ENVIRONMENTAL IMPACT ASSESSMENT

Updated Final Environmental Impact Assessment Report for the Proposed Construction, Operation and Decommissioning of a Seawater Reverse Osmosis Plant and Associated Infrastructure in Tongaat, Kwazulu-Natal

VOLUME 1 OF 2

UPDATED FINAL EIA REPORT

DEA Reference No: 14/12/16/3/3/2/652

June 2018

Prepared by:
Ms Annick Walsdorff
CSIR, PO Box 320, Stellenbosch, 7599

Prepared for:
UMGENI WATER AMANZI
(UMGENI WATER)

CSIR REPORT NO:.
CSIR/CAS/EMS/ER/2014/0013/B

CSIR
our future through science

UMGENI WATER • AMANZI

REPORT DETAILS

Title:	Environmental Impact Assessment (EIA) for the Proposed Construction, Operation and Decommissioning of a Seawater Reverse Osmosis Plant and Associated Infrastructure at Tongaat, KwaZulu-Natal North Coast: Updated Final EIA Report
Purpose of this report:	This Updated Final EIA Report forms part of a series of reports and information sources that are being provided during the EIA process for the proposed Construction, Operation and Decommissioning of a Seawater Reverse Osmosis Plant and Associated Infrastructure at Tongaat, KwaZulu-Natal North Coast. In accordance with the EIA Regulations, the purpose of this Report is to: • Present the amendments to the proposed project, including project alternatives and the need for the project; • Describe the affected environment, including the planning context, at a sufficient level of detail to facilitate informed decision making; • Provide an overview of the EIA Process, including public consultation; • Assess the predicted positive and negative impacts of the project on the environment; • Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project; • Provide a Draft Environmental Management Programme (EMPr) for the design, construction and operational phases of the project. This Updated Final EIA Report and EMPr are being made available to all stakeholders for a 21-day review period following which it will be submitted to the National Department of Environmental Affairs (DEA) for decision-making. All stakeholders are invited to comment on the Final EIA Report, with comments to reach the National Department of Environmental Affairs by 24 July 2018. Please provide a copy of such comments to the Environmental Assessment Practitioner (contact details below) **Ms Matlhodi Mogorosi (DEA Case Officer)** National Department of Environmental Affairs Private Bag X 447, Pretoria, 0001; or Environmental House, 473 Steve Biko Road, Pretoria 0001 Fax: 012 – 320 7539 Email: MMogorosi@environment.gov.za
Prepared for:	Umgeni Water Amanzi (Umgeni Water) - Proponent Contact: Phumi Ndlovu Tel: +27-31-268 7172 / Cell: +27-83-581 1904 / Email: Phumi.Ndlovu@umgeni.co.za
Prepared by:	CSIR - Environmental Assessment Practitioner P O Box 320, Stellenbosch, 7599 Tel: +27-21-888 2400 Fax: +27-21-888 2693
Authors:	Annick Walsdorff, Rohaida Abed and Paul Lochner
CSIR Report Number:	CSIR/CAS/EMS/ER/2014/0013/B
DEA Ref Number:	14/12/16/3/3/2/652
Date:	June 2018
To be cited as:	CSIR (2018): Updated Final EIA Report for the Proposed Construction, Operation and Decommissioning of a Seawater Reverse Osmosis Plant and Associated Infrastructure at Tongaat, KwaZulu-Natal North Coast.

CONTENTS

PART A: UPDATED FINAL EIA REPORT

Appendices

PART B: DRAFT EMPR

STATEMENT OF INDEPENDENCE

CSIR has been commissioned by Umgeni Water to conduct an EIA in terms of the 2010 EIA Regulations R543, R544, R545 and R546 under the National Environmental Management Act, 1998 (Act 107 of 1998, with amendments). CSIR complies with the general requirements set out below in the Regulations:

General requirements for EAPs or a person compiling a specialist report or undertaking a specialised process

An EAP appointed in terms of regulation 16(1) must -

a) be independent;
b) have expertise in conducting environmental impact assessments, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity;
c) perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
d) comply with the Act, these Regulations and all other applicable legislation;
e) take into account, to the extent possible, the matters referred to in regulation 8 when preparing the application and any report relating to the application; and
f) disclose to the applicant and the competent authority all material information in the possession of the EAP that reasonably has or may have the potential of influencing-
    - any decision to be taken with respect to the application by the competent authority in terms of these Regulations; or
    - the objectivity of any report, plan or document to be prepared by the EAP in terms of these Regulations for submission to the competent authority.

Paul Lochner
CSIR Project Leader
EAP-SA

Annick Walsdorff
CSIR Project Manager

May 2018

SUMMARY

PROJECT AND APPLICANT OVERVIEW

Umgeni Water Amanzi (Umgeni Water) (i.e. the Project Applicant) is proposing to construct and operate a sea water desalination plant in the Tongaat area (on the north coast of Durban, within the eThekwini Municipality) using sea water reverse osmosis (SWRO) technology. The proposed plant will supply fresh water to the eThekwini municipality (50%) and to the Ilembe District (50%). Umgeni Water has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the requisite Environmental Impact Assessment (EIA) and determine the biophysical, social and economic impacts associated with undertaking the proposed activity. The proposed project requires an EIA in terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and its amended EIA Regulations (i.e. Government Notice (GN) R543, R544, R545 and R546); as promulgated on 18 June 2010.

Umgeni Water is a state-owned entity and is the largest supplier of bulk potable water in KwaZulu-Natal. The organisation was established in 1974, and has grown over the years to become an entity of strategic importance in KwaZulu-Natal. Umgeni Water has six municipal customers, namely eThekwini Metropolitan Municipality, Ilembe District Municipality, Sisonke District Municipality, Umgungundlovu District Municipality, Ugu District Municipality and Msunduzi Local Municipality. The organisation currently supplies 426 million m^3 of potable water to its six municipal customers. The proposed project will service the requirements of the eThekwini Municipality.

NEED FOR THE PROPOSED PROJECT

The proposed Umgeni Water desalination plant will aim to ensure the promotion of sustainable economic development by serving the interests of a growing population as well as other commercial interests in the region. It is recognised that the future of the North Coast region of KZN is greatly dependent on an alternative water source to augment water supply of which desalination is one option.

The main objectives of the proposed desalination plant are to:

- develop a long term, sustainable alternative water source for the east coast region that is rainfall/climate-independent and ensures long-term security of supply; and
- establish a world-class and cost-effective desalination plant, whilst minimising the harmful environmental impacts of the desalination plant through comprehensive scientific investigation and consistent stakeholder engagement.

Rainfall in South Africa is highly variable in spatial distribution and unpredictable, both within and between years. Much of the country is arid or semi-arid and the whole country is subject to droughts and floods. Bulk water supplies are largely provided via a system of large storage dams and inter-basin water transfer schemes. Thus, a reduction in the amount or reliability of rainfall, or an increase in evaporation may exacerbate the already seriously limited surface and ground water resources in South Africa. According to the South African National Water Resource Strategy, South Africa will face serious water challenges in the near future if the economic growth envisaged for the country is to be sustained.

The Water for Growth and Development Framework (DWAF, 2011) stated that "water scarcity has been identified in the major urban centres. These major urban areas anchor the country's economy, and the Department has to invest heavily in the diversification of its water mix in order to prevent serious water shortages from adversely impacting on our economy. In addition to the traditional augmentation schemes,

two major ways that water supplies can be augmented are the treatment of effluent and the desalination of sea water for productive use. For the latter, major advances in the field of membrane technology during the past two decades have meant that RO as a means of sea water desalination has become a competitive alternative water source. A key principle behind assuring local water supplies is to limit the expense of transporting water by keeping supplies as close to the end-user as possible".

The Spring Grove Dam was constructed as part of an inter-basin transfer scheme between the Mooi River and the Mgeni Catchment to augment the water resources in the Mgeni. However, with the current growth in water demand, even this scheme will soon not be enough to provide the required assurance of supply to Durban, Pietermaritzburg and surrounding areas. The Department of Water and Sanitation's Reconciliation Strategy Study for the Kwazulu-Natal Metropolitan Coastal Areas (2015-Ongoing) indicates that even with further augmentation of the Mgeni System (including the implementation of Spring Grove Dam and the planned Mooi-Mgeni Transfer Scheme Phase 2) by an additional 137 Ml/day (50 million m^3/a), the supply of water in future will still not exceed the required 99% assurance of supply. This was also confirmed by Umgeni Water planning services division which undertakes long term plans (Supply and Demand forecasts) for all areas supplied by Umgeni Water. Therefore, alternative schemes such as the proposed Lower Thukela Bulk Water Supply Scheme, Mvoti Dam and uMkhomazi project are also being considered. Phase 1 of the proposed uMkhomazi Water Project is planned to secure an additional 600 Ml/d (220 million m^3/a). This involves the potential development of Smithfield Dam located along the central reaches of the uMkhomazi River, with a storage capacity of 250 million m^3 (250 000 Ml).

The capital cost for the proposed Smithfield Dam and associated infrastructure would be about R19 billion and the scheme would take many years to construct. Therefore Umgeni Water identified a 150 Ml/day sea water desalination plant in the Tongaat area using RO technology as a possible alternative that could be implemented fairly quickly to meet the growing water demand and ensure the sustainable economic development of the region. This project would supply water to Umgeni Water's North Coast Supply System and to some of the areas supplied by eThekwini's Northern Aqueduct by reversing the flow from Waterloo Reservoir. According to Umgeni Water (2018), the recent drought in KwaZulu-Natal adversely affected their ability to supply water at an adequate assurance level and restrictions had to be imposed in most systems. The affected areas were the entire eThekwini Municipality, parts of the iLembe District and the Middle South Coast.

Umgeni Water's Infrastructure Master Plan shows that, even without the current drought, the water resources of the North Coast will not be able to meet the increased demand in five to ten years' time. It is therefore imperative that Umgeni Water augment the supply of water to the North Coast over the next five years to ensure that their customers within this region can receive a sustainable supply of water and therefore Umgeni Water is considering the proposed desalination plant as a possible alternative to quickly assist with the water shortages. This desalination plant would not be constructed to mitigate the current drought but as a long term supply option similar to the plants in Perth, Australia which operate continuously all year round.

PROJECT DESCRIPTION

The proposed desalination plant will produce approximately 150 Ml/day of freshwater when at final capacity, and will have an average inflow rate of 389 Ml/day. To give one an idea of volume and scale, this would equate to providing 187 500 four-person households with water daily assuming a 200 l/person/day scenario. Approximately 183 Ml/day of brine (concentrated sea water) will be discharged into the sea. The plant will have a payback period of 20-25 years with the potential of a lifespan extension. It may be constructed in two phases over a period of five years and will occupy an area of approximately ±70 000 m^2 (excluding servitudes for pipelines). The desalination plant will consist of the following 'Linear' and 'On-site' elements:

Linear Infrastructure

- Seawater (source water) intake with screens, sea-bed pipeline laid on the ocean floor connecting vertically into an offshore tunnel which connects to the seawater pump station located a short distance inland;
- Brine outfall constructed from the seawater pump station by means of an off-shore tunnel connecting vertically to a diffuser pipeline structure on the sea bed;
- Terrestrial pipelines comprising a very short seawater pipeline between the seawater pump station (located at the desalination plant) and the desalination plant itself, a very short brine pipeline from the plant back to the seawater pump station and treated water pipelines and a pump station connecting to the existing North Coast System via the La Mercy Reservoir; and
- Electrical power line and transformer yard infrastructure.

On-site Infrastructure

- A seawater pump station located within the desalination plant operational site;
- Pre-treatment facilities including flocculation, potentially Dissolved Air Flotation (DAF), Filtration and pre-treatment membrane filtration (Ultrafiltration);
- SWRO system (with energy recovery equipment) including cartridge filtration and reverse osmosis membranes;
- Pre-treatment and RO buildings and other smaller water treatment related infrastructure;
- The extension and/or upgrading of existing access roads;
- The development of internal access roads;
- All chemical infrastructure for conditioning of the pre and post-filtered water;
- Pump stations and booster pumps for freshwater and brine as required along the proposed terrestrial pipeline routes;
- Two freshwater holding reservoirs each of 37.5 Ml;
- Domestic sewerage treatment facility;
- Stormwater handling facility;
- Primary electricity building to be connected to 132/11kV substation;
- Desalination plant waste streams handling and treatment facilities;
- Solid wastes (i.e. screenings) handling and storage facilities; and
- A total operational site of approximately 70 000 m^2 (7 ha) including all on-site infrastructure enclosed by a 3 m high security fence.

A brief description of the key infrastructural components associated with the proposed Tongaat desalination facility is provided in Table 1 below.

Table 1: Summary of the Proposed Key Components of the Tongaat Desalination Plant

Component of the Tongaat Desalination Plant	Brief Description
Sea Water/ Marine Intake and Pipeline	▪ Sea water will be abstracted from the marine environment via an intake structure located about 650 m from shore at a water depth of about 20 m. ▪ Water will be drawn in through coarse screens on the intake structure, at a height of between 4 m and 6 m above the seabed, in order to avoid the intake of marine sediment and floating matter. ▪ A low inflow velocity of less than 0.15 m/s will reduce the intake of small fish and other marine organisms. ▪ Pipelines will transport the intake water under gravity flow to the sea water pump station on shore. ▪ Seawater passing through the intake structure will be transported to the proposed desalination plant via a 220 m long seawater intake pipeline laid on the seabed and a 680 m tunnel which will be excavated in rock under the surf zone

Component of the Tongaat Desalination Plant	Brief Description
	and under the beach, the coastal forest and the M4 highway to the pump station.
Sea Water Pump Station	▪ A sea water pump station is proposed within the footprint of the desalination plant. ▪ It is anticipated that the excavation for the invert of the pump station sump is likely to be at approximately 11 m below Mean Sea Level (MSL). This is based on the requirement that the sump at the pump station be deep enough to allow for gravitational inflow of the sea water into the sump.
SRWO Desalination Plant	▪ The proposed desalination site will require an area of land approximately 70 000 m^2 in extent (7 ha). ▪ The desalination plant is proposed at an elevation of approximately 22 m above sea level, inland of the M4 highway and about 200 m from the coast. ▪ The site is situated within approximately 3 km north of the Mdloti River estuary and constitutes a non-estuarine site.
Brine Discharge pipeline and Diffuser System	▪ From the pump station, the brine discharge pipeline will be tunnelled under the M4 highway, the coastal forest and the beach, to a diffuser sited at a water depth of approximately 10 to 12 m. ▪ Brine will be discharged via a number of outlet ports located in series along the length of a diffuser. ▪ These will discharge the dense brine upwards into the water column to provide good mixing with the ambient seawater.
Potable Water Pipelines	▪ The integration of the proposed desalination plant requires construction of three potable water pipelines. ▪ The first potable water pipeline will lead from the desalination plant in a north-west direction to the La Mercy Reservoir. From there, a second potable water pipeline will continue north-westwards from the La Mercy Reservoir to the Hazelmere Bifurcation pipeline (Tying into the Hazelmere Bifurcation pipeline would allow for water to be delivered to both the north and to the south by reversing the flow in the bifurcation pipeline). The third pipeline will extend from the La Mercy Reservoir in a south-west direction following the direction of the N2 National Road before turning westwards and coming to an end at the Waterloo Reservoir. The potable water pipelines will be developed with a capacity of more than 150 Ml/day.
Power Supply Infrastructure	▪ The proposed desalination plant is anticipated to have a total energy demand of approximately 32 MW (i.e. approximately 4 kWh/m^3 of potable water produced, while additional power will be required to pump water to the plant from the sea and to deliver potable water into the existing bulk supply infrastructure). ▪ It is expected that the total electrical connection to the proposed plant would be approximately 40 MVA. ▪ A transmission line (132 kV) would be required to transfer electricity to the desalination site and the pump station, and a substation would be required to reduce the voltage to 11 kV.
Other auxiliary infrastructures	▪ Extension and/or upgrading of existing access roads; ▪ Development of internal access roads; ▪ Chemical infrastructure for conditioning of the pre and post-filtered water; ▪ Two freshwater holding reservoirs of 37.5 Ml;

Potable Water Pipeline	Length
Tongaat Desalination Plant to La Mercy Reservoir	2.34 km
La Mercy Reservoir to Hazelmere Bifurcation Pipeline	2.67 km
La Mercy Reservoir to Waterloo Reservoir	11.41 km
TOTAL	**16.42 km**

Component of the Tongaat Desalination Plant	Brief Description
	▪ Onsite sewerage treatment facility; ▪ Stormwater handling facility; ▪ Concrete retention tank; and ▪ A 3 m high security fence.

An initial site selection Environmental Screening Study (ESS) was undertaken by Umgeni Water in 2010/2011 for site identification and assessment of the desalination plant and the associated infrastructure on the KZN coastline. This study investigated five sites on the KZN North Coast between Durban and Ballito (north of Durban) were investigated, and these included the a site near Virginia Airport; Tongati; Umhlanga by Sibaya Casino, Mdloti and Tongaat near Desainagar. On the basis of various environmental and social screening criteria, the outcomes of the site selection study indicated that the Tongaat site on the KZN North Coast was the most favourable and was assessed further as part of a Phase 1 Due Diligence Report. This report provided an overview of the proposed desalination project and associated infrastructure; and included an overview of potential social and environmental impacts. Following on from the Phase 1 Due Diligence Study, a Phase 2 Feasibility Study (and preliminary design) was undertaken by the appointed consulting engineers and completed in June 2015, which has been used to inform this EIA Process.

CONSIDERATION OF ALTERNATIVES

The alternatives assessed in the EIA Report are the most feasible and likely development options in terms of environmental, social and technical criteria. All reasonable measures to forecast the expected environmental outcomes of the proposed desalination project have been undertaken as far as possible and within the full ambit of the 2010 NEMA EIA Regulations. The alternatives noted in the Final Scoping Report were at an early stage in the EIA Process. As such, certain modifications and changes to the proposed alternatives have become necessary as a result of the findings of the detailed Phase 2 Feasibility Study. Apart from the no-go alternative, other types of alternatives were considered in the pre-feasibility planning for this project and as part of this EIA Process. The analysis of the various alternatives is presented in Chapter 2 and Chapters 6 to 13 of this EIA Report, with a summary provided below:

- No-go Alternative:

The no-go alternative assumes that the proposed project does not go ahead. This alternative provides the baseline against which other alternatives are compared and will be considered throughout the report. The main implications of the no-go alternative are that alternative and possibly more expensive water supply schemes will be developed; and that water will become more expensive and possibly more scarce in the region and water reduction strategies will need to be enforced. Further, as conventional water resources near their full potential, the region will face serious challenges in terms of sustaining the economic growth envisaged for the region.

- Location Alternatives

As highlighted in Chapter 2, an Environmental Screening Study (Aurecon, 2012) was used to assess 5 potential site locations between Durban and Ballito (north of Durban) in terms of ecological and social sensitivity to the receiving marine and terrestrial environments, as well as project technical requirements. These included a site near Virginia Airport; Tongati; Umhlanga by Sibaya Casino, Mdloti and Tongaat near Desainagar. Based on the findings of the multi-criteria analysis, the site at Tongaat was selected. This proposed site is addressed in this EIA.

- Layout Alternatives
    - Pump station - Four potential sites for the sea water pump station were considered during the feasibility study (Aurecon, 2015). Of the four potential sites, the option assessed as part of this

EIA would have the least impact in terms of overall impacted area, whilst also being located at a relatively low elevation, and without direct impact on existing structures. The other options have been discarded based on technical/engineering and environmental criteria.

- Potable Water Pipeline - The Initial route proposed for the treated water pipeline from the desalination plant to the existing La Mercy reservoir passed through a young forest containing many exotic trees (secondary forest). In August 2016, Umgeni was made aware that the location of the proposed potable rising main and servitude traverse Erf 36/776 which is an area that is supposedly approved for the development of upmarket housing due to be constructed in 2017. This section of the potable water pipeline was therefore re-routed to avoid the proposed housing development. As such an amended potable water pipeline (Alternative 1) route have been assessed in this Updated Final EIA report. The route of the pipeline from the La Mercy reservoir site to the pipeline bifurcation in the north will follow the existing pipeline servitude. A number of alternative pipeline routes from the La Mercy reservoir to Waterloo Reservoir were considered and the route selected close to the N2 and along existing roads was considered to have the lowest impact and is the route that has been assessed in this EIA.
- Powerline route - eThekwini indicated that they are currently planning several new substations in the northern side of eThekwini Municipality due to rapid growth in that area. This implementation may delay providing a supply point at Tongaat. If an application is made prior to eThekwini future networks being build, the developer (i.e. Umgeni) will have to construct the 132kV transmission line in accordance with eThekwini standard and pegged by an eThekwini approved surveyor as it would have to form part of their future network and be constructed in a servitude secured and registered by them. If however, the supply to the proposed desalination plant is coincided with eThekwini's future development, then a 132kV supply point would be available within approximately 1km from the proposed desalination plant site. The transmission line route proposed by Umgeni complies with eThekwini future network planning. However, the proposed crossing of the Mount Moreland wetland (Lake Victoria) associated with this alignment was considered an outright no-go proposition by the aquatic specialist, and no offset mitigation would compensate for its authorization. Based on the above, the proposed Initial alignment for the powerline was considered fatally flawed. A proposed amendment to the alignment was identified, which avoids the Lake Victoria wetlands and roughly follows the road alignment. In its letter dated September 2016, however, the DEA, requested a re-alignment of this proposed amended route to avoid King Shaka Conservation Area as no development within this area is allowed. As such an alternative powerline route (Alternative 2) has been assessed. In addition, following the scoping phase, an alternative alignment of the first section of the powerline has been suggested (Alternative 1 route) to minimise the visual impacts on La Mercy Residents associated with the Initial route.

- Technical and Design Alternatives
  - The technology proposed for the construction and operation of the desalination plant will be guided by industry standards and global best practice. The applicable technology alternatives for this project relate to the infrastructure being installed and constructed. As noted above, a detailed feasibility study was undertaken by the applicant. The study assessed the various technology and design options for the proposed project and recommended (technically, economically and environmentally) feasible options to be considered during the detailed design phase.

NEED FOR AN EIA AND APPROACH

As noted above, in terms of the EIA Regulations promulgated under Chapter 5 of the NEMA published in GN R543, 544, 545 and 546 on 18 June 2010 and enforced on 2 August 2010 (as amended), a full Scoping and EIA Process is required for the proposed project. The need for the full Scoping and EIA is triggered by, amongst others, the inclusion of the Activity 14 listed in GN R545 (Listing Notice 2):

- *"The construction of an island, anchored platform or any other permanent structure on or along the sea bed excluding construction of facilities, infrastructure or structures for aquaculture purposes".*

An Application for Environmental Authorisation was lodged with the National Department of Environmental Affairs (DEA) (i.e. the Competent Authority) in December 2013, in terms of the 2010 NEMA EIA Regulations (prior to the promulgation of the 2014 EIA Regulations). The Final Scoping Report was accepted by DEA on 17 June 2015 allowing the project to proceed to the EIA Phase.

In its letter dated September 2016, the DEA rejected the Final EIA report and requested that the following additional information be submitted and that the EIA report be amended:

1) Detailed motivation on why other alternative sites within the Tongaat area were not assessed.
2) Re-alignment of the proposed powerline to avoid King Shaka Conservation Area and re-alignment of the proposed potable water pipeline from La-Mercy Reservoir to Waterloo Reservoir to avoid the Northern Wetland Offset Framework.
3) Inclusion of a wetland offset plan as part of the EIA report.
4) Confirmation from eThekwini Municipality that the Municipality has capacity to provide electricity to the proposed development.

In addition, on 10th August 2016, Umgeni has received a correspondence from Mr Shrivaar Singh stating that the location of the proposed potable rising main and servitude traverse Erf 36/776 which is an area that is approved for the development of upmarket housing due to be constructed in 2017. This section of the potable water pipeline was therefore re-routed to avoid the proposed housing development.

An Amended Application for Environmental Authorisation was submitted to the National DEA (a copy of which is included in Appendix B).

The results of the specialist studies and other relevant project information are summarized and integrated into the EIA Report. This EIA Report also includes an updated Draft Environmental Management Programme (EMPr) (as Part B of the report), which has been prepared in compliance with the relevant regulations and which is based on the recommendations made by specialists for design, construction, operation, and decommissioning of the project. The Draft EMPr is also based on the Umgeni Water Particular Specification for Environmental Management of Construction Projects (Version 001, dated February 2010), which has been compiled by Umgeni Water for implementation across all their construction and infrastructure projects in order to avoid and/or manage potential negative impacts.

This Updated Final EIA Report and EMPr are now submitted to the DEA for decision-making and circulated for a 21-day public review period. All comments need to be sent directly to the DEA Case Officer.

This Report is available at the Tongaat Beach Public Library (51 Dolphin Ave, Seatides, 4399) and on the following project website: https://www.csir.co.za/environmental-impact-assessment . Written notifications, hard copies and/or CDs containing the document were sent to key stakeholders, including authorities. All I&APs on the project database have been notified of the release of the Updated Final EIA Report and EMPr.

REQUIREMENT FOR A COASTAL WATER DISCHARGE PERMIT AND WATER USE LICENCE

The operation of the proposed desalination plant requires a Coastal Waters Discharge Permit in terms of the National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008) in order to enable the disposal and discharge of effluent to sea. The Coastal Waters Discharge Permit was submitted to the DEA Branch: Oceans and Coasts (Directorate: Coastal Pollution Management) in December 2015. A copy of the Coastal Waters Discharge Permit is included in Appendix F of the EIA Report.

In addition, a Water Use Licence (WUL) will be required in terms of Section 21 of the National Water Act (Act 36 of 1998) as a result of the proximity to or the crossing of nearby watercourses or identified wetlands by the proposed terrestrial pipelines. Additional information regarding the need for a WUL is provided in Chapter 8 of the EIA Report. The WUL Application is planned to be submitted to the decision-making authority, the KZN Department of Water and Sanitation, after the release of the Final EIA Report (Note that Umgeni Water made an internal decision to put the WULA on hold until a firm decision has been made whether the project will go into construction). The KZN Department of Water and Sanitation was consulted during the EIA Process to confirm the need for a WUL, confirm the requirements thereof, and to seek comment on the proposed project. At this stage, activities that would definitely trigger either a General Authorisation Registration or WUL requirements would include:

- Construction of the proposed desalination plant in a wetland;
- Excavation of pipelines through or within 500m of a wetland – this applies to all of the wetlands described in this study including the Lake Victoria wetlands;
- Construction of transmission lines across wetlands or rivers;
- Passage of pipelines across wetlands or rivers; and
- The proposed potable freshwater holding reservoirs each of 37.5 Ml capacity (2 x 37.5Ml), as their storage capacity exceeds 10 000 m^3.

IMPACT ASSESSMENT

Provided the stipulated management actions are implemented effectively, two (2) **negative** impacts of **high residual** significance are still predicted to occur as a result of this project, namely short term visual impacts associated with construction activities, and the emotional impact due to permanent loss of land and housing. The remaining impacts are all predicted to be of **very low** to **medium** significance rating providing that the recommended management actions are effectively implemented. It must be noted that the destruction of wetlands associated with construction activities has been assessed to be of **medium** to **high** significance after mitigation. In addition to the recommended on-site mitigations, as required to minimise direct impacts associated with loss of wetland ecosystem services on the site, off-site mitigation in the form of off-site offset rehabilitation of degraded wetlands is required to attempt to offset the net loss of wetlands associated with the proposed desalination plant and to address Cumulative Impacts.

The **positive** impacts generated by the project are associated with the economic benefits from employment opportunities, knowledge gained from conservation of potential fossil finds and the fact that the proposed facility is largely compatible with relevant water supply planning. Of **high** significance is the **positive** benefit that the proposed project would bring to alleviating serious water shortages in the study area and surrounding regions, in particular given increased variability in rainfall as a result of climate change. The amount of water generated by the proposed plant would equate to providing 187 500 four-person households with water daily assuming a 200 l/person/day scenario. The desalination plant will provide water to residential, commercial and industrial development both north and south of the plant site. The plant is proposed to serve the increasing demand along the entire North Coast Area, with the supply areas extending from Stanger in the North to Cornumbia, Verulam and Waterloo in the South.

Although decommissioning must be considered as a possibility, the probability of the plant being decommissioned is near zero. The intention would be to manage the plant indefinitely and to upgrade components of the plant as and when required. Once commissioned the plant would form an integral part of

the supply system for the North Coast and as such will be needed for future supply to the area. Seawater desalination technologies will improve with time and it is possible that components of the scheme may be replaced (mostly internal process components) as these technologies improve. However, it is extremely unlikely that the plant will be decommissioned in totality.

Refer to Table 2 below for summary of impacts.

CUMULATIVE EFFECTS

Cumulative impacts are defined as the impact on the environment, which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (CEQ, 1997). Bear in mind also that the distinction between cumulative and other impacts is often difficult to make. The assessment of cumulative impacts is also generally more difficult primarily as they often require more onerous assumptions regarding the likely actions of others.

It is expected that the project would facilitate further development in the wider area through the potential to influence investors (including locals) due to the availability of water supply which is a pre-requisite for such development. This would result in cumulative **positive** impacts of **medium** to **high** significance on overall investment levels. In a sense the project has the potential to lead to the 'crowding in' of further investment.

Concerns have however been raised that the proposed development would open the way for more industrial development in the immediate vicinity of the site. It is not possible to predict outcomes in this regard as future land use will depend on developer interest and what the Municipality approves. Residential development is, however, currently indicated in municipal planning for the area surrounding the site. Its suitability for industrial development beyond a desalination plant is thus not clear at this stage along with the potential for the development of an industrial node. However, it is not believed that the establishment of the desalination plant will lead to the growth of other industry in the area.

Given that the plans for the future of this region, Northern Coastal Corridor, indicate that most of it will be used for residential areas, the desalination plant is anticipated potentially have a cumulative landscape and visual impacts on the area of medium significance since it is a large industrial development which will be surrounded by low density residential areas.

Aside from issues discussed above, cumulative impacts on tourism and property values are expected to be driven primarily by cumulative visual, noise and ecological impacts.

From a coastal and marine environmental perspective, given the current past and future proposed development along the coastline of the project area, cumulative impacts as well as further disturbances to marine or coastal systems or features can be expected. This should be kept in mind during any monitoring studies undertaken as part of this (or other similar) project.

In terms of aquatic ecology, construction of the proposed desalination plant would result in the loss of wetlands, extending across a large area of the site, and without mitigation, is moreover likely to result in further degradation of downstream wetlands, as a result of changes in runoff patterns and intensities. While it is acknowledged that the wetlands in question have been highly and permanently degraded by past activities, if this argument is applied to development along the Durban coastline as a whole, where few if any unimpacted examples of such wetlands are likely to occur, then the cumulative loss of wetlands of this type will be highly significant. In light of the above discussion, additional off-site offset measures are recommended as essential to address the issue of Cumulative Impacts described above. Suitable offset targets would allow the rehabilitation of similar or more threatened wetland habitat, to a condition that is better than Category D – that is, Category C or better.

The combined effects of the above findings indicate **low** to **medium risks** of cumulative impacts and cumulative **positive** impacts of **medium** to **high** significance on overall investment levels.

OVERALL EVALUATION OF IMPACTS BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

In accordance with the Guideline on Need and Desirability published in the Government Gazette of 20 October 2014 (GN No 38108), this EIA considered the nature, scale and location of the development as well as the wise use of land (i.e. is this the right time and place for the development of this proposed project).

Section 24 of the Constitutional Act states that "everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that –

i) Prevents pollution and ecological degradation;
ii) Promotes conservation; and
iii) Secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

This EIA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures and monitoring requirements. Such measures have been identified to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans to, inter alia, monitor the impacts on marine ecology associated with the discharge of brine and protection of freshwater features present within this area (refer to the draft EMPr).

The EIA has investigated and assessed the significance of the predicted positive and negative impacts associated with the proposed Desalination Facility. Through this EIA process, clear recommendations have been provided to ensure that this project succeeds in meeting the environmental management objectives of protecting the ecologically sensitive areas and supporting sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development. Provided that all the recommended management actions are implemented effectively, no **residual negative impacts** have been identified within the ambient of this EIA that, in the opinion of the Environmental Assessment Practitioner, should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project.

Based on the need for the desalination facility and associated benefits (positive impacts) and the residual impacts identified and assessed by specialists during the EIA process (including inputs from the local community), it is the reasoned opinion of the EAP that the proposed 150 Ml/day SWRO facility would contribute to sustainable water supply in a responsible manner. It is therefore the recommendation of the EAP that this application (Proposed desalination plant, Alternative 1 Potable water pipeline and Alternative 2 Powerline alignments) should be **granted Environmental Authorisation** from the Department of Environmental Affairs on the condition that key management and monitoring actions are implemented in order to mitigate the main potential negative impacts of the project (refer to Figure 14-1 for the final proposed layout). These management actions include the requirement for off-site offset rehabilitation of degraded wetlands to a condition of PES Category C or better. Section 8.8 (Chapter 8) provides separate, specific offset details to inform the developer's decision as to the costs and feasibility of pursuing a development with an Offset requirement. The offset measures outlined in Section 8.8 must be implemented in full.

Note that if the power supply to the proposed development is coincided with eThekwini's future development plan in the area, then a 132kV point of supply would be available within 1km from the proposed Tongaat site (Figure 1 - Point A). In this case, Umgeni would construct a transmission line from the latter point of supply to the proposed desalination plant, using the Initial powerline route (Figure 1 - Yellow route). It

must however be noted that the route proposed by eThekwini as part of their electrical infrastructure expansion constitute a fatal flaw (crossing of Lake Victoria) and has a high visual intrusion on La Mercy residents. This has led to the identification of an alternative route which is proposed as part of this EIA. These findings will enable eThekwini to evaluate environmental as well as engineering and planning factors in determining whether they retain their current route plan. In the event, however, that supply to the proposed desalination plant precedes eThekwini electrical infrastructure expansion, Umgeni would construct a single-circuit 132 kV transmission line from the proposed desalination plant site to the Mdloti Substation (Alternative 2 route).

In order to ensure the effective implementation of the mitigation and management actions, a framework **Environmental Management Plan (EMP)** has been prepared for the construction and operation of the proposed project (Part B of the EIA Report). It is proposed that the draft EMPr be finalised, following input and comments from various stakeholders and authorities, and be implemented during all phases of this project.

All the required permits, licenses (including a CWDP and WULA) and authorisations (including an EA) must be obtained prior to the construction of this facility. It should also be noted that the proposed plant location will need to be re-zoned from agriculture to industrial before development of the scheme can proceed.

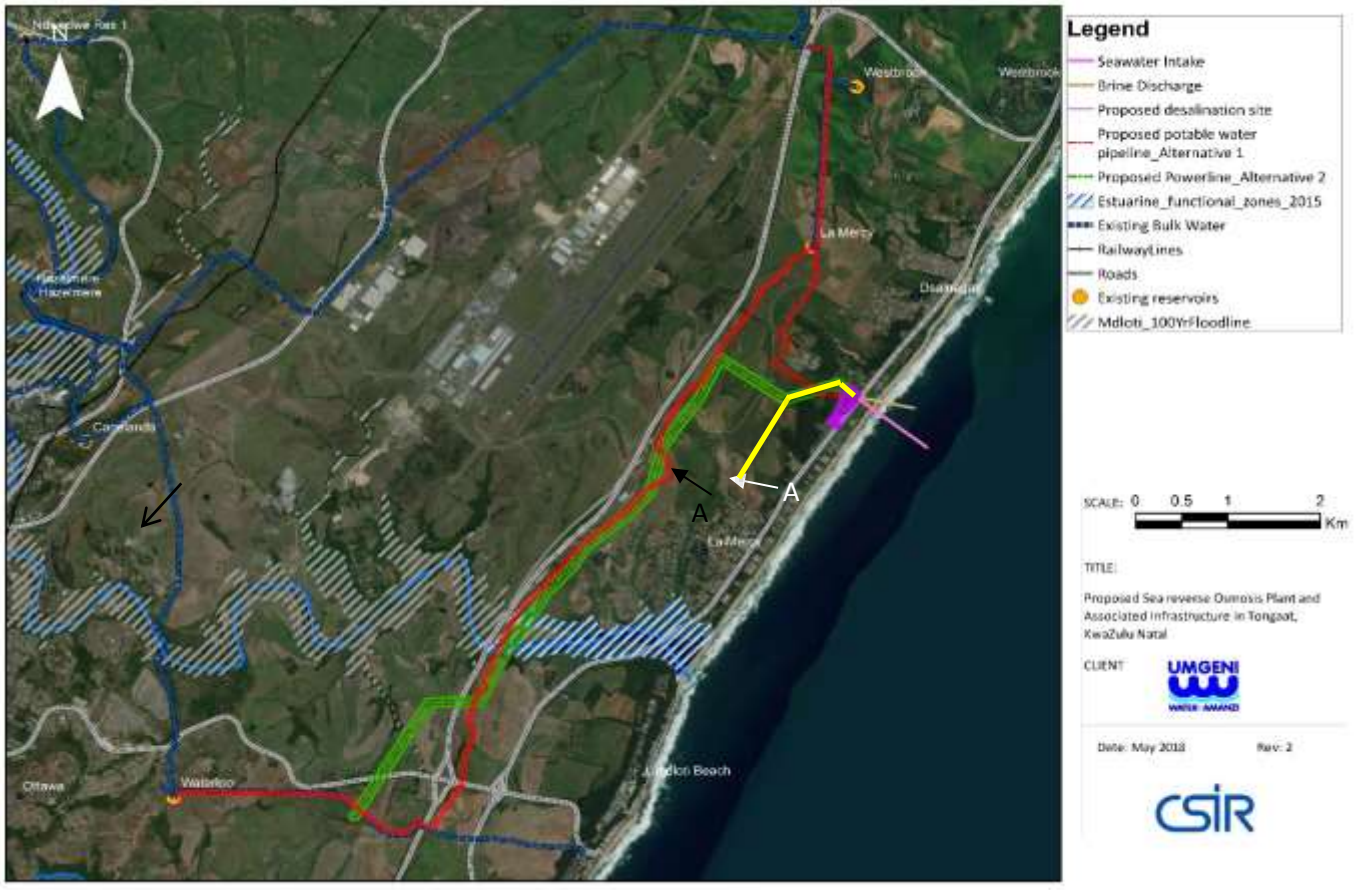

Figure 1: Final layout for the proposed desalination plant and associated infrastructures

GLOSSARY

BA	Basic Assessment
BAT	Best Available Technology
BEP	Best Environmental Practice
BID	Background Information Document
CBA	Critical Biodiversity area
CBD	Critical Biodiversity Area
CIP	Clean-in-place
CSIR	Council for Scientific and Industrial Research
CWDP	Coastal Waters Discharge Permit
DAF	Dissolved Air Flotation
DEA	National Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESS	Environmental Screening Study
FSR	Final Scoping Report
Gl	Gigalitre (1 000 000 000 litres or Mm^3)
GRP	Glass-fibre Reinforced Polyester
I&AP	Interested and Affected party
ICM	Integrated Coastal Management Act
IDP	Integrated Development Plan
IDP	Integrated Development Process
IDZ	Industrial Development Zone
kWh	Kilowatt Hours
kWh/m3	Kilowatt hours per cubic meter
Ml	Megalitre (1 000 000 litres)
MSL	Mean Sea Level
MW	Mega Watts
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management Biodiversity Act
NEMWA	National Environmental Management Waste Act
FEPA	National Freshwater Ecosystem Priority Areas
PPP	Public Participation Process
PSEIA	Plan of Study for EIA
RO	Reverse Osmosis
RoD	Record of Decision
SABS	South Africa Bureau of Standards
SADC	South African Development Community
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SMBS	Sodium Metabisulphite
SWRO	Seawater Reverse Osmosis
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
ToR	Terms of Reference
TSS	Total Suspended Solids
UF	Ultrafiltration
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environmental Programme
UW	Umgeni Water
WHO	World health Organisation
WULA	Water Use License Application