balance graphs indicating the impact of the different system yields on the timing of the next reconciliation intervention.

3.3 Factors Impacting on System Yield

Environmental Water Requirements

The environmental classifications (ECs) and associated environmental water requirements (EWR) have been determined and accepted, based on desk top and field studies (“intermediate” assessment), for all rivers except for the reach of the Buffalo River downstream of Bridledrift Dam.

The impact of implementing the EWRs on the yield from the AWSS could be a reduction of as much as 25 million m³/a ($\pm 25\%$ of the system yield). Therefore they are not implemented at this point in time, but are considered as a scenario in the reconciliation planning.

A framework has however been adopted to finalise and implement 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 water 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.

As a new large dam (significant environmental impact) and water re-use to potable standards would be required to meet the water requirements if the EWRs Screening of Screening of are implemented, a further high level review of this framework has been undertaken, which considers the relative environmental and socio-economic impacts of the these augmentation options against a potential relaxation of the EWRs. Certain adjustments or refinements to the above framework have been put forward for consideration, which are contained in **Appendix B**.

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

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

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

3.3.2 *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, will investigate this assertion and will report on the outcomes thereof at future ASSSC meetings.

3.3.3 *Forestry*

The Department of Agriculture and Rural Development (DoRD) have advised that they have received requests to increase the area of land under forestry in the upper reaches of the Kubusi River, and questioned whether this should not be considered in the interests of regional economic development.

The ASATSG have proposed that the above be reviewed in 2013, together with the review of the extent of IAP, and that it be considered a scenario in future reconciliation planning.

Progress in this regard will be reported on at future ASSSC meetings.

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

Agreements have not as yet been concluded with BCMM to facilitate the effective implementation of the new adopted operating rules. Despite the above, the system yield of 100.1 million m³/a has been used as the basis for the current reconciliation planning.

The higher possible yield of 108.1 million m³/a (as per ASATSG presentation of June 2012) has however been 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 2012 are presented in **Figure 1**. See **Appendix C** for the historical water requirements graphs for the System, as well as the respective sub-systems.

The requirement profiles are characterised by:

- The System as a whole:
 - An increase in raw water requirement between 2005 and 2008;
 - A decrease in raw water requirement between 2008 and 2011;
 - A 6.3% per annum increase in raw water requirement from 2011 to 2012 (a 7.3% per annum increase in the domestic requirement).

- 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 10.3% per annum increase in raw water requirement between 2011 and 2012 and a 10.2% per annum increase in potable water requirement over the same period.
- Upper and Middle Buffalo
- 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 1.9% per annum decrease in raw water requirement between 2009 and 2012 but, only a 0.8% per annum decrease in potable water requirement over the same time period.
 - A 2.9% per annum decrease in raw water requirement between 2011 and 2012, but a 3.3% per annum increase in potable water requirement.

4.2.2 Evaluation of the Historical Water Requirements

➤ Lower Buffalo

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). The mitigation measures put in place by BCMM then resulted in the sharp reduction in requirement between 2008 and 2011.

The increase in water requirement between 2011 and 2012 is significant and is of concern. Given that both the raw and potable water requirement increased by the same order during this period, implies that the increase is not attributed to system (raw water) losses. An analysis of the potable water sales figures indicates that the bulk of the increase is in the East London area and not Mdantsane area. There is at present no obvious explanation for this significant increase in water requirement, other than a possible response to the breaking of the drought.

BCMM have been requested to investigate the reasons for this increase in requirement and will report back in this regard at future ASSSC meetings.

➤ Middle and Upper Buffalo

The increase in raw water requirement between 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 BCMMs WC/WDM interventions in the area could account of the 1.9% per annum decrease in requirement between 2009 and 2012. The increase in potable water requirement between 2011 and 2012 is not attributed to increased development in the area, and could possibly be attributed to a response to the breaking of the drought.

The increase is considered to be significant and BCMM have been requested to investigate the reasons for the increase and to report back in this regard at future ASSSC meetings.

The general convergent trend in raw and potable water requirement between 2009 and 2012 is attributed to WC/WDM measures in the area, as well as a reduction in the water treatment losses at the Laing Dam Water Treatment Plant.

4.3 Projected Water Requirements

Given that the exact cause of the significant year on year increase in water requirement is unknown at this point in time, no revision of the water requirement projections have been undertaken for this review of the Strategy. *It may however be necessary to review the forward projections with the 2013 review of the Strategy, once the new Census data (2011) is made available and a review of the current requirement increases have been completed.*

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, starting from 2013 and being phased in evenly to 2037. These requirements 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, if implemented, in which case the impact of this supply on the System would only be noted after 2018.

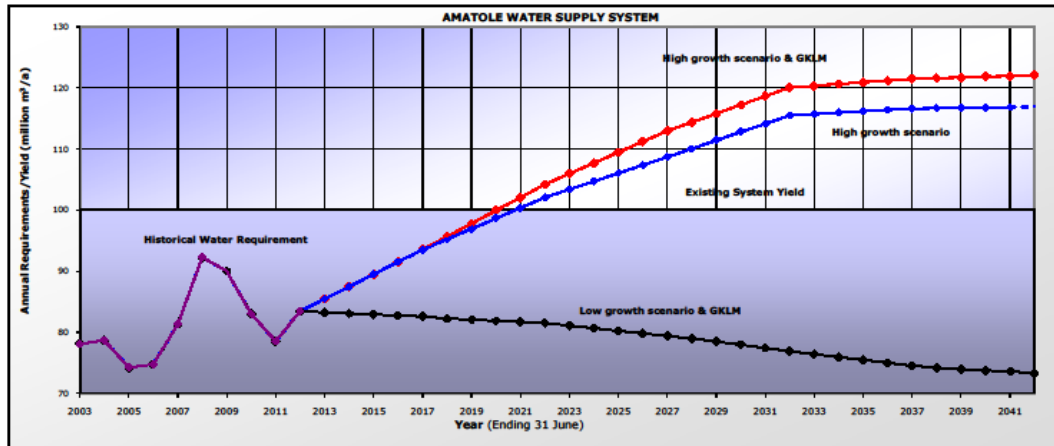
The low growth water requirement scenario, which includes supplies to the west and east of East London, indicates a decline in water requirement over time due to the predicted impact of HIV/Aids and population migration.

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, as per the current operating rules. Similar graphs have been provided for system yields based on the individual dams, as well as for various proposed amendments to the current operating rules. These are contained in **Appendix A** of this report.

Figure 1: Amatole Water Supply System: Water Balance 2012



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:

- Yield of individual dams (94.9 million m³/a) : 2018
- **Current operating rules (100.1 million m³/a) : 2021**
- Maximum yield possible from the System (108.1 million m³/a) : 2026

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

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) measures;
- The re-use of water;
- Stream flow enhancement through the removal of invasive alien plants from 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 INTEGRATED 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 and when implemented, would result in a system yield of 100.1 million m³/a. These rules are not being fully implemented by all ASSOCC member institutions at present, but initiatives are underway between DWA and BCMM to conclude agreements for the operation of the Bridledrift and Laing Dams in accordance with these operating rules.

The outcomes thereof will be reported on at future ASSSC meetings.

As noted in **Chapter 3** of this report, the system yield can be increased by a further 8.0 million m³/a, to 13.9% in excess of the sum of the yields of the individual dams, by making transfers from Wriggleswade Dam when it is spilling and by changing the transfer trigger levels of the downstream dams. If implemented, the operating rule would delay the need to implement a further reconciliation intervention by 5 years, to 2026. The ASATSG has therefore put forward proposals to DWA that these amendments to the current operating rules be considered, and have considered this increased system yield as a scenario in the current reconciliation planning.

Progress in implementing this amended operating rule will be reported on at future ASSSC meetings.

A system integration / optimization workshop was held with key officials of DWA, BCMM, ADM and Amatola Water, as well as interested parties from Agric EC and the East London IDZ on 21 June 2012. The key conclusions/resolutions of the workshop were as follows:

- Integrated system operation is the cheapest of all reconciliation options and is an imperative for reconciliation in the Amatole System; and
- BCMM undertook to abide by the proposed operating rules and would facilitate:
 - *The conclusion of the DWA/BCMM agreement in this regard; and*
 - *Ensure that their curtailment/restriction requirements are aligned with the operating rules.*

8 WATER CONSERVATION / WATER DEMAND MANAGEMENT

8.1 Background

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

The ASSSC resolved in 2011 that the planning of any new surface water supply scheme would be based on achieving 100% of the 10% saving being targeted through WC/WDM measures. Based on the 2012 review, this implies that a dam will not be required before 2026 and that planning in this regard only needs to commence by 2016.

The ASSSC also resolved in 2011 that BCMM:

- Plan and implement WC/WDM projects, which should seek to achieve an average requirement savings of 1.2 million m³/a per year over an eight year period, starting from 2012;
- BCMM be in a position to provide more comprehensive information on specific WC/WDM projects for the 2012 review; and
- BCMM and AW enhance their level of reporting on WC/WDM initiatives to the ASSSC.

8.2 Developments

8.2.1 Buffalo City Metropolitan Municipality

BCMM have an approved Strategy, which requires some R131 million to be invested over a 5 year period to achieve an estimated savings of 6.2 million m³ per annum. This strategy focuses on:

- Reducing non-revenue water;
- Increasing billed metered consumption;
- Reducing raw water treatment losses;
- Mains replacement (AC pipes);
- Enhancing the institutional capacity to implement WC/WDM measures on a sustainable basis; and
- Promoting of water use efficiency.

See **Appendix D1** for a report on the performance of BCMM in achieving their WC/WDM Strategy objectives.

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.

See **Appendix D2** for a report on the losses on the Amatola Water operated infrastructure.

8.2.3 Amathole District Municipality

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

The ADM are however planning to implement a mains replacement programme in Stutterheim and will report on progress in this regard at future ASSSC meetings.

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 28.8 million m³ per annum of 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 2011 that BCMM:

- Adopt their Water Re-use Strategy in 2012;
- 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 five years, effective from 2020, i.e. the latest start date for the planning to implement the first project is 2014.

9.2 Developments

BCMM have drafted a Water Re-use Strategy, which has already been circulated to ASSSC members for comment. An Overview Report, which seeks to align the BCMM Water Re-Use Strategy with the Reconciliation Strategy, has been prepared by the ASATSG. The Re-use Strategy document, together with the Overview Report, will be submitted to BCMM Council for approval.

Further details on the approval and implementation of the BCMM Re-use Strategy will be provided at future ASSSC meetings.

BCMM are currently investigating treated effluent re-use opportunities entailing in-direct potable re-use from their upgraded Reeston regional waste water treatment works. 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 currently at tender stage.

Further details in this regard will be provided at future 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.

Progress in this regard will be 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 2011 review of the Strategy, that the planning of a new surface water augmentation scheme be based on achieving 100% of the 10% savings being targeted through WC/WDM (i.e. latest study start date of 2016), and that any supply shortfalls prior to achieving these savings need 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 on 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 new dam; it uses surplus yields from these existing dams). The findings of the review however indicate that the surplus yields available from these dams to augment supplies to the AWSS are significantly lower than previously anticipated. The need to register and monitor water use from these dams was also identified. It can also be noted that 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.

A screening of surface water supply options workshop was held on 26 March 2012, the key outcomes of which are as follows:

- The following schemes/options are considered the most viable of the options identified to date and should be put forward for more in-depth study for consideration for implementation:

- Wesselshoek Dam (Kwelera River) – the most favourable of the options at this point in time;
- Ravenswood Dam (Keiskamma River) – only if a large yielding dam is required; and
- Stone Island Dam (Nahoon River) – potential environmental implications.
- None of the following schemes/options are considered viable in the medium- to long-term and should therefore not be considered for further study for possible implementation at this point in time.
 - All the Sandile/Binfield Park dams options - yield, social and URV concerns;
 - Junction Dam (Keiskamma River) – environmental and strategic concerns;
 - Torwood Dam (Keiskamma River) – environmental concerns; and
 - North Slope (Toise River) - URV concerns.

A summary report on the workshop is attached as **Appendix E**.

11 STREAMFLOW ENHANCEMENT

11.1 Background

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

The ASSSC resolved in 2011 that:

- DEAT:WfW should enhance their level of reporting to the ASSSC on their ongoing initiatives in the Amatole catchments.

11.2 Developments

DEAT:WfW are currently implementing the following initiatives of relevance to the AWSS:

- Terrestrial weed control: In the catchments of the Gubu and Wriggleswade Dams (Kubusi River), as well as the Maiden and Rooikrantz Dams (Buffalo River).
- Clearance of 363 ha of IAP in the catchments of the Kubusi River and 706 ha in the catchments of the Rooikrantz Dam.
- Aquatic weed control: Mechanical and biological control on the Nahoon River.

Further progress in this regard will be reported on at future ASSSC meetings.

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.

Progress in this regard will be reported on at future ASSSC meetings.

13 WATER QUALITY

13.1 Background

The Strategy requires that the System be operated 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.

The ASSSC resolved in 2011 that:

- DWA: RO ensure greater levels of compliance by the licensed effluent discharges; and
- BCMM enhance their level of reporting on their measures to address water.

See **Appendix F** for a copy of the most recent water quality report, which highlights the following:

- Effluent from the majority of the WWTWs within the System is non-compliant in terms of their discharge permits; and
- Da Gama Textiles effluents continue to impact negatively on system water quality.

13.2 Developments

13.2.1 Department of Water Affairs

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 future ASSSC meetings.

13.2.2 Buffalo City Metropolitan Municipality

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 the water quality concerns as a result of non-compliant discharges from these existing WWTWs in the Upper and Middle Buffalo. This first phase of the WWTW upgrade (175Ml/day) and associated works has commenced and it is anticipated that all works will be complete within 3 to 5 years.

Reports on progress in this regard will be reported on at future ASSSC meetings.

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 future ASSSC meetings.

13.2.3 Amatole System Administrative and Technical Support Group

It is to be noted that the amended operating rules recommended by the ASATSG for consideration for implementation would result in more frequent transfers from the Wriggleswade Dam into the Buffalo River, and would thereby assist in enhancing the water quality in this portion of the System.

Developments in implementing amended operating rules will be reported on at future ASSSC meetings.

13.3 Conclusions

Water quality remains a concern, but it is not required to affect releases to address these concerns at this point in time.

The need for all responsible parties to address pollution at source must however be reinforced, whilst DWA in its capacity as regulator, needs to more actively monitor the situation, act decisively where non-compliance is confirmed and significantly enhance its level of associated reporting to the ASSSC.

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 the beginning of 2012 and one towards the end of 2012. See **Appendix G** for copies of the press releases issued during 2012.

14.2.2 News Letters

One newsletter has been circulated during 2012. See **Appendix H** for copies of the newsletter already circulated.

15 RECONCILIATION PLANNING

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

- Without EWRs
 - System yield of 100.1 million m³/a
 - WC/WDM 100% effective
 - WC/WDM 100% effective and re-use
 - WC/WDM 100% effective and surface water augmentation
 - WC/WDM 25% effective, re-use and surface water augmentation
 - System yield of 108.1 million m³/a
 - WC/WDM 100% effective
 - WC/WDM 25% effective and re-use
- With Full EWRs
 - System yield at 100.1 million m³/a
 - WC/WDM 100% effective, re-use & surface water augmentation (1).
 - WC/WDM 100% effective, re-use & surface water augmentation (2).
 - System yield at 108.1 million m³/a
 - WC/WDM 100% effective, re-use & surface water augmentation.

- With Part EWRs
 - System yield at 100.1 million m³/a
 - WC/WDM 100% effective, re-use & surface water augmentation.
 - System yield at 108.1 million m³/a
 - WC/WDM 100% effective, re-use & surface water augmentation.

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

The following observations can be made from the above analysis:

- If the system is operated in accordance with the current operating rules.
 - Measures to augment system yield will be required by 2026 if WC/WDM is 100% effective and by 2021 if WC/WDM is not effective. This implies the following latest study start dates:
 - Re-use : 2021 (WC/WDM effective) ; 2016 (WC/WDM not effective)
 - Surface water : 2016 (WC/WDM effective)
 - A new *large dam and water re-use for potable use* is required if the full EWRs are to be implemented. The EWRs can however not be implemented before 2019, to allow time for the replacement source to be developed. The latest study start dates for both Re-use and Surface water options would then be 2013. These dates can however be delayed if the implementation of the EWRs is delayed beyond 2019.
 - A new *large dam or a water re-use for potable use or a smaller dam with non-potable re-use* are required if the amended EWRs are to be implemented. These EWRs can then be phased in over a period of 4 years starting from 2015. The latest study start dates for both the Re-use and Surface water options would then be 2013. These dates can however be delayed if the implementation of the EWRs is delayed to beyond 2019.
- If the system is operated at the higher yield, then:
 - Measures to augment system yield will be required by 2030 if WC/WDM is 100% effective and by 2027 if WC/WDM is not effective. This implies the following latest study start dates:
 - Re-use : 2025 (WC/WDM effective) ; 2022 (WC/WDM not effective)
 - Surface water : 2020 (WC/WDM effective)
 - A new *large dam or a water re-use for potable use or a smaller dam with non-potable re-use* are required if the amended EWRs are to be implemented. The EWRs can however not be implemented before 2019, to allow the time for the replacement source to be developed. The latest study start dates would for both Re-use and Surface water would be 2013. These dates can be delayed if the implementation of the EWRs is delayed to beyond 2019.
 - *Water re-use for non-potable use only*, is required if the amended EWRs are implemented. These EWRs can then be phased in over a period of 4 years starting from 2015. The latest study start dates for the re-use projects is 2020. These dates can be delayed if the implementation of the EWRs is delayed.

16 CONCLUSIONS

The following conclusions can be drawn from the above:

- The EWRs and operating rules are interlinked and urgently need to be finalised to bring certainty to the reconciliation planning going forward.
- Integrated system operation is an imperative for short- to medium-term reconciliation and therefore the current adopted operating rules need to be adopted without delay.
- Operating the System to maximise the yield from the System provides significant benefits and reconciliation flexibility, and should therefore be considered for implementation. The benefits include:
 - Significantly delays the implementation of the next reconciliation option;
 - There will be no need for a new dam if the EWRs are not implemented or are only implemented in part (based on current growth projections);
 - Assisting in meeting the EWRs in certain reaches of the Buffalo River due to the higher frequency of transfers from Wriggleswade Dam;
 - Improve water quality issues in the Upper/Middle Buffalo due to the higher frequency of transfers from Wriggleswade Dam; and
 - An enhanced estuarine regime for the Nahoon estuary, due to the higher frequency of spills from the Nahoon Dam (maintain higher dam levels).
- The effective and sustained implementation of WC/WDM interventions remains a pre-requisite, in that:
 - It will ensure reconciliation in the short- to medium-term, i.e. long-term cost benefits;
 - WC/WDM is the most cost effective reconciliation intervention after integrated system operation; and
 - WC/WDM projects have short implementation lead periods (i.e. provides greater reconciliation implementation flexibility).
- 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 water re-use and/or supply curtailment (restrictions).
- The latest study start dates are 2016 for Re-use and Surface water respectively and earlier if the EWRs are to be implemented.
- Water quality remains a concern in the System in general.
- 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 current adopted System Operating Rules without delay.
- The amended EWR implementation framework, or refinements thereto, be considered for adoption and that the requisite investigations/actions be initiated without delay, i.e. the EWRs need to be formalised as soon as possible.
- The amended operating rules that will result in the system yield being maximized be considered for implementation.

- The implementation of the EWRs be delayed until such time as decisions have been taken on the amended operating rules and EWR implementation framework.
- BCMM continue to plan and implement WC/WDM projects as per previous recommendations, i.e. savings of at least 1.2 million m³/a per year for 8 years.
 - BCMM develop an itemised list of WC/WDM projects to be implemented, complete with savings targeted, costs and envisaged start dates.
- 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 2018, i.e. latest study start date of 2013.
 - BCMM develop a list of conceptualised Re-use projects for possible implementation, complete with yields, costs and envisaged start dates.
- DWA:OA be in a position to commence planning for the next surface water augmentation scheme by at least 2016, if EWR are not to be implemented in full before 2026, and earlier if the EWRs are to be implemented.
- DWA:RO ensure greater levels of compliance by the licensed effluent discharges and enhance their level of reporting on water quality aspects.
- BCMM enhance their level of reporting on their efforts to address water quality concerns.
- The projected water requirements be reviewed in 2013.
- The extent of IAP and the potential for increased forestry be reviewed during 2013, as well as their potential impacts on System Yield.

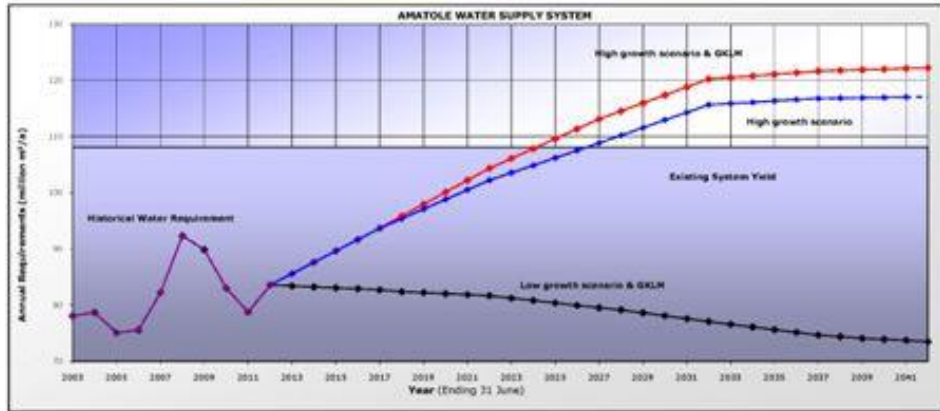
APPENDIX A
SYSTEM WATER BALANCE GRAPHS



System Yield = 95 million m³/a (individual dams)



System Yield = 100 million m³/a (integrated system operation - current operating rules)



System Yield = 100 million m³a (integrated system operation – amended operating rules)

APPENDIX B

PROPOSED REVISIONS TO THE FRAMEWORK FOR IMPLEMENTING THE EWR

PROPOSED AMMENDMENTS TO THE EWR IMPLEMENTATION FRAMEWORK

Framework Principles

- The Kubusi River and Nahoon River (estuary) are of environmental importance and merit conservation. The Kubusi River is therefore not preferred for further development. The Nahoon River should only be considered for further development if the operating rules for the proposed dam are such that they do not further negatively impact on the estuary.
- The Buffalo River downstream of King Williams Town could be considered a working river, as it is already highly impacted
- The Gonubie, Toise and Keiskamma Rivers are of environmental importance and merit protection. These rivers are not preferred for development/further development.
- The Kwelera River is already highly impacted and could be considered for further development.

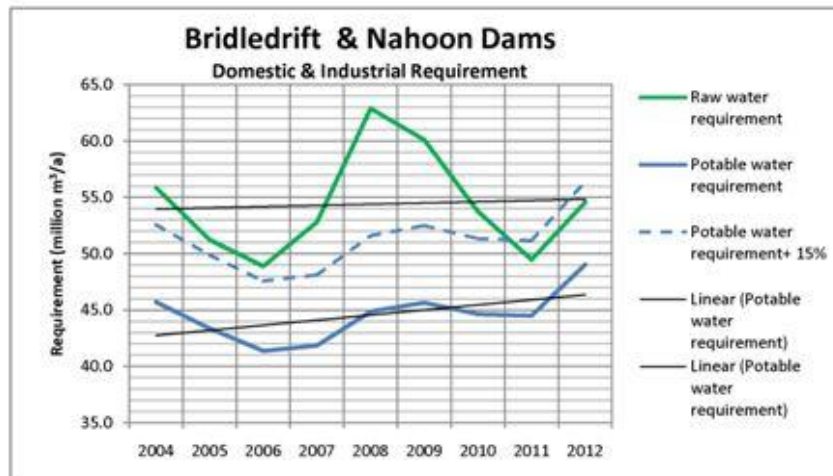
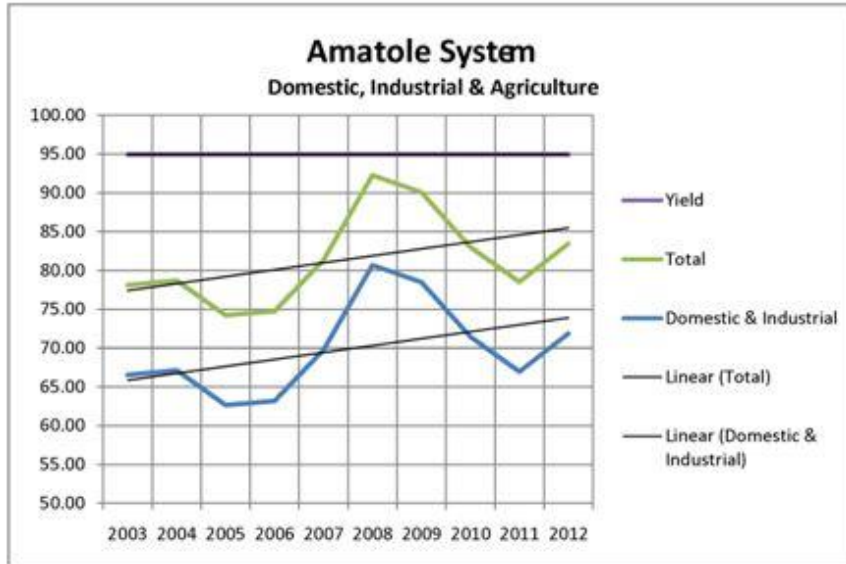
Proposals

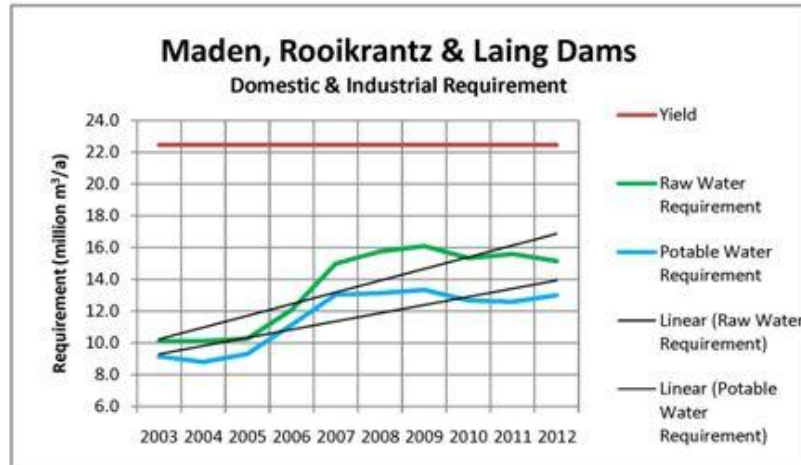
- The EWR for the river reach downstream of Gubu Dam not be implemented, but be limited to the releases to support Stutterheim, as well as the compensation releases, only.
- The EWR for the reach downstream of Wriggleswade Dam not be implemented, but be limited to existing compensation releases only. This relaxation is however subject to the condition that no dams/further dams are considered for the Toise and Kubusi Rivers and that the re-use of water be optimised in the lower portions of the System;
- The operating rule to transfer from Wriggleswade Dam when it is spilling be implemented, together with the adjusted transfer dam trigger levels, i.e. utilise the highest possible system yield.
- The EWR for the reach downstream of the Rooikrantz Dam be implemented, but only once the Kei Road Regional WTP and/or the Zwelitsha Regional WWTW have been implemented to provide the requisite replacement water. A review of the quantum of the EWR, given the proposed operating rule above, is also recommended.
- The EWR for the reach downstream of Laing Dam not be implemented, but be limited to the compensation release, as well as the releases associated with the proposed operating rule, only.
- The EWR for the Nahoon Dam be implemented, possibly using treated effluent from Mdantsane and Potsdam WWTWs. This re-use transfer could also make provision for the compensation release downstream of Nahoon Dam.
- The Buffalo River estuary is a working port and therefore does not warrant releases to sustain its condition. Effort should however be made to improve the quality of the existing effluent releases.

Further Proposal

- There is a need to better understand the key drivers for the respective EWRs, as well as the irrigation patterns of the respective farmers, in order to be able to better manage the compensation and/or transfer releases to mimic the ecological water requirement patterns of the respective rivers.

APPENDIX C
HISTORICAL WATER REQUIREMENT GRAPHS
FOR THE KEY DAMS AND
SUB-SYSTEMS OF THE AWSS





APPENDIX D

WC/WDM: STAKEHOLDERS REPORTS

- D1 : Amatola Water
- D2 : Amathole District Municipality
- D3 : Buffalo City Metropolitan Municipality

D1: Amatola Water

Amatola Water Systems

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	1.35	14.1	-0.41	-5.1	0.93
Nahoon	0.31	3.1	0.63	6.6	0.94
Rooikrantz	-0.03	-7.2	0.10	23.2	0.07
Total	1.63		0.31		1.94
Sandile	0.29	3.8	0.73	10.1	1.02
Binfield	0.19	11.5	0.35	24.1	0.53
Total	0.47		1.08		1.55

Amatole Water Supply System - Scheme Losses (2011/2012)

Scheme	Treatment Losses		Distribution Losses		Total Losses million m ³ /a
	million m ³ /a	%	million m ³ /a	%	
Laing	0.75	7.8	0.70	7.9	1.44
Nahoon	0.31	2.7	0.62	5.4	0.93
Rooikrantz	Decommissioned		0.00	0.0	0.00
Total	1.06		1.31		2.37
Sandile	0.46	6.3	0.74	10.3	1.20
Binfield	0.23	13.4	0.35	24.6	0.58
Total	0.69		1.09		1.78

D2: Amathole District Municipality

Amathole District Municipality Systems

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	%	
Kei Road Stutterheim					
Total	0.00		0.00		0.00

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	%	
Kei Road Stutterheim	0.32	37.8%			
Total	0.32		0.00		0.00

Amatole Water Supply System - Scheme Losses (2011/2012)

Scheme	Treatment Losses		Distribution Losses		Total Losses million m ³ /a
	million m ³ /a	%	million m ³ /a	%	
Kei Road Stutterheim	0.35	37.0			
Total	0.35		0.00		0.00

D3: Buffalo City Metropolitan Municipality

Buffalo City Metropolitan Municipality

Amatole Water Supply System - Scheme Losses (2008/2009)

Scheme	Raw Water Release		Treatment Losses		Distribution Losses		Total Losses million m ³ /a
	million m ³ /a	%	million m ³ /a	%	million m ³ /a	%	
Bridledrift/Umzonyana	6.62	13.5%	7.26	17.1%			
Total	6.62		7.26		0.00		0.00

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

Scheme	Raw Water Release		Treatment Losses		Distribution Losses		Total Losses million m ³ /a
	million m ³ /a	%	million m ³ /a	%	million m ³ /a	%	
Bridledrift/Umzonyana	4.44	10.1%	4.05	10.2%			
Total	4.44		4.05		0.00		0.00

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

Scheme	Raw Water Release		Treatment Losses		Distribution Losses		Total Losses million m ³ /a
	million m ³ /a	%	million m ³ /a	%	million m ³ /a	%	
Bridledrift/Umzonyana	0.11	2.7	3.48	8.9%			
Total	0.11		3.48		0.00		0.00

Notes:-

Raw water release losses were for 11 months only & projected for the 12th

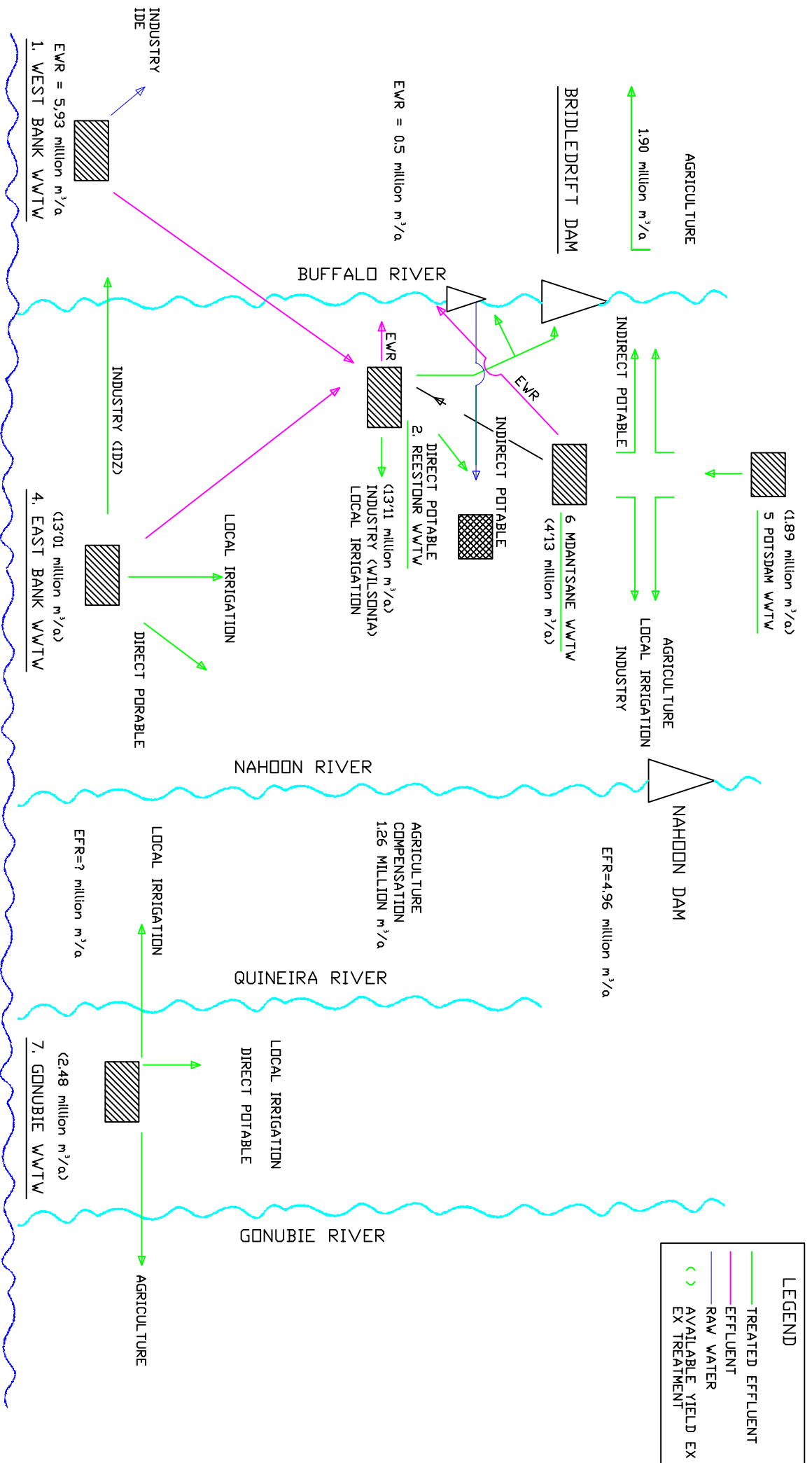
Amatole Water Supply System - Scheme Losses (2011/2012)

Scheme	Raw Water Release		Treatment Losses		Distribution Losses		Total Losses million m ³ /a
	million m ³ /a	%	million m ³ /a	%	million m ³ /a	%	
Bridledrift/Umzonyana	1.07	2.7	5.32	12.4%			
Total	1.07		5.32		0.00		0.00

Notes:-

Raw water release losses were zero due to dam spilling, but previous years losses used to determine raw water requirements

APPENDIX E
SURFACE WATER SCREENING OF OPTIONS
WORKSHOP SUMMARY REPORT



INDIAN OCEAN

04-09-2012

FRAMEWORK FOR
BCM RE-USE STRATEGY



Amatole Reconciliation Strategy
Surface Water Supply Options Screening Workshop
 Ranking of Surface Water Supply Schemes

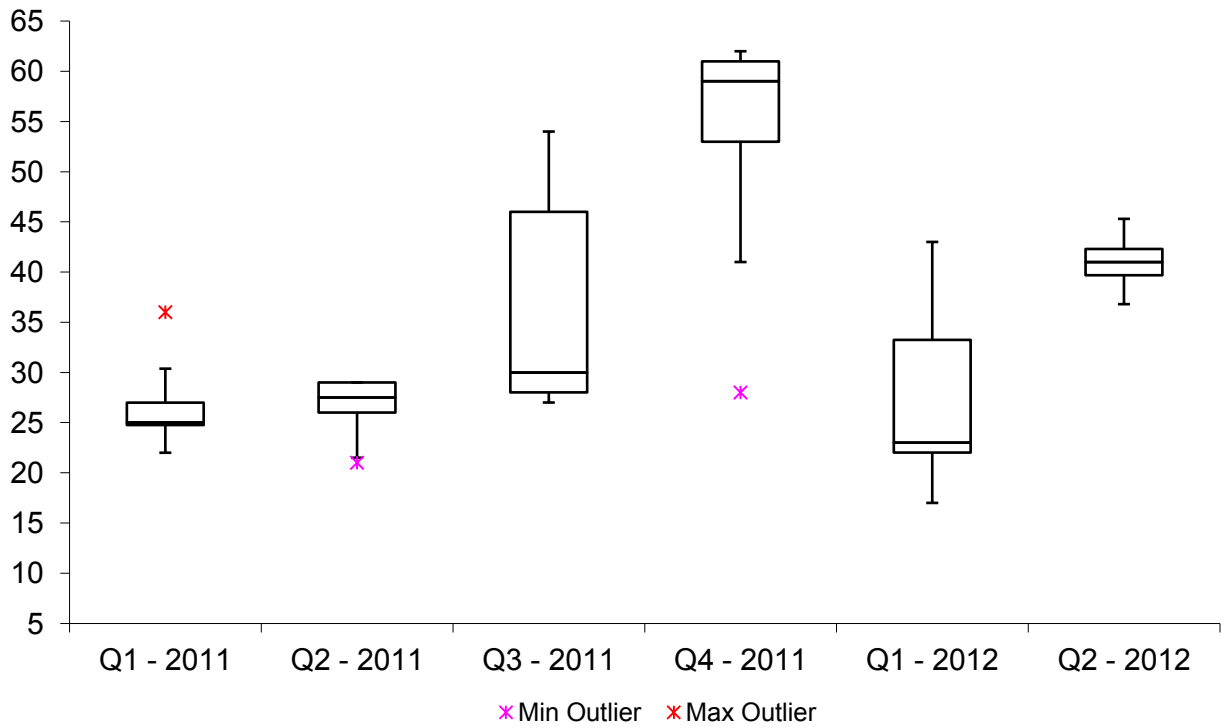
No.	Scheme	River	URV	Implementation Period	Environmental	Socio- Economic	Strategic	Score
1	Sandile/ Binfield Park - 1	Keiskamma	2	4	1	1	1	11
2	Sandile/ Binfield Park - 2	Keiskamma	4	4	2	1	1	17
3	Sandile/ Binfield Park - 3	Keiskamma	2	4	3	1	1	15
4	Junction	Keiskamma	0	2	1	2	1	12
5	Ravenswood	Keiskamma	2	2	2	3	3	20
6	Torwood	Keiskamma	1	2	0	2	3	18
7	Stone Island	Nahoon	4	4	1	2	4	21
8	Matola	Toise	3	2	0	3	3	18
9	North Slope	Toise	0	2	4	2	2	13
10	Mhalla's Kop	Gonubie	4	3	1	2	4	19
11	Groothoek	Gonubie	4	3	1	2	4	21
12	Wesselshoek	Kwelera	3	3	4	2	3	23
13	nGutu	Kei	0	0	3	3	4	18

Criteria Ranking

0	Unacceptable
1	Unfavourable
2	Moderately favourable
3	Favourable
4	Highly favourable

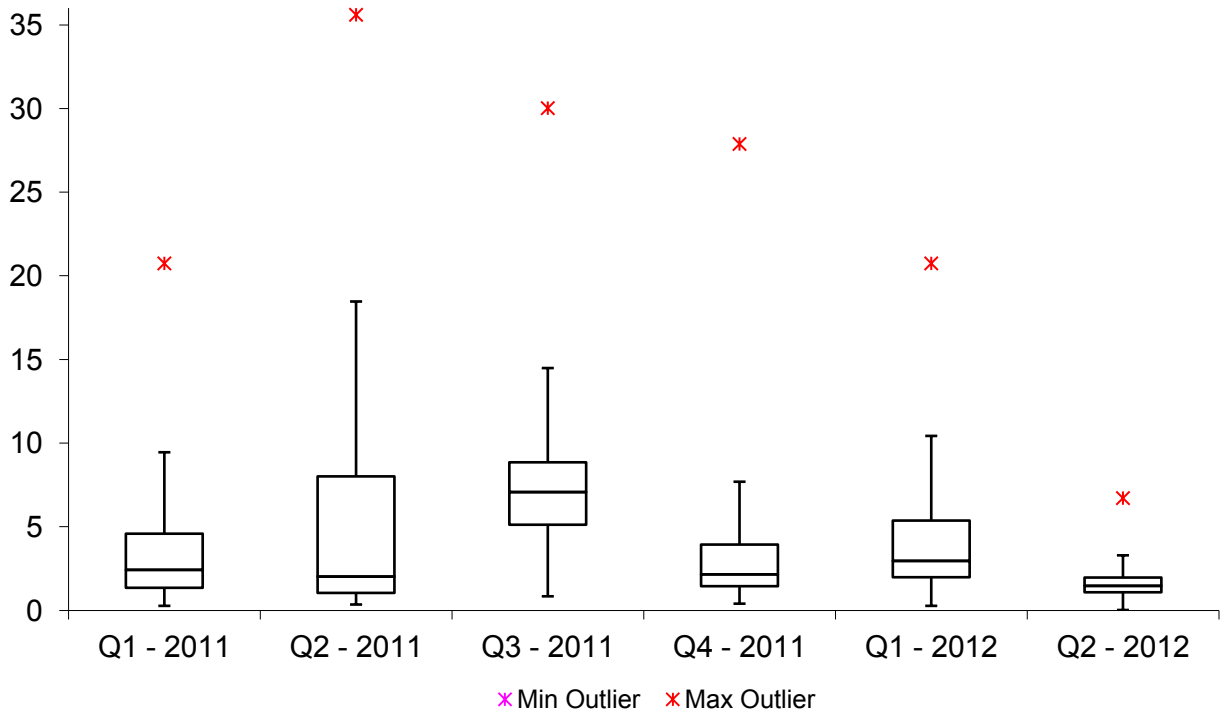
APPENDIX F
WATER QUALITY REPORT

Laing EC



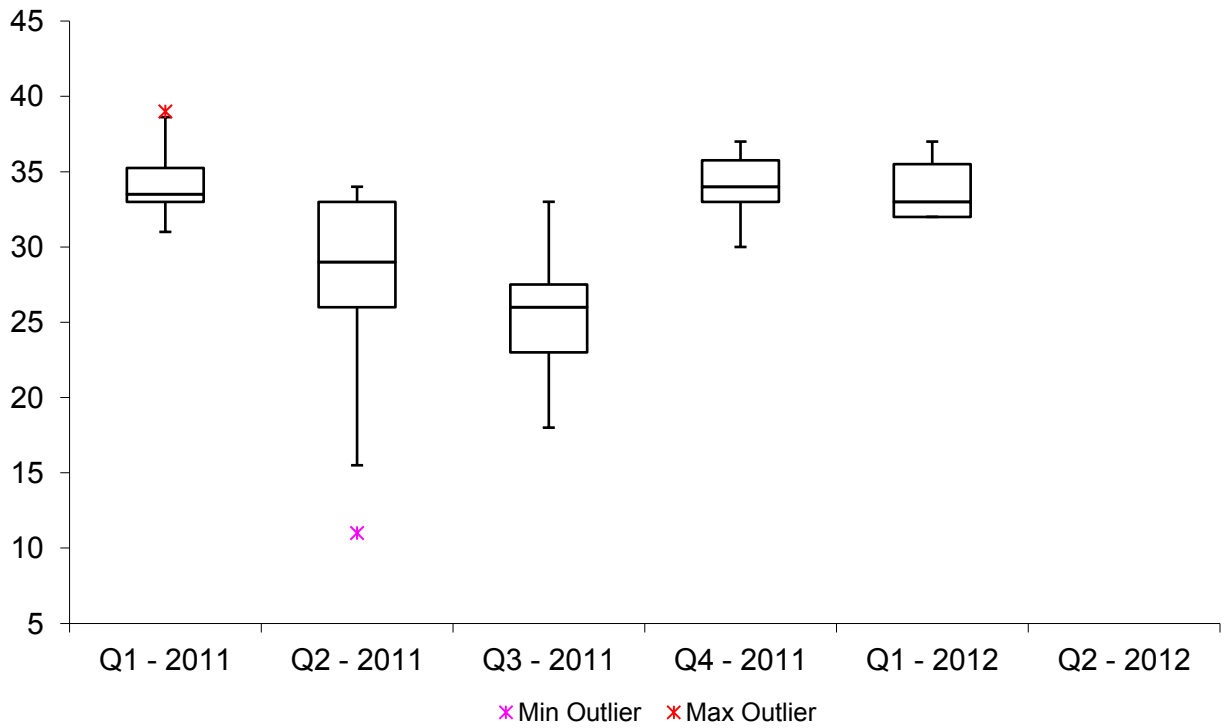
Labels	Q1 - 2011	Q2 - 2011	Q3 - 2011	Q4 - 2011	Q1 - 2012	Q2 - 2012
Min	22	21	27	28	17	36.8
Q ₁	24.75	26	28	53	22	39.7
Median	25	27.5	30	59	23	41
Q ₃	27	29	46	61	33.25	42.3
Max	36	29	54	62	43	45.3
IQR	2.25	3	18	8	11.25	2.6
Upper Outliers	5	0	0	0	0	0
Lower Outliers	0	1	0	4	0	0

KWT Turbidity



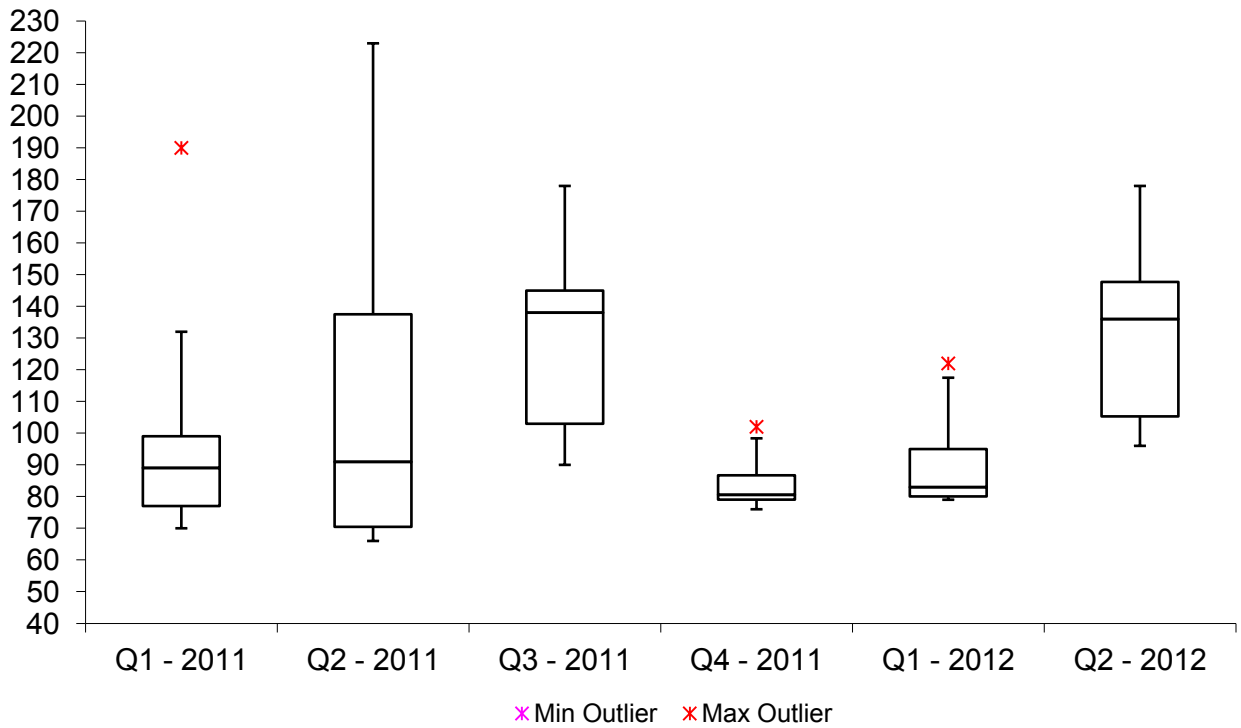
	Q1 - 2011	Q2 - 2011	Q3 - 2011	Q4 - 2011	Q1 - 2012	Q2 - 2012
Labels	Q1 - 2011	Q2 - 2011	Q3 - 2011	Q4 - 2011	Q1 - 2012	Q2 - 2012
Min	0.27	0.35	0.84	0.4	0.27	0.02
Q ₁	1.35	1.05	5.11	1.44	1.99	1.09
Median	2.43	2.02	7.07	2.15	2.97	1.47
Q ₃	4.59	8.015	8.86	3.94	5.365	1.97
Max	20.74	35.6	30.02	27.88	20.74	6.71
IQR	3.24	6.965	3.75	2.5	3.375	0.88
Upper Outliers	105	81	24	107	70	45
Lower Outliers	0	0	0	0	0	0

Nahoon EC



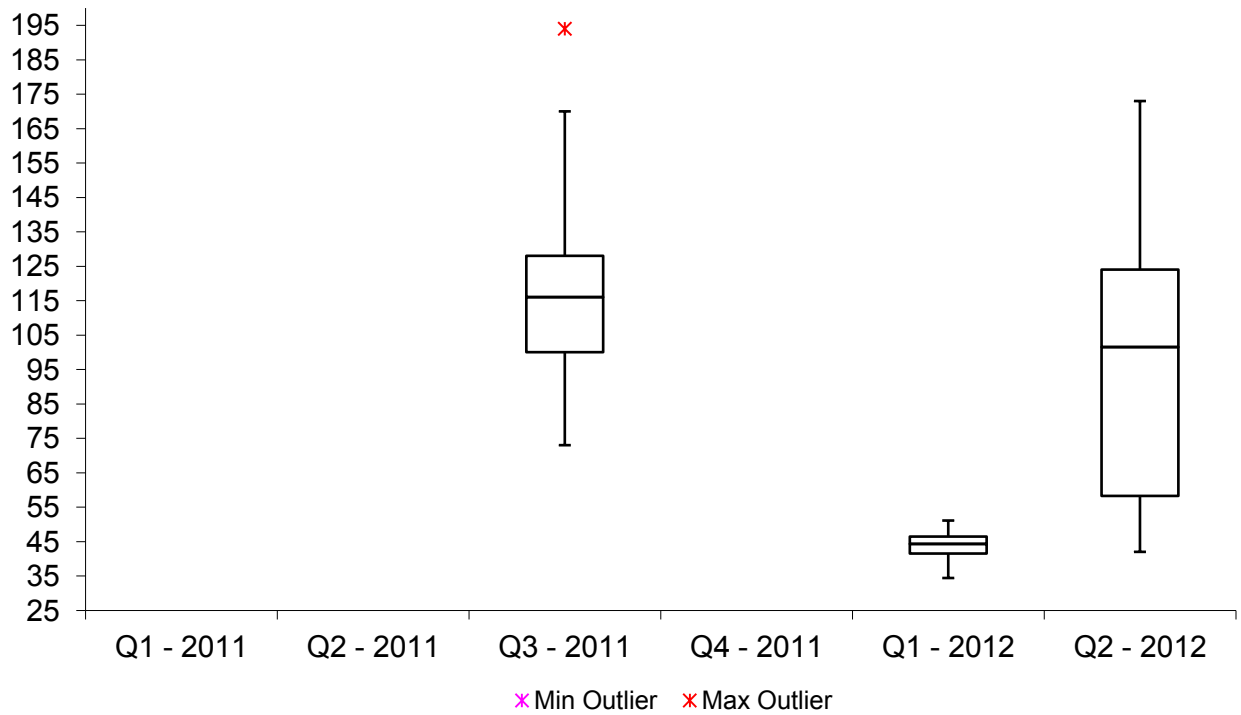
Labels	Q1 - 2011	Q2 - 2011	Q3 - 2011	Q4 - 2011	Q1 - 2012	Q2 - 2012
Min	31	11	18	30	32	0
Q ₁	33	26	23	33	32	0
Median	33.5	29	26	34	33	0
Q ₃	35.25	33	27.5	35.75	35.5	0
Max	39	34	33	37	37	0
IQR	2.25	7	4.5	2.75	3.5	0
Upper Outliers	2	0	0	0	0	0
Lower Outliers	0	1	0	0	0	0

Nahoon Turbidity



Labels	Q1 - 2011	Q2 - 2011	Q3 - 2011	Q4 - 2011	Q1 - 2012	Q2 - 2012
Min	70	66	90	76	79	96
Q ₁	77	70.5	103	79	80	105.25
Median	89	91	138	80.5	83	136
Q ₃	99	137.5	145	86.75	95	147.75
Max	190	223	178	102	122	178
IQR	22	67	42	7.75	15	42.5
Upper Outliers	3	0	0	1	1	0
Lower Outliers	0	0	0	0	0	0

Umzoniana Turbidity



Labels	Q1 - 2011	Q2 - 2011	Q3 - 2011	Q4 - 2011	Q1 - 2012	Q2 - 2012
Min	0	0	73	0	34.4	42.0
Q ₁	#NUM!	#NUM!	100	#NUM!	41.55	58.3
Median	#NUM!	#NUM!	116	#NUM!	44.3	101.5
Q ₃	#NUM!	#NUM!	128	#NUM!	46.475	124
Max	0	0	194	0	51.1	173.0
IQR	#NUM!	#NUM!	28	#NUM!	4.925	65.7
Upper Outliers	0	0	2	0	0	0
Lower Outliers	0	0	0	0	0	0

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

Period	Discharge point	Catchment	Compliance level		COD	TSS	F-coli	Average daily Flow m3/d	Notes
			Start Jan-12	End Jun-12					
	1 King Williams Town	Buffalo	Green	Green	Green	Green	Red	5193	During the period this plant did not comply 40% times on audit samples for discharge of ortho-phosphate into Middle Buffalo River. The max allowable limit is 1mg/l P.
	2 R2H016 Weir	Buffalo	Red	Green	Red	N/A	Green		The Tail Water Dam on 20 June 2012 was at its lowest point in five years. The stake was exposed to 3.375m.
	3 Zwellitsha	Buffalo	Green	Green	Green	Green	Green	6708	During the period this plant did not comply 80% times on audit samples for discharge of ortho-phosphate into Middle Buffalo River. The max allowable limit is 1mg/l P.
	4 Bisho	Buffalo	Green	Red	Red	Red	Red	2520	These ponds do irrigate with final effluent. The problem arises during wet weather. Then final effluent get discharged into Yellowwoods River on wet weather.
	5 Breidbacht	Buffalo	Green	Red	Red	Red	Red	1054	These ponds do irrigate with final effluent. The problem arises during wet weather. Then final effluent get discharged into Yellowwoods River on wet weather.
	6 Potsdam	Buffalo	Green	Green	Red	Green	Red	4608	Wet period 2-6 February 2012
	7 Mdantsane	Buffalo	Green	Green	Green	Green	Red	10857	Wet period 2-6 February 2012 and maximum flow recorded at Mdantsane WWTW was 25189 m3/d in this period.
	8 Reeston	Buffalo	Green	Green	Green	Green	Green	1138	
	9 Berlin	Nahoon	Green	Green	Green	Red	Red	641	Wet period 3-11 February 2012 and maximum flow recorded at Berlin WWTW was 4289 m3/d in this period.
	10 Border Combing	Nahoon							There has been no reported spillage in the Nahoon River catchment. The factory continues to supply the Department with monthly daily movement quantities of tanked volumes from the factory to the evaporation dams. This information includes spraying hours, indication of 500mm freeboard on each of the two ponds and recorded daily rain recorded as well as daily factor water consumption in washlines.
	11 Nahoon Dam	Nahoon	Green	Green	Green	Green	Red		
	12 Stutterheim	Cumakala	Green	Green	Green	Green	Green		The design capacity for this works is 2000 m3/d. At the time of this report, average daily flows were not yet received.

ISSUES	Bisho & Breidbach Ponds Irrigation System; Finalisation of Dagama Textile Water Use Licence; Zwellitsha and Schornville WWTW ortho-phosphate discharge non-compliance with special phosphate discharge max limit of 1mg/l P.							
PREVIOUS QUARTER								
THIS QUARTER	Q4							

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

Buffalo City has briefed the Department on future plans on WWTW: The following are planned for **Zwellitsha WWTW**: Phase 1 link Schornville via 7.7km sewer outfall, phase 1 is currently being implemented. Phase 2 to upgrade Zwellitsha WWTW to 17.5 Ml/d. Phase 3 construct Breidbach raw sewage pump station and 3.3 Km sewer collector. Phase 4 put in Bisho collector sewer 12 Km. And Phase 5 upgrade Zwellitsha WWTW to 35 Ml/d. This among other things will remove the burden to dose with Ferric Chloride in the Middle Buffalo as the Regional WWTW with be a UCT type and will be able to treat o-phosphate to an acceptable standard. The UCT process decision is based on TKN/COD ratio and will suit nitrogen and phosphorus removal in the Middle Buffalo. Of note is , the ferric chloride dosing system will not be decommissioned. It will be used as a standby. In addition **Specifically with this period Jan - June 2012: Zwellitsha WWTW** has had a problem with ortho-phosphate discharge compliance. This was a result of FeCl3 running out for a long period resulting to non-precipitation of the phosphate content in the final effluent. Buffalo City Metro Engineers whilst waiting for budget to purchase FeCl3 got hold of Alum and used it but it was not effecting to precipitate the phosphate content. A letter of non-compliance was written to Buffalo City Metro in this regard. A reply from Municipality in regard to FeCl3 is that they are planning to formalise a full two year contract instead of a month to month order purchase. **Reeston WWTW** will be upgraded to 10 Ml/d. The Reeston WWTW upgrade will be linked to decommissioning of Central WWTW. This diversion is to be done via a 2400mm tunnel to Reeston WWTW. This option will save pumping costs in the long term. In addition a Water Use Licence to link or divert sewage from Central WWTW to Reeston WWTW has been recommended by Regional Office of Water Affairs . **Mdantsane WWTW** two projects are currently on the table. One is to chlorinate the combined final effluent from Mdantsane & Potsdam WWTW. And the second recommendation is to repair the existing drying beds to full capacity. With the chlorination system tender documents by technical team for sewage branch are complete and are now ready to be submitted to Buffalo City Metro Bid Specification committee. The idea is to chlorinate and still discharge effluent below Mzonyane WTW weir located at Buffalo River below Briddledrift Dam. The idea of discharging final effluent straight into the Briddledrift Dam has not yet been taken further that the initial discussion within Amathole Systems Technical or Advisory Committee. **Bisho Ponds** the irrigation system is up and running. There has been a problem noted by the Millwright that the chlorine dosing pump got corroded and was noted and a corrosion resistant pump purchased. The second issue is the stormwater ingress into the sewer when it is raining. This we are hoping it will get addressed through the water care demand management program of Buffalo City. Currently this programme is being implemented in Dimbaza and Scenary Park communities. **In addition the Department(Bisho Ponds)** takes note that irrigation with final effluent is not sustainable during wet weather and it result to discharge into Yellowwoods River. This is because there is no Lei Dam or 14 day storage dam. The one available is at Sikhobeni Rural Village and the locals refuses to receive effluent and claim it results in mosquito breeding in the village. **R2H016 weir** this is associated with Dagama Textile. The update on the factory effluent treatment project is that the factory is treating 800cubm/day of their effluent for re-use. And their progress report said that in May 2012 they will be treating 1050cb.m/day. The Region has recently been called to a meeting at Head Office in order to clarify certain issues in the proposed licence conditions. We are hoping that the licence will be issued within the next three months before June 2012. In addition, the option at Zwellitsha WWTW to utilise certain effluent streams for irrigation under the proposed Zwellitsha WWTW upgrade could benefit Jan Tshatshu Lands as far as cattle grazing is concerned. This option is still in its infant stage as DWA is in discussion with the design consultants on this project, nothing has been finalised as yet. In addition to the above Head Office has requested the Region to have further discussions with Dagama Textile in order to confirm any improvement with the treatment facility and re-use of treated effluent. **In short Dagama as of 1 August 2012** needs to give Water Affairs an updated Water Balance inclusive of all water / wastewater streams. This the Department is to request the industry in an Official letter. **Stutterheim WWTW** : An aerator basin, a clarifier and new chlorine contact tank has been commissioned. And since this in the quarter of October 2011 and December 2011 the microbiological results has improve and complied. **The only issue of concern during Jan 2012 - June 2012 in Stutterheim WWTW** was non-compliance with Trade Effluent by laws in ANCA Chickens which resulted in sewer spillages. This got resolved via the attention of Amathole District Municipality and currently is not an issue or re-curring. **Nahoon Dam WWTW**: Amatola Water have been asked to look into the existing chlorination system and improve it. Correspondence have been exchanged between Water Affairs & Amatola Water in this regard i.e The scenario at Nahoon Dam WWTW is that final effluent gets discharge into an 80 day capacity maturation pond and this pond is currently 50% full. The two parties only needs to agree at a common sampling point for compliance with treated effluent including chlorination.

EXPLANATIONS								
PREVIOUS QUARTER								
THIS QUARTER								

Notes
It was suggested that the locations for the data used be recorded.
The compliance should be colour coded (green - good; red - poor).
Reporting should follow water quality reports.
A method statement for this reporting should be developed.
Only DWA data is to be used (3 samples per quarter).
It would be useful if the underlying data was maintained in an accessible form.

APPENDIX G
PRESS STATEMENTS



DEPARTMENT OF WATER AFFAIRS

Press Release

Draft November 2012

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

RELEASE OF 2012 ANNUAL STATUS REPORT ON THE AMATOLE WATER SUPPLY REGION

The Department of Water Affairs, working in partnership with Buffalo City Metropolitan Municipality (BCMM), Amatola Water and the other strategic partners, through the multi-stakeholder Amatole Water Supply System (AWSS) Strategy Steering Committee is pleased to announce the release of the 2012 AWSS Annual Status Report.

The Amatole Water Supply System (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 from the system fall primarily within the Buffalo City, Amahlati and Ngqushwa municipal areas with East London, King Williams Town, Bhisho and Stutterheim being the main urban centres within the supply area.

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. There is at present no provision to accommodate growth in the irrigation requirement.

While the Reconciliation Strategy Study was completed in March 2008, the purpose of the Annual Status Report is to:

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

The Status report covers all pertinent aspects for long term water sustainability, namely:

- a) An assessment of the Water Balance, and the sustainability thereof.

- b) The Reconciliation Options (strategies) being implemented and progress achieved.
- c) Conclusions and Recommendations

The sustainability of the water balance is determined by the rate of growth in demand for water. 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:

- 2018 If Dams are operated individually (94.9 million m³/a)
- 2021 If Dams are operated in terms of the current AWSS Operating Rules (100.1 million m³/a)
- 2026 If all measures are applied to achieve maximum yield from the system (108.1 million m³/a)

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

It will however be necessary to review the forward projections once the new Census data is made available and a review of the current requirement increases have been completed. This will be undertaken in 2013.

In terms of strategies the report draws the following conclusions:

- a) Integrated system operation, between DWA, BCMM and Amatola Water, is an imperative for short- to medium-term reconciliation (sustainable water supply).
- b) Operating the system to maximise the yield from the System provides significant benefits and reconciliation flexibility.
- c) The effective and sustained implementation of WC/WDM interventions remains a pre-requisite.
- d) Any failure to effectively operate the System in terms of the Operating Rules 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).
- e) The latest start dates for Studies on Re-use and Surface Water Options are 2016. This start date will need to be brought forward if the Environmental Water Requirements (EWR) are to be implemented. The EWRs Implementation Framework is to be re-assessed in 2013.
- f) Water quality remains a concern in the System in general.

The AWSS Strategy Steering Committee would like to emphasize to all stakeholders and consumers that water conservation and water demand management (WC/WDM) is the key reconciliation intervention, after integrated system operation. In this regard DWA has assisted BCMM in developing a WC/WDM Strategy which has been approved by

BCMM during 2012. The Strategy requires some R131 million to be invested over a 5 year period to achieve an estimated savings of 6.2 million m³ of water per annum.

The Strategy Steering Committee would like to remind all consumers that, despite the current situation of adequate water supply in the AWSS dams, an assured long-term water supply cannot be taken for granted and it is everyone's responsibility to conserve the scarce resource and use water wisely and efficiently.

If any stakeholder or member of the public would like further information or a copy of the Status Report (2012) 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.

The Strategy can also be accessed on the DWA internet webpage at www.dwa.gov.za under Documents/IWRP/WMA12.

Date issued: November 2012

Department of Water Affairs

Enquiries: Mr SM Mabuda, Chief Director Integrated Water Resource Planning

Tel 012 336 8477 or MabudaS@dwa.gov.za

Mr PH van Niekerk, Chairperson Amathole Reconciliation Strategy Steering Committee

Tel 012 336 8762 or Niekerk@dwa.gov.za

APPENDIX H
NEWS LETTER



Water Sustainability Planning for the Amatole Area

ACTIVITIES AND ACHIEVEMENTS FROM 2011

Newsletter 1/2012

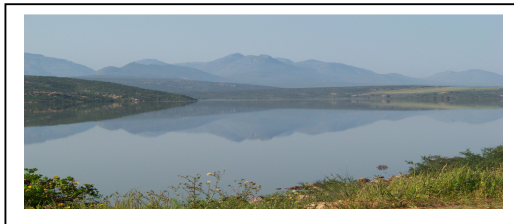
"Rising to the Challenge"

The Task of Planning for Water Sustainability

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 over the long term. 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
5. The development of new surface water supplies; and
6. Desalination of sea water.
7. Address water quality concerns at source.

The implementation of the Strategy is driven by the Strategy Steering Committee comprising the Department of Water Affairs (DWA), the Buffalo City Metropolitan Municipality (BCMM), Amathole District Municipality (ADM), Amatole Water (AW), and a number of other important stakeholders.



While the current level of water supply in the dams is good the need for ongoing activities to protect and enhance the supply are critical for the regions future.

New demands on the supply that need to be taken into account for the future:

- Extension of the supply on the western side of Buffalo City, including Kidds Beach and Kaysers Beach.
- The potential extension of the supply to towns on the east coast which have experienced a long standing water crisis.
- Significant growth in new housing as Buffalo City Metropolitan Municipality addresses the informal settlement backlog.

Future growth in water demand, and the reality that a drought period will strike the region again, means that neither Water Authorities, nor stakeholders and the general public, can afford to become complacent about our water supply. This newsletter explains some of the activities being undertaken, and successes that have been achieved, in ensuring ongoing water sustainability for the region.

“Declaring War on Water Wastage” Actions on Water Conservation and Demand Management

In 2010 the Strategy Steering Committee, which is tasked with driving the implementation of the Reconciliation Strategy, 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 implementation 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 considered on the achievement of a 10% reduction on the 2011 requirement.

Recent assessments carried out by the Department and the relevant Water Service Authorities have determined that at least 10% of the current water use in the Amatole Water Supply Area of 66.9 million m³ per annum can readily be saved through implementing effective Water Conservation and Water Demand Management measures.

Buffalo City Planning for WC/WDM

With the Buffalo City Metropolitan Municipality estimating that some 39.6% of potable water is unaccounted for, the importance of WC/WDM is clear to see. The aim of the BCMM WC/WDM plan is to:

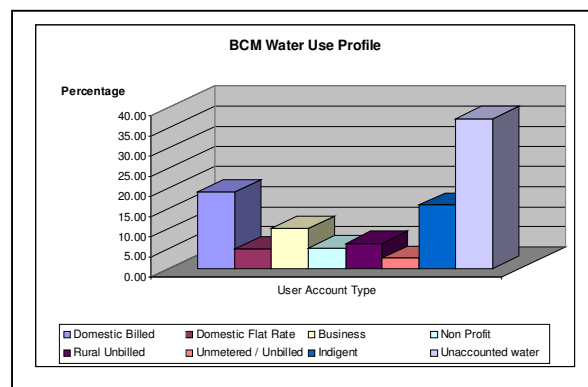
- Reduce the amount of water not being charged for (non-revenue water)
- Reduce losses experienced in the water treatment process
- Reduce water wastage and leaks from municipal infrastructure
- Establish the infrastructure and capacity to undertake detailed water use and loss assessments
- Promote efficient water use among all consumers

The plan has been finalized and will go to Council in early 2012 for approval and funding.

Some Recent Success Stories in Terms of WC/WDM

Buffalo City Metropolitan Municipality has undertaken numerous activities in order to eliminate the most problematic areas of wastage. These have included:

- Replacement of standpipes in Duncan Village that had been vandalized or were leaking, saving some 17 million litres per month.
- Carrying out repairs on indigent properties resulting in a decrease of more than 80% of water usage from these residents.
- Checking and repairing water meters in flat-rate charge areas to ensure their effective functioning. This information is then used to improve operations and maintenance in these areas, as well as enabling the quantification of current losses.
- Community Awareness and Education, including awareness pamphlets distributed through billing statements, visiting consumers door to door in flat-rate areas, visiting schools, branding on busses, and awareness campaigning at shopping malls.



**“Using Every Drop Wisely”
Planning for Efficient Water Re-Use**

There is significant potential to re-use treated water in the region, most particularly for irrigation. Currently some 28.4 million cubic meters of treated water is discharged as waste into the ocean. In comparison, only some 0.2 million cubic meters is being used, primarily for irrigation of golf courses.

While there is a National Water Re-use Strategy that has been developed by the Department of Water Affairs, no focused planning had taken place in the AWSS area to give direction to local actions concerning water re-use. In 2010 the Strategy Steering Committee resolved that planning for water re-use should commence immediately, with an initial target to re-use some 2.9 million cubic meters per annum of treated water.

Categories of Possible Municipal Waste Water Re-Use			
Category	Use Potential	Category	Use Potential
Agriculture	Irrigation of certain production crops,,	Domestic Non-Potable	Fire-fighting, toilet flushing, irrigation of gardens etc.
Local Irrigation	Irrigation of parks, golf courses, cemeteries, sportsfields etc.	Domestic Potable	Blending into water supply reservoirs
Industry	Cooling water, heavy construction, etc.	Environment	Releases to meet the water requirements of downstream river environments

Note: Different re-use categories have different water treatment requirements and standards of acceptance.

Planning for Water Re-Use in BCMM

While some treated water is already being used in releases into rivers in the BCMM area, the Buffalo City Metropolitan Municipality began developing its Water Re-Use Strategy in 2011.

In conducting the analysis for this plan, it was identified that through and re-using treated water, an additional 31.5 million cubic meters per annum could be made available in the Amatole Water Supply System. This amounts to nearly 50% of the current water demand in the BCMM area, implying that the re-use of water has a significant role to play in meeting the future water needs for the Amatole Region.

Further investigations into the specific treatment requirements, technologies and system design options will need to be undertaken, and the cost effectiveness of re-use confirmed, before water re-use infrastructure can be developed for the city.

The BCMM Water Re-use Strategy will be considered for approved by the Council in 2012.

Water Re-Use Screening Criteria	
Engineering	Technical Feasibility Resource Limitations
Economic	Financial Feasibility Economic Feasibility
Social	Health and Environmental Community Acceptance



“One System” Achieving Management Efficiency

Through computer modelling it has been shown that operating the supply system as a single integrated system, and not as independent dams and treatment works, clearly improves the efficiency of water storage *and could result in an additional six million cubic meters of water being available per annum* from the System. This is a significant amount of water which could have a critical impact on the sustainability of the System in the short- to medium-term.

In order to achieve this increased yield, it requires that the Department of Water Affairs, Buffalo City Metropolitan Municipality and Amatola Water work closely together in their management of the supply infrastructure. This is the work of the ‘Operations Committee’, known as ASSOCC, which brings officials of the authorities together for joint management decision making.

The ‘Operations Committee’ is guided by the Operating Rules for the water system. The Operating Rules determine decision making in respect of when releases should be made from dams, at what rate water can be released, and when water restrictions should be imposed. The Operating Rules are reviewed and updated as necessary to achieve maximum efficiency in the management of the system.

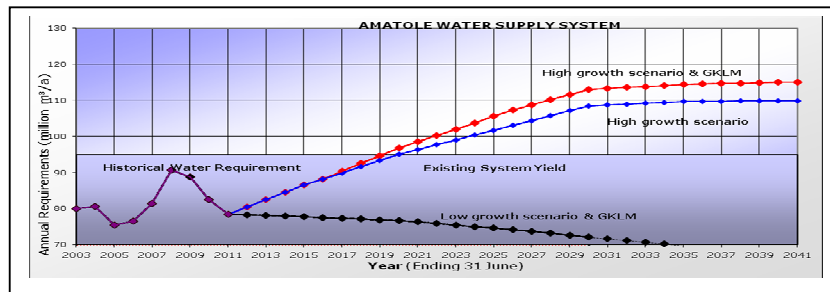
Examples from AWSS Restrictions Policy (current)

- Restrictions to be introduced when storage drops to 45% of system capacity.
- Restrictions for Urban and Domestic users:
 - i) Level 1: Restricted to 85% of demand when Wriggleswade is at 60%
 - ii) Level 2: Restricted to 80% of demand when Wriggleswade is at 30%
 - iii) Level 3: Restricted to 70% of demand when Wriggleswade is at 10%
- Restrictions for Irrigation Users:
 - i) Level 1: Restricted to 60% of demand when Wriggleswade is at 60%
 - ii) Level 2: Restricted to 40% of demand when Wriggleswade is at 40%

“Assessing our future” Long Term Water Supply Projections

Due to the uncertainty of projecting future water requirements, the planners working on the AWSS Reconciliation Strategy have identified high and low demand scenarios with sustainability planning being undertaken against the high growth projection. Actual requirements are tracked annually by the ASSC, with the growth projections and sustainability planning being reviewed accordingly. The low demand projection currently indicates that existing water supply capacity is sufficient to meet the predicted future for the next 30 years, whilst, the high demand projection indicating a supply shortfall within 8 years unless water savings through integrated system operation, WC/WDM, and water re-use are achieved.

**AWSS
Water
Supply
Scenario
Projections
as at the end
of 2011**



“Prevention not Cure” The Challenge of Water Quality

Besides environmental and health concerns, water quality also affects operating costs and potentially even the amount of usable water in the supply system. For example poor river water quality may result in the need for water releases to flush the rivers, resulting in wastage of available water. The key is to address the cause of the pollution at source, and avoid expensive treatment processes.

The Strategy Steering Committee is working with the relevant authorities tasked with monitoring water quality in order to firstly improve available information and knowledge about water quality concerns, and secondly to facilitate actions to address identified problems. Actions are already underway to establish a regional Water Treatment Works at Zwelitsha to address legally ‘non-compliant’ discharges from the waste water treatment works in the KWT area.. . However progress on the housing backlog and the elimination of informal settlements in river and dam catchment areas must be a priority for a safe water supply.

The table below reflects on water quality concerns identified at bulk discharge points within the AWSS at the end of 2011 which need to be addressed. Note this is not a measurement of tap water quality.

Water Quality Status Report (4th Quarter 2011)							
Discharge point	Catchment	Conductivity	Ammonia	COD	TSS	F.col	Flowrate Capacity
King Williams Town	Buffalo	Green	Green	Green	Green	Red	6700
R2H016 Weir	Buffalo	Red	Green	Red	N/A	Green	
Zwelitsha	Buffalo	Green	Green	Green	Green	Green	8000
Bisho	Buffalo	Green	Red	Red	Red	Red	2000
Breidbacht	Buffalo	Green	Red	Red	Red	Red	1300
Potsdam	Buffalo	Green	Green	Red	Green	Red	4800
Mdantsane	Buffalo	Green	Green	Green	Green	Red	11100
Reeston	Buffalo	Green	Green	Green	Green	Green	1100
Berlin	Nahoon	Green	Green	Green	Red	Red	700
Border Combing	Nahoon						
Nahoon Dam	Nahoon	Green	Green	Green	Green	Red	
Stutterheim	Cumakala	Green	Green	Green	Green	Green	1800

Green = Compliance/ Red = Non Compliance

For a copy of the AWSS Reconciliation Strategy please visit the website:

<http://www.dwaf.gov.za/Documents/Other/WMA/12/AmatoleBulkWaterMar08.asp>

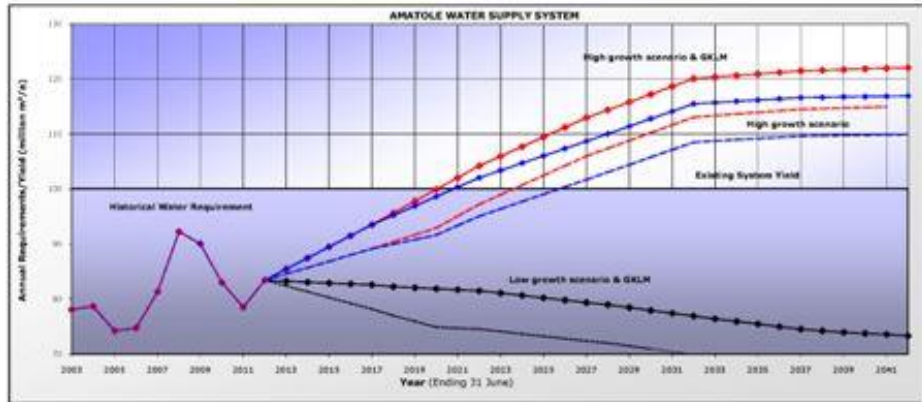
**This Newsletter is produced and distributed by the AWSS Strategy Steering Committee
For further information please contact: Mr Mandilakhe Zenzile, Communications Manager,
Department of Water Affairs, (e-mail) zenzilem@dwa.gov.za or (Tel) 043 6045400**

APPENDIX I

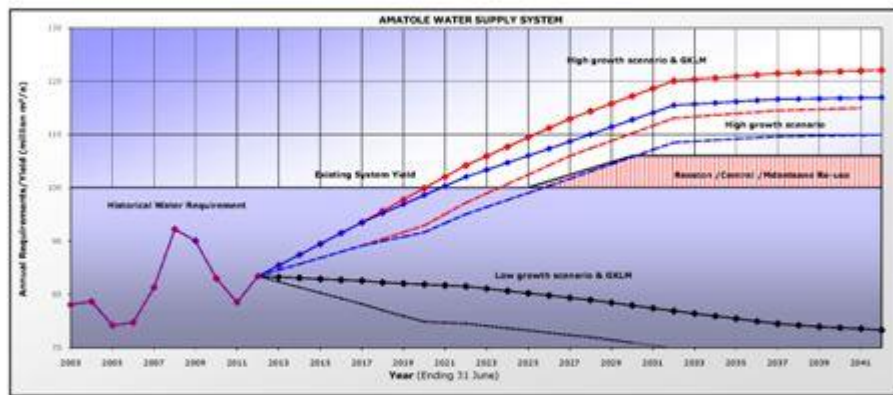
RECONCILIATION SCENARIO GRAPHS

- I1 : No EWR: Medium Yield
- I2 : No EWR: High Yield
- I3 : Full EWR: Medium Yield
- I4 : Full EWR: High Yield
- I5 : Part EWR: Medium Yield
- I6 : Part EWR: High Yield

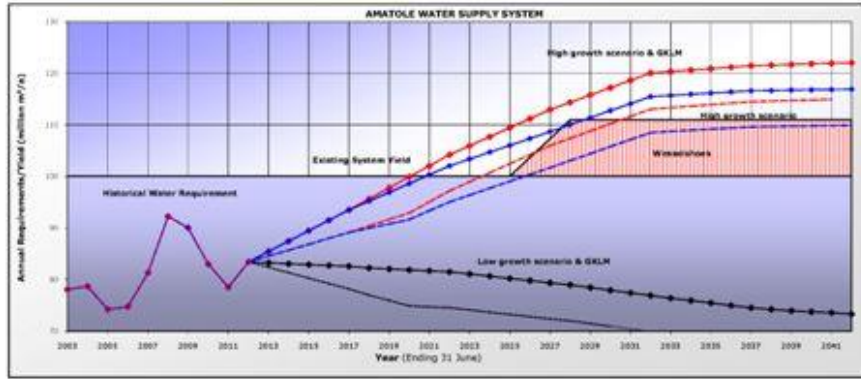
I1 : No EWR: "Medium" Yield



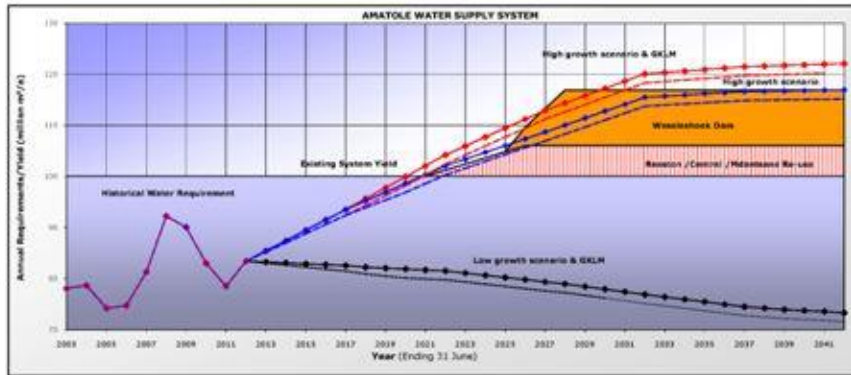
System Yield = 100 million m3a (integrated system operation - current operating rules)



System Yield = 100 million m3a (integrated system operation - current operating rules)

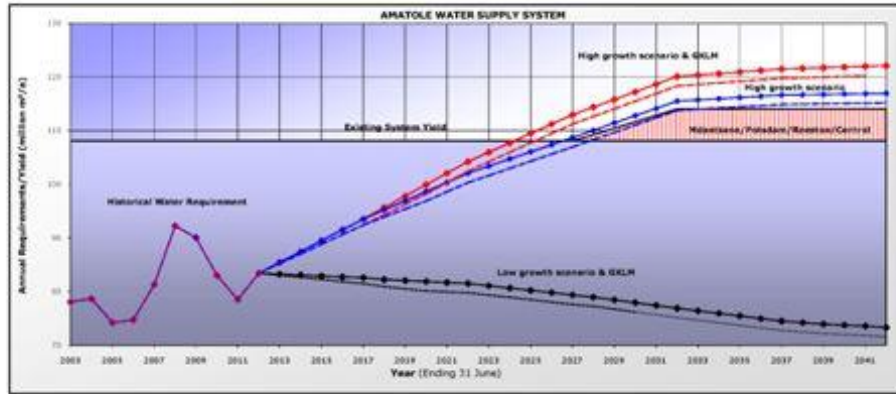


System Yield = 100 million m³/a (integrated system operation – current operating rules)

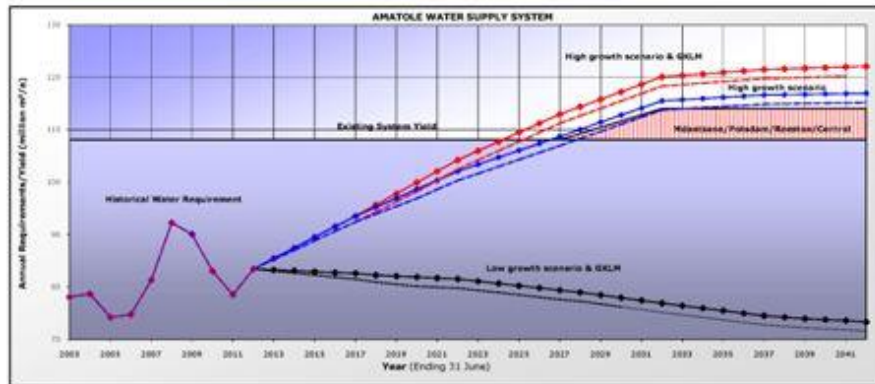


System Yield = 100 million m³/a (integrated system operation – current operating rules)

I2 : No EWR: “High” Yield

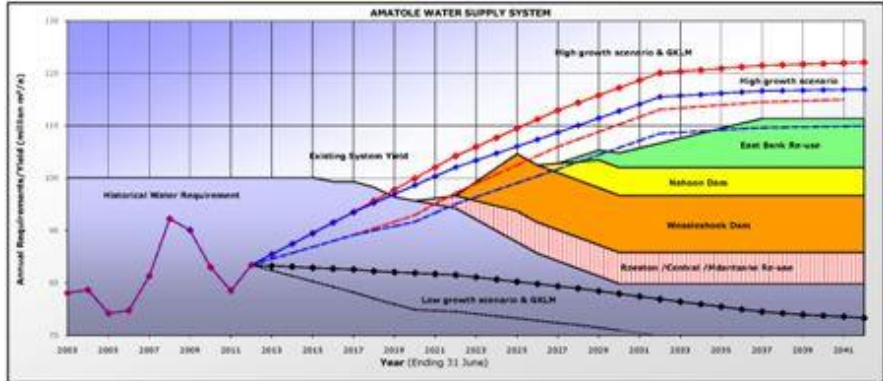


System Yield = 100 million m³/a (integrated system operation – amended operating rules)

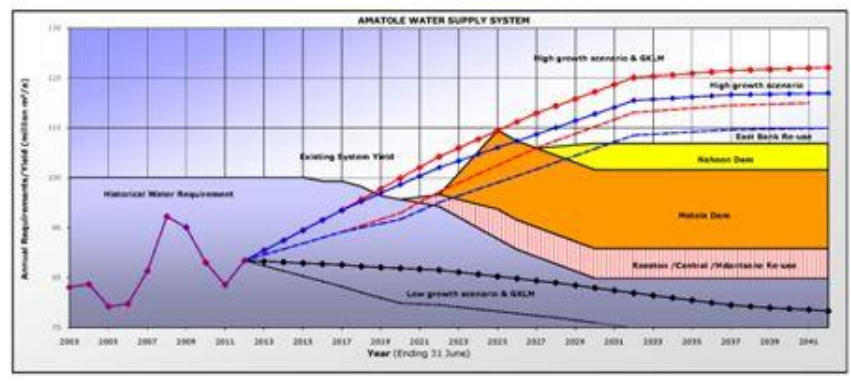


System Yield = 100 million m³/a (integrated system operation – amended operating rules)

I3 : Full EWR: “Medium” Yield

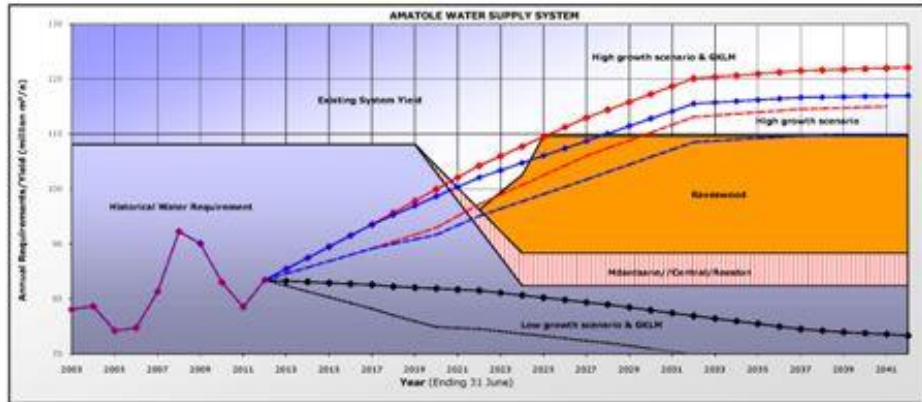


System Yield = 100 million m³/a (integrated system operation - current operating rules)



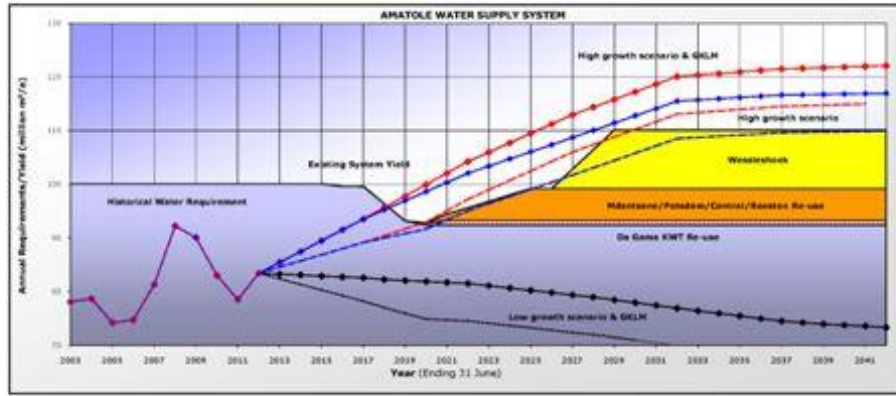
System Yield = 100 million m³/a (integrated system operation - current operating rules)

I4 : Full EWR: “High” Yield

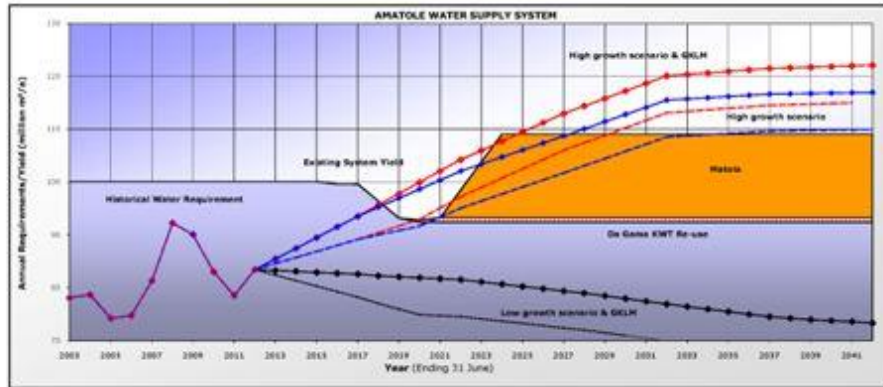


System Yield = 100 million m³/a (integrated system operation – amended operating rules)

I5 : Part EWR: “Medium” Yield

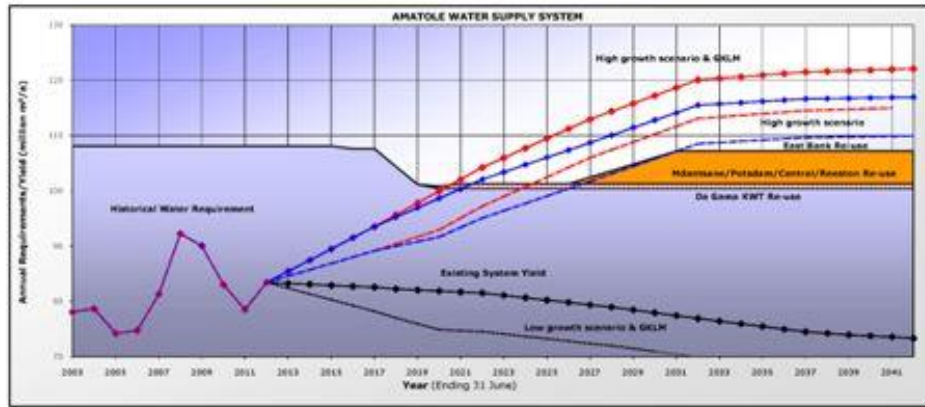


System Yield = 100 million m³/a (integrated system operation - current operating rules)



System Yield = 100 million m³/a (integrated system operation - current operating rules)

I6 : Part EWR: “High” Yield



System Yield = 100 million m³/a (integrated system operation – amended operating rules)