

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED NUCLEAR POWER STATION (“NUCLEAR-1”) AND ASSOCIATED INFRASTRUCTURE

Site Control Environmental Impact Report

March 2011



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(Pty) Ltd**



Prepared for: Arcus GIBB Pty Ltd



On behalf of: Eskom Holdings Ltd





March 2011

DECLARATION OF INDEPENDENCE

I, Peter Nigel Rosewarne as duly authorised representative of SRK Consulting, hereby confirm my independence (as well as that of SRK Consulting) as a specialist and declare that neither I nor SRK Consulting have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Arcus GIBB was appointed as environmental assessment practitioner in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for worked performed, specifically in connection with the Environmental Impact Assessment for the proposed conventional nuclear power station ('Nuclear-1'). I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in my attached report.



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EXECUTIVE SUMMARY

This report investigates the impacts and required mitigation measures associated with the construction and operation of a Conventional Nuclear Power Station (NPS) and associated infrastructure at one site in the Eastern Cape and two sites in the Western Cape. The sites have been identified based on site investigations undertaken since the 1980s. This EIR covers Site Control and was carried out by SRK Consulting.

Eskom proposes to construct an NPS of the Pressurised Water Reactor type technology, with a capacity of ~ 4 000 MWe. The proposed NPS will include nuclear reactor, turbine complex, spent fuel, nuclear fuel storage facilities, waste handling facilities, intake and outfall structures and various auxiliary services infrastructure. The plant will have a design operating lifespan of ~60 years.

All three proposed sites, at Thyspunt (Eastern Cape), Bantamsklip and Duynefontein (Western Cape), are located on the coast. The first two are greenfield sites while the existing Koeberg Nuclear Power Station (KNPS) is located on the latter site.

The Terms of Reference (ToR) for the specialist Site Control study is to assess various aspects with respect to site control, including the following:

- Site security;
- Access control (entry and exit of, both during the construction and operational stages); and
- Owner-controlled areas.

The methodology followed for the Site Control EIR has entailed a desk study and site reconnaissance based on:

- Relevant Sections of Eskom's Technical Specifications for Nuclear Sites Investigations (Eskom 2006, 2009);
- Relevant legislation;
- Relevant chapters of the Koeberg Site Safety Report (Eskom 2006, 2009);
- Site control measures at the KNPS (Eskom 2006);
- Site investigations; and
- Pebble Bed Modular Reactor Demonstration Power Plant (on the Duynefontein site). Environmental Impact Assessment Specialist Study: Site Security (Malepa Holdings 2007).

Based on the above information and impact assessment, the following conclusions can be drawn:

Duynefontein:

- The site is already developed as a NPS with full access and site control, which has been in place since commissioning in 1984 and prior to this during construction;
- It has full visitor facilities with a Visitor's Centre;
- Koeberg Nature Reserve has been developed on the site;
- Walking and mountain bike trails exist;
- Access will be via new access control points and upgraded existing roads leading off the R27;
- There will be minimal additional or cumulative impacts with development of Nuclear-1; and

- The impact rating is *low* for *intensity*, *consequence* and *significance*, at a mostly *high level of confidence* and there will be no impact on irreplaceable resources. There are no fatal flaws.

Thyspunt:

- It is a greenfield site;
- Sensitive wetland ecosystems and heritage features present will be preserved by the implementation of site control measures;
- Access to the site is currently limited and controlled by fencing and electronic/locked gates;
- A new access control point will be developed on the western or eastern owner-controlled boundary and at the outer and inner security fence; and
- The impact rating is *low* for *intensity*, *consequence* and *significance*, at a mostly *high level of confidence* and there will be no impact on irreplaceable resources. There are no fatal flaws.

Bantamsklip:

- It is a greenfield site;
- Access to the site is currently limited and controlled by fencing and gates. However, the R43 tarred road passes through the site;
- Access will be via an access control point/roads from the R43 and access control points at the outer and inner security fence; and
- The impact rating is *low* for *intensity*, *consequence* and *significance*, at a mostly *high level of confidence* and there will be no impact on irreplaceable resources. There are no fatal flaws.

No Go Option:

- Eskom will sell the Thyspunt and Bantamsklip sites;
- The impact rating is *low* for intensity with *neutral consequence* and *low significance* for Duynfontein and *medium* for *intensity*, *negative consequence* and *high significance* for the Thyspunt and Bantamsklip sites.

Climate change and a desalination plant will not have any bearing on this Site Control impact assessment.

Mitigation Measures:

The following mitigation measures are proposed:

- Clearly communicate access policy for the properties to the public, using notice boards on access gates and by directly communicating with the communities nearby;
- Consider providing permits to allow access for fishing activities and whale watching in any coastal exclusion zone;
- Maintain public access to the R43 where it traverses the Bantamsklip site;
- Implement mitigation measures recommended in the visual impact assessment report;
- Establish a nature reserve within the owner-controlled area and provide access for scientific research;
- Maintain or re-establish indigenous vegetation;
- Retain and maintain environmental features on sites such as wetlands;
- Preserve heritage features;
- Facilitate a review of site control issues raised in this EIR on National Key Points via the Minister of Police;

- Confirm the availability of any required support for site control from the relevant police, military, naval and coastal management agencies;
- Integrate the site specific control measures with existing local and regional security measures;
- Develop an Environmental Management Plan prior to construction. Define mitigation measures, monitoring parameters, target 'goals' and responsibilities in the EMP; and
- Appoint an Environmental Control Officer.

An Environmental Management Plan must be drawn-up prior to construction in consultation with Eskom. Responsibilities, mitigation measures and monitoring of the effectiveness thereof must be clearly defined.

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED NUCLEAR POWER STATION (“NUCLEAR-1”) AND ASSOCIATED INFRASTRUCTURE SITE CONTROL

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GLOSSARY

Ecosystem:	A biological community of interacting organisms and their physical environment
EIA Corridor	Area within which the nuclear power station and auxiliary plant will be located
Greenfield:	Relating to or denoting previously undeveloped sites for commercial development
National Key Point:	Any place or area can be declared a National Key Point if it appears to the Minister at any time that any place or area is so important that its loss, damage, disruption or immobilization may prejudice the Republic, or whenever he considers it necessary or expedient for the safety of the Republic or in the public interest. The owner of any place or area so declared a National Key Point shall forthwith be notified by written notice or such declaration.
Protected Area:	An area encompassed by physical barriers and to which access is controlled.
Sensitive Area:	An area inside a protected area containing equipment, systems or devices, or nuclear material, the sabotage of which could directly or indirectly lead to unacceptable radiological consequences.
Wetland:	Swampy or marshy ground that is saturated with moisture

ABBREVIATIONS

EIA:	Environmental Impact Assessment
EIR:	Environmental Impact Report
EMP:	Environmental Management Plan
ha:	hectares
KNPS:	Koeberg Nuclear Power Station
m:	metres
MWe:	Megawatts of electricity
NNRA:	National Nuclear Regulatory Act
NNR:	National Nuclear Regulator
NPS:	Nuclear Power Station
ToR:	Terms of Reference

1 INTRODUCTION

1.1 Background

Eskom proposes to construct a conventional Nuclear Power Station (NPS) of the Pressurised Water Reactor type technology, with a capacity of ~ 4 000 MWe. The proposed NPS will include nuclear reactors, turbine complex, spent fuel, nuclear fuel storage facilities, waste handling facilities, intake and outfall structures and various auxiliary services infrastructure. The plant will have a **design operating** lifespan of ~60 years.

An Environmental Impact Assessment (EIA) is being undertaken to investigate the impacts and required mitigation measures associated with the construction and operation of the NPS and associated infrastructure at three sites in the Eastern (1) and Western (2) Cape (see **Figure 1.1**). The potential sites have been identified based on site investigations undertaken since the 1980s and work carried out under this EIA scoping process. The three potential sites, at Thyspunt (Eastern Cape), Bantamsklip and Duynefontein (Western Cape) are located on the coast. The former two sites are greenfield sites while the existing Koeberg Nuclear Power Station (KNPS) is located on the latter site.

This Environmental Impact Report (EIR) covers the assessment of Site Control at each site and will inform the overall EIA. It was carried out by SRK Consulting.

1.2 Terms of Reference

The assessment of impacts will broadly be undertaken in accordance with the amended EIA regulations under the National Environmental Management Act, 1998 (Act No. 107 of 1998), as appropriate to the specific field of study. The specialists are required to provide detailed information pertaining to each of the sites in terms of the following:

- Discussion of relevant policies and frameworks, where applicable;
- The affected environments (baseline information) as well as inferred changes to the baseline environment considering the effects of climate change;
- Identification of information gaps, limitations and additional information required;
- Description of the anticipated impacts using the impact assessment criteria as defined in **Section 1.2.4** for the various phases of the project, i.e. design, construction and operation;
- Development of relevant mitigation measures;
- Effects of climate change on the proposed development and *vice versa*;
- Utilisation of information from the existing Koeberg NPS in order to determine the cumulative impacts at the Duynefontein site;
- Assessment of the impacts associated with the desalination plant;
- Derivation of monitoring and auditing programmes, where necessary.



PROJECT NO. 378677	COORDINATE SYSTEM GAUSS CONFORMAL	NUCLEAR-1 ENVIRONMENTAL IMPACT ASSESSMENT FOR A PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE LOCATION OF THE PROPOSED NUCLEAR POWER STATION SITES	DATE 08/07/2009	SCALE 1:9,000,000
	SPHEROID WGS84		CENTRAL MERIDIAN 25	COMPILED BY SCHN

The ToR for the specialist Site Control study is to assess various aspects with respect to site control, including the following:

- Site security;
- Access control;
- Owner-controlled areas; and
- Other security issues that may be identified during the public participation process.

This report does not cover external issues such as the threat of terrorist attacks.

1.2.1 Methodology

The methodology followed for the Site Control EIR has entailed a desk study and site reconnaissance based on:

- Relevant Sections of Eskom's Technical Specifications for Nuclear Sites Investigations (Eskom 2006, 2009);
- Relevant legislation;
- Relevant chapters of the Koeberg Site Safety Report (Eskom 2006, 2009);
- Site control measures at the KNPS (Eskom 2006);
- Site investigations; and
- Pebble Bed Modular Reactor Demonstration Power Plant (on the Duynefontein site). Environmental Impact Assessment Specialist Study: Site Security (Malepa Holdings 2007).

1.2.2 Legislative Framework

The following Acts that are employed in South Africa have relevance to site control and the protection of nuclear material and facilities:

- National Key Points and Strategic Installations Bill, 2007 (Government Gazette 29789, **Government Notice No. R 432 of 2007**);
- National Nuclear Regulator Act, 1999 (Act No. 47 of 1999);
- Nuclear Energy Act, 1999 (Act No. 46 of 1999);
- South African Police Services Act, 1995 (Act No. 68 of 1995);
- National Strategic Intelligence Act, 1994 (Act No. 39 of 1994);
- Protection of Constitutional Democracy against Terrorist and Related Activities Act, 2004 (Act No. 33 of 2004);
- Seashore Act, 1935 (Act No. 21 of 1935) as amended by Act No. 51 of 1997;
- Aviation Act, 1962 (Act No. 74 of 1962) as amended by the Aviation Laws Amendment Act, 1997 (Act No. 82 of 1997);
- **National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008).**

The National Key Points and Strategic Installations Bill provides for designation of National Key Points and the safeguarding thereof and for matters connected therewith. It replaces the National Key Points Act of 1980. The Minister of Police is now the responsible line Minister for the administration of this Bill. Koeberg NPS was declared a National Key Point in 1982 and site security arrangements thus have to satisfy the bill/act.

The National Nuclear Regulator Act, 1999 (NNRA) establishes the National Nuclear Regulator (NNR). The main object of the NNR is to provide for the protection of persons,

property and the environment against nuclear damage¹ through the establishment of safety standards and regulatory practices. Site security arrangements thus have to satisfy the act.

Draft Regulations (Draft 2, proposed) in terms of Section 36 read with Section 47 of the NNRA include the following clause:

(11) An assessment from the relevant national security authorities on the suitability of the site for the siting of nuclear installations from a security perspective.

The Seashore Act, 1935 governs security restrictions along the shore and into the ocean and will provide a valuable contribution to the protection of marine life.

The Aviation Act, 1962 covers air space restrictions around NPSs.

The **National Environmental Management: Integrated Coastal Management Act, 2008** came into effect on 1 December 2009 and is the first legal instrument of its kind in South Africa dedicated to managing the country's coastline. The main objectives of the act, *inter alia*, are to coordinate the integrated management of the coastal zone by all spheres of government, preserve and protect the status of coastal public property being held by the State and secure equitable access to the opportunities and benefits of coastal public property.

Eskom will apply for the following exclusion zones:

- A 1 km exclusion zone which will be the same length as the property and extend 1 km offshore from the high water mark. Eskom will also apply for an exemption in terms of the Sea Shore Act;
- In principle, Eskom will consider permits to allow access for fishing activities (e.g. chokka boats and whale watching) and any such permits will be administered by Eskom;
- The National Intelligence Agency (NIA) will conduct an independent risk assessment and they will advise Eskom regarding this exclusion zone. This may be different to what Eskom applies for or may result in an exclusion zone not being necessary. In the event that an exclusion zone is not required by the NIA, Eskom will still apply for the 1 km exclusion zone;
- In terms of the Aviation Act, there will be a 750 m height restricted airspace over the Eskom property;
- The area controlled zone in which there will be no access to the public will be 800 m from the inner plant security fence.

The site specific security/control measures will need to be integrated into the local and regional security network.

Acquisition of nuclear sites must be completed by Eskom as soon as possible after the sites have been selected so that nuclear requirements can be incorporated into the spatial plan. Sub-regional spatial planning and zoning that incorporates the nuclear requirements is mandatory and these spatial plans must be approved by the relevant authorities. Management or site control of sites by Eskom continues until disposal of the sites takes place.

For the purpose of this assessment it is assumed that the construction phase extends beyond the physical construction of the access control infrastructure to include construction of the entire NPS, estimated to last approximately five years, even though the construction

¹ Any injury to or the death or any sickness or disease of a person; or other damage, including any damage to or any loss of use of property or damage to the environment, which arises out of, or results from, or is attributable to, ionizing radiation with a nuclear installation, nuclear vessel or action.

of site control infrastructure itself is expected to be much faster. Construction will take place and will be contained within the site security fence.

1.2.3 Assumptions & Limitations

This report has been based on extensive work carried out for the Nuclear-1 Project by SRK Consulting from October 2007 to December 2009. This work in turn has involved numerous site visits, evaluation of site control as practiced at the KNPS on the Duynfontein site, and review of a specialist report on site security for the Pebble Bed Modular Reactor Demonstration Power Plant (Duynfontein site) EIA (Malepa Holdings 2007). It is assumed that site control for the Nuclear-1 sites will follow a similar approach to the KNPS, with modifications related to specific topographic and access route features. There are no restricting limitations to this specialist study, apart from restrictions on access to sensitive/classified information concerning current security measures at the KNPS.

For the project description it was assumed that site control measurements will be similar to those currently employed at the KNPS. It is therefore assumed that the proposed new NPS will have three levels of security areas, namely:

1. An owner-controlled area, which is the area within the original farm boundaries on which the NPS is to be located. This is the property boundary as shown on **Figure 2.1**, **Figure 2.2** and **Figure 2.3**. The area will be fenced with a low cost fence having a specification similar to a game fence and comprising suitable corrosion resistant materials. Entrance will be controlled by Eskom. Parts of this area could be developed as a nature reserve, as at the KNPS;
2. An outer security fence around the off-terrace area cleared for construction, which will be patrolled and guarded by security guards. Eskom will exercise full control over all activities within this area. This area will be within the EIA Corridor area as shown on **Figure 2.1**, **Figure 2.2** and **Figure 2.3**;
3. An inner plant security fence, which encloses an exclusion area containing the nuclear reactors and associated infrastructure. The area will be surrounded by a high security electrified fence meeting National Key Point requirements and will be guarded. Access to this area will be highly restricted. This area will be located back from the coast to reduce the corrosive effects of the marine environment on the NPS.

1.2.4 Impact Assessment standards

Impact Assessment is based on a standard approach defined in *the table below, as supplied by Arcus Gibb*.

Criteria	Rating Scales	Notes
Nature	Positive	<i>This is an evaluation of the type of effect the construction, operation and management of the proposed NPS development would have on the affected environment.</i>
	Negative	
	Neutral	
Extent	Low	<i>Site-specific, affects only the development footprint</i>
	Medium	<i>Local (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius);</i>
	High	<i>Regional (beyond a 10 km radius) to national</i>

Criteria	Rating Scales	Notes
Duration	Low	0-3 years
	Medium	4-8 years (i.e. full duration of construction phase)
	High	More than 9 years to permanent
Intensity	Low	Where the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected
	Medium	Where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected
	High	Where natural, cultural or social functions and processes are altered to the extent that the impact will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.
Potential for impact on irreplaceable resources	Low	No irreplaceable resources will be impacted.
	Medium	Resources that will be impacted can be replaced, with effort.
	High	There is no potential for replacing a particular vulnerable resource that will be impacted.
Consequence (a combination of extent, duration, intensity and the potential for impact on irreplaceable resources).	Low	<p>A combination of any of the following</p> <ul style="list-style-type: none"> • Intensity, duration, extent and impact on irreplaceable resources are all rated low • Intensity, duration and extent are rated low but impact on irreplaceable resources is rated medium to high • Intensity is low and up to two of the other criteria are rated medium • Intensity is medium and all three other criteria are rated low
	Medium	<ul style="list-style-type: none"> • Intensity is medium and one other criterium is rated high, with the remainder being rated low. • Intensity is low and at least two other criteria are rated medium or higher. • Intensity is rated medium and at least two of the other criteria are rated medium or higher • Intensity is high and at least two other criteria are medium or higher • Intensity is rated low, but irreplaceability and duration are rated high
	High	<ul style="list-style-type: none"> • Intensity and impact on irreplaceable resources are rated high, with any combination of extent and duration • Intensity is rated high, with all of the other criteria being rated medium or higher
Probability (the likelihood of the impact occurring)	Low	It is highly unlikely or less than 50 % likely that an impact will occur.
	Medium	It is between 50 and 70 % certain that the impact will occur.
	High	It is more than 75 % certain that the impact will occur or it is definite that the impact will occur.

Criteria	Rating Scales	Notes
Significance (all impacts including potential cumulative impacts)	Low	<ul style="list-style-type: none"> • Low consequence and low probability • Low consequence and medium probability • Low consequence and high probability
	Low to medium	<ul style="list-style-type: none"> • Low consequence and high probability • Medium consequence and low probability
	Medium	<ul style="list-style-type: none"> • Medium consequence and low probability • Medium consequence and medium probability • Medium consequence and high probability • High consequence and low probability
	Medium to high	<ul style="list-style-type: none"> • High consequence and medium probability
	High	<ul style="list-style-type: none"> • High consequence and high probability

2 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section provides a brief description of the current environment of the three proposed sites, as it relates to proposed site control. The general location of the three sites is shown in **Figure 1.1**.

2.1 Thyspunt

Thyspunt is situated in the Eastern Cape Province on the coast between the towns of Oyster Bay in the west and St. Francis Bay in the east. The site can be reached from the N2 highway via Humansdorp, from where an untarred secondary road in moderate condition leads to Oyster Bay. A branch from this road also leads to St. Francis Bay.

The greater area is generally rural and not densely populated. There are currently three holiday residences on the coastal strip of the proposed site. Outside of the site, the nearest settlements are located in Oyster Bay and St. Francis Bay, both of which are popular holiday towns. The general land use outside of the towns is farming, most notably dairy and wheat farming.

2.1.1 Owner-controlled areas

The proposed nuclear site is located on the following farms or portions thereof:

- Welgelegen 735;
- Langefontein 736;
- Farm 741;
- Welgelee 743;
- Thysbaai 744; and
- Buffelsbosch 742.

Figure 2.1 shows the location of the owner-controlled area with respect to the outer property boundary and other farms in the Oyster Bay district. The southern boundary of the site is formed by the coast.

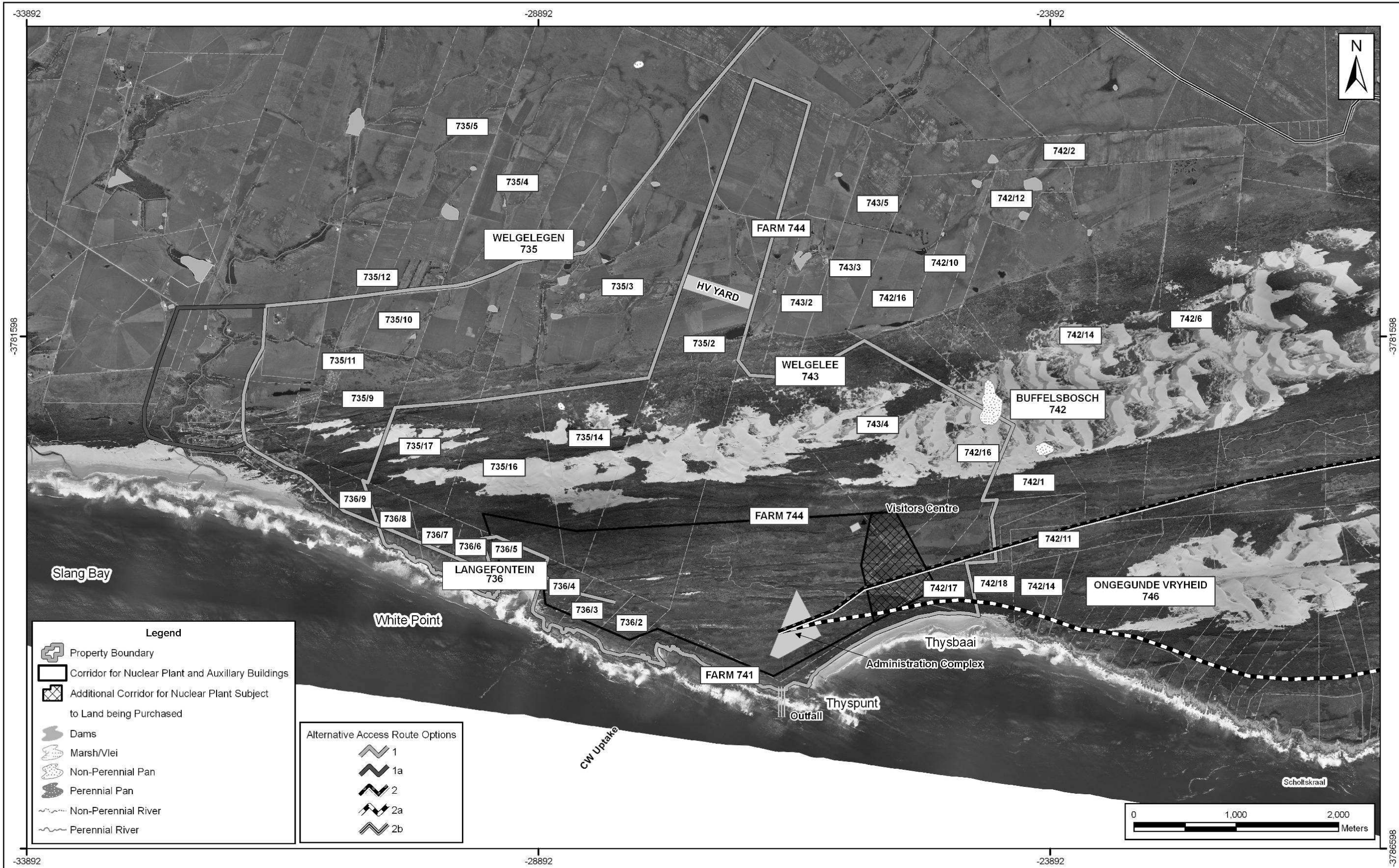
The site contains important ecosystems (wetlands, dunes, vegetation) and heritage features. Much of the site is covered in virtually impenetrable coastal bush. These aspects are described in more detail in the relevant specialist studies.

2.1.2 Access Control

The site is currently partially fenced, as it is a private property. As such, access to the site and through it to the coast is currently restricted. The site can be accessed via two landward points:

- One access point is via an electronically operated gate and dirt track from the Oyster Bay Site boundary. This requires a 4 x 4 vehicle for access.
- The other access point is from the north in the Sand River area via a locked gate and also requires a 4 x 4 vehicle for access.

There are numerous opportunities for the public to access the coast outside of the site boundaries.



PROJECT NO. 378677	COORDINATE SYSTEM GAUSS CONFORMAL		NUCLEAR-1 ENVIRONMENTAL IMPACT ASSESSMENT FOR A PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE SPECIALIST STUDY: SITE CONTROL DETAILED LOCALITY MAP: THYSPUNT	DATE 24/07/2009	SCALE 1:35,000
	SPHEROID WGS84	CENTRAL MERIDIAN 25		COMPILED BY GOES	FIG NO. 3.1

There are two proposed future access points, one on the western boundary and one on the eastern boundary (see **Figure 2.1**). The western access point corresponds with the existing one, while the eastern one would be a new access point. Access control points will be established at the owner-controlled boundary and outer and inner security fences.

2.2 Bantamsklip

Bantamsklip is situated on the southern coast of the Western Cape Province between the towns of Pearly Beach in the west and Buffeljags in the east. The site can be accessed via the R43 tar road running from Gansbaai parallel to the coast, which cuts through the proposed NPS property.

The greater area is generally rural and very sparsely populated. The nearest residences are located in Pearly Beach (a popular holiday town), approximately 7 km from the outer boundary of the site. Some farming takes place in the area, and much of the land is covered in indigenous fynbos vegetation.

2.2.1 Owner-controlled areas

The proposed nuclear site covers the following farms/areas:

- Hagelkraal 318;
- Buffeljagt 309; and
- Pearly Beach Nature Reserve.

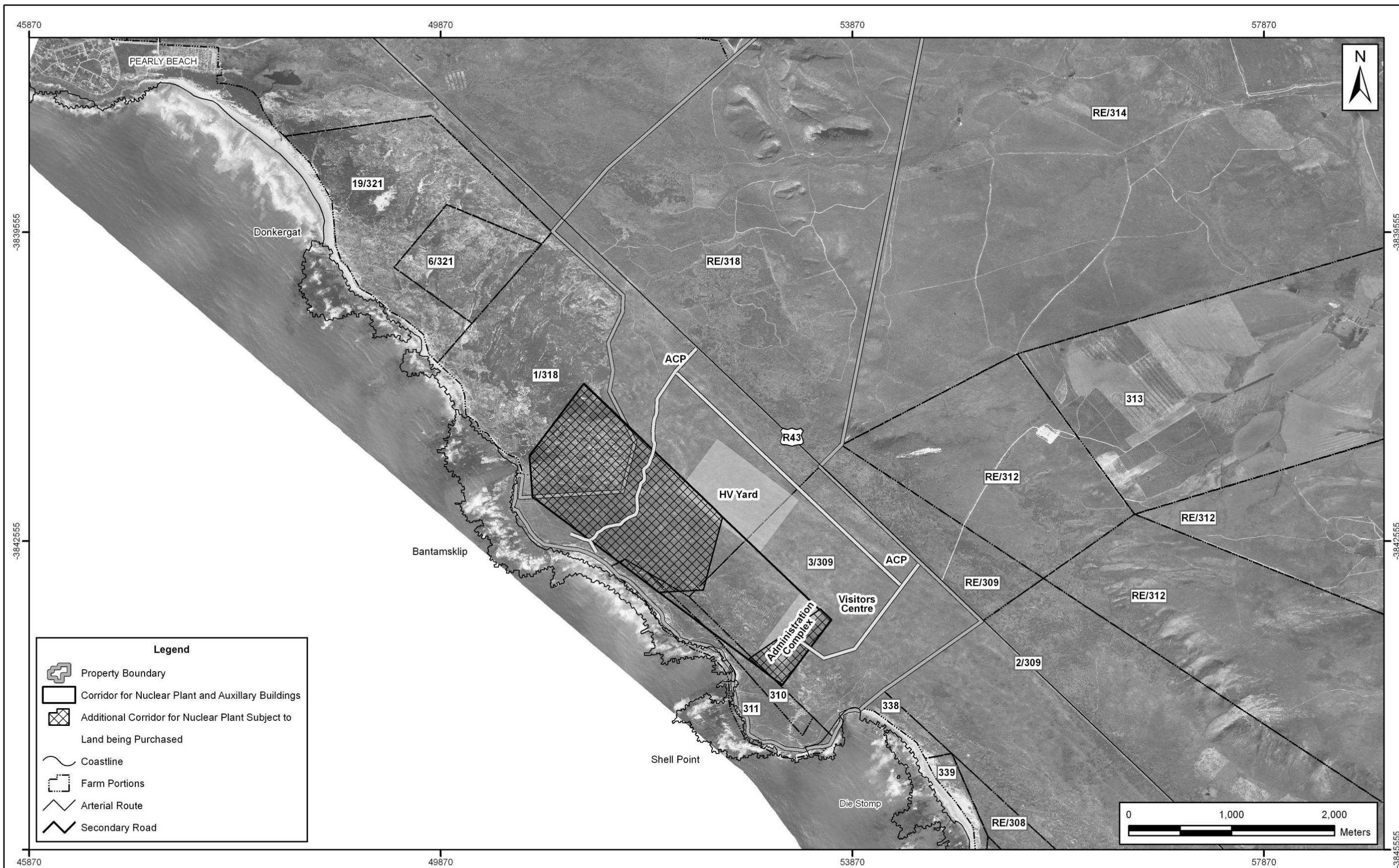
Figure 2.2 shows the location of the owner-controlled area with respect to the outer property boundary and the other farms in the Bantamsklip area.

2.2.2 Access Control

The site is currently fenced, as it is a private property. The R43, running through the proposed NPS site, is fenced on either side. As such, official access to the site and through it to the coast is currently restricted. The site can be accessed via the current main entrance gate that is located on the R43 approximately 7 km from Pearly Beach.

However, this site currently experiences significant problems related to the trespassing of illegal perlemoen (abalone) and crayfish poachers, who are assumed to easily reach the area via the R43.

New access routes will be developed feeding off the R43 with access control points at the owner-controlled boundary and outer and inner security fence (see **Figure 2.2**).



PROJECT NO. 378677	COORDINATE SYSTEM GAUSS CONFORMAL		NUCLEAR-1 ENVIRONMENTAL IMPACT ASSESSMENT FOR A PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE SPECIALIST STUDY: SITE CONTROL DETAILED LOCALITY MAP: BANTAMSKLIP	DATE 13/08/2009	SCALE 1:35,000
	SPHEROID WGS84	CENTRAL MERIDIAN 19		COMPILED BY GOES	FIG NO. 3.2

2.3 Duynefontein

Duynefontein is situated on the western coast of the Western Cape Province, just north of the existing KNPS and southeast of the town of Atlantis. The site is located approximately 35 km north of Cape Town and can be reached via the R27 West Coast Road and Otto du Plessis Drive. There are full visitor facilities, including a Visitors' Centre, a nature reserve and walking and mountain bike trails.

The proposed new NPS site at Duynefontein is largely located within the existing owner-controlled boundary of the KNPS. The area surrounding the proposed NPS site is generally rural and not densely populated. The nearest town is Atlantis, located approximately 5 km away from the boundary of the proposed site, and the dormitory township of Duynefontein. The general land use outside of the towns is farming.

2.3.1 Owner-controlled areas

The proposed nuclear site is located on the following farms or portions thereof:

- Coastal Strip Farm 1375;
- R/E Duynefontein 34;
- R/E Klein Springfontein 33;
- Kleine Springfontein No 33/6; and
- Kleine Springfontein No 33/5.

The boundaries of the owner-controlled area are shown in **Figure 2.3**.

2.3.2 Access Control

As the proposed new NPS site at Duynefontein is largely located within the existing owner-controlled boundary of the KNPS, extensive access controls are already in place for most of the site.

The owner-controlled boundary of KNPS is enclosed by a game fence, while its nuclear terrace area is enclosed by a diamond mesh fence. These barriers enclosing the protected and sensitive areas of the KNPS are designed such that they prevent, detect and delay unauthorized access. They are continuously monitored.






The only permanent access roads into the owner-controlled area are the existing Otto du Plessis Drive and the main access road from the R27. The main access road to the north from Trunk Road No. 77 can be used as an evacuation route, if necessary. Access at all entrance points is restricted to registered users only and is kept to a minimum at all times.

The area between the site security fence and the owner-controlled boundary is known as the public exclusion area, which excludes the public from living in this area, but not necessarily from visiting it. Eskom exercises full control over all activities within the public exclusion area, which is fenced and provided with suitable warning signs.



Access to the Nuclear-1 site will be via two routes, following existing roads, one to the north and one to the south, feeding off the R27. Access control points will be established at the owner-controlled boundary and outer and inner security fence (see **Figure 2.3**).



Legend

-  Property Boundary
-  Corridor for Nuclear Plant and Auxillary Buildings
-  Farm Portion
-  Arterial Route
-  Other Roads

Access Routes

-  Existing Road
-  Existing Roads to be Upgraded

PROJECT NO. 378677	COORDINATE SYSTEM GAUSS CONFORMAL	NUCLEAR-1 ENVIRONMENTAL IMPACT ASSESSMENT FOR A PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE SPECIALIST STUDY: SITE CONTROL DETAILED LOCALITY MAP: DUYNEFONTEIN	DATE 12/08/2009	SCALE 1:50,000
	SPHEROID WGS84	CENTRAL MERIDIAN 19	COMPILED BY BOOK	FIG NO. 3.3

3 IMPACT IDENTIFICATIONS AND ASSESSMENT

Impacts associated specifically with site control at the proposed new NPS have been identified and are listed in **Table 3.1** below. It is important to note that impacts primarily associated with other aspects of the proposed NPS (such as the establishment of general development exclusion zones and the loss of holiday homes on the coast) have been assessed in the relevant specialist studies or the main EIR.

Impacts are assessed and significance ratings are assigned in line with the Impact Rating Methodology that was supplied to specialists with the ToR, as listed in **Section 1.2.4**. Some of the impacts and mitigation measures listed relate to engineering and should not be construed as minimum requirements.

Table 3.1: Potential impacts from site control

Activity	Possible Impacts
Fencing of Site Access Control	Restricted access for people Preservation of environment within outer boundary Cessation of perlemoen/crayfish poaching (Bantamsklip site) Cessation of access to quadbikes, motorbikes and off-road vehicles (Thyspunt site)

4 ENVIRONMENTAL ASSESSMENT

4.1 Thyspunt

4.1.1 Restricted access to the site

The site is currently partially fenced as it is private property and thus not legally accessible to the general public. There are a number of holiday towns and residences located in the greater area surrounding the site, for which coastal access is an important attraction for tourists. However, coastal access can be obtained at a number of alternative sites, and the site is not known to be an important access point to the coast at present.

The overall impact of the restricted access at the site during operation is considered to be of *low (negative)* significance. Mitigation measures are listed below but are not expected to further reduce the significance of the impact (see **Table 4.2**).

Access restriction to the public is expected to be similar during construction and operation. As such, the overall impact during construction is also considered to be of *low (negative)* significance (see **Table 4.1**).

Proposed mitigation measures include:

- Clearly communicate the access policy for the property to the public, using notice boards on access gates and by directly communicating with the communities nearby.
- Consider whether access to the coast can be provided either via a coastal “corridor” at the site or in a nearby area;
- Consider issuing of permits to allow access for fishing activities.

4.1.2 Preservation of environment within outer boundary

The site contains important ecosystems such as wetlands, dunes and indigenous vegetation as well as heritage resources. The establishment of strict access control to the site and the absence of significant activities in the areas outside of the nuclear terrace will result in a degree of protection of the currently existing environment, if this is not altered.

As such, the benefit of preservation of the environment within the outer property boundary at the site during operation is considered to be of *medium (positive)* significance. Optimisation measures are listed below and are expected to further increase the benefit to a *high (positive) significance* (see **Table 4.2**).

It is expected that construction activities at the proposed NPS will not directly impact on most of the area within the outer property boundary, although the duration of the construction phase is shorter than the operational phase. As such, the overall impact during construction is considered to be of *low (positive)* significance (see **Table 4.1**).

Proposed mitigation measures include:

- Establish a nature reserve and make the area available for scientific research;
- Maintain or re-establish indigenous vegetation; and
- Retain and maintain environmental features on the site such as wetlands.

Based on the above assessment there are not considered to be any fatal flaws associated with the Thyspunt site.

Table 4.1: Impacts at the Thyspunt site during the construction phase

<i>Impact</i>	<i>Nature</i>	<i>Intensity</i>	<i>Extent</i>	<i>Duration</i>	<i>Impact on irreplaceable resources</i>	<i>Consequence</i>	<i>Probability</i>	<i>SIGNIFICANCE</i>
<i>Impact 1: Restricted access to site</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>Impact 2: Preservation of environment within outer boundary</i>	<i>Positive</i>	<i>Medium</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>	<i>Medium</i>
<i>With mitigation</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>

Table 4.2: Impacts at the Thyspunt site during the operational phase

<i>Impact</i>	<i>Nature</i>	<i>Intensity</i>	<i>Extent</i>	<i>Duration</i>	<i>Impact on irreplaceable resources</i>	<i>Consequence</i>	<i>Probability</i>	<i>SIGNIFICANCE</i>
<i>Impact 1: Restricted access to site</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Negative</i>	<i>Medium</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>
<i>Impact 2: Preservation of environment within outer boundary</i>	<i>Positive</i>	<i>Medium</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>
<i>With mitigation</i>	<i>Positive</i>	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>	<i>Medium</i>

4.2 Bantamsklip

4.2.1 Restricted access to the site

The site is currently fenced as it is private property and thus not legally accessible to the general public. There are a number of holiday homes located in the greater area surrounding the site, for which coastal access is an important attraction for tourists. However, legal coastal access can be obtained at a number of alternative sites.

An important assumption in this assessment is that the access to and along the R43 where it lies within the site will be maintained for the public.

The overall impact of the restricted access at the site during operation is considered to be of *low (negative)* significance. Mitigation measures are listed below but are not expected to further reduce the significance of the impact (see **Table 4.4**).

Access restriction to the public is expected to be similar during construction and operation. As such, the overall impact during construction is also considered to be of *low (negative)* significance (see **Table 4.3**).

Proposed mitigation measures include:

- Clearly communicate the access policy to the property to the public, using notice boards on access gates and by directly communicating with the communities nearby;
- Consider whether access to the coast can be provided either via a coastal “corridor” at the site or in a nearby area;
- Consider issuing of permits to allow access for e.g. fishing and whale watching; and
- Maintain public access to the R43 where it traverses the site.

4.2.2 Preservation of environment within outer boundary

The site contains significant ecosystems to the north of the R43.

As such, the benefit of preservation of the environment within the outer property boundary at the site during operation is considered to be of *low (positive)* significance. Optimisation measures are listed below and are expected to further increase the benefit to *medium (positive) significance* (see **Table 4.4**).

It is expected that construction activities at the proposed NPS will not directly impact on most of the area within the outer property boundary, although the duration of the construction phase is shorter than the operations phase. As such, the overall impact during construction is considered to be of *low (positive)* significance (see **Table 4.3**).

Proposed mitigation measures include:

- Establish a nature reserve and make the area available for scientific research.
- Maintain or re-establish indigenous vegetation.
- Retain and maintain environmental features on the site such as wetlands.

4.2.3 Cessation of access for poachers through the site

Despite being fenced, the site currently experiences significant problems related to the trespassing of perlemoen (abalone) and crayfish poachers, who are assumed to easily reach the area via the R43. Perlemoen in particular is highly overfished and threatened. As such, stricter access control to the site as well as the coastal stretch belonging thereto could result in a reduction in poaching of perlemoen and crayfish in this area, resulting in a benefit to these coastal resources.

As such, the benefit of curbing the access of poachers to the coast at the site during operation is considered to be of *low (positive)* significance. Mitigation measures are listed below and are expected to further increase the benefit to a *medium (positive)* significance (see **Table 4.4**).

Access restriction to the public is expected to be similar during construction and operation. As such, the benefit of curbing access of poachers already during construction is also considered to be of *low (negative)* significance (see **Table 4.3**).

Proposed mitigation measures include:

- Monitor the coast adjacent to the site for poachers as part of site control for the NPS.

The above measure will only be feasible should the adjacent sea be declared a restricted area in terms of the NKPB and/or Seashore Act. Based on the above assessment, there are no fatal flaws associated with the Bantamsklip site.

Table 4.3: Impacts at the Bantamsklip site during the construction phase

<i>Impact</i>	<i>Nature</i>	<i>Intensity</i>	<i>Extent</i>	<i>Duration</i>	<i>Impact on irreplaceable resources</i>	<i>Consequence</i>	<i>Probability</i>	<i>SIGNIFICANCE</i>
<i>Impact 1: Restricted access to site</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>Impact 2: Preservation of environment within outer boundary</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>Impact 3: Cessation of access for poachers through the site</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Positive</i>	<i>Medium</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>	<i>Medium</i>

Table 4.4: Impacts at the Bantamsklip site during the operational phase

<i>Impact</i>	<i>Nature</i>	<i>Intensity</i>	<i>Extent</i>	<i>Duration</i>	<i>Impact on irreplaceable resources</i>	<i>Consequence</i>	<i>Probability</i>	<i>SIGNIFICANCE</i>
<i>Impact 1: Restricted access to site</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>Impact 2: Preservation of environment within outer boundary</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>Impact 3: Cessation of access for poachers through the site</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Positive</i>	<i>Medium</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>	<i>Medium</i>

4.3 Duynefontein

4.3.1 Restricted access to the site

Access to the site is already largely controlled as the proposed site falls partly within the existing outer property boundary of the existing KNPS. Koeberg's site control system would be extended to include the entire site. The area of the site currently lying outside of the Koeberg controlled area is also currently fenced as it is private property and thus not legally accessible to the general public. Due to its proximity to the KNPS, the site is not known to be an important access point to the coast for the public at present.

The overall impact of the restricted access at the site during operation is considered to be of *low (negative)* significance. Mitigation measures are listed below but are not expected to further reduce the significance of the impact (see **Table 4.6**).

Access restriction to the public is expected to be similar during construction and operation. As such, the overall impact during construction is also considered to be of *low (negative)* significance (see **Table 4.5**).

Proposed mitigation measures include:

- Clearly communicate the access policy to the property to the public, using notice boards on access gates and by directly communicating with the communities nearby.
- Consider whether access to the coast can be provided either via a coastal "corridor" at the site or in a nearby area; and
- Consider issuing of permits to allow access for fishing.

4.3.2 Preservation of environment within outer boundary

The area within the KNPS property boundary has been managed as a protected area, to the benefit of many *fauna* and *flora* species present on the site. If the proposed NPS is located at Duynefontein, part of the existing reserve will be used for the new NPS installation, thus making the currently protected area smaller.

As such, the impact of preservation of the environment within the outer property boundary at the site during operation is considered to be of *low (negative)* significance. Mitigation measures are listed below, but are not expected to further reduce the impact significance (see **Table 4.6**).

It is expected that construction activities at the proposed NPS will not directly impact on most of the area within the outer property boundary, other than the 31 ha that are included in the proposed NPS site, although the duration of the construction phase is shorter than the operational phase. As such, the overall impact during construction is considered to be of *low (negative)* significance (see **Table 4.5**).

Proposed mitigation measures include:

- Maintain the existing nature reserve as far as possible and make the area available for scientific research.
- Maintain or re-establish indigenous vegetation; and
- Retain and maintain environmental features on the site such as wetlands.

Based on the above assessment there are not considered to be any fatal flaws associated with the Duynefontein Site.

Table 4.5: Impacts at the Duynfontein site during the construction phase

<i>Impact</i>	<i>Nature</i>	<i>Intensity</i>	<i>Extent</i>	<i>Duration</i>	<i>Impact on irreplaceable resources</i>	<i>Consequence</i>	<i>Probability</i>	<i>SIGNIFICANCE</i>
<i>Impact 1: Restricted access to site</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>Impact 2: Preservation of environment within outer boundary</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>

Table 4.6: Impacts at the Duynfontein site during the operational phase

<i>Impact</i>	<i>Nature</i>	<i>Intensity</i>	<i>Extent</i>	<i>Duration</i>	<i>Impact on irreplaceable resources</i>	<i>Consequence</i>	<i>Probability</i>	<i>SIGNIFICANCE</i>
<i>Impact 1: Restricted access to site</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Negative</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>Impact 2: Preservation of environment within outer boundary</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>
<i>With mitigation</i>	<i>Positive</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>Low</i>	<i>High</i>	<i>Low - Medium</i>

4.4 No Go Option

In the event that the sites are not developed for NPSs, Eskom will sell the Bantamsklip and Thyspunt properties and non-essential parts of Duynefontein could also be sold. In this scenario the impact is seen to be *low* intensity, *neutral* consequence and *low* significance for the Duynefontein site but of *medium* intensity, *negative* consequence and *high* significance for the Thyspunt and Bantamsklip sites as it is unlikely that a similar level of site control and preservation of ecological and heritage features could be enforced or afforded by private land owners/developers as would have been the case with a nuclear site. The main mitigation measure for this scenario would be strict enforcement of conditions applicable to any approved future development of the sites, which would presumably cover preservation of these features.

5 MITIGATION MEASURES

The following mitigation measures are proposed:

- Clearly communicate access policy for the properties to the public, using notice boards on access gates and by directly communicating with the communities nearby;
- Consider providing permits to allow access for fishing activities and whale watching in any coastal exclusion zone;
- Maintain public access to the R43 where it traverses the Bantamsklip site;
- Implement mitigation measures recommended in the visual impact assessment report;
- Establish a nature reserve within the owner-controlled area and provide access for scientific research;
- Maintain or re-establish indigenous vegetation;
- Retain and maintain environmental features on sites such as wetlands;
- Preserve heritage features;
- Facilitate a review of site control issues raised in this EIR on National Key Points via the Minister of Police;
- Confirm the availability of any required support for site control from the relevant police, military, naval and coastal management agencies;
- Integrate the site specific control measures with existing local and regional security measures;
- Develop an Environmental Management Plan prior to construction. Define mitigation measures, monitoring parameters, target 'goals' and responsibilities in the EMP; and
- Appoint an Environmental Control Officer;

6 CONCLUSIONS AND RECOMMENDATIONS

Based on the above information and impact assessment, the following conclusions can be drawn:

Duynfontein:

- The site is already developed as a NPS with full access and site control, which has been in place since commissioning in **1984** and prior to this during construction;
- It has full visitors facilities with a Visitors Centre;
- Koeberg Nature Reserve has been developed on the site;
- Walking and mountain bike trails exist;
- New access control points will be established at the owner-controlled boundary and outer and inner security fence, on existing but upgraded roads leading off the R27;
- There will be minimal additional or cumulative impacts with development of Nuclear-1; and
- The impact rating is *low* for *intensity*, *consequence* and *significance*, at a mostly *high level of confidence* and there will be no impact on irreplaceable resources. There are no fatal flaws.

Thyspunt:

- It is a greenfield site;
- Sensitive wetland ecosystems and heritage features present will be preserved by the implementation of site control measures;
- Access to the site is currently limited and controlled by fencing and electronic/locked gates;
- New access control points will be established, either on the western or eastern boundary with access control points, plus at the outer and inner security fence; and
- The impact rating is *low* for *intensity*, *consequence* and *significance*, at a mostly *high level of confidence* and there will be no impact on irreplaceable resources. There are no fatal flaws.

Bantamsklip:

- It is a greenfield site;
- Access to the site is currently limited and controlled by fencing and gates. However, the R43 tarred road passes through the site;
- New access roads will feed off the R43 and access control points will be set up at the owner-controlled boundary and the outer and inner security fence; and
- The impact rating is *low* for *intensity*, *consequence* and *significance*, at a mostly *high level of confidence* and there will be no impact on irreplaceable resources. There are no fatal flaws.

No Go Option:

- Eskom will sell the Thyspunt and Bantamsklip sites;
- The impact rating is *low* for intensity with *neutral consequence* and *low significance* for Duynfontein and *medium* for *intensity*, *negative consequence* and *high significance* for the Thyspunt and Bantamsklip sites

Climate change and a desalination plant will not have any bearing on this Site Control impact assessment.

Mitigation Measures:

The following mitigation measures are proposed:

- Clearly communicate access policy for the properties to the public, using notice boards on access gates and by directly communicating with the communities nearby;
- Consider providing permits to allow access for fishing activities and whale watching in any coastal exclusion zone;
- Maintain public access to the R43 where it traverses the Bantamsklip site;
- Implement mitigation measures recommended in the visual impact assessment report;
- Establish a nature reserve within the owner-controlled area and provide access for scientific research;
- Maintain or re-establish indigenous vegetation;
- Retain and maintain environmental features on sites such as wetlands;
- Preserve heritage features;
- Facilitate a review of site control issues raised in this EIR on National Key Points via the Minister of Police;
- Confirm the availability of any required support for site control from the relevant police, military, naval and coastal management agencies;
- Integrate the site specific control measures with existing local and regional security measures;
- Develop an Environmental Management Plan prior to construction. Define mitigation measures, monitoring parameters, target 'goals' and responsibilities in the EMP; and
- Appoint an Environmental Control Officer.

An Environmental Management Plan must be drawn-up prior to construction in consultation with Eskom. Responsibilities, mitigation measures and monitoring of the effectiveness thereof must be clearly defined.

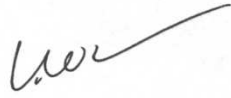
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10 March 2011