



**ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE
PROPOSED ESTABLISHMENT OF A THIRD 400kV
TRANSMISSION LINE BETWEEN POSEIDON SUBSTATION
(near Cookhouse) AND GRASSRIDGE SUBSTATION (near Port
Elizabeth), EASTERN CAPE PROVINCE AND THE EXTENSION
OF GRASSRIDGE SUBSTATION**

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EXECUTIVE SUMMARY

1. OVERVIEW OF THE PROPOSED PROJECT

1.1. The Purpose and Need for the Proposed Project

The transmission network in the Cape is supplied with power from the Tutuka power station. The total load requirement is fed via two 400 kV Transmission lines from the Tutuka power station to Alpha Substation. From Alpha Substation, the load is transferred via two 765 kV Transmission lines to Beta Substation. Power is then transferred to the Hydra and Delphi Substations for further transmission (Eskom, 2002).

The Eastern Cape electricity demand is approximately 1 150 MVA (at 2001 peak). This total load is fed via two 400 kV Transmission lines from Hydra Substation to Poseidon Substation. At Poseidon Substation, the load is split between the East London area (Neptune Substation) and the Port Elizabeth area (Grassridge Substation) (Eskom, 2002).

The Grassridge Substation (located near the town of Coega, on the outskirts of Port Elizabeth) is the main substation supplying electricity to the greater Port Elizabeth area. This substation is currently supplied with electricity via the Poseidon-Grassridge No 1 400 kV Transmission line, as well as via the Poseidon-Grassridge 220 kV Transmission line. These existing Transmission lines are presently heavily loaded, and are close to reaching their full capacity of 550 megawatts. A second 400 kV Transmission line between these two substations is to be constructed in the near future within the vacant registered servitude which lies directly adjacent (to the west) to the existing 220 kV Poseidon-Grassridge Transmission line in order to supplement this supply.

Greater Port Elizabeth's growing electricity demand, together with the proposed development of the Coega Harbour and associated Industrial Development Zone (IDZ) (including the proposed Aluminium Pechiney smelter) is placing an increasing demand on the current energy supply infrastructure to the Greater Port Elizabeth area. The existing Poseidon-Grassridge No 1 400 kV and 220 kV Transmission lines, as well as the proposed Poseidon-Grassridge No 2 400 kV Transmission line do not have sufficient capacity to supply the anticipated additional load without jeopardising the supply to the current customers (including the Port Elizabeth City Council, which supplies other sensitive industrial customers such as the automotive industry). Therefore, in order to meet this increasing demand, more power is required to be transmitted to this area for use. Eskom Transmission, therefore, propose to

upgrade the capacity of an existing Transmission line (i.e. the 220 kV) to a higher voltage, and replace the older infrastructure with new infrastructure. In order to accommodate this new Transmission line infrastructure, the Grassridge Substation north of the Coega IDZ is proposed to be extended to accommodate a new 400 kV infrastructure. This extension work will require additional land adjacent to the existing substation site, and a 'mirror-image' of the existing Substation will be established (refer to Figure 1 overleaf).

The new Transmission line is proposed to be established within the existing Eskom servitude, and the existing 220 kV Transmission line will be 'recycled' through the construction of this proposed 400 kV Transmission line. In order to recycle the 220 kV Transmission line servitude, it will be required that the existing 220 kV towers be dismantled and removed, and new towers will be erected. Project activities, therefore, entail the following:

- the decommissioning and dismantling of the existing 220 kV Transmission line; and
- the construction of the new 400 kV Transmission line.

This proposed recycling of the 220 kV Transmission line servitude would require the switching off of the existing 220 kV line. As the existing Poseidon-Grassridge No 1 400 kV Transmission line cannot support the Greater Port Elizabeth area's electricity demand alone, and the reliance on only one Transmission line for supply could compromise the reliability of supply, it would be required that Eskom construct the new Poseidon-Grassridge No 2 400 kV Transmission line prior to the establishment of the third 400 kV line. The sequence of project activities will, therefore, be as follows:

- Digging and laying of new foundations for the new Poseidon-Grassridge No 2 400 kV line and the proposed Poseidon-Grassridge No 3 400 kV line (in parallel).
- Erection of towers and stringing of the new Poseidon-Grassridge No 2 400 kV Transmission line.
- Commissioning of the new Poseidon-Grassridge No 2 400 kV Transmission line.
- Decommissioning and dismantling of the existing Poseidon-Grassridge 220 kV Transmission line.
- Erection of towers and stringing of the proposed Poseidon-Grassridge No 3 400 kV Transmission line.
- Commissioning of the proposed Poseidon-Grassridge No 3 400 kV Transmission line.

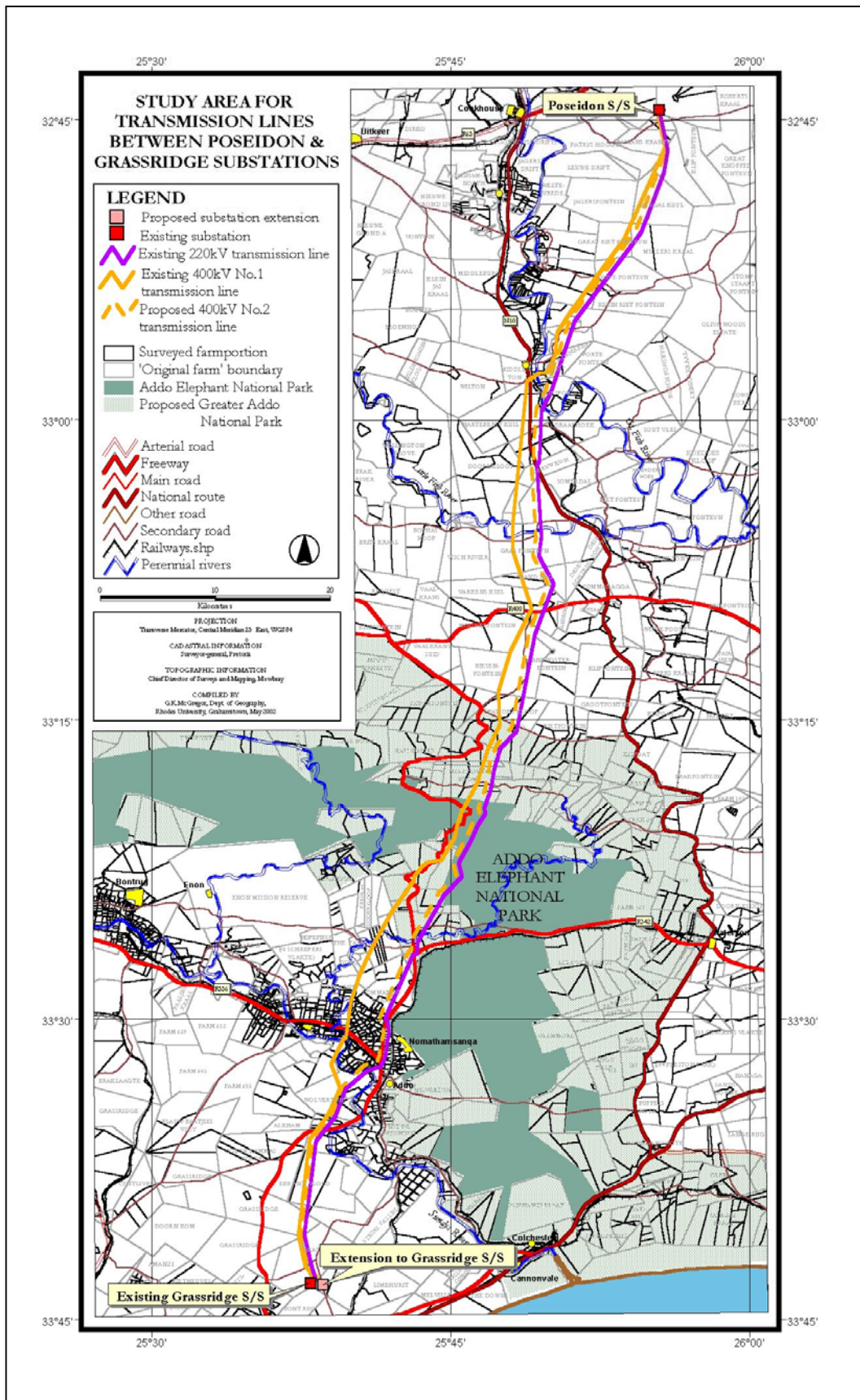


Figure 1: Map showing the existing and proposed Transmission lines between the Poseidon and Grassridge Substations, as well as the existing Grassridge Substation and proposed extension

1.2. Alternative Transmission Line Corridors

As the proposed 400 kV Transmission line is proposed to be constructed within the existing 220 kV Transmission line servitude, no alternative Transmission line corridors were investigated. However, site-specific alternative alignments were considered in sensitive areas (e.g. in the vicinity of the citrus farms in the Addo area).

1.3. Alternative Substation Sites

The extension to Grassridge Substation is required to be interconnected to the existing substation on the busbar in order to maintain the security of firm supply to customers, and to minimise the potential loss of supply. In order to ensure the reliability of supply to the Greater Port Elizabeth, it was therefore determined that the most appropriate position for the proposed substation extension is alongside the existing Grassridge Substation.

1.4. Technical Details

A total servitude width of 55 m will be required to accommodate the proposed 400 kV Transmission line. This will require the widening of the existing 220 kV Transmission line servitude (outside of the Greater Addo National Park).

Where feasible, the “cross-rope suspension” (CRS) tower will be used. This tower type consists of two masts and four anchor cables. These towers have a reduced steel-component, and are, therefore, both less expensive and less visually intrusive than conventional self-supporting tower structures. The CRS tower has limitations in that bends greater than 3° and steep surfaces will require that more stable “strain” or self-supporting towers be used.

2. ENVIRONMENTAL STUDIES AND PUBLIC PARTICIPATION

An Environmental Impact Assessment (EIA) for the proposed Transmission line and substation extension has been undertaken in accordance with the Environmental Impact Assessment (EIA) Regulations published in Government Notice R1182 to R1184 of 5 September 1997 in terms of Section 21 of the Environment Conservation Act (No 73 of 1989), as well as the National Environmental Management Act (NEMA; No 107 of 1998). This EIA was undertaken in order to identify and assess potential environmental impacts (biophysical and social) associated with the proposed project.

Specialist studies undertaken within the EIA included the assessment of potential impacts on:

- Agricultural potential;
- vegetation;
- avifauna (bird life);
- terrestrial fauna
- aesthetics and visual quality;
- archaeological, cultural and historical sites; and
- the social environment.

To ensure effective public participation throughout the environmental studies for this project, an on-going public participation process was implemented. The aim of the public participation process was to establish efficient communication channels which would provide all I&APs with the opportunity to participate meaningfully in the process. Individuals and organisations throughout the broader study area representing a broad range of sectors of society were consulted telephonically, through individual meetings/interviews, through documentation distributed via mail and via the printed media throughout the EIA process. Special attention was paid to consultation with potentially directly affected landowners (e.g. within the demarcated corridors).

The EIA process identified and recorded landowners' details within the study area, as well as issues and concerns raised. Issues and concerns raised during the environmental were recorded, and incorporated as the core of the assessment of social issues within this Environmental Impact Assessment Report.

The Draft EIA Report has been made available for public review. Comments received from the public will be captured within a final Environmental Impact Assessment Report, which is to be presented to the National and Eastern Cape Departments of Environment Affairs for comment and approval.

3. SUMMARY OF SPECIALIST STUDY FINDINGS

The proposed project involves the following project activities:

- the decommissioning and dismantling of the existing 220 kV Transmission line;
- the construction of the new 400 kV Transmission line; and

- the extension of the existing Grassridge Substation.

It is acknowledged that any development will impact on the environment. The construction of the proposed Transmission line and extension of the Grassridge Substation will have impacts on the biophysical and the social environment. This EIA investigated and assessed these impacts as a result of project actions.

The majority of the potential impacts associated with the proposed project are anticipated to be restricted to the construction phase, and are thus of a short-term nature. These construction impacts can largely be minimised through the compilation and implementation of a site-specific EMP, which should form part of the construction contractors contract. Therefore, no significant impacts are anticipated as a result of the construction of the proposed Poseidon-Grassridge No 3 400 kV Transmission line and the extension to Grassridge Substation.

No significant impacts are anticipated as a result of the operation and maintenance of the proposed Transmission line and substation extension, provided that appropriate mitigation measures are implemented through a site-specific EMP. This is due to the fact that the existing 220 kV Transmission line and the existing Grassridge Substation have an existing impact on the surrounding area, and the new line and substation extension are not anticipated to add significantly to this impact.

The existing 220 kV Transmission line has an existing visual impact on the surrounding area. With the replacement of the existing 220 kV Transmission line self-supporting towers with cross-rope suspension towers, it is anticipated that existing visual impacts will be lowered, as these towers are smaller and less steel intensive than the existing towers. Therefore, it is anticipated that the proposed project will have a positive impact of moderate to high significance on the aesthetics of the area.

The significance of the impact is predominately determined by the final alignment, the final design, the final construction activities, and how achievable the mitigation measures to minimise such impacts are. Therefore, once the final tower positions have been determined within the existing 220 kV Transmission line servitude, a detailed survey of this route will be required to be undertaken in terms of botanical, avifaunal and heritage aspects in order to determine site-specific impacts and mitigation measures. These site-specific mitigation measures, together with the mitigation measures recommended within this EIA should be included within an Environmental Management Plan (EMP) for construction, operation and maintenance.

Table 1 overleaf provides a summary of the findings and recommendations made within the specialist studies regarding the proposed Transmission line between the Poseidon and Grassridge Substations and the extension to the existing Grassridge Substation.

4. OVERALL CONCLUSION AND RECOMMENDATIONS

The detailed investigations which have been undertaken as part of this EIA have not identified any issues of high significance which could not be mitigated, such that the proposed project can not be accepted from an environmental perspective. All the potentially negative impacts identified for the proposed Transmission line corridor and substation site can potentially be mitigated through controls in the construction and rehabilitation phases in order to reduce their severity and significance to acceptable levels. In addition, a number of potentially positive impacts have been highlighted which will result in benefits to the region.

The conclusions of this EIA are the result of specialist assessments, based on issues identified within the Scoping Phase, as well as the parallel process of public participation. The public consultation process has been extensive and every effort has been made to involve as many affected property owners as possible.

The finalisation of these conclusions and detailed input into the EMP will be informed by final comment from key stakeholders, the public and the relevant environmental authorities on this draft EIA report.

The issuing of an authorisation for this project EIA by the National Department of Environmental Affairs and Tourism (DEAT) in consultation with the relevant provincial department will permit the negotiation for the expansion of the Transmission line servitude (outside of the GANP area) and the final design of the Transmission line and substation to be undertaken. At that stage, details in terms of final placement of towers and access roads will be determined and the technical aspects of the powerline and substation site will be finalised.

Table 1: Summary of potential impacts associated with the construction of a new 400 kV Transmission line and extension to Grassridge Substation

Issue	Potential Impact and Mitigation Measures
Rare, endangered and threatened plant species	<ul style="list-style-type: none"> • The construction of the proposed Transmission line and associated infrastructure could potentially impact on the endangered, rare and threatened floral species, which have been identified to potentially occur within the study area. This impact will be localised and confined to single individuals, but will be permanent, and therefore significant. With the implementation of appropriate mitigation measures (e.g. relocation of towers, transplanting of plants), the majority of these impacts can be minimised. • The extension of Grassridge Substation could potentially impact on the protected floral species, which have been identified to potentially occur at the proposed substation site. This impact will be localised and confined to single individuals, but will be permanent, and therefore significant. With the implementation of appropriate mitigation measures (e.g. transplanting of plants), the majority of these impacts can be minimised.
Vegetation structure	<ul style="list-style-type: none"> • Construction of a Transmission line, and the associated bush clearance within the study area could potentially have a highly significant negative impact on various vegetation types which have been identified within the study area, due to the slow recovery periods of these vegetation types (e.g. xeric succulent thicket). With the implementation of Eskom’s standard practices (e.g. soil erosion prevention, no clearance in sensitive areas, erection by helicopter where required in sensitive/inaccessible areas), these impacts will be largely ameliorated.
Agricultural potential	<ul style="list-style-type: none"> • Impacts on agricultural potential are localised and are largely limited to tower footprint. • Potential impacts associated with the proposed Transmission line in areas where commercial agriculture has changed to game farming include mainly those associated with aesthetics. • No impacts are anticipated where the new Transmission line crosses grazing land, as grazing remains viable under the lines. • The construction of a new Transmission line across citrus farms could result in the limitation of the height of trees planted for windbreaking purposes, should these be in the path of the proposed line. This will impact significantly on the productivity of the citrus farm and, therefore, its overall viability. The possible avoidance of such farms can actively be addressed during negotiations for final line placement. • No impacts on agricultural potential are anticipated as a result of the proposed extension of Grassridge Substation as the area is not utilised for agricultural purposes.

Table 1 cont.: Summary of potential impacts associated with the construction of a new 400 kV Transmission line and extension to Grassridge Substation

Issue	Potential Impact and Mitigation Measures
Terrestrial Fauna	<ul style="list-style-type: none"> • Monkeys have been reported to scale towers, and in the event of them inadvertently touching a conductor, have been electrocuted. The use of climb guards a short distance from the ground have been included within tower design in order to prevent animals and humans from scaling the tower, thus effectively minimising the incidences of electrocution. • The construction of the proposed Transmission line could result in limited opening-up of the vegetal cover during the construction phase. The opening up of existing vegetated areas, thereby creating corridors along which animals can move, may result in increased predation levels on small mammals (and other fauna) along these corridors. The limitation of the disturbance of vegetation cover within sensitive areas will ameliorate this impact. • Excessive habitat destruction during construction could reduce the amount of habitat available. This impact is anticipated to be localised, of a long-term nature and of low significance, provided that appropriate mitigation measures are implemented (e.g. the limitation of vegetation clearance within sensitive areas). • No additional impacts are anticipated on terrestrial fauna as a result of the extension of Grassridge Substation.
Avifauna	<ul style="list-style-type: none"> • The primary impacts associated with the construction and operation of a Transmission line include habitat destruction or alteration, and impacts due to electrocution or collisions. • With the implementation of Eskom’s Standard Practices in terms of vegetation clearance in sensitive areas, impacts in terms of habitat alteration will be small-scale, and will have no significant influence on sensitive bird populations. • Eskom have identified bird collisions as a major impact on both the environment and the operation and reliability of Transmission lines. Therefore, appropriate mitigation measures have been developed in the form of different types of bird diverters. Investigations regarding the effectiveness of these diverters have indicated an 80% reduction in bird collisions with lines fitted with these diverters. • No impacts on bird species are anticipated as a result of the extension of Grassridge Substation due to the disturbed nature of the area.

Table 1 cont.: Summary of potential impacts associated with the construction of a new 400 kV Transmission line and extension to Grassridge Substation

Issue	Potential Impact and Mitigation Measures
Visual impacts	<ul style="list-style-type: none"> • A positive impact is anticipated with the replacement of the existing self-supporting 220 kV Transmission line towers with cross rope suspension towers, as these towers are smaller and less steel-intensive, and therefore are less visually-intrusive than the existing towers. • A localised visual impact of high significance is anticipated with the extension of the Grassridge Substation. This impact is anticipated to be mainly restricted to the proposed Coega Industrial Development Zone.
Archaeological sites	<ul style="list-style-type: none"> • A positive impact is that sites previously not known of or identified will be discovered, primarily through excavation activities associated with the construction phase. • As cultural heritage resources are non-renewable, and economic values cannot be placed on these resources, should damage or loss of these resources occur, potential destruction of the sites is considered as a significant negative impact. Care should, therefore, be taken such that minimal damage occurs to these sites during construction activities. No historical artefacts should be removed by unqualified personnel at any time.
Safety and security	<ul style="list-style-type: none"> • Residents in the farming areas of the study area perceive cleared servitude lines as access routes used for theft and other crimes. Other concerns expressed relate to the construction phase of the establishment of the Transmission line and substation extension, and the introduction of an “unknown” labour force into the area. With increasing incidences of farm attacks country-wide, this concern is heightened.
Health and safety	<ul style="list-style-type: none"> • Concerns were raised by I&APs with regards to potential health impacts associated with electric and magnetic fields (EMFs) from Transmission lines. Studies have shown that EMFs reduce in magnitude with increasing distance from the source. EMFs recorded are highest at the centre of the Transmission line servitude and rapidly decrease in intensity from this centre line, such that the impact of EMFs from a Transmission line is negligible beyond the servitude. In order to ensure that health impacts are minimised, structures are not permitted to be constructed underneath the conductors of a Transmission line (i.e. within the servitude). In addition, this fulfils safety requirements, ensuring that no person is able to have physical contact with a line conductor (e.g. by standing on the roof of a building under the conductors).

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ACRONYMS AND ABBREVIATIONS

AENP	Addo Elephant National Park
amsl	Above mean sea level
CDC	Coega Development Corporation (Pty) Ltd
CRS	Cross-rope suspension
DEAT	National Department of Environmental Affairs and Tourism
EC DEAET	Eastern Cape Department of Economic Affairs, Environment and Tourism
EIA	Environmental Impact Assessment
ESS	Environmental Scoping Study
EMP	Environmental Management Plan
GANP	Greater Addo National Park
I&AP	Interested and affected party
I&APs	Interested and affected parties
IDZ	Industrial Development Zone
kV	Kilovolt
NEMA	National Environmental Management Act
NGOs	Non-governmental Organisations
SANParks	South African National Parks
SIA	Social Impact Assessment

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