

# APPENDIX 10

## Proposed Isundu Sub-Station

### Motivation for Exemption from the Assessment of Alternatives

SHOULD THE APPLICANT WISH TO APPLY FOR EXEMPTION FROM ANY PROVISION OF THE ACT AS IT RELATES TO ENVIRONMENTAL IMPACT ASSESSMENT OR FROM ANY PROVISION OF GN R. 543, AS ALLOWED BY GN R543 (50), DETAILS OF THE EXEMPTION APPLICATION MUST BE PROVIDED AS **APPENDIX 9** IN THE FORM OF A TABLE AS SHOWN BELOW.

REGULATION NUMBER	REGULATION DESCRIPTION	REASON(S) FOR EXEMPTION	SUPPORTING DOCUMENTATION ATTACHED	NOTIFICATION DONE I.T.O	
				GN 543(51)(3)	R.
R543 22(2)(h), R543 28(1)(c) and R543 31(1)(g)	Investigation of alternatives	After extensive prior investigations covering in excess of 20 different sites, it has been found that there are no reasonable or feasible site alternatives for the proposed sub-station	Yes	Yes	No

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## 1. INTRODUCTION

As part of this Application for the proposed Isundu Sub-station in the Midlands of KwaZulu-Natal, Eskom Holdings SOC Limited (Eskom) hereby motivates to the Department of Environmental Affairs (DEA) for exemption from the assessment of site alternatives for the proposed sub-station, for the reasons outlined hereunder.

## 2. BACKGROUND

The proposed Isundu Sub-station is one single component of a much larger electrical transmission line project, viz. the Venus-Sigma-Hector-(Ariadne) (VSHA) Transmission Line Project, including the Sigma Sub-station, which have already been authorised by DEA:

- ❑ Environmental Authorisation in terms of the National Environmental Management Act, 1998, GN R. 387: Proposed Construction of a 765 kV Transmission Line from the Venus Sub-station, near Estcourt, to the proposed Sigma Sub-station within the Albert Falls Area, KwaZulu-Natal Province (NEAS Reference: DEAT/EIA/3150/2008; DEA Reference: 12/12/20/1397/1) dated 11 June 2012. As amended by: Amendment to the Environmental Authorisation Issued on 11 June 2012 for the Proposed Construction of a 765 kV Transmission Line from the Venus Sub-station, near Estcourt, to the proposed Sigma Sub-station within the Albert Falls Area, KwaZulu-Natal Province (NEAS Reference: DEAT/EIA/3150/2008; DEA Reference: 12/12/20/1397/1) dated 14 August 2012.
- ❑ Environmental Authorisation in terms of the National Environmental Management Act, 1998, GN R. 387: Proposed Construction of 2 x 400 kV Transmission Lines from the Proposed New Sigma Sub-station to the Hector Sub-station within Georgedale Suburb, as well as Installation of 3 x 400 kV Feeder Bays at Hector Sub-station, KwaZulu-Natal Province (NEAS Reference: DEAT/EIA/3167/2008; DEA Reference: 12/12/20/1397/3) dated 29 May 2012. As amended by: Amendment to the Environmental Authorisation Issued on 29 May 2012 for the Proposed Construction of 2 x 400 kV Transmission Lines from the New Sigma Sub-station to the Hector Sub-station within Georgedale Suburb, as well as Installation of 3 x 400 kV Feeder Bays at Hector Sub-station, KwaZulu-Natal Province (NEAS Reference: DEAT/EIA/3167/2008; DEA Reference: 12/12/20/1397/3) dated 15 August 2012.
- ❑ Environmental Authorisation. Construction of a new 765 kV Sub-station within the Albert Falls Area, KwaZulu-Natal Province. (NEAS Reference: DEAT/EIA/3168/2008; DEA Reference: 12/12/20/1397/2) dated 30 March 2012. As amended by: Amendment to the Environmental Authorisation Issued on 30 March 2012 for the Proposed Construction of a New 765 kV Sub-station within the Albert Falls Area, KwaZulu-Natal Province (NEAS Reference: DEAT/EIA/3168/2008; DEA Reference: 12/12/20/1397/2) dated 14 June 2012.

While the environmental authorisations were appealed, these appeals were withdrawn in October 2013, once a Memorandum of Understanding (MOU) had been agreed and signed by Eskom and the South African Sugar Association (concerning the continued cultivation and burning of sugar cane beneath high voltage transmission lines).

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Subsequent to the authorisation of the Sigma Sub-station (in which the environmental authorisation and assessment process considered three sub-station site alternatives), Eskom determined that the cost to construct the Sigma Sub-station would be exorbitant<sup>1</sup> due to excessive earthworks that would be required to construct the sub-station platform.

This necessitated Eskom investigating alternative sub-station sites within the same area of KwaZulu-Natal.

### **3. HISTORY**

During project planning in late 2008, Eskom Grid Planning identified five potential sub-station site alternatives. In early 2009, for technical reasons, Eskom reduced the initial five sub-station sites to three.

The three site alternatives were all located within the uMshwati Local Municipality area, north-east and east of the existing Mersey Sub-station near Albert Falls Dam. For reference purposes, the three sites were numbered Sigma 1, Sigma 2 and Sigma 3. The reason for the positioning of the three site alternatives in this general area of KwaZulu-Natal is due to the future requirement to link the Sigma Sub-station with the proposed Theta Sub-station close to Empangeni on the North Coast of the province.

Three 2 km wide corridors were identified (viz. the Western, Central and Eastern Corridors) which would connect the Venus Sub-station to the Sigma Sub-station, and, in turn, the Sigma Sub-station to the Hector Sub-station.

In March 2009, as part of Scoping, a Key Stakeholder Workshop (KSW) was held with potentially affected landowners and associated stakeholders from the agricultural sector in the uMshwati Municipality. These landowners and industries would potentially have been the most significantly affected by the three Sigma Sub-station site alternatives.

Issues and concerns raised during this meeting, particularly relating to the potential impact of a sub-station and associated transmission lines on the agricultural and local economy of the area, led to the decision to appoint an agricultural economist to conduct an Agricultural economics Study (AES) during Scoping (the three sub-station sites were located within an agricultural area comprising fairly dense timber plantations and sugarcane cultivation).

The AES found that the three sub-station sites, together with the associated transmission lines, in the context of other constraints within the agricultural sector, could potentially significantly affect the agricultural economy of the study area. This led to two key recommendations being made by the specialist:

- ❑ To investigate additional Sigma Sub-station site alternatives further to the south, i.e. effectively moving out of the area with high-density timber and sugarcane farming.
- ❑ To reconsider the Eskom policy of sugarcane free servitudes, subject to formal agreement with individual landowners.

Based on the findings of the AES, Sigma 1, together with the Western Corridor for the transmission line, was the preferred site and alignment at the time (from an agricultural economics perspective).

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<sup>1</sup> Of the order of R 500 million more than a normal 765 kV sub-station.

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Based on the findings and recommendations of the AES, Eskom Grid Planning investigated a number of additional sub-station sites (Sigma 4 – 7), further to the south and closer to the Hector Sub-station. After both desk-top and in-field investigations, it was determined that two of the additional sites for the Sigma Sub-station (sigma 6 and Sigma 7) were technically feasible, while still fulfilling the future requirement of a linkage with the Theta Sub-station. A decision was taken to eliminate two of the three initial sub-station sites, Sigma 2 and Sigma 3, which were both located within the dense timber growing areas.

Therefore, for the environmental authorisation process, three sub-station sites were investigated, viz. Sigma 1, Sigma 6 and Sigma 7. This then led to the consideration of another corridor, namely the Southern Corridor, or the 'Blue Route' as it became known, around the western side of Albert Falls dam.

In the Environmental Impact Assessment (EIA), the two most feasible sub-station sites further south, Sigma 6 and 7, were not recommended, and Sigma 1 was recommended as the preferred site on condition that Eskom allow the burning of sugar cane under the transmission lines. A MOU between Eskom and the South African Sugar Association to this effect was signed by both parties in October 2013.

#### **4. APPLICABLE LEGISLATION**

This motivation is for exemption from a provision of the 2010 EIA Regulations, namely R 543, 28 (3) which states "The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i)<sup>2</sup> of the Act and motivation if no reasonable or feasible alternatives, as contemplated in subregulation (1)(c)<sup>3</sup> exist".

#### **5. THE CURRENT PROPOSED SUB-STATION**

The proposed Isundu Sub-station<sup>4</sup> is required as part of Eskom's transmission network supplying electricity from the Majuba Power Station in Mpumalanga to the KwaZulu-Natal Midlands, Southern KwaZulu-Natal and Zululand. The network requires strengthening to meet growing demand and to improve service quality and reliability.

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<sup>2</sup> Section 24(4)(b)(i) reads as follows:

"24. Environmental authorisations

(4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment –

(b) must include, with respect to every application for an environmental authorisation and where applicable-

(i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity".

<sup>3</sup> Subregulation 28(1)(c) reads as follows:

"28. Content of scoping report

(1) scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include—

(c) a description of any feasible and reasonable alternatives that

<sup>4</sup> Previously called Sigma Sub-station and required as a replacement to the already authorised Sigma 1 Sub-station.

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## 5.1 Sub-station site alternatives identified and assessed

In the order of 40 sub-station sites have been considered since the outset of the VSHA project. All sites considered up to the end of the VSHA EIA process are referred to as Sigma. Alternatives considered post the VSHA EIA, are referred to as Isundu.

The details of all the sites considered during the Scoping and EIA process, as well as more recently (after issuing of environmental authorisation for Sigma 1) can be found in ACER's reports (DEA is in possession of the Scoping and EIA reports for the Sigma Sub-station EIA and for the Venus-Sigma-Hector-Ariadne Transmission Lines, while a more recent Feasibility Study report is provided with this Application for Environmental Authorisation as Annexure A). The reasons for discarding certain sites and taking others forward for further study are described in these reports. A short summary of alternatives investigated since 2008 is provided below.

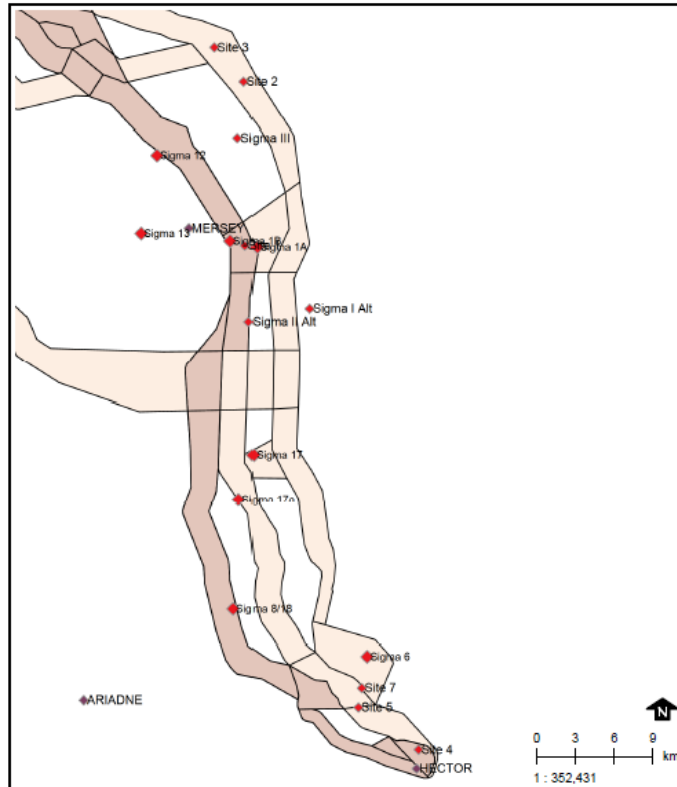
Out of about 18 sites originally considered from a technical perspective by Eskom Grid Planning, five site alternatives for the location of the new 765 kV Sigma Sub-station were passed on to the EIA team for Scoping in late 2008. For technical reasons, Eskom reduced the initial five sub-station sites to three in early 2009. These three sites (Sigma 1, 2 and 3) were presented to the public. The no-development alternative was also considered during Scoping and was found to be unfeasible with long-term negative impacts. During the course of Scoping, issues raised led to the investigation of an additional four site alternatives (Sigma 4 to 7). Of the seven considered during Scoping, Sigma 2 and 3 were not taken forward due to their impact on commercial forestry. Three were taken forward into the EIA phase (Sigma 1, 6 and 7).

At the end of the EIA Phase, the final recommended site was Sigma 1, which was authorised by DEA in 2012. For reasons explained, Eskom made the decision to identify and assess further alternatives to Sigma 1.

To this end, Eskom commissioned Geopractica Consulting Engineers to do a comparative geotechnical investigation on a further two sites (Sites 12 and 8/18). From a geotechnical perspective, Site 8/18 was preferred.

During 2013, ACER conducted a Feasibility Study, which reviewed the findings of previous studies and identified further Isundu Sub-station sites that could potentially work as an alternative to Sigma 1. Acknowledging the considerable investigative work, including comprehensive stakeholder participation, that has been undertaken to identify the optimum VSHA corridor alignment, the study area was confined to that which allows the proposed Isundu Sub-station to feasibly fit in with the authorised VSHA corridor as well as to meet Eskom's electrical transmission requirements for central, southern and northern KwaZulu-Natal. ACER undertook a search for all areas within a defined zone to narrow down areas with the correct gradient that were potentially large enough to accommodate a sub-station. After ruling out areas of incompatible land use, 11 potential sites (60 ha in size) were identified. These 11 Isundu sites (named Sites B, C, D, E, F, G, H, I J and K), as well as Sites 12 and 8/18, were comparatively assessed. Of these, only site 8/18 was found to merit further consideration.

A further four (100 ha) sites within the study area were identified and briefly investigated in an attempt to find a reasonable and feasible alternative to 8/18. None of these sites proved suitable.



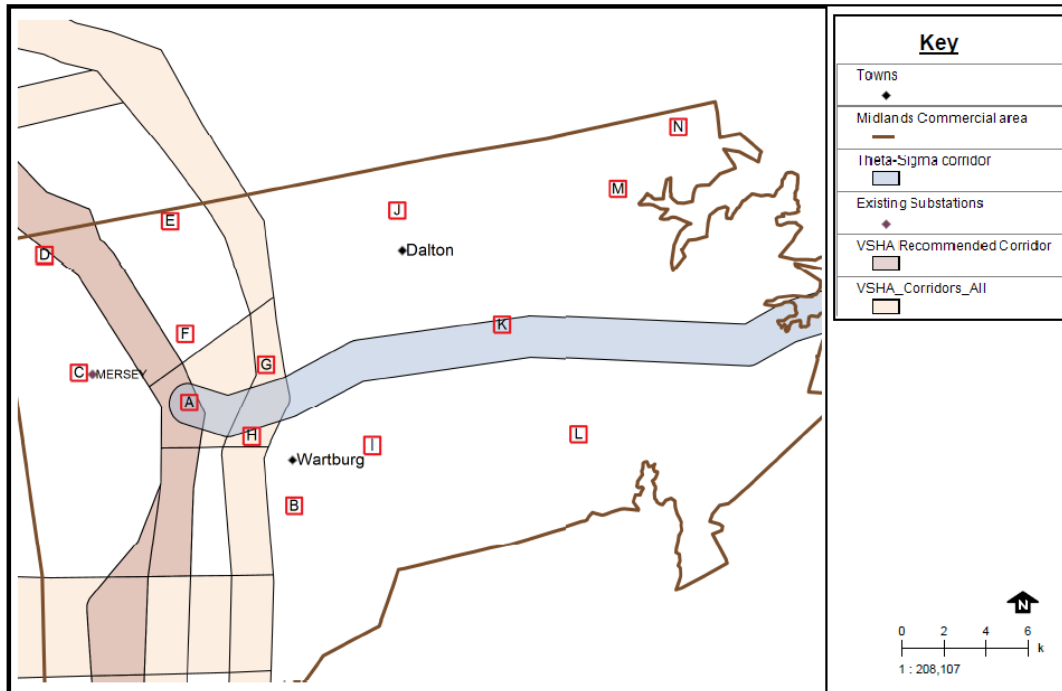
**Figure 1 Sigma sites previously considered**

Additional alternative options were briefly investigated in the form of alternative technologies (gas insulated sub-stations<sup>5</sup>) as well as possible sub-station sites to the east, more distant from the authorised corridor<sup>6</sup>. None of these options were considered suitable.

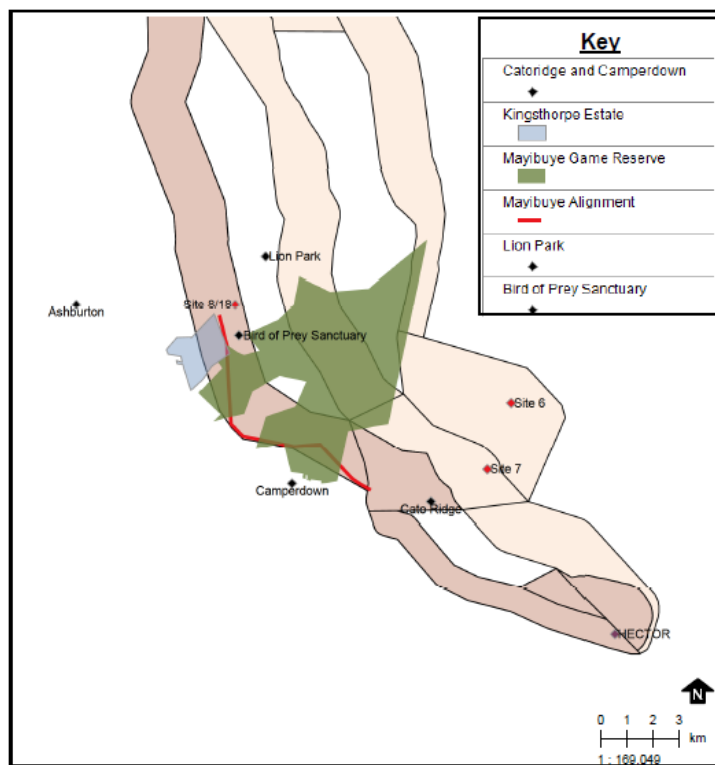
It was concluded by Eskom and the consulting team that the only potential site worth investigating further, as an alternative to Sigma 1, would be Site 8/18. From an environmental perspective, Site 8/18 has both advantages and disadvantages, which require further investigation within an environmental authorisation process.

<sup>5</sup> Very expensive (of the order of 10 times the cost of a conventional sub-station).

<sup>6</sup> Very hilly with many steep slopes. Available flat land is already being used for infrastructure, housing and the like.



**Figure 2 Potential new and already existing sites investigated and assessed**



**Figure 3 Developments surrounding Site 8/18 and specific alignment proposed for the VSHA transmission line as authorised**



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## 6. MOTIVATION

It is clear from the above discussion that a significant amount of work has been put into the investigation of alternatives for a sub-station site for the approved VHSA corridor. Unfortunately, none of these sites have proved ideal from all perspectives (financial/technical/environmental) and only one site (Site 8/18) merits further detailed investigation. It must be understood that the authorised Sigma 1 site is the default and, in a worst case scenario that environmental authorisation cannot or is not secured for the proposed Isundu Sub-station, Eskom will have no option but to construct the costly Sigma 1. In view of this, it is considered reasonable to be granted exemption from investigating further site alternatives<sup>7</sup> within the new EIA process to be undertaken for the proposed Isundu Sub-station.

## 7. REFERENCES

ACER, 2010. Proposed Sigma Substation. Final Scoping Report (Reference EIA: 12/12/20/1397/2). Prepared for Eskom Holdings SOC Limited by ACER (Africa) Environmental Management Consultants.

ACER, 2011. Proposed Sigma Substation. Final Environmental Impact Assessment Report (Reference EIA: 12/12/20/1397/2). Prepared for Eskom Holdings SOC Limited by ACER (Africa) Environmental Management Consultants.

ACER, 2013. Isundu Sub-station. Environmental Feasibility Study Findings. Prepared for Eskom Holdings SOC Limited by ACER (Africa) Environmental Management Consultants.

Geopractica, 2012. Preliminary Comparative Geotechnical Report at two Sites for the proposed New Isundu Sub-station (Site 8/18 and Site 12, Pietermaritzburg). Prepared for Eskom Holdings SOC Limited by Geopractica Consulting Engineers.

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<sup>7</sup> The environmental authorisation process will consider alternatives in so far as they relate to transmission line connections between the proposed Isundu and other Sub-stations.

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**ANNEXURE A**

**Proposed Isundu Sub-station: Environmental Feasibility Study**