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Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Water Reconciliation Strategy Study for the Algoa Water Supply Area

Algoa Reconciliation Strategy

Department of Water and Sanitation

Status Report 5

Algoa Recon Strategy Status Report

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Document prepared by:

Aurecon South Africa (Pty) Ltd
1977/003711/07
Aurecon Centre
1 Century City Drive
Waterford Precinct
Century City
Cape Town
7441
PO Box 494
Cape Town
8000
South Africa

T +27 21 526 9400
F +27 21 526 9500
E capetown@aurecongroup.com
W aurecongroup.com

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Author signature		Approver signature	
Name	Erik van der Berg	Name	Erik van der Berg
Title	Technical Director	Title	Technical Director

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Department:
Water and Sanitation
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DEPARTMENT OF WATER AND SANITATION

Directorate: National Water Resource Planning

Support of the Water Reconciliation Strategy for the Algoa Water Supply System

STATUS REPORT 5

FINAL: April 2018

Prepared by:

Aurecon South Africa (Pty) Ltd
P O Box 494
Cape Town, 8000
South Africa

Tel: 021 526 5790
Fax: 086 526 9500
E-mail: erik.vanderberg@aurecongroup.com

Prepared for:

Director: National Water Resource Planning,
Director: Water Use Efficiency
Department of Water and Sanitation
Private Bag X313
Pretoria 0001
South Africa

Mr Tendayi S Makombe (PE: NWRP, Central)
Tel: 012 336 8503
E-mail: MakombeT@dws.gov.za

Mr Patrick Mlilo (D: NWRP)
Tel: 012 336 8293
E-mail: mlilop@dws.gov.za

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SUPPORT OF THE WATER RECONCILIATION STRATEGY FOR THE ALGOA WATER SUPPLY SYSTEM

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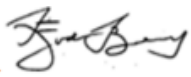

……..
E VAN DER BERG
Technical Director

DEPARTMENT OF WATER AND SANITATION
Directorates National Water Resource Planning

Approved for Department of Water and Sanitation:

……..	……..
T MAKOMBE	***P MLILO***
CE: NWRP (Central)	***D: NWRP***

Water Reconciliation Strategy for the Algoa Water Supply System

STATUS REPORT NR 5

1. Purpose of this report

This report provides information on the current water availability situation and the activities relating to the implementation of the Algoa Reconciliation Strategy. It provides pertinent background, progress made to ensure a sustainable long-term water supply to the Nelson Mandela Bay Municipality (referred to as the Metro), key issues to be addressed and recommendations on the way forward.

2. Water restrictions

Water restrictions were implemented on 30 August 2016. On 13 February 2018 the drought was reclassified as a national disaster. Since 18 January 2018, part C of the water tariffs are in force for residential use, and part B for commercial and industrial premises. On 26 March 2018 the total combined capacity of the 10 dams supplying the Metro was 24.8 %.

3. Background

The Algoa Reconciliation Strategy was completed in 2011 by the then Department of Water Affairs in cooperation with the Metro and other stakeholders, to secure a sustainable future water supply for the Metro and the other towns served by the Algoa Water Supply System. The major irrigation schemes that are situated around the Metro are also addressed in the strategy. Implementation of the Strategy will ensure that interventions to augment the water supply will be studied and implemented in time to prevent unacceptable risks of water restrictions.

The purpose of the Strategy is to:

- Annually determine the system water balance,
- Annually update possible future water balance scenarios for a 25-year planning horizon,
- Track progress of the planning and implementation of interventions and update relevant information,
- Monitor other information relevant to the Strategy and activities that may impact on the Strategy.

4. Progress

a. Management of the Strategy

The Strategy Steering Committee monitors the implementation of agreed strategies/actions, updates the strategy as it becomes necessary, and informs all stakeholders and the public of progress with the implementation of the Strategy and the existing water availability situation in the Algoa Water Supply System. They are supported in this by the Administrative and Technical Support Group. These committees were constituted in 2011. The Strategy Steering Committee meets twice a year and the Administrative and Technical Support Group meets two weeks before and after each Strategy Steering Committee meeting, and sometimes in-between as required. The most recent Administrative and Technical Support Group meeting was held on 7 March 2018, and the next SSC meeting will be held on 18 April 2018.

b. Communication

The Reconciliation Strategy Study aims to facilitate contributions from stakeholders and the public. A media release is issued annually after the final Steering Committee meeting of the year. A Strategy Status Report is compiled, disseminated and presented annually during September. A web page is also available on the DWS website with all information and reports relevant to the study. The web page can be accessed at http://www.dws.gov.za/Projects/Algoa.

c. Temporary Drought Measures

A temporary drought measure is to construct temporary bulk water infrastructure, to be able to abstract the 210Mℓ/day peak flow planned for Phase 3 of the Nooitgedagt Low Level Scheme, from the lower Sundays River. This will be made possible by constructing a temporary raw water by-pass at Nooitgedagt water treatment works, to supply raw water (50 to 70Mℓ/day) to the High Lift pump station. The raw water will be pumped to Grassridge Reservoir, which is being modified into a temporary treatment works.

Other modifications are planned at the Nooitgedagt water treatment works to ensure that the treatment works can deliver 160Mℓ/day (Phase 2 peak) in the short-term.

The raw water from the lower Sundays River will be pumped to Grassridge reservoir. Grassridge Reservoir is being modified at present into a temporary treatment works with facilities for chemical dosing, desludging, disinfection and operator facilities. Treated water from Grassridge reservoir will be blended with treated water delivered via the Nooitgedagt Low Level pipeline, at the Motherwell reservoir.

Rezoning has been done to increase the demand zone dependent on Orange River water.

Because of the increased flow in the Chelsea-Motherwell pipeline, the pressure will drop in the pipeline, resulting in the Despatch Tower running dry. An emergency pump station is therefore required at Chatty reservoir to boost water into the Despatch Tower zone. A decommissioned 500mm dia pipeline at Chatty will have to be recommissioned to minimise the pressure losses in the system. Water will be boosted via the Standford Road pump station to the Chelsea reservoir.

To supply Orange River water to the Churchill pipeline, and hence to Kwanobuhle (in the Loerie Zone) once the Kouga Dam fails, the Chelsea pump station need to be upgraded.

d. Improving the confidence of water availability: proposed water availability assessment study

As the surface water resources of the Kromme and Kouga catchment areas could be under stress, the need for verification and validation (V&V) of water use for these areas was identified. The verification and validation of water use of a significant part of the Kouga River catchment was previously completed. The PSP's contract for V&V project for the whole of the Eastern Cape ended on 31 March 2018. The status is that the Validation process is complete with the Verification process 54% complete. The PSP trained the CMA's technical staff to continue with the Verification process.

The information gathered by the V&V projects will be used as input to the future planned Water Availability Assessment Study for the Kromme and Kouga catchments. This study is expected to be initiated after the verification and validation has been completed.

e. Coega Industrial Development: Water Requirements

The Coega Special Economic Zone (SEZ) has forty-two (42) operational investors worth a combined investment value of seven billion rand (R 7 billion).

The estimates of the bulk water studies for the uptake of industrial water requirements have remained consistent over the past number of years. Planning for Bulk water is guided by the Coega East Master Plan (2014) and the Coega IDZ Water, Sewer and Return Effluent Master Plan (2009). A Demand / Discharge model provides potable water and industrial water demands as well as effluent discharges from all zones in the Coega SEZ. While projections of water demand have remained constant, the temporal aspects of the demand are affected by the lack of certainty in respect of the new heavy industries, which have previously committed and then either postponed or withdrawn their proposed developments.

The availability of industrial water is a requirement for establishing heavy industries in the Coega SEZ. Similarly, the implementation of solutions for the provision of Return Effluent (Industrial Water) to the SEZ, is dependent on the availability of off takes for the water. Thus, the uptake of industrial water will remain uncertain until such time that the availability of industrial water supplies and use can be confirmed. The supply of industrial quality water is a requirement of the environmental authorisation for establishing large industries at the Coega IDZ. The lack of confirmed availability of industrial quality water can pose serious challenges to attracting future development to the Coega IDZ.

In terms of the future water requirements, according to projections done under this Strategy Support Study and the Water Master Plan Review document of the Metro, surplus potable water can be available from the Nooitgedagt/Coega Low-Level Scheme (Phase 3), once completed in September 2019. The potable water can be cost-effectively used as an interim industrial water supply to the Coega IDZ. In the interim, bulk water infrastructure that is already in place for the delivery of industrial water (such as the return effluent reservoir on Coega Kop), will (as an interim measure) be utilised to supply potable water to the Coega SEZ. The environmental authorisation conditions applicable to large water users, that industrial water requirements should be met by the reuse of treated wastewater, will remain. Provision is however made for the use of potable water, as an interim measure, to address any potential gap between the requirement for industrial water and the availability thereof.

Water demands of the Coega SEZ will continue to be closely monitored, particularly in terms of timeframes of demand for industrial water, with the view to establishing the tipping point for the implementation of the return effluent solutions required for the SEZ.

f. Water Conservation and Water Demand Management (WC/WDM)

WC/WDM was identified in 2010 as a key action for NMBM to reduce water use and non-revenue water.

As the NMBM is currently experiencing one of the worst droughts in decades, WC/WDM has become even more important. The NMBM have been active in implementing WC/WDM measures for over seven years, but have also implemented additional measures since the introduction of water restrictions in July 2016. A large publicity and marketing campaign was launched to reduce water consumption and this continued as the drought intensified.

Despite limited provision for operating and capital budgets, shortage of technical staff and delays in supply chain management processes, real losses were reduced. For the 2015/16 to 2016/17 financial years, non-revenue water reduced from 43.4% to 37.5% and physical water losses reduced from 37.3% to 29.4%.

The NMBM have been active in implementing WC/WDM measures for over seven years but have implemented additional measures since the introduction of water restrictions in July 2016. All planned WC/WDM interventions are continuing, with pressure management and leak repairs on bulk pipelines making an impact. High consumers are being targeted with the installation of flow limiting meters. Despite this, consumption increased from 259 Mℓ/day in May 2017 to 289 Mℓ/day in January 2018. Consumption dropped slightly over February and March 2018 to 275 Mℓ/day.

The increased output from Nooitgedagt WTW, to a maximum of 140 Mℓ/day since July 2017 has resulted in reduced abstraction from the western supply sources. Dam storage has continued to decline to 24%, despite some inflow from summer rainfall. Parts of the city are being rezoned to the Nooitgedagt supply, to maximise the available supply.

Non-revenue water volumes fluctuate monthly, mainly due to fluctuating billing volumes. From 2015/16 to 2016/17 financial years, non-revenue water reduced from 43.4% to 37.5% and physical water losses reduced from 37.3% to 29.4%. Volumes for 2017/18 will only be available in the second half of the year.

g. Implementation of the Nooitgedagt/Coega Low-level Scheme

The Metro is constructing the Nooitgedagt/Coega Low-Level Scheme (NCLLS) as an extension to the existing Nooitgedagt High-Level Scheme, that will treat Orange River water, delivered through the Orange-Fish-Sundays River system, to drinking water standard for supply into the Metro's water supply system.

The Metro is completing the outstanding works on the project in a phased approach, in line with the capacity of its capital budget. Phase 1 ensured an average supply of 90 Ml/day (32.9 m^3/a), which is the existing capacity of the WTW. Phase 2 ensured an average supply of 140 Ml/day (51.1 m^3/a). Phase 3 will ensure an average supply of 160 Ml/day (58.4 m^3/a) which is the full allocation of NMBM from the OFS Scheme. The peak capacity of Phase 3 will be 210 Ml/day (76.7 m^3/a)

The implementation status is as follows:

Phase 1 was implemented by the Metro and is practically complete.

Phase 2 is practically complete and was funded by the Metro (R128 million, excl. VAT). Phase 2 comprised of an additional 6 filters and a low-lift pump station at Nooitgedagt WTW, three separate contracts for civil works, mechanical and electrical works at the WTW, and mechanical and electrical works at the pump station.

Phase 3 involves the construction of an additional 70 Mℓ/day (peak) module at Nooitgedagt WTW (civil, mechanical and electrical works), a 45 Mℓ reservoir at Olifantskop (in addition to the 10Mℓ reservoir previously constructed at the Olifantskop site), cathodic protection and AC mitigation measures on the Nooitgedagt and Churchill pipelines, and rehabilitation of the Chelsea-Motherwell pipeline. The Metro has received a regional bulk infrastructure grant of R437 million, over 3 years, for the completion of the Nooitgedagt Scheme. Phase 3 is currently underway and is progressing well. The contractor was appointed in December 2016, with the commencement date being 19 May 2017. Phase 3 is expected to be completed by February 2020.

h. Water Use Efficiency Study

As part of the Algoa Reconciliation Strategy study, the water use efficiency of the Eastern Cape Province Orange-Fish-Sundays (OFS) Transfer Scheme was evaluated. The study recommended several water use efficiency interventions.

The recommendation made for potential additional future allocation of Orange River water to the NMBM, through efficiency savings in the longer-term, is 18.25 million m^3/a, which is equivalent to 50 Mℓ/day. This will require Phase 3 of the Nooitgedagt WTW to be run at its full capacity of 210 Mℓ/day (with no peaking capacity). Should the further allocation be made, this may potentially require additional peaking capacity to be constructed for the WTW and may have other bulk conveyance, pumping and/or power supply implications. It is recommended that the NMBM submit an application to the DWS for an additional allocation of 18.25 million m^3/a (50 Mℓ/day) to utilise transferred Orange River water that is saved by effective water use efficiency measures. For the DWS to favourably consider such an application, it would need to be evident that water use efficiency measures were being effectively implemented to provide efficiency savings.

The long-term target for potential reduced transfer of Orange River water to the Eastern Cape Province, aligned with expected savings from water efficiency interventions, is 64 million m^3/a, to potentially be utilised within the Orange River Basin, taking into account potential additional future allocations of water to small towns of 7 million m^3/a. This potential water saving is a long-term target volume, and is dependent on the effective implementation of the efficiency interventions recommended in the study.

i. Feasibility Study

The purpose of the Feasibility component of the Support of the Water Reconciliation Strategy for the Algoa Water Supply System study is to remove potential operating system constraints for sustainable delivery of bulk Orange River water to both the Lower Sundays River WUA and the Metro, for water requirements up to 2040. The objective is to limit risks of shortfall in supply, as well as operational risks, to acceptable levels. This investigation is ongoing, and is planned to be completed by March 2019.

Various potential balancing dam sites were identified in the vicinity of Scheepersvlakte Dam and the Nooitgedagt WTW. These options were compared in terms of estimated costs, operational complexity, location, ecological considerations, flood considerations and environmental and social impacts. The Lower Coerney and Upper Scheepersvlakte Dam sites were selected to be evaluated further. The topographical survey and geotechnical evaluation of these sites commenced in March 2018. This will be followed by the feasibility design of the preferred option.

j. Other interventions

Groundwater: DWS has indicated that groundwater is generally under-utilised and that the water scarce areas should focus on the possible abstraction of groundwater. The potential groundwater sources have been identified during the Reconciliation Strategy Study.

After extensive investigations, that included geophysical and resistivity as well as magneto-telluric analyses, the Metro appointed a driller and drilling started in March 2014 in the Coega Kop area. Twenty-seven probe/exploration holes have been drilled during 2014/15. Procurement of a specialist driller has progressed well and drilling should commence in May 2018. Drilling should be completed by January 2019. The design of the water treatment works is underway. Construction of the treatment works should start in January 2019 and be completed in December 2020. Options for a 3Mℓ/d emergency water treatment works is currently being considered, and will be decided upon should the drought persist. Because the aquifer is artesian, boreholes are designed and will be constructed to ensure that they do not leak when not in use. Care is taken to minimise the surface impact, with strict environmental control, and most importantly, future abstraction will be designed to ensure that the aquifer cannot be over-pumped. The "sustainable yield" of the aquifer is estimated at between about 35 - 43 Mℓ/day. The Metro has applied for a groundwater use license of 26 Mℓ/day which includes the flow from the Uitenhage Springs. Water quality testing still needs to be completed to determine the actual iron and manganese content of the water. The entire well field still needs to be test-pumped.

Explorational drilling is also currently underway at Churchill Dam and Moregrove quarry. A company was appointed for drilling and yield testing of additional boreholes around Port Elizabeth at selected locations. This includes the sites like reservoirs, municipal sports fields, hospitals, clinics, frail care and old age homes, municipal parks and water treatment plants.

Water re-use: The scheme involves large-scale supply of treated water from the Fish Water Flats Waste Water Treatment Works (WWTW) to industries in Port Elizabeth and the Coega Industrial Development Zone (IDZ). The first phase of supply is based on the understanding that the Metro will supply 30 Mℓ/day of Category 4 industrial process water from the Fish Water Flats WWTW via a balancing storage reservoir at Coega Kop to the IDZ. The second phase of the scheme will increase the water re-use scheme to 60 Mℓ/day and will incorporate a new storage reservoir(s) at Olifantskop. This will be constructed at a future date and is excluded at this stage. The environmental impact assessment for the scheme to supply the IDZ has been approved by the Dept. Economic Development, Environmental Affairs and Tourism. The design of the scheme is complete and a 17 Mℓ reservoir at Coegakop is currently being completed. The implementation of the remainder of the scheme is dependent on the water requirements from large water users establishing in the IDZ. There is currently a fairly small demand for industrial water, which is being met by potable water supply. The construction of the remainder of the scheme will take 18-24 months to complete and R600 million is needed to bring the bulk supply conveyance infrastructure to the Coega IDZ boundary. The Coega Development Corporation will need to procure additional funds to complete the reservoir as NMBM does not have the funds.

Desalination of Seawater - Schoenmakerskop: Several investigations have been done into possible locations for a desalination plant, to augment the water supply in the NMBM. These included various sizing and implementation options. A 60Mℓ/d Feasibility investigation was undertaken in two phases, these being a Site Selection and a Detailed Feasibility Investigation. The siting was concluded with the Schoenmakers inland site at the western side of the city being recommended as the preferred site. The feasibility study got underway, but was stopped early in 2017, with the pre-feasibility investigations, site selections and marine bathymetry having been completed, and with the water quality monitoring evaluation done at desktop level. According to the NMBM Drought Mitigation Plan Interventions update (March 2018), a proposal was made to implement the plant in phases, with a proposed 20-30Mℓ/d emergency plant constructed first. A concept design for an emergency plant has been drafted and should the NMBM dam levels become critically low, this project could be initiated.

Desalination of Seawater - Marina Desalination Plant: Following the drought of 2010 / 2011, several investigations have been done into possible locations for a desalination plant to augment the water supply in the NMBM. Ab Inbev & Marina Salt Works Collaboration is one of these options. Marina Salt has proposed that it will construct a desalination plant which will produce a basic supply of 26 Mℓ/d of potable water provided that the NMBM purchases potable water through an offtake agreement between the two parties. The right of the NMBM to conclude an off-take agreement with Marina Salt and the definitive agreements contemplated therein is regulated by a number of Local Government Laws as well as other National Legislation. Together with the legislative concerns the financial implications to the Metro still need to be carefully considered.

Evaluation of Kouga River dams: An updated dam safety evaluation found that no major dam safety rehabilitation work is necessary for the existing Kouga Dam wall, as previously indicated. It is planned to update the assessment and cost of a potential large dam in the Kouga River (either a new dam at Guernakop or a raised Kouga Dam) later in 2018, potentially at a pre-feasibility level.

5. Recommendations

The most significant issues that requires support and urgent attention are the following:

a. Completion of the Nooitgedagt/Coega Low Level Scheme and Phase 3 of the Nooitgedagt Water Treatment Works as soon as possible is critical, as this can significantly improve the situation.

b. Finalise implementation of the Coega Kop groundwater scheme.

c. Effective WC/WDM within the Metro is extremely important to curb water use.

d. It is important that efficient water use be sustained when restrictions are lifted.

e. Reduction of non-revenue water is a long-term programme initiative, that must be funded on a continuous basis, to achieve the goals set out in the Integrated Water Resources Management Strategy of the Metro.

f. The implementation of temporary drought measures at the Nooitgedagt Water Treatment Works and the further distribution, treatment and blending of Orange River water should proceed, as well as the rezoning to increase the demand zone dependant on water supplied from the Orange River. The development of emergency groundwater schemes should also proceed.

g. Funding: R600 million of funding for the Metro's Fishwater Flats WWTW Re-use Scheme is needed, for water supply to the Coega IDZ (industrial quality process water). Without this development being assured, it is unlikely that significant industries will commit to development in the Coega IDZ.

Aurecon South Africa (Pty) Ltd

1977/003711/07

Aurecon Centre
1 Century City Drive
Waterford Precinct
Century City
Cape Town
7441

PO Box 494
Cape Town
8000

South Africa

T +27 21 526 9400

F +27 21 526 9500

E capetown@aurecongroup.com

W aurecongroup.com

Aurecon offices are located in:
Angola, Australia, Botswana, China, Ethiopia, Ghana, Hong Kong, Indonesia, Lesotho, Libya, Malawi, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam.