



NGT ESH
Environment | Socio-Economics | Heritage

PROJECT TITLE:

THE EAST COAST GAS 400 KV POWER LINES, LOCATED IN RICHARDS BAY, WITHIN
THE UMHLATHUZE LOCAL MUNICIPALITY IN THE KING CETSHWAYO DISTRICT
MUNICIPALITY IN THE KWAZULU-NATAL PROVINCE.

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Heritage Impact Assessment for the East Coast Gas 400 KV power line, located in Richards Bay, within the Umhlathuze Local Municipality in the King Cetshwayo District Municipality, Kwazulu-Natal Province.

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DECLARATION OF INDEPENDENCE

Cherene de Bruyn for NGT ESH has compiled this report. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision-making process for the project.

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EXECUTIVE SUMMARY

NGT was appointed by EKOInfo to conduct a HIA for the proposed East Coast Gas 400 KV powerlines, located in Richards Bay, in ULM within KCDM, in the KZN, South Africa. NGT appointed its subsidiary (NGT ESH) responsible for implementation of environmental, socio-economic, heritage and sustainability project to manage the HIA study. This report forms part of the EIAs and it informs the design of proposed powerlines by highlighting heritage sensitive areas and mapping out Go and No-Go-Areas from a heritage resources management perspective. This study is conducted independently in terms of Section 38 of the National Heritage Resources Act (NHRA), No. 25 of 1999.

The standard NGT ESH HIA study process entailed conducting a detailed background information search of the receiving environment. The search assesses among other forms of data, previous studies conducted in and around the proposed study area or the development area. This also includes conducting an onsite investigation (survey) to identify and map out heritage resources on site and assess impacts of the proposed development on the identified heritage resources. Recommendations are then made with regards to how the identified heritage resources should be managed and/or mitigated to avoid being negatively impacted by development activities. Furthermore, recommendations are made on how the positive project benefits can be enhanced, to ensure a long-term strategy for the conservation and promotion of heritage resources, if any are found.

The survey of the project area was conducted between Tuesday the 26th of February and Thursday the 28th of February 2019. The survey was conducted by Miss Cherene de Bruyn (Manager: Archaeology & Heritage Unit – NGT ESH) with Mr Retief Grobler (Wetland Ecologist and Director - Imperata Consulting) and Mr Lukas Niemand (Ornithologist & Entomologist and Director- Pachnoda Consulting). The survey was conducted on foot. A vehicle was also used to access the site. During the survey no archaeological resource were identified. The uThungulu Regional Cemetery (Burial Site-01) was identified in the East-West project area. In terms of built environment an Open-Air Church and old SpoorNet village was identified. The heritage resources identified were documented, photographed and mapped. Based on the results of the literature review, field survey and the assessment of heritage sensitivity, the following conclusions and recommendations are made about the project in terms of the of minimum standards for conducting such studies as legislated in the NHRA, No.25 of 1999:

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Conclusions:

Based on the results of literature review, field survey and the assessment of identified heritage resources, the following conclusions are made in terms of the HHRA 25 of 1999 about the proposed development:

- It is concluded that the project area near Richards bay, is located in a region rich in archaeology and heritage resources.
- However, no archaeological or historical resources were identified.
- A municipal cemetery was found in the East-West project area
 - *uThungulu Regional Cemetery (Burial Site-01)*
 - The uThungulu Regional cemetery is located north of the R34 and located between the R102 and N2. The cemetery falls within the 1 km corridor proposed for Option 1.
 - The uThungulu Regional cemetery is a declared cemetery under the jurisdiction of the ULM within the KCDM.
- No other unmarked or informal graves were identified. However, graves are subterranean in nature and might not have been identified during the initial site visit and survey.
- In terms of the built environment an Open-air church (Site Complex-01) and old SpoorNet village (Site Complex-02) were identified in the northern section of the project area.
 - *Open-air church (Site Complex-01)*
 - Located to the east of the N2 near one of the Mondi plantations. The site contained a couple of white painted stones and plastic bags and buckets.
 - As a site associated with living heritage and cultural practices it has medium heritage significance and is as such protected by the NHRA 25 of 1999.
 - *SpoorNet village (Site Complex-02)*
 - Several old Asbestos houses and kraals associated with an old SpoorNet village was observed. The village is currently occupied by a small community who grows several crops in the kraals.
 - Although the buildings located at the SpoorNet village, do not demonstrate any unique architectural style or language/vernacular, particular use of rare or unique technology in terms of building materials, cooling and heating systems, or associated with unique group of people/persons that makes them unique, they are of medium significance as a result of the communities currently living there.

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- In terms of SAHRA Paleontological Sensitivity Layer the project area that is in a low to very high sensitivity area.
 - The East-West study area contains three Palaeontological Sensitive Area (PSA) layers.
 - South of the R34 linking Empangeni and Richards Bay, is a green area meaning that it has Moderate PSA;
 - the area north of the R34 shows two layers, green and blue indicating it has low to moderate palaeontological sensitivity; and
 - the western section of East-west Study area falls within a yellow/orange area which has a high palaeontological sensitivity.
 - According to the Paleontological Impact Assessment (PIA) report the proposed powerline routes lie on shales of the Pietermaritzburg Formation of the Ecca Group and this has a small chance of impacting on invertebrate trace fossils if they are present here, with Berea Formation in the central section and Quaternary sands for the eastern section.
 - The North-East study area on the other hand yielded four PSA.
 - The eastern section of the East-north study area and east of the Nseleni River, falls in an area that is predominantly blue and has low paleontological potential;
 - the western and central section, west of the Nseleni River up to Enseleni Nature Reserve shows a green, yellow/orange layer as well as pockets of grey layer, which indicates an insignificant to high palaeontological sensitivity; and
 - the west and north of the R619 and the N2 intersection a thin layer of PSA in red is shown, meaning that this area is of very high palaeontological sensitivity
 - According to the PIA report the proposed powerline routes lie on Quaternary sands and these are not fossiliferous. The ancient granites and gneisses in the area are not fossiliferous. The Jurassic dolerite dykes and overlying Quaternary sands to the west do not preserve fossils.

Recommendations:

Based on the Limitations and Conclusions it is recommended that:

- *Cemetery (Burial Site-01)*
 - As a Municipal cemetery the site is already demarcated with a fence.

- It should be treated as No-Go-Area. Machinery and equipment should avoid the cemetery.
- As such it is proposed that the construction and placement of the Eksom towers should be outside the demarcated fence area.
- *Open-air church (Site Complex-01)*
 - This Open-Air Churches is located within the possible servitude of the powerline (1km corridor).
 - A 10m buffer should be maintained around the Open-air church, and it should be demarcated with a fence and treated as No-Go-Area.
 - Machinery and Equipment should avoid the Open-Air Church.
 - If the powerlines encroach on the Open-Air Church during the construction phase that the Church members cannot participate in their Church related activities on site, it is recommended that the client discuss the possibility of relocation and associated costs with the Church members.
- *SpoorNet village (Site Complex-02)*
 - The village falls within the servitude of the powerlines (1km corridor).
 - A 10m buffer should be maintained around the village.
 - If during the construction phase the development of the powerlines encroaches on the village, the client should enter into negotiations with the occupants and propose the possibility of relocation. A Relocation Action Plan should be developed.
- It should be noted that some archaeological material, including artefacts and graves can be buried underground and as such, may not have been identified during the initial survey and site visits. In the case where the proposed development activities bring these materials to the surface, they should be treated as **Chance Finds**. Should such resources be unearthed, it is recommended that the activities be stopped immediately, and an archaeologist be contacted to conduct a site visits and make recommendations on the mitigation of the finds. SAHRA and AMAFA should also be informed immediately on such finds.
- In terms of the SAHRA Paleontological Sensitivity Layer, the area falls within a region defined as an insignificant to very high sensitivity area. For only the western part of the west-east sector a Fossil Chance Find Protocol should be followed once excavations and construction of the powerline poles commences. If any trace fossils are discovered by the responsible person in

charge, they should be rescued and put aside for a professional palaeontologist to assess. The north-south sector is not on fossiliferous rocks. As far as the palaeontology is concerned the project may proceed (See PIA report and Appendix 3).

- The proposed powerlines will not have impact on the heritage and archaeological resources in the broader Richards bay area.
- From a viability perspective, the East-West lines are supported subject that they will not disturb the graves located in the uThungulu Regional Cemetery.
- It is recommended that both the SAHRA and the Amafa grant the project a **Positive Review Comment** and allow the proposed East Coast Gas 400 KV power lines located near Richards bay to proceed as planned.

TABLE OF CONTENTS

ACKNOWLEDGEMENT OF RECEIPT.....	II
COPYRIGHT.....	III
DECLARATION OF INDEPENDENCE.....	IV
EXECUTIVE SUMMARY	V
TABLE OF CONTENTS	X
TABLE OF FIGURES.....	XII
LIST OF TABLES.....	XIII
LIST OF ABBREVIATIONS	XIV
TERMS AND DEFINITIONS.....	XV
1.1. INTRODUCTION	1
1.2. Background Information of Project	1
1.3. Location of the study area.....	1
1.4. Description of the Affected Environment.....	2
1.4.1. Land Use and History	2
1.4.2. East-West Study Area	4
1.4.3. North-East Study Area.....	10
1.5. Access	14
1.6. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist	15
1.7. Legal Requirements for Completion of the Study.....	15
1.8. Limitations and Assumptions.....	16
2. METHODOLOGY	17
2.1. Approach to the Study.....	17
2.2. Step I – Literature Review (Desktop Phase).....	17
2.3. Step II – Physical Survey	17
2.4. Step III – Report Writing and Site Rating.....	18
3. BACKGROUND LITERATURE REVIEW	25
3.1. The Stone Age	27
3.2. Iron Age	28
3.3. Historical Period	32
3.4. Conclusions on Literature Review.....	34
4. STUDY RESULTS.....	37
4.1. Archaeological Sites	42

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4.2. Burial sites and Graves	42
4.3. Built Environment	44
4.4. Paleontological Sensitivity	49
4.5. Heritage Significance	50
5. CONCLUSIONS	52
6. RECOMMENDATION	54
7. REFERENCES	56
8. APPENDIX A: SPECIALIST CV – CHERENE DE BRUYN.....	71
9. APPENDIX B: CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL	79
10. APPENDIX C: MAPS OF THE PROPOSED POWER LINES.....	82

TABLE OF FIGURES

<i>Figure 1: Map showing the two study areas in relation to four major towns (Supplied by EkoInfo)</i>	3
Figure 2: Cattle and goat farm in East-West Study Area	5
Figure 3: Example of Mondi plantation.....	5
Figure 4: Sugar cane field south of the TransNet railway line	6
Figure 5: Sugar cane field in relation to Eskom substation (red arrow) and the TransNet railway line (blue arrow).....	7
Figure 6: Markers of TransNet gas pipeline (see plantations in the background).....	7
Figure 7: Example of existing Powerlines in East-West Study Area	8
Figure 8: TransNet railway line	8
Figure 9: Sewer and water pipelines.....	9
<i>Figure 10: Vegetation cover to the area with swamp north of the water pipeline and TransNet railway line</i>	9
Figure 11: Proposed line crossing point for the proposed Option 01 over the existing Powerlines.....	10
Figure 12: Water works plant west of the proposed Powerlines and TransNet railway line	11
Figure 13: Water infrastructure and servitude along the existing Powerlines and west of the TransNet railway line.....	11
Figure 14: SpoorNet village	12
Figure 15: Kraals at the SpoorNet village.....	12
Figure 16: Mondi process plant	13
Figure 17: Existing water body (ecological support area) along the proposed and existing Powerlines and west of the TransNet railway line.....	13
Figure 18: Existing Powerlines in the interaction of East-West Study Area and East-North Study Area	14
Figure 19: Access to site (yellow arrow) from Durban	14
Figure 20: Map indication previous Heritage studies conducted around the project area	26
Figure 21: Map indicating the distribution of Iron Age ceramics in KwaZulu-Natal (After Huffman (2007)).	31
Figure 22: Map dating to 1858, with Richard bay (blue circle) not appearing on map (Source: Flemming 1855).	35
Figure 23: Map dating to 1890, with Richard bay (blue circle) appearing on map (Source: National Library of France. 2019)	36
Figure 24: GPS track log of the area surveyed	38
Figure 25: General view of the East-west project area.....	39
Figure 26: General view of the North-south project area.....	40
Figure 27: Map indicating the sites identified in the project area.	41
Figure 28: General view of the uThungulu Regional cemetery	43
Figure 29: General view of Open-Air Church-01	45
Figure 30: General view of the SpoorNet village.....	47
Figure 31: Kraals located directly in front of the village	48
Figure 32: View of kraals located to the east of the village.....	48
<i>Figure 33: Paleo-Sensitivity layer of the East West (in purple circle) and North East (in red circle) project areas proposed for the East Coast Gas 400 KV power line, located near Richards Bay.</i>	51

LIST OF TABLES

Table 1: Site Location and Property Information	2
Table 2: Summary of economic activities and infrastructure found on site	4
Table 3: Summary of economic activities and infrastructure found on site	10
Table 4: Legislation and relevance to this HIA Study	16
Table 5: Site significance classification standards as prescribed by SAHRA	18
Table 6: Table indicating the impact significance rating.	19
Table 7: Impact Rating table with impact mitigation.	22
Table 8: Risk assessment.....	23
Table 9: Final Significance Ratings	24
Table 10: Previous heritage studies.....	25
Table 11: Burial Site-01 (uThungulu Regional cemetery)	42
Table 12: Impact and risk assessment rating for the pre-and post-mitigation for all project phase for Archaeological and Living Heritage Resources	43
Table 13: Site Complex-01	44
Table 14: Impact and risk assessment rating for the pre-and post-mitigation for all project phase for Archaeological and Living Heritage Resources	45
Table 15: Site Complex-02	46
Table 16: Impact and risk assessment rating for the pre-and post-mitigation for all project phase for Archaeological and Living Heritage Resources	49
Table 17: SAHRA Site significance classification and ratings for the buildings located in the project area	50

LIST OF ABBREVIATIONS

ACRONYMS	DESCRIPTION
AUTHORITIES	
Amafa	Heritage KwaZulu Natali
ASAPA	Association of South African Professional Archaeologists
DEA	Department of Environmental Affairs
KCDM	King Cetshwayo District Municipality
KZN	KwaZulu-Natal Province
NGT	Nurture, Grow, Treasure
SADC	Southern African Developing Community
SAHRA	South African Heritage Resources Agency
ULM	Umhlathuze Local Municipality
DISCIPLINE	
BGG	Burial grounds and graves
CCPP	Combined Cycle Power Plant
CMP	Cultural Management Plan
EIAs	Environmental Impact Assessment
EMPr	Environmental Management Programme
HCMP	Heritage Cultural Management Plan Report
H-PS	Heritage Plan of Study
HIA	Heritage Impact Assessment
PIA	Palaeontological Impact Assessment
PSA	Palaeontological Sensitive Area
PSL	Palaeontological Sensitivity Layer
RQC	Review and Quality Control
LEGAL	
KZNHA	KwaZulu Natal Heritage Act
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act

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TERMS AND DEFINITIONS

Archaeological resources

These include:

- Material remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- Rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- Wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- Features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.
- This report focusses on heritage resources identified in the project area which include, and Open-air church, an old SpoorNet Village and the uThungulu Regional Cemetery located near Richards bay in the KwaZulu-Natal Province.

Palaeontological

This means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial.

Cultural significance

- This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.
- Open-Air Churches and the uThungulu Regional Cemetery form part of the heritage resources of high cultural, social and spiritual (to some communities) significance in South Africa.

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- Construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- Carrying out any works on or over or under a place;
- Subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- Constructing or putting up for display signs or boards; any change to the natural or existing condition or topography of land;
- And any removal or destruction of trees, or removal of vegetation or topsoil.
- The current development is for 400kv transmission lines and associated infrastructure and its impact on potential heritage resources within the project area.

Heritage resources: This means any place or object of cultural significance

Living heritage

- This means the intangible aspects of inherited culture and may include cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships.
- Open-Air Churches have both tangible (in their physical state) and intangible value to communities due to their sacredness and association with the ancestors and gods.

1.1. INTRODUCTION

1.2. Background Information of Project

NGT was appointed by EkolInfo to conduct a HIA for the proposed East Coast Gas 400 KV powerlines, located in Richards Bay, in ULM within KCDM, in the KZN, South Africa (*Figure. 1 and Appendix 10*). NGT appointed its subsidiary (NGT ESH) responsible for implementation of environmental, socio-economic, heritage and sustainability project to manage the HIA study.

Eskom proposed the construction of four 400kv power lines. These new powerlines will be able to transmit the power generated at the new proposed Combined Cycle Power Plant (CCPP). The aim of the project is to upgrade all applicable 400kv powerlines, install fault limiting reactors at the 132kv side of the transformers at Athene substation as well as loop into Athene- Invubu and Athene – Umfolozi 400 kV lines (Appendix C).

The HIA investigated the potential impacts of the proposed construction of four 400kv power lines on any heritage resources identified within the receiving environment. The overall objective of the HIA is to give advice on the management of the heritage resources in and around the proposed project area in terms of known heritage resources management measures in line with the NHRA, No. 25 of 1999.

1.3. Location of the study area

The study area is located between the towns of Richards Bay (in the east), Empangeni (in the west), KwaMbonambi is found in the north and Eskhwawinin in the south. The study area is predominantly situated east of the N2 national road which traverses the site from the north to south (*Figure. 2-3*). The R102 (provincial road) is situated west of the proposed development area and the N2, joining the N2 north of East-West Study Area and west of the North-East Study Area. The R34 traverses the East-West Study Area from Richards Bay in the east to Empangeni in the west. This provincial road is situated south of the North-East Study Area, joining the R619 north of Richards Bay in the east. The R619 which is another provincial road, traverse the North-East Study Area from the east joining the N2 in the north.

Table 1: Site Location and Property Information

Location	
Town	Richards bay and Empangeni
Responsible Local Authority	Umhlathuze Local Municipality
Ward	2 26 12
Magisterial District	King Cetshwayo District Municipality
Region	KwaZulu-Natal
Country	South Africa
Site centre GPS coordinates	<ul style="list-style-type: none"> • 28° 43' 55.02" S • 31° 59' 58.64" E

1.4. Description of the Affected Environment

1.4.1. Land Use and History

The development is located next to the Nseleni River and surrounded by Industrial hubs with urban communities located on the periphery. The receiving environment, both the East-West Study Area and the North-East Study Area, is situated in a landscape that has been predominantly transformed in the past through the development of industrial infrastructure such as the water and sewer pipelines, SpoorNet railway lines and gas pipelines, national and provincial roads, industrial nodes/hubs, hospital and through agricultural activities such as sugar cane farming and Mondi plantations. There are, however, sections of the receiving environment that have ecological support area such as Nseleni River and the swamps found north of the R34 linking Richards Bay and Empangeni. Below is the summary of socio-economic activities and associated infrastructure found in each of the two study areas i.e. East-West study area and North-East study area (*Table. 1, Table. 2, see also Figure. 3*).

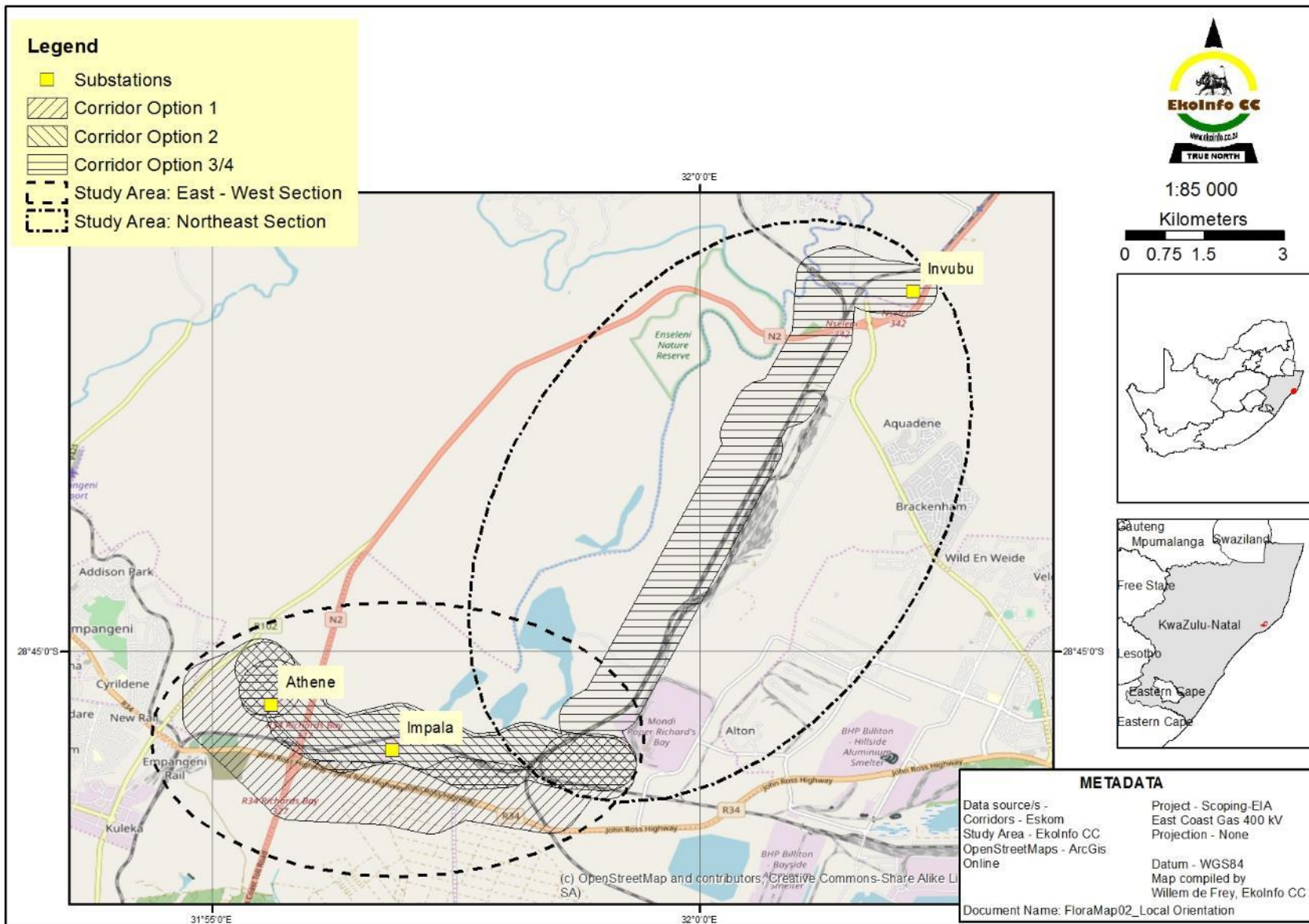


Figure 1: Map showing the two study areas in relation to four major towns (Supplied by EkolInfo)

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1.4.2. East-West Study Area

Below are economic activities and infrastructure found on site associated with each socio-economic activity (*Table. 2*).

Table 2: Summary of economic activities and infrastructure found on site

ACTIVITY	TYPE OF IDENTIFIED INFRASTRUCTURE
Farming	<ul style="list-style-type: none"> • Cattle and goat farm north of the R34 and west of Nseleni River and the swamp (<i>Figure 4</i>) • This study area is characterised by plantations north of the R34 and the TransNet railway line and sugar cane fields south of the railway line which stretch to the south of the R34 (<i>Figures. 5-10</i>).
Energy	<ul style="list-style-type: none"> • Eskom Powerlines and substation (existing) (e.g. <i>Figure. 11, 13</i>) • TransNet gas pipeline north and south of the railway line (<i>Figure. 8</i>) • The proposed Option 01 and Option 02 of the proposed Powerlines from the proposed Gas Power Station in the east are situated within this study area. • Option 01 of the proposed Powerlines from the Gas Power Station to the substation in the west travels from the Gas Power Station north and along the R34, traverse across the the R34 approximately 2.66km from the power station. It travels across sugar cane fields, traversing the R34 at approximately 3.24km from where it first crosses the R34 north of the R34 to make a bend before connecting to the substation in the west (<i>Figure. 6</i>). • Option 02 is situated north of the R34 and along the TransNet railway line and south of the ecological area formed by Nseleni River – an area defined by a swamp and indigenous plant species. This line further travels south-east, south and south-west of the Mondi plantation before it connects to the substation in the west (<i>Figure. 4</i>).
Transportation and Rail Infrastructure	<ul style="list-style-type: none"> • The TransNet railway line (north of the R34), the N2 (National Road) and the R34 (local road).
Social Infrastructure	<ul style="list-style-type: none"> • Private hospital south of the R34 from Richards Bay to Empangeni • A sewer pipeline from the water works plant in the east to the west (<i>Figure. 11</i>) • Water works plant in the north-eastern section East-West Study Area
Towns and Communities	<ul style="list-style-type: none"> • North of the R34 and west of the N2 Zendele Village • The community of Mpangele is found both north and south of the R34
Industrial Parks	<ul style="list-style-type: none"> • East of the N2 and north of the R34 another industrial park and plant hire site are found. • North of the R34 and west of the N2 ZSM Industrial area found
Ecological Support Area	<ul style="list-style-type: none"> • A swamp formed by Nseleni River is found in both East-West Study Area and the North-East Study Area (on the south-western section) (e.g. <i>Figure. 12 north of the pipeline</i>).



Figure 2: Cattle and goat farm in East-West Study Area



Figure 3: Example of Mondi plantation



Figure 4: Sugar cane field south of the TransNet railway line



Figure 5: Sugar cane field in relation to Eskom substation (red arrow) and the TransNet railway line (blue arrow)



Figure 6: Markers of TransNet gas pipeline (see plantations in the background)



Figure 7: Example of existing Powerlines in East-West Study Area



Figure 8: TransNet railway line



Figure 9: Sewer and water pipelines



Figure 10: Vegetation cover to the area with swamp north of the water pipeline and TransNet railway line



Figure 11: Proposed line crossing point for the proposed Option 01 over the existing Powerlines

1.4.3. North-East Study Area

Below are economic activities and infrastructure found on site associated with each socio-economic activity within North-East Study Area (Table. 3).

Table 3: Summary of economic activities and infrastructure found on site

ACTIVITY	TYPE OF IDENTIFIED INFRASTRUCTURE
Farming	<ul style="list-style-type: none"> • Mondi plantations and pockets of sugar cane fields west of Nseleni River are found.
Energy	<ul style="list-style-type: none"> • Eskom Powerlines and substation (in the north of the study area where the proposed Option 03 is to connect) (Figure. 20)
Transportation and Rail Infrastructure	<ul style="list-style-type: none"> • The TransNet railway line north of the R34 and west of the R619 • The R619 local road which connects from the R34 north of Richards Bay to the N2 north of the receiving environment
Social Infrastructure	<ul style="list-style-type: none"> • Water works plant in the south-west section of the study area i.e North-East Study Area (Figure 14-15)
Towns and Communities	<ul style="list-style-type: none"> • An old small SpoorNet Village is situated in the north of the study area, east of Option 03 and east of the TransNet railway line (as well as its depots/sidings) (Figure 16. and 17) • The communities of Aquadene and Brackenhams are found on the eastern section of the study area north of the industrial parks • North of the N2 and on the northern section of the study area, the southern section of Nseleni A is found.
Industrial Parks	<ul style="list-style-type: none"> • The southern and eastern sections of this study area is characterised by the following industries: <ul style="list-style-type: none"> ○ Mondi processing plant (Figure. 18) ○ Alton Industrial Park
Ecological Support Area	<ul style="list-style-type: none"> • Nseleni River (and a section of the swamp formed by this River) is found in the western section of the study area. • A small water body was also found to be one of the ecological support areas (Figure. 19).



Figure 12: Water works plant west of the proposed Powerlines and TransNet railway line



Figure 13: Water infrastructure and servitude along the existing Powerlines and west of the TransNet railway line



Figure 14: SpoorNet village



Figure 15: Kraals at the SpoorNet village



Figure 16: Mondi process plant



Figure 17: Existing water body (ecological support area) along the proposed and existing Powerlines and west of the TransrNet railway line



Figure 18: Existing Powerlines in the interaction of East-West Study Area and East-North Study Area

1.5. Access

From Durban Richards bay can be accessed mainly through the N2 (Figure 21).

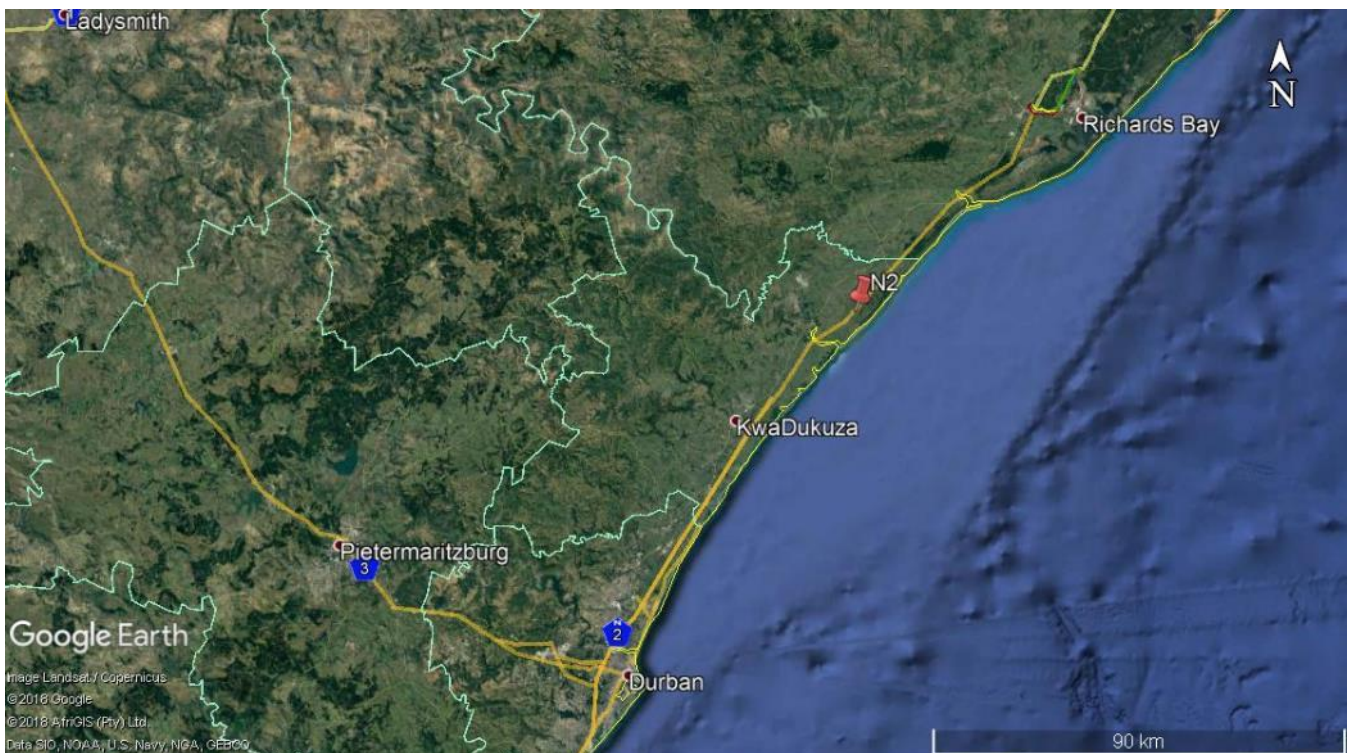


Figure 19: Access to site (yellow arrow) from Durban

1.6. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

The HIA is conducted in terms of Sections 38 the NHRA, No. 25 of 1999. This prescript of the Act Section 38:

“the responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (3) (a): Provided that the following must be included:

- (a) The identification and mapping of all heritage resources in the area affected;
- (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;
- (c) An assessment of the impact of the development on such heritage resources;
- (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- (e) The result of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.”

NGT ESH is appointed as the lead cultural resources management (CRM) consultant to conduct and manage the HIA. Cherene de Bruyn (Manager: Archaeology & Heritage Unit – NGT ESH), conducted the study for the proposed development. The appointment of NGT ESH as an independent CRM firm is in terms of the NHRA, No. 25 of 1999.

1.7. Legal Requirements for Completion of the Study

The NHRA, No. 25 of 1999 sets norms and standards for the management of heritage resources in South Africa. Section 35 and 38 (3) of the NHRA, No. 25 of 1999 informs the current HIA study. Table 4 below gives a summary of all the relevant legislations that informed the current study.

Table 4: Legislation and relevance to this HIA Study

LEGISLATION (INCL. POLICIES, BILLS AND FRAMEWORK)	
Heritage	<ul style="list-style-type: none"> • Heritage resources in South Africa are managed through the National Heritage Resources Act (NHRA), No. 25 of 1999. This Act sets guidelines and principles for the management of the <i>nation estate</i>. • Section 34 becomes relevant in terms of structures. • Section 35 becomes relevant in terms of archaeology and palaeontology. • Section 36 becomes relevant for the management of burial grounds and graves. • Section 38 of the Act becomes relevant in terms of nature of the proposed project in terms of developing the heritage impact assessment study. • The KwaZulu-Natal Heritage Act (KZNHA), No. 10 of 1997 is developed to manage heritage resources at a provincial level. • The other applicable legal document is the KwaZulu-Natal Heritage Bill of 21 February 2008.
Environmental	<ul style="list-style-type: none"> • The NEMA, No. 107 of 1998. • The cultural environment in South Africa is managed through Section 24 of the NEMA, No. 107 of 1998.

1.8. Limitations and Assumptions

Although a comprehensive physical survey was undertaken it should be noted that some of the archaeological material, including artefacts and graves can be buried underground or hidden underneath clumped and thick vegetation and as such, may not have been identified during the initial survey and site visit. In the case where the proposed development activities bring these materials to the surface, they should be treated as Chance Finds. Should such resources be unearthed it is recommended that, the development activities be stopped immediately, and an archaeologist be contacted to conduct a site visits and make recommendations on the mitigation of the finds. SAHRA and Amafa should also be informed immediately on such finds. In this case no archaeological material of graves should be moved from the site, until the heritage specialist has been able to make an assessment regarding the significance of the site and archaeological material, which is also subject to SAHRA approval.

The following section outline the methodology used to assess the current site impacts and cumulative impacts that will result from the proposed project on the identified historic or archaeological sites.

2. METHODOLOGY

2.1. Approach to the Study

Cherene de Bruyn (Manager: Archaeology & Heritage Unit – NGT ESH), is responsible for the compilation of the current HIA report. The Review and Quality Control (RQC) process involved reviewing the First Draft HIA (Revision 01) and revising the Second Draft (Revision 02); the RQC was completed by Mr Nkosinathi Tomose Executive Director and CEO NGT (also Principal Consultant for NGT subsidiaries **NGT ESH Solutions** and **NGT-Infraco** (an infrastructure development entity specialising **Construction, Conservation** (rehabilitation and refurbishment of historic sites, buildings and public artworks), and **Civils**). The RQC is a standard process at NGT; in the case that the Director and Principal Consultant is responsible for the report – another consultant has to undertake the RQC process. This HIA report is conducted for a proposed East Coast Gas 400 KV power line, located in Richards Bay, within the ULM in the KCDM, KZN, South Africa.

2.2. Step I – Literature Review (Desktop Phase)

Background information search for the proposed development took place following the receipt of appointment letter from the client. Sources used included, but not limited to published HIA studies, academic books, academic journal articles and the internet about the site and the broader area in which it is located. Interpretation of legislation (the NHRA, No. 25 of 1999) and local by-laws forms, form the backbone for the study.

2.3. Step II – Physical Survey

- The preliminary survey of the project area for the scoping study was conducted between Tuesday the 25th and Thursday 27th of September 2018. The survey was conducted by Mr. Nkosinathi Tomose. These findings were discussed in detail in a Scoping report.
- The heritage survey of the project area was conducted between Tuesday the 26th of February and Thursday the 28th of February 2019. The survey was conducted by Miss Cherene de Bruyn with Mr Retief Grobler (Wetland Ecologist and Director - Imperata Consulting) and Mr Lukas Niemand (Ornithologist & Entomologist and Director- Pachnoda Consulting). The aim of the survey was to identify archaeological and heritage sites and resources, along with the challenges these sites possess within the area proposed for development activities as well as within an assessment corridor (1 km).
- The survey of the proposed development area was conducted on foot and the site was accessed using a bakkie;

- The aim of the surveys was to identify archaeological, burial grounds and graves, and built environment heritage sites and resources in and around the area proposed for development;
- To record and document the sites using applicable tools and technology;

The following technological tools were used for documenting and recording identified resources on site:

- Garmin GPS (i.e. Garmin 62s) – to take Latitude and Longitude coordinates of the identified sites and to track the site.
- Canon SLR – to take photos of the affected environment and the identified sites.

2.4. Step III – Report Writing and Site Rating

The final step involves compilation of the report using desktop research as well as the physical survey results. Archaeological resources, graves and sites found in the project area is rated according to the site significance classification standards as prescribed by SAHRA. The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by ASAPA for the Southern African Developing Community (SADC) region were used to grade the identified heritage resources or sites (*Table. 5*). Impact Significance Rating will be completed and is guided by the requirements of the NEMA EIA Regulations (2014) (*Table. 6-9*).

Table 5: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	High Significance	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	High Significance	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP. A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP. A)	-	Low Significance	Destruction

Table 6: Table indicating the impact significance rating.

Alternative No	List Alternative Names	
Proposal	Development	
Alternative 1	Development Area 01	
Alternative 2	Development Area 02	
Nature	-1	Negative
	1	Positive
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or

	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact
Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),
Public feedback	1	Low: Issue not raised in public responses
	2	Medium: Issue has received a meaningful and justifiable public response
	3	High: Issue has received an intense meaningful and justifiable public response
Cumulative Impact	1	Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	2	Medium: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	3	High: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.

Irreplaceable loss of resources	1	Low: Where the impact is unlikely to result in irreplaceable loss of resources.
	2	Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	3	High: Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).
Degree of Confidence	Low	<30% certain of impact prediction
	Medium	>30 and < 60% certain of impact prediction
	High	>60% certain of impact prediction
Priority	Ranking	Prioritisation Factor
3	Low	1,00
4	Medium	1,17
5	Medium	1,33
6	Medium	1,50
7	Medium	1,67
8	Medium	1,83
9	High	2,00
Phase		
Planning		
Construction		
Operation		
Decommissioning		
Rehab and closure		

Table 7: Impact Rating table with impact mitigation.

IMPACT DESCRIPTION		PRE – MITIGATION							POST – MITIGATION							IMPACT PRIORITISATION			
Impact	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Public response	Cumulative Impact	Irreplaceable loss
1. Heritage Impact Ratings	Planning	-1	3	2	2	2	5	-11,25	-1	3	1	2	2	4	-8	High	1	2	1
								0	-1						0				
								0							0				

Table 8: Risk assessment.

	Impact Name						
	Alternative						
	Phase						
	Environmental Risk						
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation	
	Nature of Impact			Magnitude of Impact			
	Extent of Impact			Reversibility of Impact			
	Duration of Impact			Probability			
	Environmental Risk (Pre-mitigation)						
	Mitigation Measures						
	Heritage Risk (Post-mitigation)						
	Degree of confidence in impact prediction:						
	Impact Prioritisation						
	Public Response						
	Cumulative Impacts						
Degree of potential irreplaceable loss of resources							
Prioritisation Factor							
Final Significance							

Table 9: Final Significance Ratings

SIGNIFICANCE RATINGS	
Value	Description
< -10	Low Negative (i.e. where this impact would not have a direct influence on the decision to develop in the area)
≥ -10 and < -20	Medium Negative (i.e. where the impact could influence the decision to develop in the area)
≥ -20	High Negative (i.e. where the impact must have an influence on the decision process to develop in the area)
< 10	Low Positive (i.e. where this impact would not have a direct influence on the decision to develop in the area)
≥ 10 and < 20	Medium Positive (i.e. where the impact could influence the decision to develop in the area)
≥ 20	High Positive (i.e. where the impact must have an influence on the decision process to develop in the area)

3. BACKGROUND LITERATURE REVIEW

In Southern Africa, the archaeology is divided into the Stone Age, Iron Age and the Historical Period. During these periods, diverse groups of people settled on the Southern African landscape. Several archaeological sites have been identified in the KwaZulu-Natal Province. The greater Richards bay area and surrounding regions have a long history of occupation by Stone Age hunter gather groups, Iron Age Farming communities and Colonial settlers. Most of the research on the culture, archaeology, rock art in and around the KwaZulu-Natal Province has been conducted by Davies (1976); Mason (1968, 1982, 1986); Kuman *et al.*, (1997); Huffman (2002, 2007); Wadley 2007; Kuman & Field (2009) and Sutton (2012). Several HIA and AIA studies have been conducted in the Richards bay region (*Table 10 and Figure 20*).

Table 10: Previous heritage studies

NO	AUTHOR/YEAR	SITE	SAHRIS ID	DISTANCE FROM PROJECT AREA
1.	Anderson, G. & Anderson, L. 2008	John Ross Interchange Development	MAPID_03336	0,92 km
2.	Anderson, G. 2008a.	East Central Arterial	CTS_305186	5,88 km
3.	Anderson, G. 2008b	Richards Bay Coal Terminal	CTS_305351	6,81 km
4.	Anderson, G. 2008c	Empangeni Southern Outfall Sewer	CTS_305192	3,89 km
5.	Anderson, G. & Anderson, L. 2009	Empangeni Southern Outfall Sewer	CTS_309928	3,91 km
6.	Anderson, G. 2010	Richards Bay Central Industrial Area	CTS_305321	4,02 km
7.	Van Jaarsveld, A. 2013.	Sewer Line for Mandlazini Agri-Village	2961	9,39 km
8.	Van Schalkwyk, J. 2013	Proposed Swaziland Rail Link	3017	0,28 km
9.	Anderson, G. 2014.	Tronox KZN Sands	6279	23,44 km
10.	Prins, F. 2015	Richards Bay Industrial Development Zone	9973	2,66 km
11.	Anderson, G. & Anderson, L. 2016.	Nsezi Pipeline, Mhlatuze	9244	0,18 km
12.	Van Der Walt. 2016	Hillside Desalination Plant	9604	4,40 km
13.	Van Schalkwyk, L. 2016.	Nkonginga Pump Station and Rising Main Upgrade	10105	6,39 km
14.	Anderson, G. 2017.	Upgrade of A Ring Road, Mandlazini,	11056	8,71 km
15.	Magom, M. 2018	Eskom Inyaninga 2 X 500 Mva 400/132 Kv Substation, And Inyaninga – Mbewu 400kv Powerline	12772	15,09 km
16.	Van Schalkwyk, L. 2018	RBCT Repeater Mast Port of Richards Bay	12482	9,52 km
17.	Van Der Walt, J. 2019	Richards Bay Combined Cycle Power Plant	11535	0,17 km

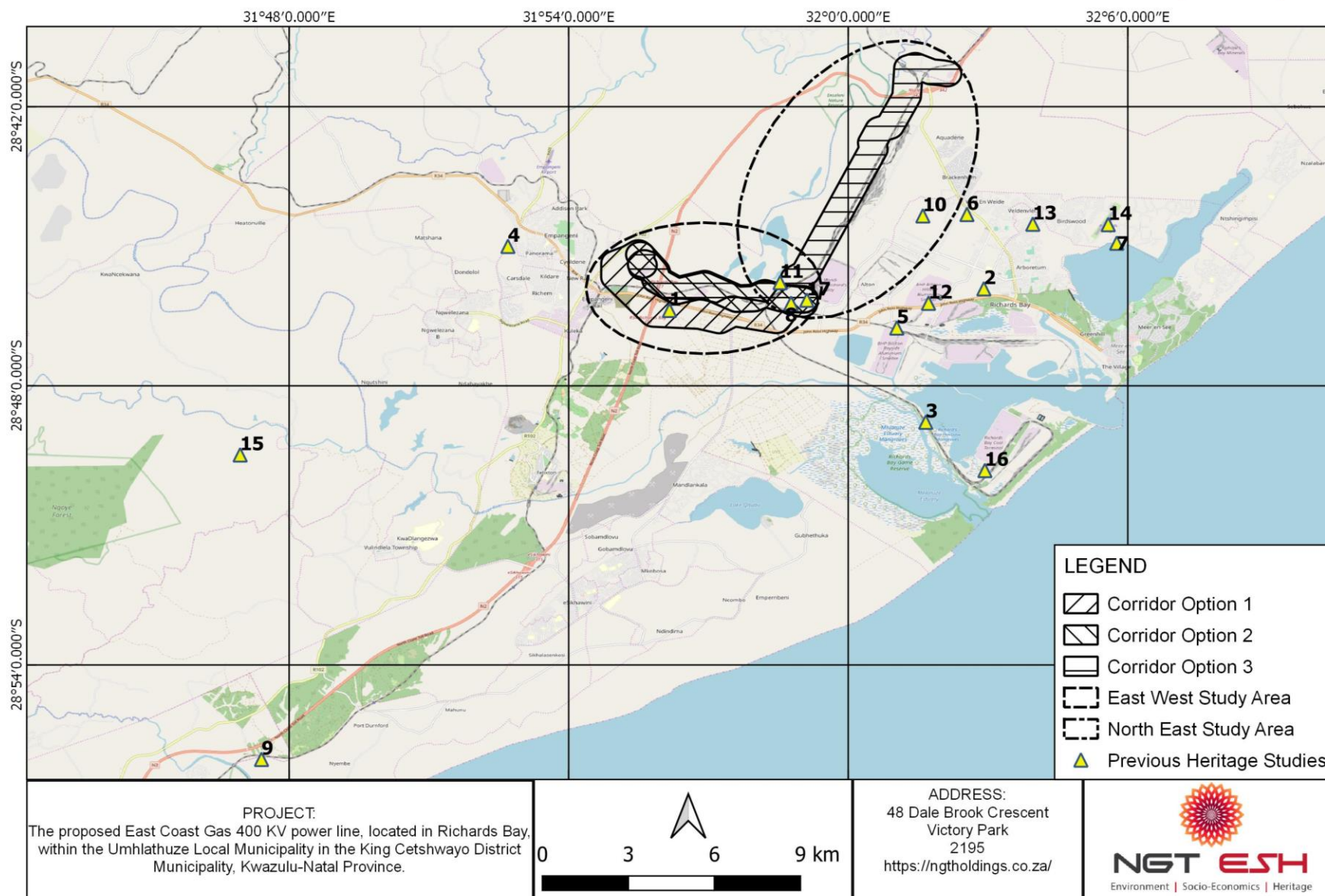


Figure 20: Map indication previous Heritage studies conducted around the project area.

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3.1. The Stone Age

In South Africa the Stone Age is divided into three periods, namely the Early Stone Age (ESA) (2 million to 250 000 years ago), the Middle Stone Age (MSA) (250 000 – 22 000 years ago) and the Later Stone Age (LSA) (25 000 to 200 years ago). The archaeological history of the KwaZulu-Natal (KZN) Province dates back to about 2 million years and possibly older, marking the beginning of the Stone Age period.

The Early Stone Age (ESA) is the first phase identified in South Africa's archaeological history. It incorporates the period from early to middle Pleistocene and is associated with early hominids and their ancestors (Prins *et al.*, 2013). The archaeological history of the KwaZulu-Natal (KZN) Province dates back to about 2 million years and possibly older- marking the beginning of the Stone Age period (Seliane 2016). The ESA is comprised of the Oldowan stone tool complex (2 and 1.7-1.5 million years ago), and is characterised by small flakes, flaked cobbles and percussive tools (Klein 2000; Mitchell 2002; Diez-Martín *et al.*, 2015; De La Torre 2016). The Acheulean stone tool complex included large hand axes and cleavers (1.7-1.5 million years ago and 250-200 thousand years ago) (Klein 2000; Mitchell 2002; Diez-Martín *et al.*, 2015; De La Torre 2016). Within KZN there are some sites where ESA tools have been reported. Two known ESA sites occur in the proposed land of 5333 Richards Bay, where artefacts such as hand-axes and cleavers have been found (Anderson *et al.*, 1998). Besides stone artefacts, very little has been produced from the ESA sites in this province. This has made it difficult to make inferences pointing to economical dynamics of the ESA people in this part of the world (Mazel 1989; Prins *et al.*, 2013).

The transition from the Early to Middle Stone Age includes a change in technology from large stone tools to smaller blades and flakes. The MSA stone tool assemblage is associated with anatomically modern humans and includes blades, flakes, scrapers and pointed tools that could have been hafted and used as spears or arrowheads (Wadley 2005). In KZN MSA sites occur around the greater Durban, Pietermaritzburg, as well as Drakensberg areas and are often located in rock shelters. Palaeo-environmental data imply that the distribution of MSA sites in the high lying Drakensberg and surrounding areas was influenced specifically by the amount and duration of snow climate conditions (Carter 1976). Five MSA sites are located in KwaZulu-Natal, they are Sibudu Cave which is located about 40 km from Durban (Wadley & Jacobs 2004), Umhlatuzana Rock Shelter located 35 km west of Durban (Kaplan 1990; Mohapi 2013), Border Cave located in the Lebombo Mountains (Cooke *et al.*, 1945; Butzer *et al.*, 1978; Bird *et al.*, 2003), Umbeli Belli Rock Shelter located near Scottburgh (Badar *et al.*, 2016; Bader & Will 2017), and Holley

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Shelter located 25 km northeast of Pietermaritzburg in KwaZulu-Natal (Cramb 1961; Badar *et al.*, 2015). During the survey of the heritage impact assessment for the proposed expansion to the Richards Bay harbour conducted by Anderson & Anderson (2009), ESA and MSA stone tools were found on the surface of a disturbed area. A Cretaceous layer was also identified. During his survey in 2013, Van Schalkwyk found a single isolated stone tool of low heritage significance, in the area 28 m east of Option 1,2, 3 and 4 where the proposed Richards Bay Combined Cycle Power Plant (CCPP) will be constructed.

The Later Stone Age (LSA) is the third phase identified in South Africa's archaeological history. It incorporates the period from 25 000 years B.P. up to the Iron Age, Historical Periods and contact between hunter-gatherers and Iron Age farmers or European colonists. The LSA is associated with modern humans and is characterised by lithic tool industries such as Smithfield and Robberg. Moreover, the LSA is associated with rock engravings and rock paintings. LSA occupation has also been noted at Sibudu Cave, Umhlatuzana Rock Shelter, Border Cave and Umbeli Belli Rock Shelter (Beaumont *et al.*, 1978; Kaplan 1990; Mitchell 1998; Badar *et al.*, 2016). Stone tools of the LSA are often associated with the San and are smaller and more diverse than the previous periods. During the LSA, the first Khoi herders and Nguni-speaking agro-pastoralists started to immigrate into southern Africa from the north. These groups had contact with the Later Stone Age people, which often led to them migrating to the Kalahari Desert or being assimilated into the Nguni-speaking cultural groups. Several LSA sites have been located in the Tugela River Basin to the North of Pietermaritzburg, including Mgede Shelter (Mazel 1986), Sikhanyisweni Shelter (Mazel 1988), KwaThwaleyakhe Shelter (Mazel 1993), iNkolimahashi Shelter (Mazel 1999; Badenhorst 2003) and Driel Shelter (Maggs 1980b). Rock art dating to the LSA have also been found in several rock shelters in the Drakensberg Mountains (Willcox 1990), including the rock art site of Game Pass Shelter in the Kamberg Nature Reserve (van Riet Lowe 1947; Høerlé & Salomon 2004) and a San rock art site of Storm Shelter located in the southern Drakensberg (Blundell & Lewis-Williams 2001), as well as in the areas around Estcourt, Mooi River and Dundee (Van der Walt 2017).

3.2. Iron Age

Several Iron Age sites have been excavated in the wider region of the KZN. The Iron Age, according to Huffman (2007) can be divided into the Early Iron Age (200 – 900 A.D.); the Middle Iron Age (900 – 1300 A.D.); and the Late Iron Age (1300 – 1840 A.D.). The Iron Age is characterized by the farming communities who domesticated animals, produced various ceramic vessels, as well as smelted iron for weapons and

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tools. Unlike the Stone Age people, Iron Age people led quite complex lifestyles; their dependence on agriculture necessitated more sedentary settlements (Maggs 1989).

The Early Iron Age communities throughout eastern and southern Africa share a similar Iron Age culture called the Chifumbaze complex (Phillipson 1994; Huffman 2007). The Chifumbaze complex contains evidence of the first farmers who settled in areas with cultivated crops, herded domestic animals, used iron, and who made pots (Phillipson 1994). It can, furthermore, be divided into the Kalundu and Urewe Traditions (Huffman 2007). These Early Iron Age farming communities originated in the Great Lakes region of East Africa where Urewe ceramics are the earliest form of the Chifumbaze complex (Phillipson 1994; Mitchell 2002). Part of the Urewe tradition was the Kwale branch, which settlements were restricted to relatively well-watered hilly country and can be found along the coast from Kenya to KwaZulu-Natal (Phillipson 1994; Mitchell 2002). Mzonjani Facies of the Kwale branch dated to AD450-750 (Huffman 2007). Mzonjani Facies (AD 450-750) have been found in the areas surrounding Pretoria and Johannesburg as well as the region between Musina and Nelspruit (Evers 1975, 1977; Huffman 2007). Ceramics of the Mzonjani Facies have also been located around Richards bay (*Figure 21*) in KwaZulu-Natal (Maggs 1980; Huffman 2007). Mzonjani settlements provide the earliest evidence of Iron age settlement in KwaZulu-Natal (Ribot *et al.*, 2010). Matola phase EIA sites dating to 500 AD – 600 AD were found in the Mngeni valley and contained ceramics similar to the Msuluzi, Ntshekane and Mzonjani phase (Whitelaw and Moon 1996).

Around the second century AD there took place a swift migration of Iron Age farmers of the Chifumbaze complex (Phillipson 1994). This spread is known as the Nkope branch of the Urewe tradition, which spread through a wide area extending southwards towards Tanzania and Mozambique, through Malawi, eastern Zambia and Zimbabwe into the northern parts of South Africa, Swaziland and into KwaZulu-Natal (Phillipson 1994; Mitchell 2002).

During the EIA, settlements were situated on the valley floors and next to rivers (Maggs & Ward 1984; Badenhorst 2010). EIA sites which are located near the Lower Thukela Basin in KwaZulu-Natal are Mamba (Van Schalkwyk 1994a), Wosi (Van Schalkwyk 1994b), and Ndondondwane (Loubser 1993). Other EIA sites include Mpambanyoni (Mitchell 2002) and Nanda (Whitelaw 1993). Ceramic pottery styles of the Kalundu Tradition, including Msuluzi (AD 500-700), Ndondondwane (AD 700-800), and Ntshekane (AD 800-900),

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which are found in the broader areas around Durban and Richards Bay and are specifically located near the Tugela River (Stoffberg & Loubser 1984; Maggs 1989; Huffman 2007). Evidence of iron production has also been found at sites associated with Ndongondwana, Msuluzi, Mamba and Wosi ceramics in the Tugela basin, (Maggs 1980a; Stabbins 1982; Stoffberg & Loubser 1984; Whitelaw 1991; Maggs 1992; van Schalkwyk 1994a and 1994b). During the same survey for the proposed expansion of the Richards Bay harbour, Anderson & Anderson (2009) also found several EIA pottery shards scattered across the site. During his survey in 2019, Van Der Walt found a single isolated pot sherd of low heritage significance, in the area 17 m east of Option 1,2, 3 and 4 where the proposed Richards Bay CCPP will be constructed.

The Iron Age site of KwaGandaganda is located in the Mngeni Valley near Durban that was occupied from around 700 AD to 1100 AD (Whitelaw 1994). The site was organized in the Central Cattle Pattern (CCP), a means of social organisation in Iron Age settlements, where relationships between people were constructed through the layout of the settlement (Huffman 2000). During excavation ceramics of the Msuluzi, Ndongondwane and Ntshekane were found, including remains of daga structures, grindstones, evidence of iron working, byers, possible ceramic figurines, metal and glass beads, worked bone and shell, (Whitelaw 1996).

The Blackburn facies, including Moor Park Facies and the Nqabeni facies are part of the Blackburn branch of the Urewe Tradition and form part of the Nguni speaking groups pottery sequence (Huffman 2004; Van der Walt 2019). Blackburn facies is dated to AD 1050-1500 (Huffman 2007). Ceramics of this facies have been found at Sibudu Cave along with grindstones, glass beads, metal, bones digging sticks and small fragments of basketry (Wood *et al.*, 2009). The Moor Park facies dated to AD 1350-1750 follows the Blackburn facies (Huffman 2007). Characteristically it is sparsely decorated with rim notching, applique bumps, lines, and bands of punctates (Huffman 2004). Apart from changes in the ceramic sequence, the Later Iron Age is also characterised by stone walled settlements. The oldest form of the CCP has been found at a site called Moor Park in the midlands of KwaZulu-Natal (Mitchell 2002; Huffman 2007). Moor Park walling dates to the fourteenth and sixteenth century and is located on a hilltop in a defensive position. It is characterised by rough stone walling that encloses various cattle kraals and areas in the site (Mitchell 2002). Moor Park walling is associated with Nguni speaking people (Huffman 2007). Dating to the same period as the Moor Park ceramic phase, the Portuguese explorer Vasco de Gama discovered the coastland and named it Natal In 1497 (Russell 1891).

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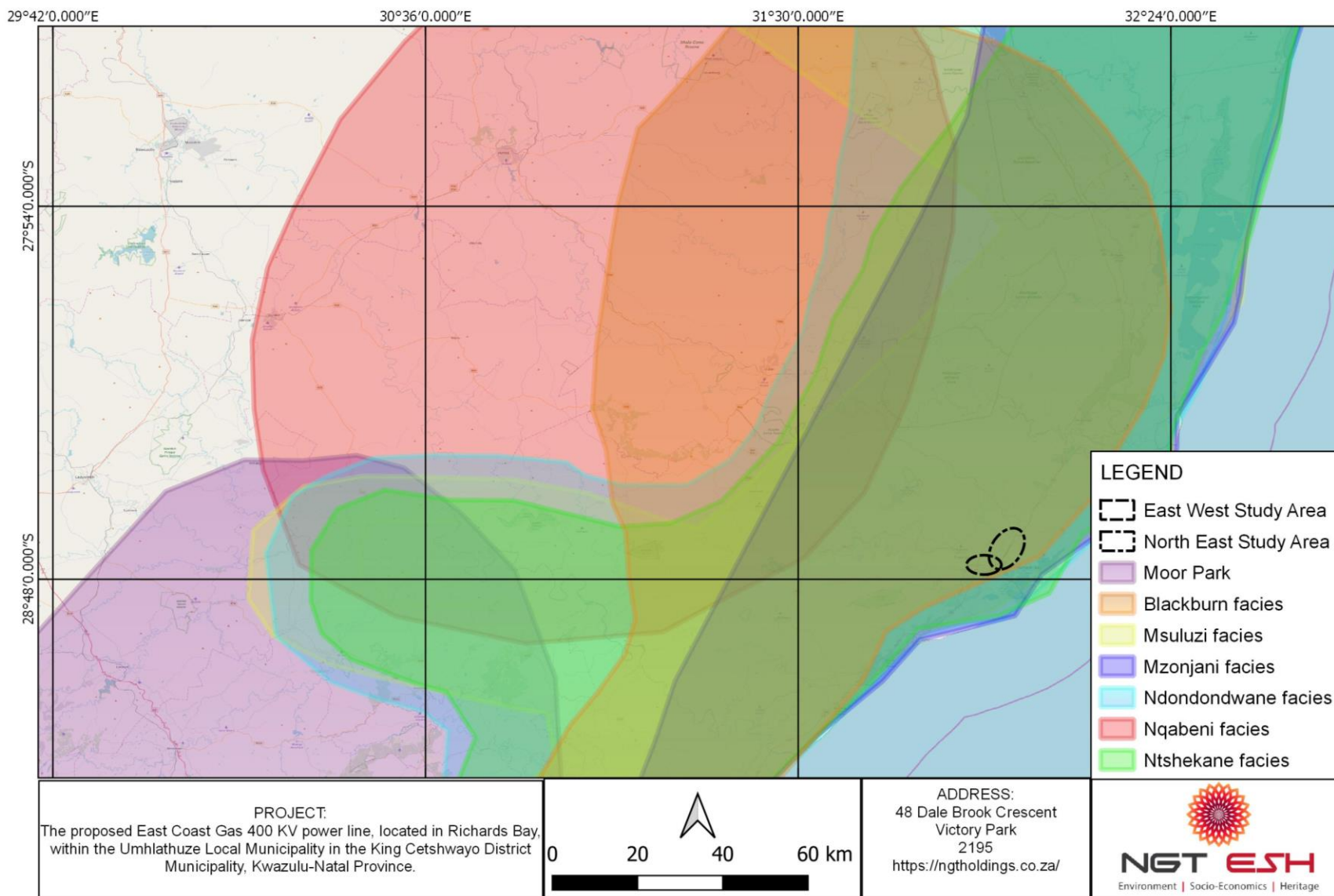


Figure 21: Map indicating the distribution of Iron Age ceramics in KwaZulu-Natal (After Huffman (2007)).

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The third Nguni style pottery is Nqabeni facies, which is dated to AD 1700-1820 (Huffman 2004; Huffman 2007). During the Nqabani ceramic phase several group migrated from Kwa-Zulu-Natal as a result of the *Mfecane/Difaqane*. Trade played a major role in the economy of LIA societies. Goods were traded locally and over long distances. The main traded goods included: salt, grain, cattle, thatch, and metal- leading to the establishment of economically driven centres and the growth of trade wealth (Maggs 1989; Huffman 2007; Prins *et al.*, 2013). Keeping of domestic animals, the cultivation of crops, and metal work continued with a change in the organisation of economic activities. Iron Age societies practiced iron smelting quite significantly as they had to produce iron implements for agricultural use (Maggs 1989). However, no smelting sites were discovered in the study area as it is the northern KZN that is rich in abandoned iron smelting sites (Maggs, 1989; Huffman 2007). The Later Iron Age communities in KwaZulu-Natal were the direct ancestors of the present-day Zulu people (Middleton 1997; Huffman 2007).

3.3. Historical Period

The Historical Period dates from around AD 1600 and is generally the period related to colonial settlement and the *Difaqane* wars in South Africa. During the historical period, the KwaZulu-Natal region was often left in turmoil due to wars and conflict between the different cultural groups that settled in the area.

Sources of evidence for socio-political organization during the mid-eighteenth to early nineteenth century in the study area and the larger former Natal Province suggest that the people here existed in numerous small-scale political units of different sizes, population numbers, and political structures (Wright & Hamilton 1989). During the 2nd half of the eighteenth century, stronger chiefdoms and paramourcies emerged. But due to the fact that there were no proper central political bodies established, the chiefdoms were not fully-grown states (Prins *et al.*, 2013). They became states in the 1780's when a shift towards a more centralized political state occurred. This shift was mainly characterized by population growth and geographical expansion of states (Prins *et al.*, 2013). At this time, the largest and strongest states were the Mabhudu, Ndwandwe and Mthethwa. However, other smaller states, also established themselves in the greater Tugela Region. These included, in the south: the Qwabe, Bhaca, Mbo, Hlubi, Bhele, Ngwane and many others (Wright & Hamilton, 1989). Even with all these states, the Zulu Kingdom, established by King Shaka, remained the most powerful in the region throughout the 19th century (Wright & Hamilton, 1989).

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During the *Mfecane/Difaqane* at the end of the 18th and beginning of the 19th centuries, communities who had settled in KwaZulu-Natal were displaced and forced to move by wars between the Zulu chiefdoms (Huffman 2007; Ndlovu-Gatsheni 2009; Shillington 2013). Due to the political and climate conditions in the 19th century, one of the generals of King Shaka, Mzilikazi and his Transvaal Ndebele army migrated from KwaZulu-Natal in 1820 and later settled in Zimbabwe (Van Warmelo 1930; Huffman 2007). King Shaka was assassinated by his two half-brothers, King Dingane and Mhlangana in 1828, with King Dingane becoming ruler of the Zulu Kingdom (Wright & Hamilton 1989; Laband 1995; Greaves 2013). Dingane was born in 1795 and was the son of Chief Senzangakhona and his 'great wife' (Okoye 1969; Akyeampong & Gates 2012).

During King Dingane's rule, Cape merchants moved into the region to colonize Natal, while the Voortrekkers, who became dissatisfied with British rule, also started to move into the area (McKenna 2011). In 1837 Piet Retief led the Voortrekkers into Natal, where he met with King Dingane to arrange for permission to settle in Natal (Stapleton 2017). However, in 1838 King Dingane ordered the massacre of Piet Retief and the remaining Voortrekkers (Knight 1998). Siganda Shezi who was part of King Dingane's inKulutshane Military witnessed the massacre of Piet Retief (Gillings 1989). This later resulted in the Battle of Blood River in December of 1838 where the Zulus fought the Voortrekkers under the command of Andries Pretorius (Stapleton 2017). The old wagon road the Voortrekkers used in 1838 when they were making their way down the slopes of the Drakensberg mountains and into Pietermaritzburg can still be seen today (Oberholser 1972). Once in Natal, the Dutch farmers encountered the Zulus who lured them into a trap and brutally massacred many of them. This led to a series of battles; the most notable battle being that of the Battle of Blood River in 1838 where the Boers defeated the Zulus (Wright & Hamilton 1989). This ended the Zulu threat to the white settlers, leading to a permanent and formal settlement in Natal being established. However, the Zulu kingdom remained independent for a couple of decades. In 1840 King Dingaan was overthrown by King Mpanze and the Boers (Greaves 2013; Meredith 2014). He fled to the Lebombo mountains in Swaziland where he died (Greaves 2013; Meredith 2014). The Republic of Natalia was annexed by the British in 1845 and in 1879 the Zulu Kingdom was also invaded (Wright & Hamilton 1989; Wahl & Van Schalkwyk 2013).

An official survey of the Zululand coast was carried out by the boat HMS Forester in 1879 (Minnaar 1895). During the survey the area surrounding the mouth of the Mhlatuze River was named Richards Bay (Minnaar 1895) (*Figure 22-23*). In December 1879 Richards bay appeared on Admiralty Chart No. 2089 for the first time (Minnaar 1895). During the Anglo-Zulu war in 1879, the Commodore of the Cape, Sir Frederick Richards used the area around Richards bay as a harbour (Wahl & Van Schalkwyk 2013). Richards bay is also named after him (Zwamborn & Swart 2012). Richards bay was surveyed in again in 1902 by Cathcart Methven, who determined that the area has the potential to be developed into a harbour (Zwamborn & Swart 2012). In 1907 the fort wagon trail from Empangeni to Richards bay was established by George Higgs (Van der Walt 2019). In 1965 it was declared that the town of Richards bay was going to be used as the largest port in South Africa along the coast (Van der Walt 2019). The harbour opened in 1976. Richards bay was proclaimed as a town in 1969 (Wahl & Van Schalkwyk 2013; Van der Walt 2019). Housing development began in 1970 with the first suburb being called Meerensee (Van der Walt 2019). The construction of the harbour in Richards bay began in 1972 and by 1976 it was functioning and exporting coal (Zwamborn & Swart 2012; Van der Walt 2019).

3.4. Conclusions on Literature Review

In conclusion the background information search has shown that the KwaZulu-Natal region has a long history with many different people migrating and settling in the area. Ulundi and the surrounding areas are rich in archaeology and history which played a role in documenting the lives of the Voortrekkers and the Zulu people. The areas surrounding Ulundi and Empangeni document the Stone Age, Iron Age and Historical Period of the South African human population. As such there are several archaeological and heritage sites located in the KwaZulu-Natal Province that provides evidence of past people's daily activities, the interactions and relationships they had with the people around them. These sites are of historical and cultural importance to the South African people.

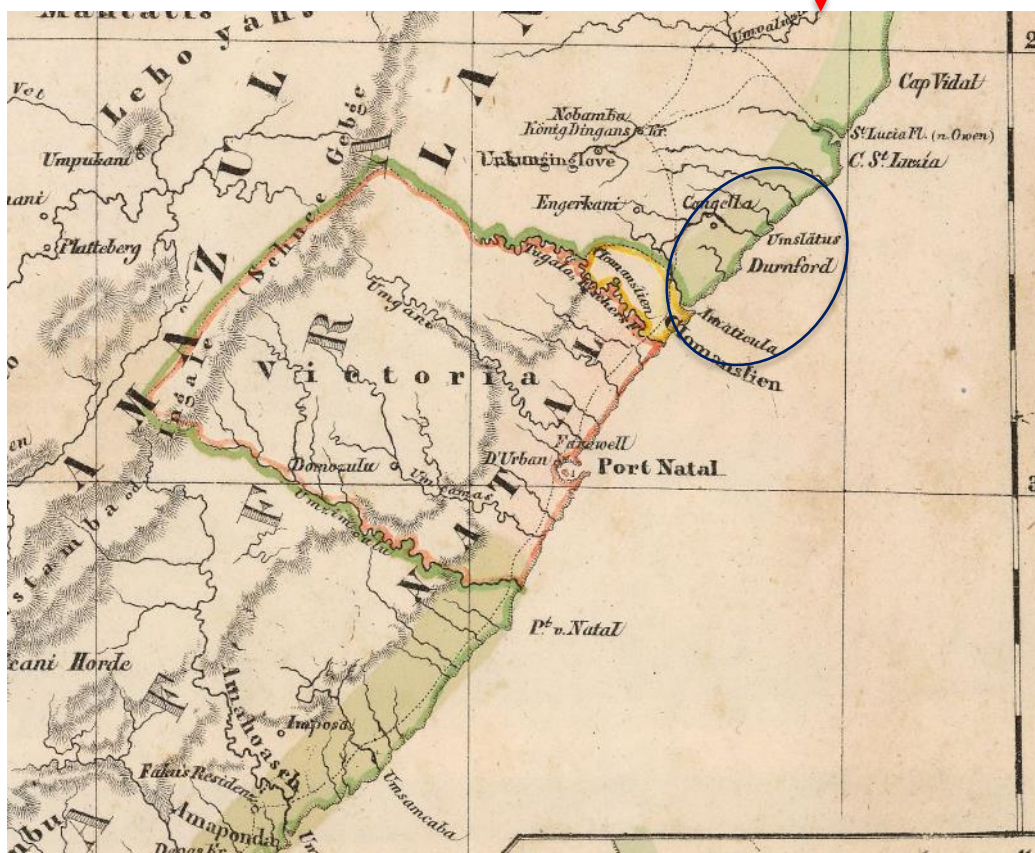
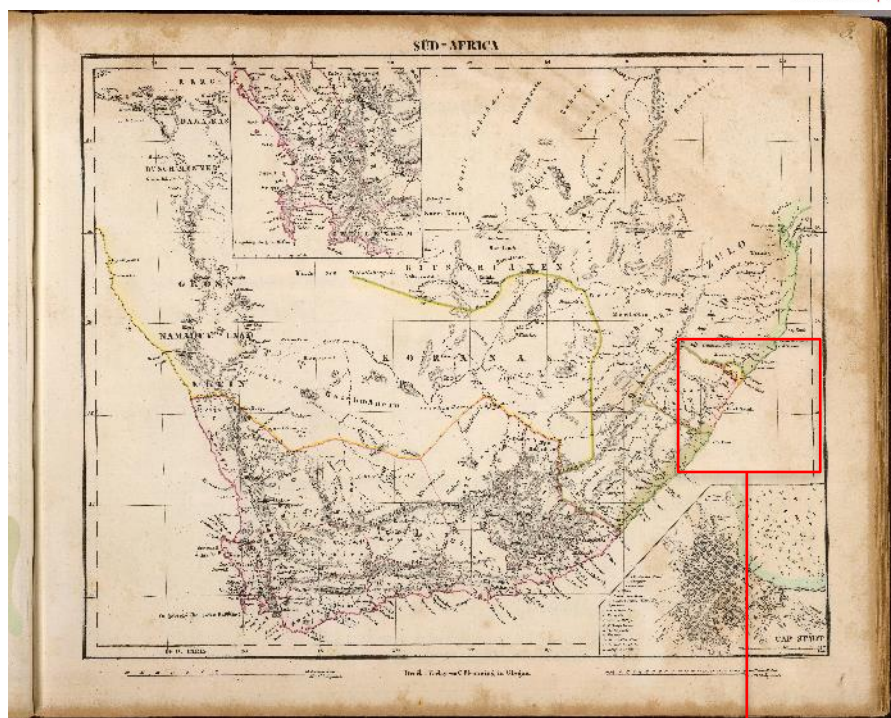


Figure 22: Map dating to 1858, with Richard bay (blue circle) not appearing on map (Source: Flemming 1855).

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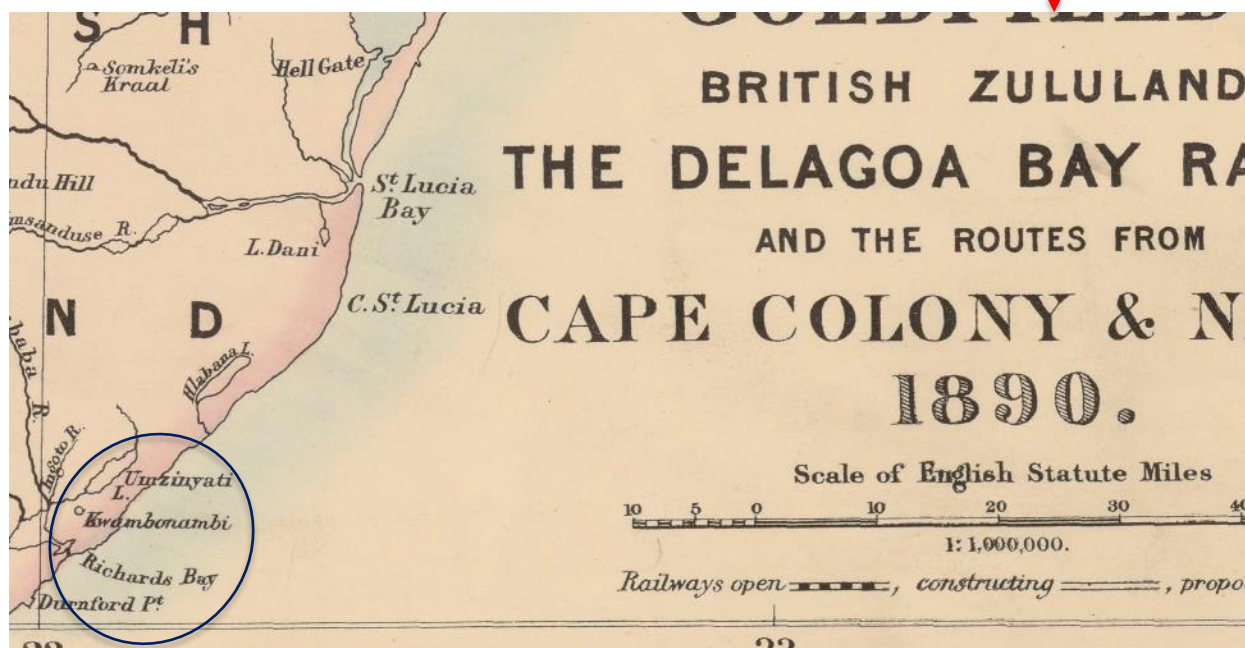


Figure 23: Map dating to 1890, with Richard bay (blue circle) appearing on map (Source: National Library of France. 2019)

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4. STUDY RESULTS

The background information yielded information about known archaeological and heritage resources located in KZN, and particularly the areas surrounding Richards bay. The physical survey focused on the area proposed in the 1km corridor (*Figure 24*). The 1km corridor for each Option was assessed as the final location of each power line option could fall within the proposed corridor.

The proposed location for the power lines are situated in a grassland area, containing several wetlands and plantations (*Figure 25 and 26*). The Nseleni River is located approximately 1km west of the proposed power lines. In some areas the environment is used for agricultural activities, including cattle grazing as well as for plantations. The project area has been disturbed by several other power lines and a railway track that have previously been constructed in the region. An Open-air church, an old SpoorNet village and the uThungulu Regional cemetery were identified in the project area (*Figure 27*).

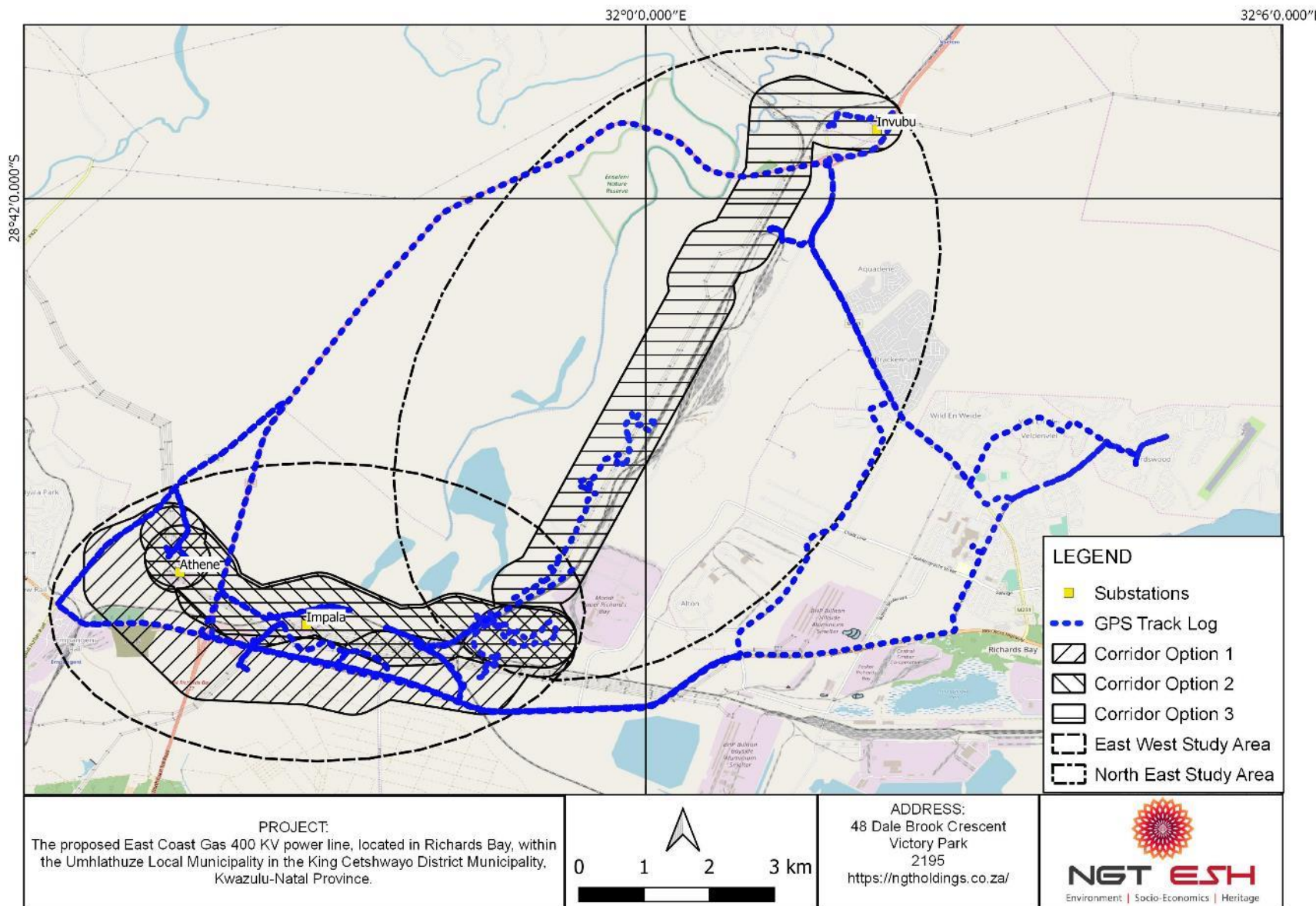


Figure 24: GPS track log of the area surveyed

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Figure 25: General view of the East-west project area

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Figure 26: General view of the North-south project area.

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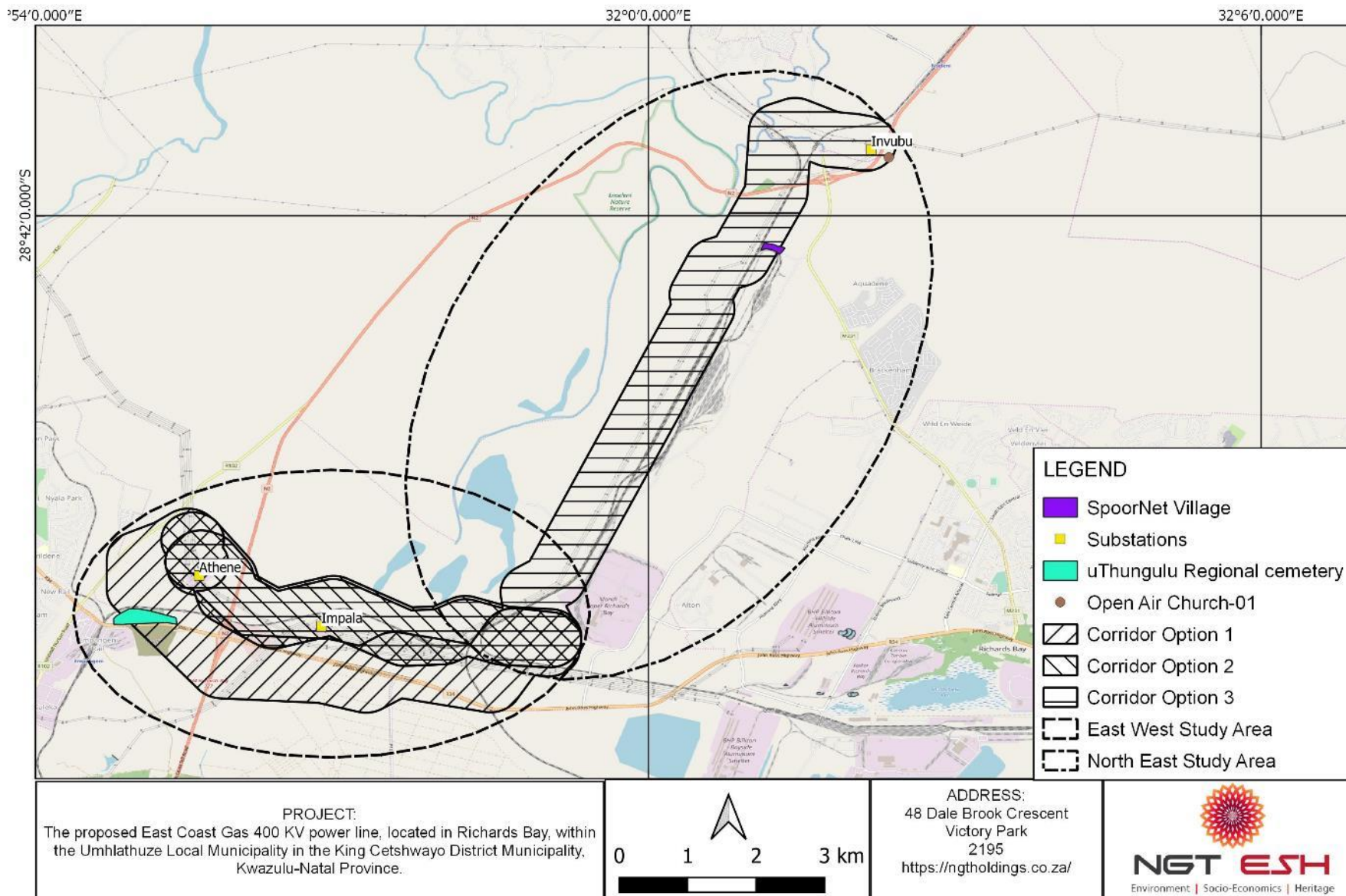


Figure 27: Map indicating the sites identified in the project area.

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4.1. Archaeological Sites

No archaeological sites were identified

4.2. Burial sites and Graves

Table 11: Burial Site-01 (uThungulu Regional cemetery)

Site Name:	uThungulu Regional cemetery
Type:	Cemetery
Density:	High
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 28° 45' 56.66" S • 31° 54' 52.54" E
Approximate Age:	Contemporary
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 36 of the NHRA, No. 25 of 1999
Description:	
<p>The uThungulu Regional cemetery is located north of the R34 and located between the R102 and N2 (Figure 28). The cemetery falls within the 1 km corridor proposed for Option 1. The uThungulu Regional cemetery is a declared cemetery under the jurisdiction of the ULM within the KCDM. As a site associated with burial grounds and graves it is of high local significance and has high heritage significance and is protected by the NHRA 25 of 1999.</p>	
Recommended Mitigation Measures:	
<ul style="list-style-type: none"> • As a Municipal cemetery the site is already demarcated with a fence. • It should be treated as No-Go-Area. Machinery and equipment should avoid the cemetery. • As such it is proposed that the construction and placement of the Eksom towers should be outside the demarcated fence area. • Subject to approval from Amafa. 	



Figure 28: General view of the uThungulu Regional cemetery

Table 12: Impact and risk assessment rating for the pre-and post-mitigation for all project phase for Archaeological and Living Heritage Resources

B. Destruction/damage of graves and burial grounds					
Impact Name	Destruction/damage of graves and burial grounds				
Alternative	Proposal				
Phase	Planning, Construction, Operation, Decommission and Closure				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature of Impact	-1	-1	Magnitude of Impact	5	3
Extent of Impact	4	4	Reversibility of Impact	4	3
Duration of Impact	5	3	Probability	5	3
Environmental Risk (Pre-mitigation)					-22,50
Mitigation Measures					
See Table 10					
Environmental Risk (Post-mitigation)					-9,75
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
<i>Low: Issue not raised in public responses</i>					
Cumulative Impacts					2
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.</i>					
Degree of potential irreplaceable loss of resources					3
<i>The impact may result in the irreplaceable loss of resources of high value (services and/or functions).</i>					
Prioritisation Factor					1,50
Final Significance					-14,63

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4.3. Built Environment

Below are tables with site information and impact assessment ratings

Table 13: Site Complex-01

Site Name:	Site Complex -01
Type:	Open-Air Church
Density:	Low/Medium
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 28° 41' 25.69" S • 32° 2' 21.28" E
Approximate Age:	Contemporary/Recent
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 34 of the NHRA, No. 25 of 1999
Description:	
An Open-Air Church was identified 800 m from the northern section of the proposed power line to the east of the N2 near one of the Mondi plantations. The site contained a couple of white painted stones and plastic bags and buckets (<i>Figure 29</i>).	
Recommended Mitigation Measures:	
<ul style="list-style-type: none"> • This Open-Air Churches is located within the 1km corridor and possible servitude of the powerline. • A 10 m buffer should be maintained around the site, it should be demarcated with a fence and treated as No-Go-Area. • Machinery and Equipment should avoid the Open-Air Church. • If the powerlines encroach on the Open-Air Church during the construction phase that the Church members cannot participate in their Church related activities on site, it is recommended that the client discuss the possibility of relocation and associated costs with the Church members. • As a site associated with living heritage and cultural practices it has medium heritage significance and is as such protected by the NHRA 25 of 1999. • Subject to approval from Amafa. 	



Figure 29: General view of Open-Air Church-01

Table 14: Impact and risk assessment rating for the pre-and post-mitigation for all project phase for Archaeological and Living Heritage Resources

A. Destruction/damage of archaeology and living heritage resources					
Impact Name	Destruction/damage of archaeology and living heritage resources				
Alternative	Proposal				
Phase	Planning, Construction, Operation, Decommission and Closure				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature of Impact	-1	-1	Magnitude of Impact	3	2
Extent of Impact	3	2	Reversibility of Impact	4	2
Duration of Impact	3	2	Probability	3	2
Environmental Risk (Pre-mitigation)					-9,75
Mitigation Measures					
See Table 12					
Environmental Risk (Post-mitigation)					-4,00
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
<i>Low: Issue not raised in public responses</i>					
Cumulative Impacts					2
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.</i>					
Degree of potential irreplaceable loss of resources					2
<i>The impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.</i>					
Prioritisation Factor					1,33
Final Significance					-5,33

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Table 15: Site Complex-02

Site Name:	Site Complex -02
Type:	Old SpoorNet Village
Density:	Low/Medium
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 28° 42' 17.59" S • 32° 1' 9.76" E
Approximate Age:	Historical/Contemporary
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 34 of the NHRA, No. 25 of 1999
Description:	
<p>Several old Asbestos houses associated with an old SpoorNet village was observed (<i>Figure 30</i>). The SpoorNet village is located approximately 360m to the east of the proposed powerlines. A small community group is currently occupying the houses. Several kraals were also observed next to (<i>Figure 31</i>) and east of the village (<i>Figure 32</i>). The kraals are being used as areas for the growing of crops and other vegetables.</p>	
Recommended Mitigation Measures:	
<ul style="list-style-type: none"> • The village falls within the possible servitude of the powerlines (1 km corridor). • Although the buildings located at the SpoorNet village, do not demonstrate any unique architectural style or language/vernacular, particular use of rare or unique technology in terms of building materials, cooling and heating systems, or associated with unique group of people/persons that makes them unique, they are of low- medium significance as a result of the communities currently living there. • A 10m buffer should be maintained around the village. • If during the construction phase the development of the powerlines encroaches on the village, the client should enter into negotiations with the occupants and propose the possibility of relocation. A Relocation Action Plan should be developed. • Subject to approval from Amafa. 	



Figure 30: General view of the SpoorNet village

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Figure 31: Kraals located directly in front of the village



Figure 32: View of kraals located to the east of the village

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Table 16: Impact and risk assessment rating for the pre-and post-mitigation for all project phase for Archaeological and Living Heritage Resources

Destruction/damage of built environment resources					
Impact Name	Destruction/damage of built environment resources				
Alternative	Proposal				
Phase	Planning, Construction, Operation, Decommission and Closure				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature of Impact	-1	-1	Magnitude of Impact	4	2
Extent of Impact	3	2	Reversibility of Impact	4	2
Duration of Impact	4	2	Probability	3	2
Environmental Risk (Pre-mitigation)					-11,25
Mitigation Measures					
<i>See Table 14</i>					
Environmental Risk (Post-mitigation)					-4,00
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
<i>Low: Issue not raised in public responses</i>					
Cumulative Impacts					2
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.</i>					
Degree of potential irreplaceable loss of resources					2
<i>The impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.</i>					
Prioritisation Factor					1,33
Final Significance					-5,33

4.4. Paleontological Sensitivity

The SAHRA Palaeo-Sensitivity Layer (Figure. 33) shows that the project area that is in a low to very high sensitivity area. The East-west study area contains three Palaeontological Sensitive Area (PSA) layers.

- South of the R34 linking Empangeni and Richards Bay, is a green area meaning that it has Moderate PSA;
- the area north of the R34 shows to layers, green and blue indicating it has low to moderate palaeontological sensitivity; and
- the western section of East-west Study area falls within a yellow/orange area which has a high palaeontological sensitivity.

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- According to the PIA report the proposed powerline routes lie on shales of the Pietermaritzburg Formation of the Ecca Group and this has a small of chance of impacting on invertebrate trace fossils if they are present here, with Berea Formation in the central section and Quaternary sands for the eastern section.

The North-East study area on the other hand yielded four PSA.

- The eastern section of the East-north study area and east of the Nseleni River, falls in an area that is predominantly blue and has low paleontological potential;
- the western and central section, west of the Nseleni River up to Enseleni Nature Reserve shows a green, yellow/orange layer as well as pockets of grey layer, which indicates an insignificant to high palaeontological sensitivity; and
- the west and north of the R619 and the N2 intersection a thin layer of PSA in red is shown, meaning that this area is of very high palaeontological sensitivity.
- According to the PIA report the proposed powerline routes lie on Quaternary sands and these are not fossiliferous. The ancient granites and gneisses in the area are not fossiliferous. The Jurassic dolerite dykes and overlying Quaternary sands to the west do not preserve fossils.

4.5. Heritage Significance

Table 17: SAHRA Site significance classification and ratings for the buildings located in the project area

FEATURE	FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
Burial Site-01 (uThungulu Regional cemetery)	Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Site Complex-01 (Open Air Church 01)	Generally Protected A (GP. A)	-	High / Medium Significance	Mitigation before destruction
Site Complex-02 (Old SpoorNet village)	Generally Protected A (GP. A)	-	High / Medium Significance	Mitigation before destruction

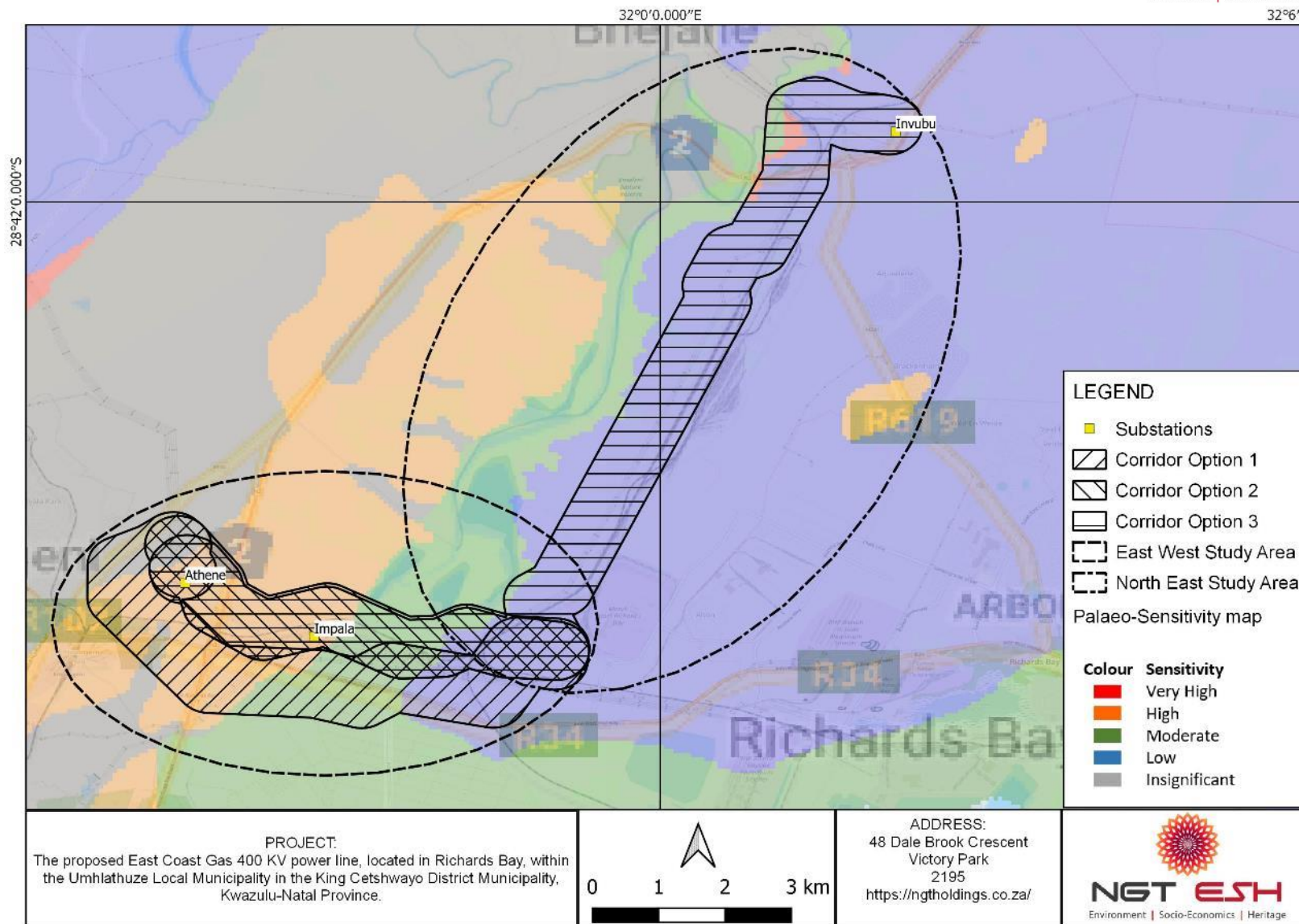


Figure 33: Paleo-Sensitivity layer of the East West (in purple circle) and North East (in red circle) project areas proposed for the East Coast Gas 400 KV power line, located near Richards Bay.

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5. CONCLUSIONS

Based on the results of literature review, field survey and the assessment of identified heritage resources, the following conclusions are made in terms of the National Heritage Act about the proposed development:

- It is concluded that the project area near Richards bay, is located in a region rich in archaeology and heritage resources.
- However, no archaeological, historical resources or sources of living heritage were identified.
- A municipal cemetery was found in the East-West project area
 - *uThungulu Regional Cemetery (Burial Site-01)*
 - The uThungulu Regional cemetery is located north of the R34 and located between the R102 and N2. The cemetery falls within the 1 km corridor proposed for Option 1.
 - The uThungulu Regional cemetery is a declared cemetery under the jurisdiction of the ULM within the KCDM.
- However, graves are subterranean in nature and might not have been identified during the initial site visit and survey.
- In terms of the built environment an Open-air church (Site Complex-01) and old SpoorNet village (Site Complex-02) were identified in the northern section of the project area.
 - *Open-air church (Site Complex-01)*
 - Located to the east of the N2 near one of the Mondi plantations. The site contained a couple of white painted stones and plastic bags and buckets.
 - As a site associated with living heritage and cultural practices it has medium heritage significance and is as such protected by the NHRA 25 of 1999.
 - *SpoorNet village (Site Complex-02)*
 - Several old Asbestos houses and kraals associated with an old SpoorNet village was observed. The village is currently occupied by a small community who grows several crops in the kraals.
 - Although the buildings located at the SpoorNet village, do not demonstrate any unique architectural style or language/vernacular, particular use of rare or unique technology in terms of building materials, cooling and heating systems, or

associated with unique group of people/persons that makes them unique, they are of medium significance as a result of the communities currently living there.

- In terms of SAHRA Paleontological Sensitivity Layer the project area that is in a low to very high sensitivity area.
 - The East-West study area contains three Palaeontological Sensitive Area (PSA) layers.
 - South of the R34 linking Empangeni and Richards Bay, is a green area meaning that it has Moderate PSA;
 - the area north of the R34 shows two layers, green and blue indicating it has low to moderate palaeontological sensitivity; and
 - the western section of East-west Study area falls within a yellow/orange area which has a high palaeontological sensitivity.
 - According to the Paleontological Impact Assessment (PIA) report the proposed powerline routes lie on shales of the Pietermaritzburg Formation of the Ecca Group and this has a small chance of impacting on invertebrate trace fossils if they are present here, with Berea Formation in the central section and Quaternary sands for the eastern section.
 - The North-East study area on the other hand yielded four PSA.
 - The eastern section of the East-north study area and east of the Nseleni River, falls in an area that is predominantly blue and has low paleontological potential;
 - the western and central section, west of the Nseleni River up to Nseleni Nature Reserve shows a green, yellow/orange layer as well as pockets of grey layer, which indicates an insignificant to high palaeontological sensitivity; and
 - the west and north of the R619 and the N2 intersection a thin layer of PSA in red is shown, meaning that this area is of very high palaeontological sensitivity
 - According to the PIA report the proposed powerline routes lie on Quaternary sands and these are not fossiliferous. The ancient granites and gneisses in the area are not fossiliferous. The Jurassic dolerite dykes and overlying Quaternary sands to the west do not preserve fossils.

6. RECOMMENDATION

Based on the Conclusions it is recommended that:

- *Cemetery (Burial Site-01)*
 - As a Municipal cemetery the site is already demarcated with a fence.
 - It should be treated as No-Go-Area. Machinery and equipment should avoid the cemetery.
 - As such it is proposed that the construction and placement of the Eksom towers should be outside the demarcated fence area.
- *Open-air church (Site Complex-01)*
 - This Open-Air Churches is located within the possible servitude of the powerline (1km corridor).
 - A 10m buffer should be maintained around the Open-air church, and it should be demarcated with a fence and treated as No-Go-Area.
 - Machinery and Equipment should avoid the Open-Air Church.
 - If the powerlines encroach on the Open-Air Church during the construction phase that the Church members cannot participate in their Church related activities on site, it is recommended that the client discuss the possibility of relocation and associated costs with the Church members.
- *SpoorNet village (Site Complex-02)*
 - The village falls within the servitude of the powerlines (1km corridor).
 - A 10m buffer should be maintained around the village.
 - If during the construction phase the development of the powerlines encroaches on the village, the client should enter into negotiations with the occupants and propose the possibility of relocation. A Relocation Action Plan should be developed.
- It should be noted that some archaeological material, including artefacts and graves can be buried underground and as such, may not have been identified during the initial survey and site visits. In the case where the proposed development activities bring these materials to the surface, they should be treated as **Chance Finds**. Should such resources be unearthed, it is recommended that the activities be stopped immediately, and an archaeologist be contacted to conduct a site visits and make recommendations on the mitigation of the finds. SAHRA and AMAFA should also be informed immediately on such finds.

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- In terms of the SAHRA Paleontological Sensitivity Layer, the area falls within a region defined as an insignificant to very high sensitivity area. For only the western part of the west-east sector a Fossil Chance Find Protocol should be followed once excavations and construction of the powerline poles commences. If any trace fossils are discovered by the responsible person in charge, they should be rescued and put aside for a professional palaeontologist to assess. The north-south sector is not on fossiliferous rocks. As far as the palaeontology is concerned the project may proceed (See PIA report and Appendix 3).
- The proposed powerlines will not have impact on the heritage and archaeological resources in the broader Richards bay area.
- From a viability perspective, the East-West lines are supported subject that they will not disturb the graves located in the uThungulu Regional Cemetery.
- It is recommended that both the SAHRA and the Amafa grant the project a **Positive Review Comment** and allow the proposed East Coast Gas 400 KV power lines located near Richards bay to proceed as planned.

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8. APPENDIX A: SPECIALIST CV – CHERENE DE BRUYN

Name : Cherene de Bruyn
Profession : Archaeology
Date of Birth : 1991/03/01
Parent Firm : NGT Holdings (Pty) Ltd
Position in Firm : Manager: Archaeology & Heritage Unit
Years with firm : 11 Months
Nationality : South Africa
BI & Male/Female Status : White South African Female
Languages :

Language	Speak	Read	Write
English	X	X	X
Afrikaans	X	X	X

Countries of Work Experience : South Africa
Proposed Position on Team : Manager: Archaeology & Heritage Unit

KEY QUALIFICATIONS

Cherene is a hardworking Archaeologist who has developed a mature and responsible approach to any task she undertakes. She received the British High Commissions Chevening Scholarship to complete her Master’s degree in Archaeology at UCL in 2016/2017. She is skilled in excavating and analysing archaeological artefacts such as pottery and skeletal human remains, and have an interest in Egyptian, African and burial archaeology. Cherene is a motivated individual who gained relevant professional experience in the heritage sector through Internships as well as through volunteering on archaeological projects.

●●●●● = Excellent ●●●● = Proficient ●●● = Intermediate ●● = Developing ● = Novice

Communication	●●●●●
Team Work	●●●●●
Time Management	●●●●●
Adaptability	●●●●●
Creativity	●●●●
Leadership	●●●●
Excavation	●●●●●
Recording	●●●●●
MS Office	●●●●
Google Earth	●●●●
QGIS	●●●
Total Station	●●●

EDUCATION

NAME OF INSTITUTION	DEGREE OBTAINED	DATES ATTENDED
University College London	MA in Archaeology	2016-2017
University of Pretoria	BSC Honours in Physical Anthropology	2015
University of Pretoria	BA Honours in Archaeology	2013
University of Pretoria	BA in Archaeology	2010-2012

RELEVANT EXPERIENCE

DATE	PROJECTS	POSITION	LOCATION
2019-Present	NGT ESH (Pty) Ltd Unit	Manager: Archaeology & Heritage	RSA
	Heritage Impact Assessment for the proposed mining rights on the Farm Waterkloof 95 located between Griekwastad and Groblershoop in the Pixley Ka Seme District Municipality within the Northern Cape Province	Author	
	Heritage Impact Assessment for the proposed East Coast Gas 400 Kv Power Lines, located in Richards Bay, within the Umhlathuze Local Municipality in the King Cetshwayo District Municipality in the Kwazulu-Natal Province.	Author	
	Heritage Impact Assessment for the mining right application for the Farm Woodlands 407, situated in the Free State Province.	Co-Author	
	Heritage Impact Assessment for the proposed for the Construction of the Bulk Water Supply Pipeline in Selcourt, in the Ekurhuleni Metropolitan Municipality, Gauteng Province	Co-Author	
	Heritage Impact Assessment for the refurbishments of Lyttelton Primary School, Lyttelton Manor, Centurion, Gauteng Province.	Author	
2018-2019	NGT Holdings (Pty) Ltd	Archaeologist and Heritage Consultant	RSA
	Heritage Impact Assessment for the refurbishments of the Caledonian Stadium in Pretoria, Gauteng Province.	Author	

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DATE	PROJECTS	POSITION	LOCATION
	Gap Analysis Of All The Heritage And Cultural Reports Completed For The Madimatle Cave, Limpopo Province, South Africa	Author	
	Heritage Impact Assessment for the amendment of an existing prospecting right and environmental authorization for Bothaville NE Ext A, situated in the Free State Province.	Author	
	Heritage Impact Assessment for the Madimatle Cave located near Thabazimbi in the Limpopo Province, South Africa	Author	
	Letter of Recommendation for Exemption from conducting a heritage impact assessment for the proposed alterations of Erf 1/966 Rosettenville located at 94 Main Street Rosettenville within the City of Johannesburg Metropolitan Municipality, Gauteng Province.	Co-Author	
	Heritage Impact Assessment Study for the Proposed New Lambano Sub Acute Facility on Stand 5454, 5455, 5456,5457 and New Training Facility on Stands 5458 and 5460 in Kensington, Johannesburg, South Africa	Author	
	Heritage Impact Assessment for the Prospecting Right and Environmental Authorization Application for Ventersburg B situated in the Free State Province.	Author	
	Exhumation and reburial report of 4 graves located at Tombo, Eastern Cape Province, South Africa.	Author	
	Heritage Impact Assessment for the proposed prospecting rights application and environmental authorisation for the farm Three Sisters in Barberton, within the city of Mbombela Local District, Mpumalanga, South Africa	Author	
	Report on the exhumation and reburial report of 16 graves from Doornkop, to Voortrekker Cemetery in Middelburg, Mpumalanga Province, South Africa	Author	

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DATE	PROJECTS	POSITION	LOCATION
	Heritage Impact Assessment Study For The Development Of The Zandspruit Secondary School On Portion 504 Of The Farm Wilgespruit 190 Iq, Zonnehoeve, Gauteng Province, South Africa	Author	
	Grave exhumation and relocation off 19 graves on erf 3 of Holding 87 North Riding Agricultural Holdings, City Of Johannesburg, Gauteng Province	Author	
	Heritage Impact Assessment and Integrated Cultural Resources Management Study For The Proposed Mfolozi-Mbewu 765kv Transmission Line, Zululand And King Cetshwayo District Municipality, Kwazulu-Natal.	Author	
	Archival Search And Literature Background Study Of The Lyttelton Primary School, Lyttelton Manor, Centurion, Gauteng Province	Author	
	Heritage Impact Assessment for the proposed for the Construction of the Bulk Water Supply Pipeline and Feeder Pipes in Dunnottar, Gauteng Province	Author	
	Heritage Impact Assessment for the Proposed Development of a Place of Worship for Hope Restoration Ministries Project on Portion 31 And 32 of the Farm Blue Hills 397 JR, Gauteng Province, South Africa – Version 2	Author	
	Letter of Recommendation for Exemption from Conducting a full Heritage Impact Assessment Study for the Matlala Park, Ekurhuleni Metropolitan Municipality, Gauteng Province.	Author	
	Heritage Impact Assessment for the Proposed KwaThema to Grundlingh WWTW Bulk Outfall Sewer: Capital Project Implementation near Nigel, Gauteng Province, South Africa.	Author	

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DATE	PROJECTS	POSITION	LOCATION
	Heritage Impact Assessment the prospecting right and environmental authorisation application for Kroonstad South situated in the Free State Province.	Author	
	Heritage Impact Assessment the prospecting right and environmental authorisation application for Vredefort West situated in the Free State Province.	Author	
	Archaeological impact assessment for a mining permit application for portion 19 of the farm Syferfontein 303 IP within the city of Matlosana Local Municipality in the North West Province, South Africa.	Author	
	Background literature study on the archaeology and history of Madimatle Mountain and the Gatkop Caves situated within the Thabazimbi Local Municipal area of Waterberg District, Limpopo Province, south Africa.	Author	
	Heritage Impact Assessment report for the proposed development of a SMME Training Centre and Youth Enterprise Park on Erf 1977 Edendale-CC located in the Msunduzi Local Municipality, Pietermaritzburg, KwaZulu-Natal Province, South Africa.	Author	
	Prospecting Right and Environmental Authorisation for the proposed WRE Nkunzana Prospecting Right Project.	Researcher	
2014-2015	FARC, University of Pretoria Intern	DST-NRF Archaeological	RSA
	Report on rescue excavations and skeletal analyses of two archaeological graves inadvertently uncovered in Boitekong, North-West.	Field Assistant and Researcher	

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DATE	PROJECTS	POSITION	LOCATION
	Report on Follow-up site visit excavation and physical anthropological analyses of archaeological human remains transferred from SAPA Victim Identification Center to Department of Anatomy. Mamelodi East Phase 2 House 566.	Field Assistant and Researcher	
	Rescue excavation of an unmarked grave yard at Diamond Park, Greenpoint, Kimberley, Northern Cape Province	Field Assistant	
	Follow up site visit on human remains found at Bothlokwa (Ramatjowe & Mphakahne), Limpopo Province	Field Assistant	
	Follow up site visit on human remains found in Waterpoort, Soutpansberg, Limpopo Province	Field Assistant	
2014	Archaetnos Ltd	Archaeological Assistant	RSA
	A report on a cultural heritage impact assessment for the proposed development on portion 91 of the farm Waterkloof 305 JQ, close to Rustenburg, Northwest Province.	Field Assistant	
	A report on the phase II heritage investigation of a farmstead on portion 470 of the farm Waterkloof 305 JQ near Rustenburg in the Northwest Province.	Field Assistant	
	A report on the heritage impact assessment for the proposed new bulk water and sewer pipeline from Cosmo City to Lanseria, Gauteng Province.	Field Assistant	
	A report on the updating of a previous cultural heritage impact assessment for the EMPR alignment and consolidation process at Anglo American Platinum: Rustenburg platinum mines – Rustenburg section, Northwest Province.	Field Assistant and Researcher	
	A report on a cultural heritage impact assessment for the proposed Thusanang housing development, close to Rustenburg, Northwest Province.	Field Assistant and Researcher	

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DATE	PROJECTS	POSITION	LOCATION
	A report on the cultural heritage impact assessment for the Tshepong extension 1, 2 and 3 housing development, close to Vereeniging, Gauteng Province.	Field Assistant	
	A report on the cultural heritage impact assessment for the proposed Isibonelo Colliery Block Z opencast mine, close to Kriel, Mpumalanga Province.	Field Assistant	
	A report on a cultural heritage impact assessment for a proposed transport facility on portion 33 of the farm Vaalbank 289 JS, close to Middelburg, Mpumalanga Province.	Field Assistant	
	Report on a cultural heritage Impact assessment done for the Anglo-American Platinum and African Rainbow Minerals Modikwa Platinum Mine South Shaft 2 project, close to Burgersfort, Limpopo Province.	Field Assistant	

SUMMARY OF OTHER EXPERIENCE

DATE	EMPLOYER	POSITION	LOCATION
2018	Sci-bono Discovery Centre	Lascaux Exhibition Tour Guide	Newton, RSA
2017	Tower Bridge Exhibition	Casual Worker	London, UK
2018, 2016	Umbeli Belli Middle Stone Age Excavation	Field and Lab Assistant	Kwazulu-Natal, RSA
2015-2016	Bio-Archaeological Analysis and Archaeological Geophysics Unit, University of Pretoria	Archaeological Contractor	Pretoria, RSA
2016, 2015	Wenner-Gren Foundation Funded Grassridge Archaeological and Palaeoenvironmental Project	Field and Lab Assistant	Eastern Cape, RSA
2015	Department of Anatomy, University of Pretoria	Student Teaching Assistant	Pretoria, RSA

SUMMARY OF PUBLICATIONS

DATE	AUTHORS	TITLE AND JOURNAL
2018	De Bruyn, C. & Meyer, A.	A Bioarchaeological analysis of the historic human skeletal remains recovered from Lancaster Mine, Witwatersrand, South Africa. <i>The South African Archaeological Bulletin</i> , 73(207): 4-12
2017	De Bruyn, C. & Jordaan, J.	Regional feature: Perspectives from Southern African archaeology professionals. <i>International Journal of Student Research in Archaeology</i> 2(3): 2-18
2014	De Bruyn, C.	An archaeological investigation in the Masebe Nature Reserve, Limpopo Province, <i>The Digging Stick</i> 31(1):9-11

MEMBERSHIPS

DATE	ORGANIZATION	POSITION
2019- Present	Association of Southern African Professional Archaeologists	CRM Accredited
2018-Present	International Association of Impact Assessment South Africa	Member
2015 - Present	Association of Southern African Professional Archaeologists	Professional Member
2014 - Present	South African Archaeological Society	Member

DECLARATION

I confirm that the above information contained in the CV is an accurate description of my experience and qualifications and that, at the time of signature, I am available and willing to serve in the position indicated for me in the Proposal, for the durations and at the locations indicated therein.



Cherene de Bruyn

1 May 2019

9. APPENDIX B: CHANCE FINDS OF PALAEOLOGICAL MATERIAL

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under section 38 of the NHRA no 25 of 1999.

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the NHRA and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded. Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO.

It is recommended that copies of the attached poster and procedure are printed out and displayed on-site so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken: one person in the team must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on-site should follow the protocol correctly in order to not jeopardise the conservation and well-being of the fossil

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material. Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

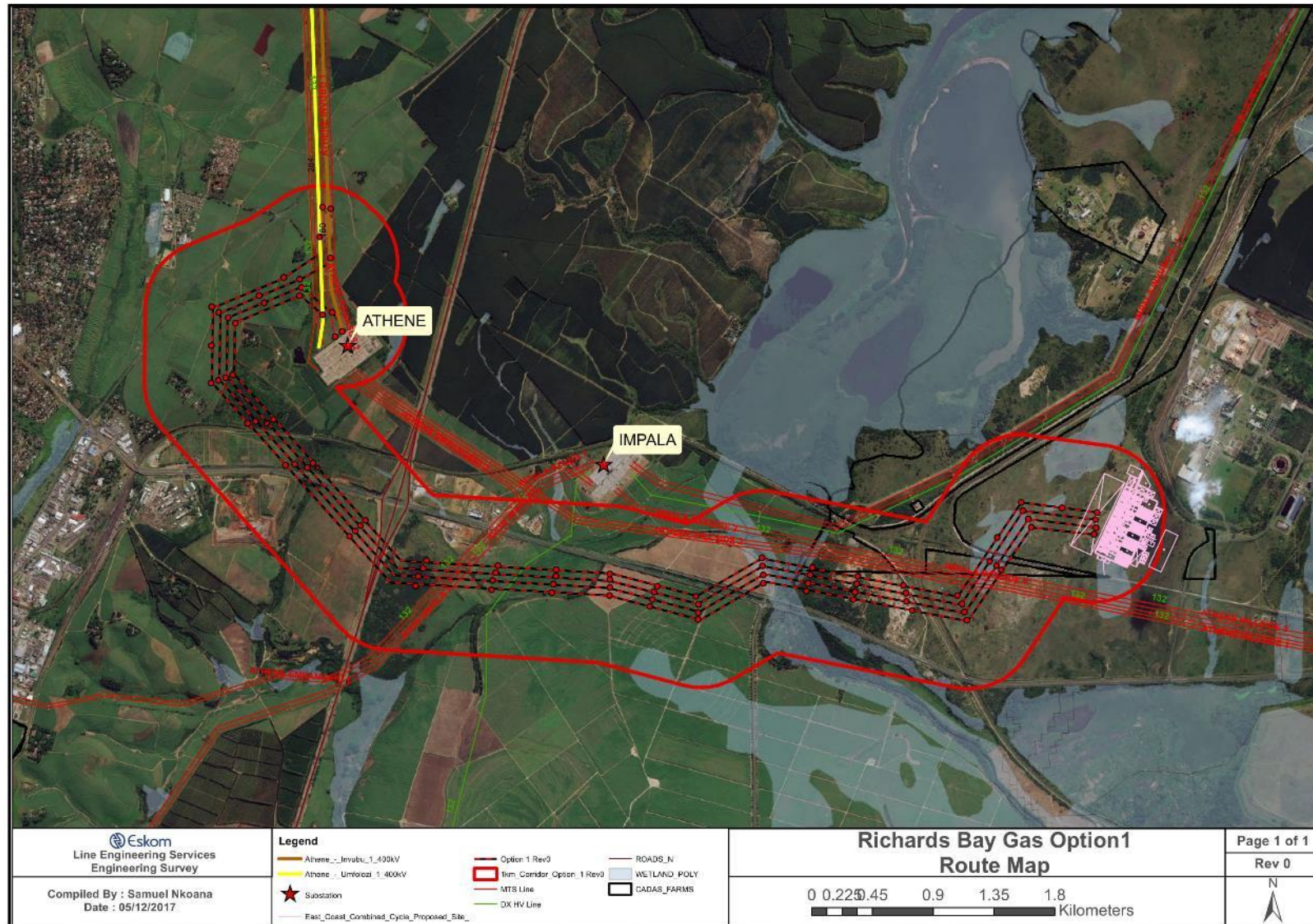
Procedure to follow if it is likely that the material identified is a fossil:

- I. The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;
- II. The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- III. The ECO or site agent must compile a Preliminary Report and fill in the Fossil Discoveries: SAHRA Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
 - The date
 - A description of the discovery
 - A description of the fossil and its context (e.g. position and depth of find)
 - Where and how the find has been stored
 - Photographs to accompany the preliminary report (the more the better):
 - A scale must be used
 - Photos of location from several angles
 - Photos of vertical section should be provided
 - Digital images of hole showing vertical section (side);
 - Digital images of fossil or fossils.
- IV. Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.
- V. Exposed finds must be stabilised where they are unstable, and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- VI. If the find cannot be stabilised, the fossil may be collected with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in

this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

10. APPENDIX C: MAPS OF THE PROPOSED POWER LINES



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