

**ENVIRONMENTAL IMPACT ASSESSMENT:  
PROPOSED REVERSE OSMOSIS PLANT AT HENDRINA POWER  
STATION, MPUMALANGA**



DEA REF. NO. 12/12/20/2273

AUGUST 2011



**EXECUTIVE SUMMARY: FINAL BASIC ASSESSMENT REPORT**

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Eskom Holdings (Pty) Ltd (Eskom) proposes to construct a Reverse Osmosis (RO) plant at Hendrina Power Station (Hendrina) in Pullenshope, Mpumalanga.

**Proposed Project and Location**

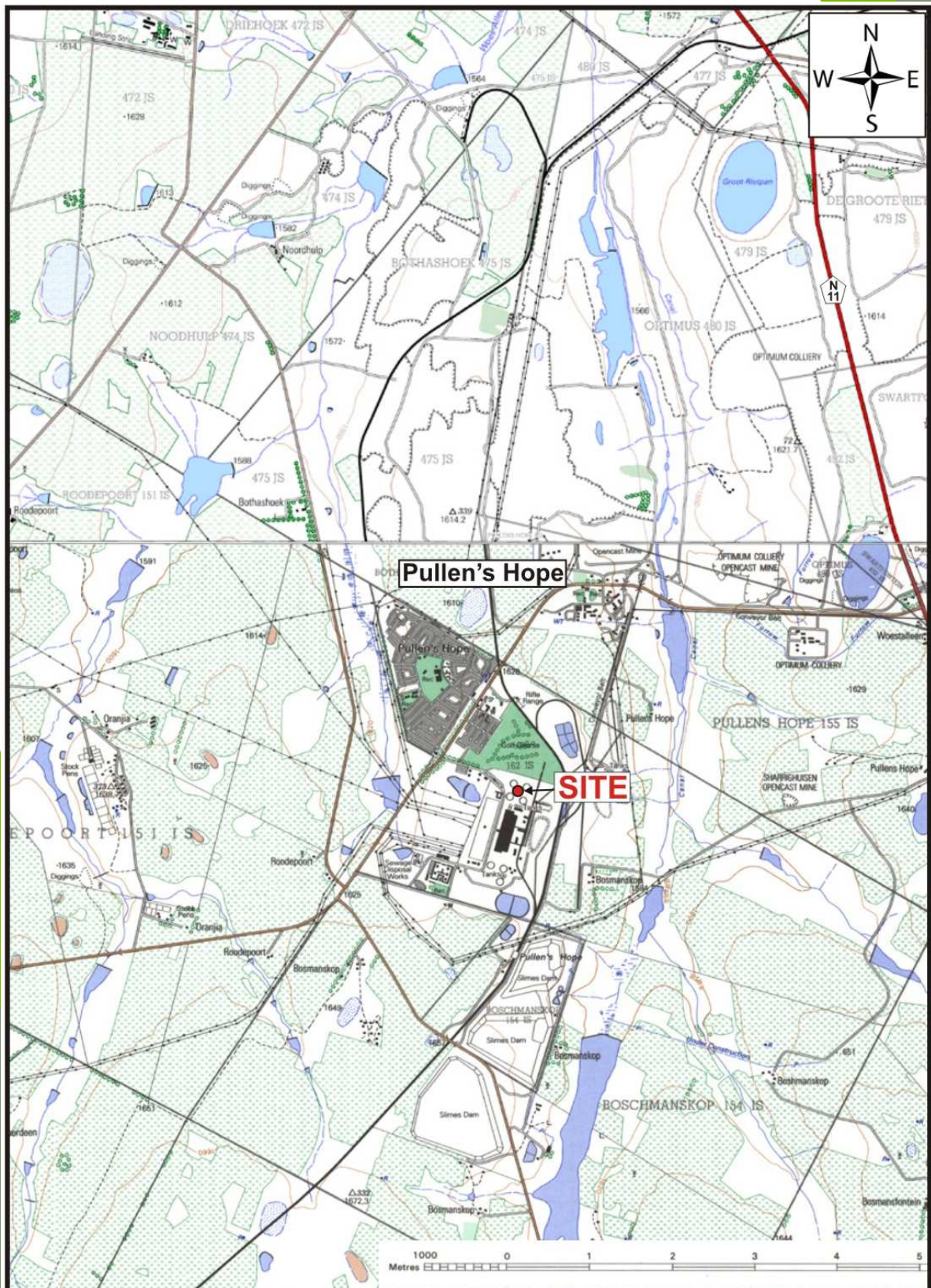
Hendrina is located approximately 16 km north northwest of Hendrina town in the Steve Tshwete Local Municipality, Mpumalanga (**Figure 1**), and consists of ten units of 200 megawatts (MW) each.

Water processing at the station is such that raw water is demineralised to produce demineralised water for use in driving the turbines. Raw water is also used inside the cooling towers for cooling the exhaust steam from the turbines. This cooling water is distributed as a fine spray by the flow distributors inside the cooling towers. Some of this water is evaporated by the updraft, while the remainder collects in the cooling tower ponds, where it is termed concentrated cooling water (CCW). From here this CCW is either reused in the above-mentioned process and so concentrated further or, if it is too concentrated for reuse, it is used in the transportation of ash, as ash slurry, from the power station to the ash dams. As the ash settles out of the water in the ash dam, the water is pumped back to the ash water return (AWR) dams for reuse in the ash transportation process.

During the wet season an additional volume of storm water collected in the ashing system must be accommodated. Storm water enters the ash dams and is pumped to the AWR dams. Furthermore, due to the decreasing quality of the raw water supplied to Hendrina, the number of times that the CCW can be reused has decreased and hence increased volumes of CCW are sent to the dams. As a result of the increasing volumes of CCW sent to the ash dam, together with high volumes of storm water captured on site during high rainfall years, the freeboard on the ash and AWR dams is reducing. Should the ash dams overflow they overflow into the AWR dams. Should the AWR dams overflow they would spill to the environment. As such the additional volume of storm water and CCW is a risk to Eskom's Zero Liquid Effluent Discharge (ZLED) policy compliance and the environment, and has to be accommodated in order to comply with legislation. Therefore Eskom proposes to construct an RO plant to treat the CCW, which would allow for its reuse and therefore decrease the volumes of CCW being sent to the ash dams.

The proposed RO plant for Hendrina would treat 8 ML/day or 2 920 ML of CCW per annum and would be designed to have a minimum recovery of 80 %. The plant would be modular so that it could continue to operate whilst modules are offline for maintenance, hence allowing an availability of 90 %. The plant would be located on the north side of the station precinct, between two cooling towers, on a concrete slab of approximately 0.5 ha in extent.

A number of chemicals would be used in the proposed RO process, including amongst others, Sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), Sodium hypochlorite (NaOCl) and Hydrochloric Acid (HCl). It is anticipated that the combined capacity of the chemicals would be less than 30 MI (which is below the threshold which requires environmental authorisation).



**aurecon**

Location of proposed reverse osmosis plant at Hendrina Power Station, Mpumalanga

SCALE  
NTS

Figure 1

The following pipelines would be required for the proposed RO plant, with approximate lengths:

- From the cooling water sedimentation basin to the proposed RO plant (approximately 100 m);
- From the proposed RO plant to the demineralisation plant in the WTP (approximately 150 m);
- From the proposed RO plant to the cooling water system (approximately 100 m); and
- From the proposed RO plant to the effluent sumps at the WTP (approximately 130 m).

These would be above ground except where they cross roads, where they would be buried.

## Legal Requirements

In terms of the National Environmental Management: Waste Act (No. 59 of 2008)(NEM:WA) the proposed treatment of waste in an RO plant, as described above, is listed in Category B of Schedule 1 (Government Notice (GN) No. 718 of 3 July 2009). The following activities are applicable:

No.	Listed activity (category B)
7	The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic metres or more.
11	The construction of facilities for activities listed in Category B of this Schedule (not in isolation to associated activity).

According to Section 4 of Schedule 1, "...a person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct an environmental impact assessment process, as stipulated in the environmental impact assessment regulations made under section 24(4) of National Environmental Management Act...as part of the waste licence application."

Furthermore, in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA) the proposed RO plant is also listed in GN No. 544 of 18 June 2010. The following activity is applicable:

No.	Listed activity (GN No. 544, 18 June 2010)
28	The expansion of or changes to existing facilities for any process or activity where such expansion or changes to will result in the need for a permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.

According to Section 3(2) of GN No. 544 of 18 June 2010, "The investigation, assessment and communication of potential impact of activities must follow the procedure as prescribed in regulations 21 to 25 of the Environmental Impact Assessment Regulations published in terms of section 24(5) of the Act." Section 21 to 25 of the EIA Regulations refers to the Basic Assessment (BA) process.

However, Section 20 (4) of the NEMA allows that "If an applicant intends undertaking an activity to which S&EIR [Scoping and Environmental Impact Report] must be applied in terms of subregulation (2) and the applicant, on advice of the EAP managing the application, is for any reason of the view that it is likely that the competent authority will be able to reach a decision on the basis of information provided in a basic assessment report, the applicant may apply, in writing, to the competent authority for permission to apply basic assessment instead of S&EIR to the application."

A motivation for a downgrade from an EIA to a BA process was subsequently submitted to DEA and approved on 12 April 2011. As such a BA process, as outlined in sections 21 to 25 of Regulation R543, is currently being undertaken for the proposed project.

Aurecon has been appointed to undertake the required environmental authorisation process on Eskom's behalf.

## Public Participation Process

Public participation is a key component of this BA process and has taken place at various stages throughout the project. The public participation process to date has involved the following aspects:

The initial consultation phase occurred at the outset of the BA process in April 2011, its purpose being to present the applicant's motivation for the proposed project and elicit initial issues and comments that Interested and Affected Parties (I&APs) may have in this regard. The Initial Phase comprised the following steps:

- The proposed project was advertised in English and Afrikaans in the Middelburg Observer and Interested and Affected Parties (I&APs) on 13 May 2011 were invited to register and comment on the proposed project
- A maildrop took place in Pullenshope, whereby the above-mentioned notice was delivered to all houses in the town, on 13 May 2011.
- Registered I&APs were notified of the proposed project via mail on 16 May 2011 and invited to comment on the proposed project
- I&APs were provided with a 21 day comment period until 3 June 2011. One comment was received and has been collated and responded to in a Comments and Response Report (CRR) which has been sent to the I&AP who submitted comments.

The assessment phase aims to present the Basic Assessment Report (BAR) to I&APs. Public participation in this phase comprised the following steps:

- The Draft BAR was made available to the public at the Pullenshope Public Library (Club Building, Kiaat Street, Pullenshope), the security center at Hendrina Power Station and online on Eskom's ([www.eskom.co.za/eia](http://www.eskom.co.za/eia) Hendrina RO plant) and Aurecon's ([www.aurecongroup.com](http://www.aurecongroup.com) – click on 'public participation') websites for 40 days (from 15 June 2011 to 1 August 2011).
- A poster, in English and Afrikaans, was erected at the entrance to Hendrina Power Station inviting I&APs to comment on the Draft BAR.
- All registered I&APs were informed of the lodging of the Draft BAR for public comment by means of a letter in English and Afrikaans, which was posted and e-mailed on 15 June 2011.
- All registered I&APs were informed, by means of a letter in English and Afrikaans on 1 July 2011, of the change of date of the Open House from 14 July 2011 to 19 July 2011.
- An advertisement was placed in English, Afrikaans, Zulu and Sepedi in the Middelburg Observer to notify the public of the change in date of the Open House from 14 July 2011 to 19 July 2011 on 8 July 2011.
- An Open House was held to present the Draft BAR on **Tuesday, 19 July 2011, 14h00 – 18h00 at the Pullenshope Recreation Centre** (Club Building, Kiaat Street, Pullenshope). Information from the BAR was on view (e.g. posters and maps), and the project team was available to provide further clarity and answer questions.
- Two written comments were received and are included in the BAR. The comments were collated and responded to in CRRII, which is included in the BAR.

Actions which will be undertaken simultaneously with the lodging of this final report:

- Once the Final BAR has been submitted to DEA, it will be made available for a 21 day comment period at the same locations as the Draft BAR.
- All registered I&APs will be informed of the lodging of the Final BAR for public comment by means of a letter in English and Afrikaans, which will be posted and e-mailed.

- All registered I&APs will be informed of the Department of Environmental Affairs decision by means of a letter in English and Afrikaans, which will be posted and e-mailed.

An appeal period, where I&APs have the opportunity to appeal against the Environmental Decision issued by DEA, will follow the issuing of the Environmental Decision.

### Project alternatives

Although a number of alternatives were considered for the proposed project, only the following alternatives were considered to be reasonable and feasible and hence were assessed in the BAR:

- Recycling of CCW via a proposed RO plant at the Cooling Water North location; and
- The no-go alternative.

### Assessment of identified impacts

The BAR has provided a comprehensive assessment of the potential environmental impacts, identified by the environmental team and I&APs, associated with the proposed RO plant. The significance of the potential impacts associated with the proposed project and the no-go alternative are summarised in **Table 1 and 2**, respectively.

**Table 1 Summary of significance of the potential impacts associated with the proposed development**

	WITHOUT MITIGATION	WITH MITIGATION
<b>CONSTRUCTION</b>		
Local socio-economic	Low (+)	Low (+)
Composite assessment	Low (-)	Neutral
<b>OPERATION</b>		
Water resources	Low (+)	Low (+)
Visual impacts	Neutral	Neutral
Noise impacts	Neutral	Neutral
<b>DECOMMISSIONING</b>		
	No impact	No impact
<b>CUMULATIVE</b>		
	No impact	No impact

**Table 2 Summary of the significance of the potential impacts associated with the no-go alternative to the proposed development**

	WITHOUT MITIGATION	WITH MITIGATION
<b>CONSTRUCTION</b>	No impact	No impact
<b>OPERATION</b>		
Water resources	Low (-)	Low (-)
<b>DECOMMISSIONING</b>		
	No impact	No impact
<b>CUMULATIVE</b>		
	No impact	No impact

KEY				
	H	High Significance	VL	Very Low Significance
	M-H	Medium to High Significance	N	Neutral Significance
	M	Medium Significance	H+	High positive significance
	L-M	Low to Medium Significance	M+	Medium positive significance
	L	Low Significance	L+	Low positive significance
	VL-L	Very Low to Low Significance		

## Recommendations

Two potential impacts identified for the proposed project, namely the potential impact on water resources and construction phase impacts on local socio-economics, are considered to be of low positive significance. One potential impact, namely composite construction phase impacts was considered to be of very low (-) significance (without mitigation) and neutral (with mitigation). However, the potential impacts resulting from the “No-go” alternative would result in impacts of low negative significance on water resources. Only one negative potential impact (composite assessment) has been identified during the construction phase of the proposed development. No negative impacts were identified during the operation and no or decommissioning phases or cumulative impacts were identified. Positive impacts on the socio-economic and water will result from the proposed development. Should the proposed project not proceed (i.e. the no-go alternative), there would be a continued risk of negative impact on water resources.

It is the environmental practitioner’s opinion that the proposed project in its preferred form is acceptable and indeed more beneficial than alternatives considered, namely the “no-go” alternative.

## Way Forward

Once DEA has reviewed the Final BAR, they will need to ascertain whether the BA process undertaken met the legal requirements and whether there is adequate information to make an informed decision. Should the above requirements be met, they will then need to decide on the environmental acceptability of the proposed project. Their decision will be documented in an Environmental Authorisation, which will detail the decision, the reasons therefore, and any related conditions. Following the issuing of the Environmental Authorisation, DEA’s decision will be communicated by means of a letter to all registered I&APs and the appeal process will commence, during which any party concerned will have the opportunity to appeal the decision to the Minister of Environmental Affairs in terms of NEMA.

Should you wish to raise any comment on the Final BAR please contact the Public Participation Office at the details below by **Tuesday, 30 August 2011**.

### List of Acronyms

BA	Basic Assessment
BAR	Basic Assessment Report
CCW	Concentrated Cooling Water
CRR	Comments and Response Report
DEA	Department of Environmental Affairs
EIA	Environmental Impact Assessment
GN	Government Notice
I&AP	Interested and Affected Party
MW	Megawatts
NEMA	National Environmental Management Act
NEMWA	National Environmental Management: Waste Act

### Public Participation Office

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