



**SPAR GROUP LTD**

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# **Spar Warehouse and Associated Infrastructure, Port Elizabeth**

## **Heritage Impact Report**

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## **Executive Summary**

PGS Heritage was appointed by SiVEST Environmental Division to undertake a Heritage Impact Report that forms part of the Basic Assessment report (BAR) and Environmental Management Programme (EMPr) for the proposed construction of a Warehouse and associated infrastructure for SPAR, at Perseverance in Port Elizabeth, Nelson Mandela Bay Metropolitan Municipality, Eastern Cape Province.

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

The archival research undertaken for the project indicated that there was not expected to be any significant archaeological or historical resources present on the study area. However, the desktop PIA has indicated that the development footprint of the study area is underlain by the Cretaceous aged Sundays River and Kirkwood Formations of the Uitenhage Group. The Palaeontological sensitivity of these areas is rated as very high.

The subsequent field work completed for the HIA component in January 2017, has confirmed that two heritage sites /find spots were identified within the project study area.

Therefore, the following mitigation measures are required.

### **1.1 Pre-Construction / Archaeology**

Since only two isolated archaeological findspots were recorded, which are considered to be of low to negligible significance, no mitigation measures will be required.

### **1.2 Palaeontology**

1. The development area is completely underlain by sediments of the Algoa Basin, Sundays River and Kirkwood Formation of the Uitenhage Group. The Palaeontological sensitivity of these areas is rated as very high.
2. It is thus recommended that a full EIA level palaeontology report be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage.
3. Depending on the results of the full PIA, it may be recommended that a Palaeontologist should apply for a SAHRA permit and field work would entail surveying, recording and describing fossil heritage, and obtaining relevant data concerning the surrounding sedimentary matrix) and the well preserved fossils must be excavated and sent to a permitted institution. All of the information regarding the process followed must be compiled into a report after fossils have been excavated.

The recommendations must be included in the EMPr of the project.

### **1.3 Comparative Assessment of Alternatives**

No alternative layouts or sites for the proposed warehouse have been provided. Therefore, only alternative to the proposed development is the “no-go” option. Since only two archaeological resources of low significance were identified, while palaeontological resources of very high significance underlie most of the proposed development site; a comparative assessment of the “no-go” option with respect to the “construction” option has shown that the No-Go alternative will have no impact on heritage resources and the current status quo will be kept.

# **SPAR WAREHOUSE**

## **HERITAGE IMPACT REPORT**

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- A: LEGISLATIVE PRINCIPLES
- B: HERITAGE IMPACT ASSESSMENT METHODOLOGY
- C: IMPACT ASSESSMENT MATRIX
- D: PALAEOLOGICAL DESKTOP ASSESSMENT

# 1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by SiVEST Environmental Division (SiVest) to undertake a Heritage Impact Assessment (HIA) that forms part of the Basic Assessment Report (BAR) and Environmental Management Programme (EMPr) for the construction of a Warehouse and associated infrastructure for the SPAR Group (Pty) Ltd, at Erf 1090 at Red House in Port Elizabeth, Eastern Cape Province.

## 1.1 Scope of the Study

The aim of the study is to identify possible heritage resources, sites, finds and sensitive areas that may occur in the study area for the BA study. The HIA aims to inform the BA in the development of a comprehensive EMPr to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

## 1.2 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the development area. Various factors account for this, including the subterranean nature of some archaeological sites. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

It should be noted that during the field survey, the team encountered extremely dense thicket vegetation over the western portion of the study area. The two isolated stone tools were both found in disturbed areas within this thicket vegetation.

## 1.3 Specialist Qualifications

PGS Heritage (Pty) Ltd compiled this Heritage Scoping Report.

The staff at PGS has a combined experience of nearly 80 years in the heritage consulting industry. PGS and its staff have extensive experience in managing the HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, Project manager for this project, is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA) and has CRM accreditation within the said organisation, as well as being accredited as a Professional

Heritage Practitioner with the Association of Professional Heritage Practitioners – Western Cape (APHP)

Henk Steyn, heritage specialist and project archaeologist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Field Director.

Jennifer Kitto, Heritage Specialist and author for this project, has considerable experience in the heritage sector, a large part of which involved working for a government department responsible for administering the NHRA, (Act No 25 of 1999). Therefore, she is well-versed in the legislative requirements of heritage management. She holds a BA in Archaeology and Social Anthropology and a BA (Hons) in Social Anthropology.

Elize Butler, who undertook the desktop PIA for this project, has an MSc in Palaeontology from the University of the Free State, Bloemfontein, South Africa. She has been working in Palaeontology for more than twenty years. She has been conducting Palaeontological Impact Assessments since 2014.

#### 1.4 Legislative Context

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

- i. National Environmental Management Act (NEMA), Act 107 of 1998
- ii. National Heritage Resources Act (NHRA), Act 25 of 1999
- iii. Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002

This project triggers a HIA under s38(8) of the NHRA and will require the comments from the relevant Heritage Resources Agency – the Eastern Cape Provincial Heritage Resources Agency for a final decision under the relevant environmental agency under NEMA.

Refer to **Appendix A** for further discussions on heritage management and legislative frameworks

**Table 1: Terminology**

<b>Acronyms</b>	<b>Description</b>
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age



GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

### **Archaeological resources**

This includes:

- i. material remains resulting from human activity 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;
- ii. 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;
- iii. 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;
- iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

### **Cultural significance**

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

### **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 a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- ii. carrying out any works on or over or under a place;
- iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- iv. constructing or putting up for display signs or boards;
- v. any change to the natural or existing condition or topography of land; and
- vi. any removal or destruction of trees, or removal of vegetation or topsoil

### **Earlier Stone Age**

The archaeology of the Stone Age, between 700 000 and 2 500 000 years ago.

### **Fossil**

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

### **Heritage**

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

### **Heritage resources**

This means any place or object of cultural significance, such as the caves with archaeological deposits identified close to both development sites for this study.

### **Holocene**

The most recent geological time period which commenced 10 000 years ago.

### **Later Stone Age**

The archaeology of the last 30 000 years associated with fully modern people.

### **Late Iron Age (Early Farming Communities)**

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

### **Middle Stone Age**

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

### **Palaeontology**

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 use, and any site which contains such fossilised remains or trace.

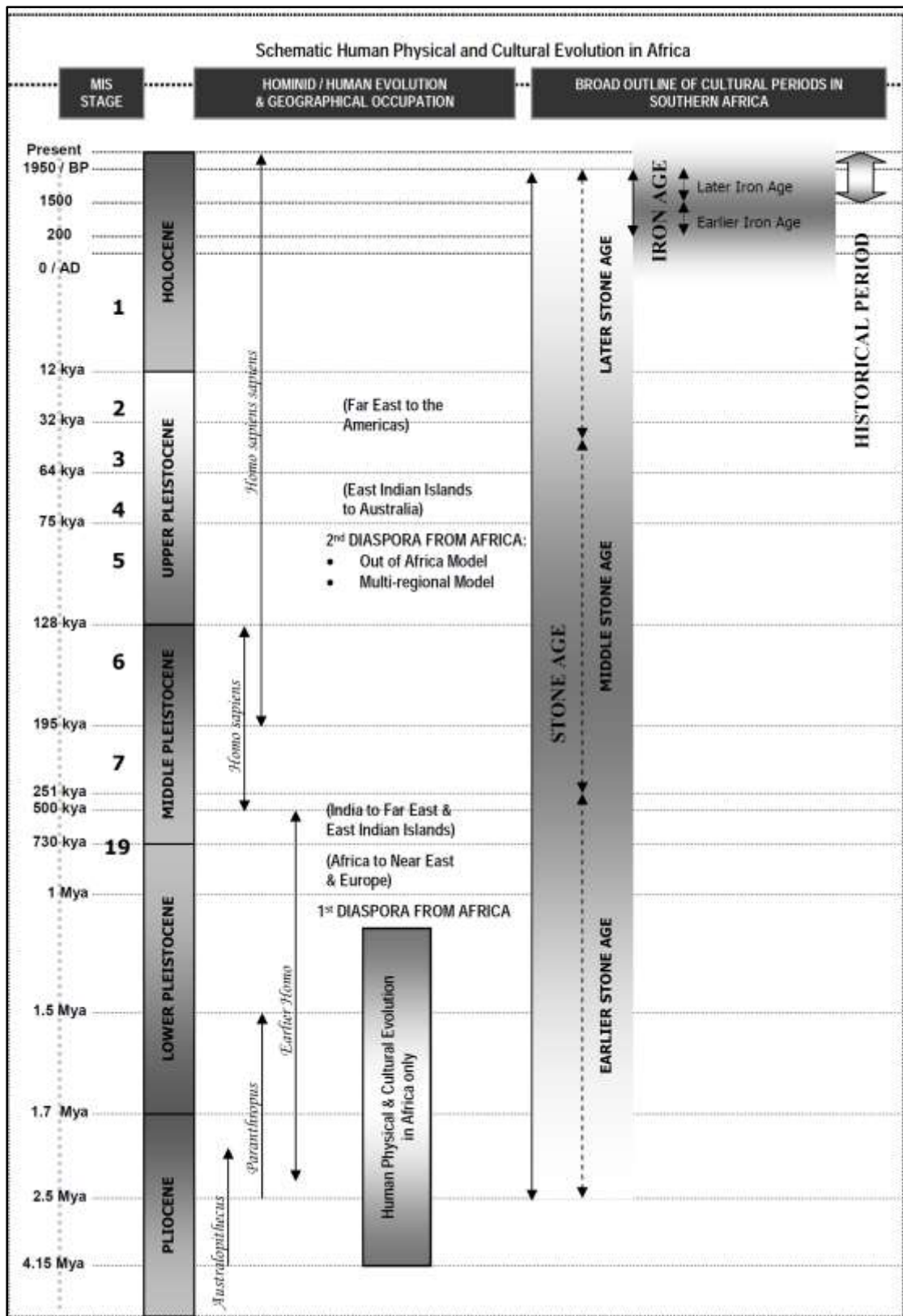


Figure 1: Human and Cultural Timeline in Africa (Morris, 2008)

## 2 TECHNICAL DETAILS OF THE PROJECT

### 2.1 SPAR Warehouse Technical details

The key technical details and infrastructure required are presented below:

Due to the growing market demands, SPAR aim to construct a self-sustainable facility which includes a new Dry Goods Warehouse with an internal Returns Area and Workshop/Charging Bay. In addition, the following buildings are included:

- Conference Facility (including Entrance Foyer, IT Centre, Training Rooms, Bar Facility, Conference Ablutions & Entertainment Area);
  - Security Entrance & Staff Ablution;
  - Canteen;
  - Guardhouse / Entrance Canopy;
  - Truck Workshop & Truck Wash;
  - Services Room (accommodating electrical, transformer and generator);
  - Municipal Sub-station;
  - Truck Entrance & Guard House;
  - Fire Pump House; and
  - Site services such as internal roads, stormwater systems, water reticulation systems and sewage systems.
- 
- The site is undeveloped but is located within an industrial area;
  - The site is therefore zoned as industrial;
  - The site currently belongs to the municipality. The ownership of the property is however in the process of being transferred to SPAR. The property will thus ultimately belong to SPAR;
  - The site is approximately 14.6463 Hectares (Ha) in extent;
  - The infrastructure proposed above is expected to cover a total area of approximately 16 945 m<sup>2</sup> (approx. 1.7 Ha)
  - In addition, SPAR are also proposing to construct internal access roads and storm water infrastructure





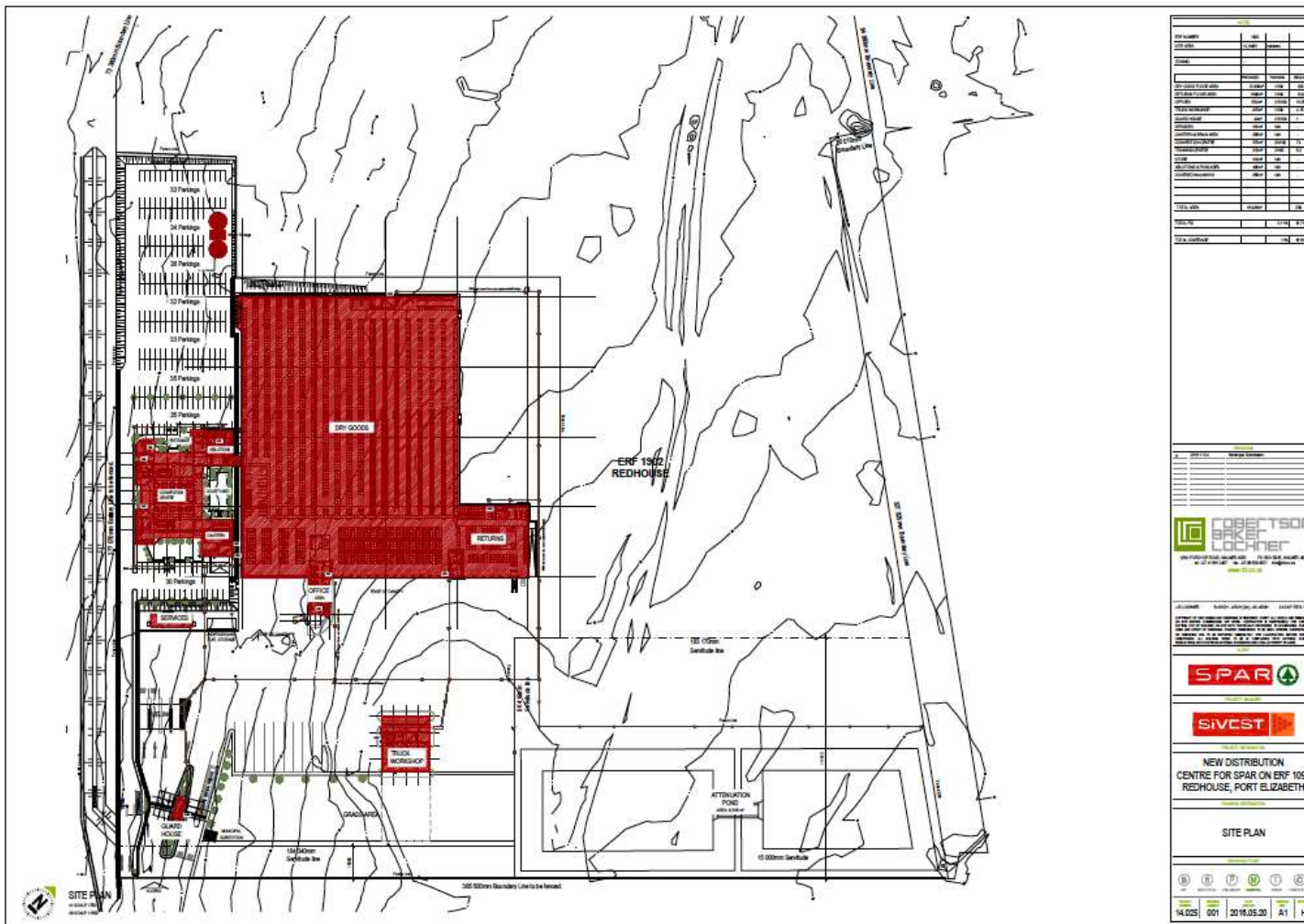


Figure 3: Site layout plan – with internal roads (provided by SiVEST)

CLIENT NAME: SPAR GROUP LTD  
 Project Description: SPAR Warehouse and Infrastructure  
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prepared by: PGS for SiVEST

## 2.2 Project Location

The proposed warehouse and associated infrastructure will be located on Erf No. 1902 of the Property Redhouse, at Perseverance in Port Elizabeth, Nelson Mandela Bay Metropolitan Municipality in the Eastern Cape Province. The study area is situated approximately 15km north-west of the city of Port Elizabeth and roughly 7 km south-east of the town of Despatch.

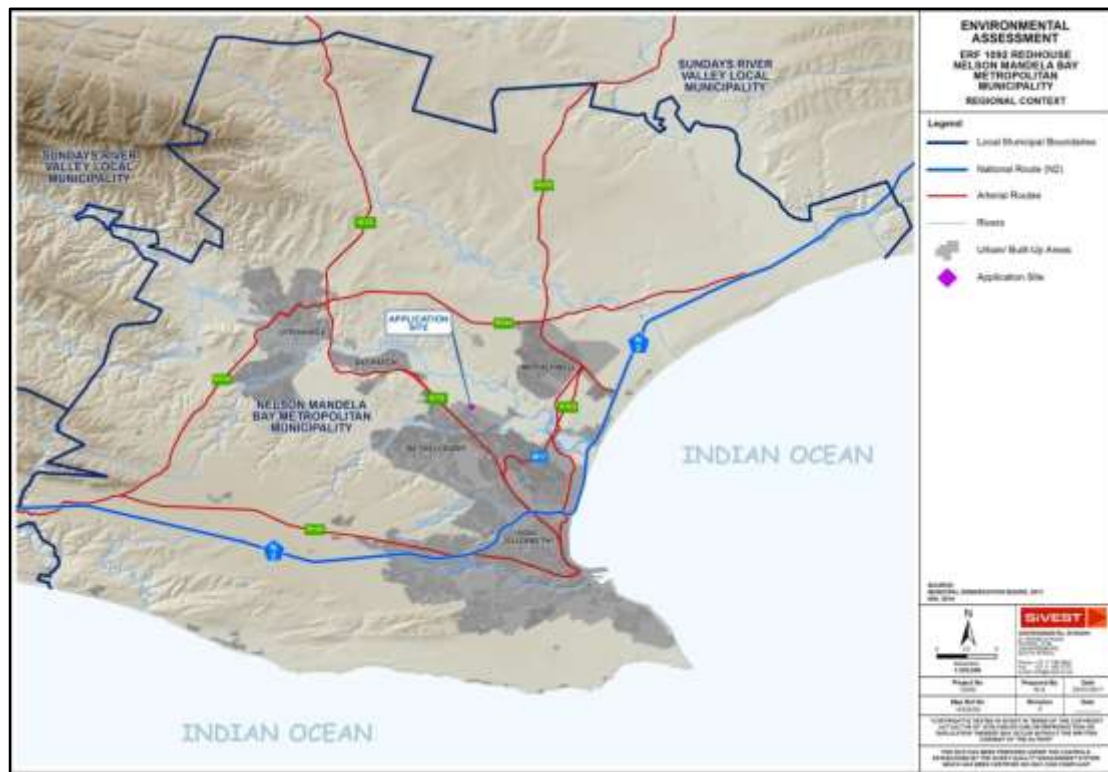


Figure 4: Regional Location of the study area (provided by SiVEST)

## 2.1 No-go Alternative

The 'no-go' alternative is the option of not constructing the proposed warehouse and associated infrastructure. The warehouse is proposed to be developed for the purpose of housing the increase in SPAR's operational demands due to national and regional growth. The new site makes provision for the 20 year expansion plan and is in close proximity to the existing site. The site identified is situated in the same street as the existing Distribution Centre (Kohler Rd).

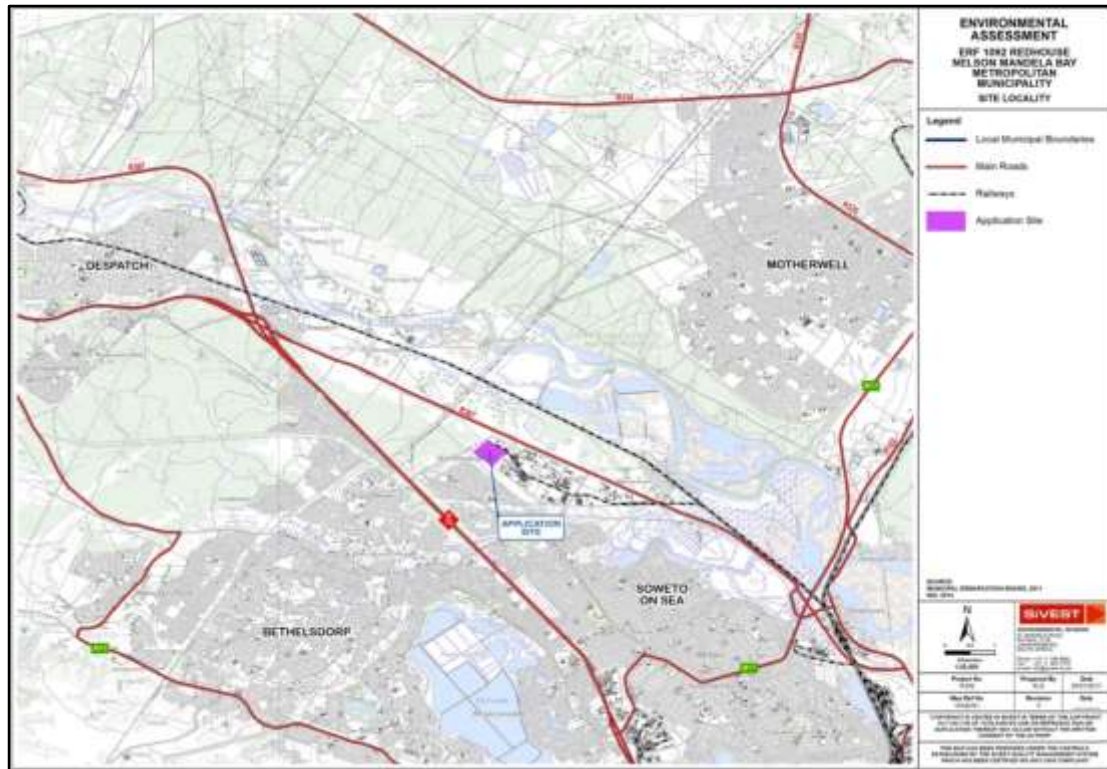


Figure 5: Location of study area within Port Elizabeth (provided by siVest)

### 3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

#### 3.1 Methodology for Assessing Heritage Site significance

This HIA report was compiled by PGS for the proposed SPAR Warehouse. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998). The HIA process consisted of three steps:

##### 3.1.1 Basic Assessment Phase

Step I – Literature Review: The background information to the field survey relies greatly on the Heritage Background Research.

Step II – Physical Survey: A physical survey was conducted on foot and by vehicle through the proposed project area by a single qualified archaeologist, which aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant archaeological resources, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.



**Appendix B** outlines the Heritage Impact Assessment methodology, while **Appendix C** provides the guidelines for the impact assessment evaluation that was undertaken for the project.

## 4 UPDATED ENVIRONMENTAL BASELINE

### 4.1 Description of Study Area

The study area is topographically reasonably flat with an area of low foothills towards the north-western end of the property. The study area encompasses a partially cleared/disturbed area on the eastern portion (**Figure 6**) while part of the western portion of the study area is covered by dense thicket vegetation (**Figure 7**). The site is approximately 14ha in size and is situated on the fringes of an existing industrial area (located to the east and south). The northern side of the study area is bordered by an area of dense shrub thicket growth, which has been partially cleared outside the northern and western sides. The partially cleared area to the immediate north of the site contains an informal settlement with plots demarcated by walls. The township of Kwamagxaki is situated approximately 200m to the west of the study area site. The vegetation of the surrounding area and the western section of the proposed site is Motherwell Karroid Thicket and Sundays Doringveld Thicket (information from SiVest).

Most of the site has been used for the illegal dumping of building material and household rubbish. Several footpaths and an informal road run through the site (**Figure 7**). A large area in the centre of the site is covered by a wetland/pan with standing water (**Figure 8**). Indications are that the wetland might be much larger in the wet season.



**Figure 6: This view of the area to the north of the site shows that the property has been partially cleared/disturbed, as well as the surrounding existing industrial development**



**Figure 7: This view of the western portion shows the dense vegetation as well as one of several footpaths on the study area**



**Figure 8: View showing the wetland/pan located in the southern part of the site**

## **4.2 Existing Heritage Sites**

No known heritage sites exist within or around the study area or in the surrounding region.

## **5 BACKGROUND RESEARCH**

The examination of heritage databases, historical data and cartographic resources represents a critical additional tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Therefore, an Internet literature search was conducted and relevant archaeological and historical texts were also consulted. Relevant topographic maps and satellite imagery were studied.

### **5.1 Previous Studies**

Researching the SAHRIS online database (<http://www.sahra.org.za/sahris>), it was determined that a number of other archaeological or historical studies have been performed within the immediate and general vicinity of the study area. Previous studies listed for the general area on the SAHRIS database included a number of surveys undertaken close to the project study area, listed below in ascending chronological order, from 2007 to 2014:

VAN RYNEVELD, K. 2007. Phase 1 Archaeological Impact Assessment: The Hopewell Conservation Project, Greenbushes, Port Elizabeth, Eastern Cape, South Africa. ArchaeoMaps Archaeological Consultancy.

BINNEMAN, J. 2010a. A Phase 1 Archaeological Impact Assessment (AIA) For The Proposed Motherwell Nu 31 Housing Development, Portion 2 Of 316, Uitenhage, Nelson Mandela

Metropolitan Municipality, Port Elizabeth, Eastern Cape Province Eastern Cape Heritage Consultants.

BINNEMAN, J. 2010b. A Phase 1 Archaeological Impact Assessment of the Greater Coega Industrial Development Zone (IDZ), near Port Elizabeth, Nelson Mandela Bay Municipality, Eastern Cape Province. Eastern Cape Heritage Consultants.

BINNEMAN, J. 2010c. A Phase 1 Archaeological Heritage Impact Assessment for the Application for a Prospecting Right on Area D (86,7 Ha) on the Remainder of Erf 1362 Bloemendal, Nelson Mandela Bay Municipality, Port Elizabeth, Nelson Mandela Bay Municipality, Port Elizabeth District, Eastern Cape Province. Eastern Cape Heritage Consultants.

MURIMBIKA, M. 2010. Phase 1 Archaeological And Heritage Impact Assessment Specialist Study Report For Proposed Construction Of Low Cost Housing And Associated Infrastructure In Kwanobuhle Area 11, Nelson Mandela Bay Metropolitan Municipality, Port Elizabeth In The Eastern Cape Province. Nzumbululo Heritage Solutions.

BOOTH, C. 2012. A Phase 1 Archaeological Impact Assessment (AIA) For The Proposed Jachtlakte Precinct Sustainable Human Settlement Plan, Nelson Mandela Bay Municipality, Eastern Cape Province. Albany Museum.

VAN RYNEVELD, K. 2013 . Phase 1 Archaeological Impact Assessment Malabar Extension 6 Phase 2 Housing Development, Erf/Re 349, New Brighton & Erven 444 & 1086, Malabar, Nelson Mandela Bay Municipality, Eastern Cape, South Africa. ArchaeoMaps Archaeological Consultancy.

VAN RYNEVELD, K. 2013 (Mar). Phase 1 Archaeological Impact Assessment Replacement Of The Chatty Valley Collector Sewer & Construction Of The Link Sewer, Bethelsdorp, Nelson Mandela Bay Municipality, Eastern Cape, South Africa. ArchaeoMaps Archaeological Consultancy.

BOOTH, C. 2014. A Letter Of Recommendation (With Conditions) For The Exemption Of A Full Phase 1 Archaeological Impact Assessment For The Proposed Masakhane Village Housing Project On Erf 8531 And Erf 52009, Ibhayi, Port Elizabeth, Nelson Mandela Bay Municipality, Eastern Cape Province. Albany Museum.

#### *5.1.1 Findings from the studies*

The closest previous heritage/archaeological study located through SAHRIS was undertaken for the Chatty Valley Collector Sewer project in Bethelsdorp, which was located roughly 2,5 km south-west of the SPAR warehouse study area (van Ryneveld, 2013). No archaeological or cultural heritage resources during the field assessment of the Chatty Valley sewer alignment situated east of the R75. However, four Colonial Period residences, still in use, were identified during the field assessment of the Chatty Valley sewer alignment situated west of the

R75. Two Colonial Period cemetery sites were also identified just north of the development alignment.

The next closest heritage study was undertaken for the New Brighton area and was located roughly 9.5 km directly south of the SPAR study area (Van Ryneveld, 2013). This study recorded only one archaeological / historical site, which was a single grave formed by human remains eroding out of an ant hill. Van Ryneveld also noted that several pebble lenses occurred on the study area, some of which contained occasional lithic artefacts. These artefacts were identified as Middle Stone Age (MSA) technology but were assessed as of low significance.

Several other studies for the general area around the SPAR study area, for projects proposed to be located between 6km and 13km away from the current study area, also note large-scale disturbance of the existing landscape (Murimbika, 2010; Booth, 2014). Murimbika's (2010) study for a housing development situated immediately south of Kwanobuhle township, indicated that the affected property was situated in a degraded cultural landscape surrounded by existing densely built up settlements. Therefore, the area was rated as of low significance for cultural heritage. Similarly, a letter of exemption for a housing project located in Ibhayi, roughly 6 km south-east of the SPAR study area (Booth, 2014), noted that the area had been disturbed by the construction of underground stormwater pipelines, buildings, and the establishment of current dwelling structures. No archaeological heritage remains, features, or sites were documented within the proposed areas for that development. A study by Booth (2012) for a proposed Jachtvlakte Precinct to be developed for human settlement purposes, located between Despatch, Bethelsdorp and kwaNobuhle, (roughly 10 km to the west of the SPAR study area) also notes heavy disturbance by the construction of various infrastructure, and the occurrence of stock grazing. However, in this area Booth records that the ruins of historic farmsteads still remain as well as occasional surface scatters of Middle Stone Age (MSA) stone artefacts. The stone tool scatters are considered to be in a secondary context. **The proposed area for development is considered as having a low-medium cultural significance.**

The study for the Hopewell Conservation Project, Greenbushes, Port Elizabeth (van Ryneveld, 2007) noted mainly historic period farmsteads and remains. This study area was located to the west of the current project study area, approximately 16 km away. One Middle Stone Age occurrence was identified. Immediately adjacent to the development area, a contemporary graveyard was situated (which was in the process of grave relocation). A study by Binneman. (2010c) in the same area (Bloemendal), noted that occasional Stone tools were the only archaeological material found during the investigation. Binneman (2010a) also recorded occasional surface scatters of predominantly Middle Stone Age (MSA) stone tools over the entire area proposed for development of a housing development in Motherwell, located . These were considered to be in a secondary context. A few Early Stone Age (ESA) stone tools were also documented. No sites containing any depth of deposit or other archaeological material associated with the stone tool artefacts were observed within the area.

Further away, for a study of the Greater Coega Industrial Development Zone (IDZ), Binneman (2010b) recorded the presence of a large number of shell middens on the property of the National Port Authority close to the boundary with the Coega IDZ. He also noted that occasional Earlier, Middle and Later Stone Age stone tools were found throughout the Coega IDZ where river gravels were exposed.

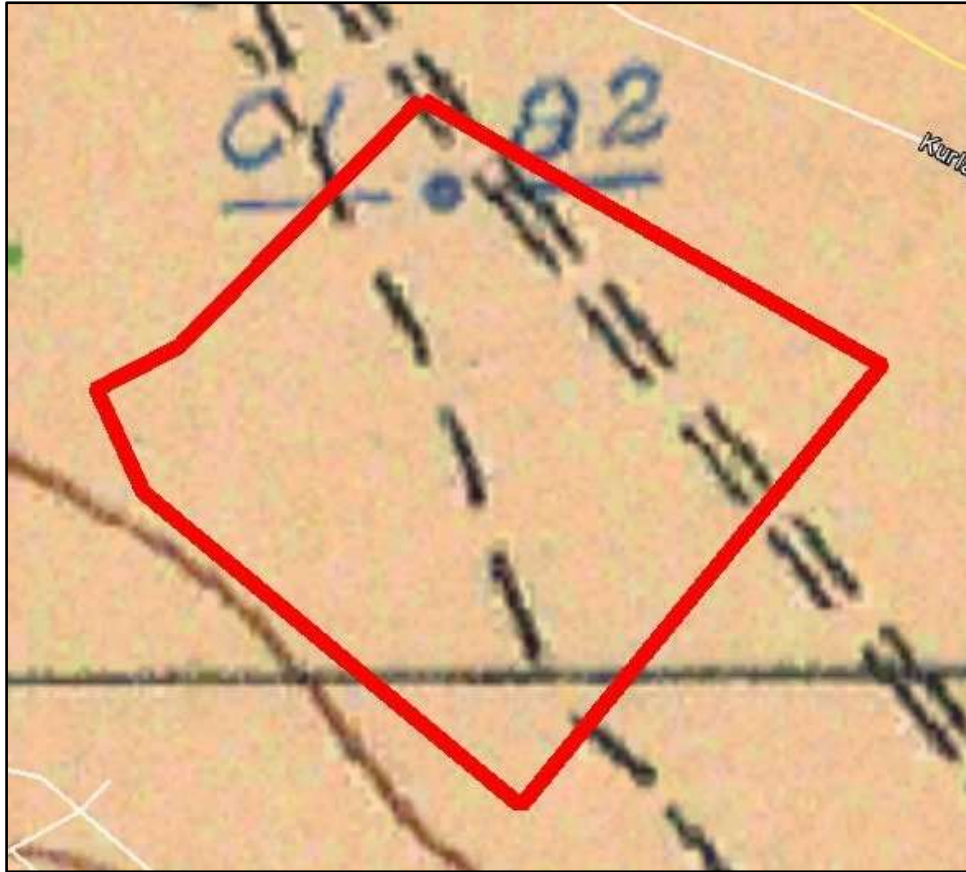
#### *5.1.2 Historical structures and history*

No historical sites fall within the immediate study area. Several previous reports for study areas in the general vicinity did indicate the presence of historical structures but those study areas are located some distance away, for example, in the Coega Industrial Development Zone (Binneman 2010b) and the Hopewell Conservation Project (van Ryneveld, 2007).

Several historic maps that depict the study area were identified. These maps were overlain on the project study area and examined for indications of the possible presence of historical structures or grave sites (60 years or older).

#### ***South Africa 1:50 000 3325DC-3325DD/3425BA 1941 ED1 (Port Elizabeth)***

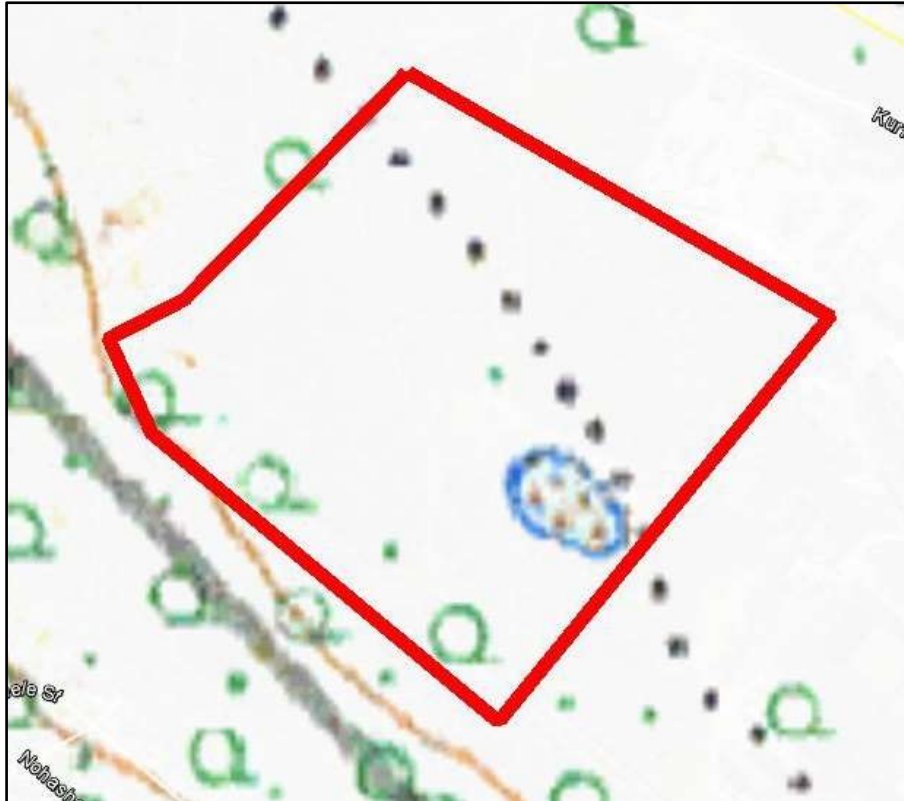
This map is a Provisional War Edition produced in 1941. Examination of this map did not show the presence of any buildings or graves sites within the study area at the time of publication of the map (1941). However, this map did indicate two roads crossing the study area from south to north at that time, one closer to the eastern portion of the study area and the other closer to the western side (**Figure 9**).



**Figure 9: South Africa 1:50 000 3325DC-3325DD/3425BA 1941 ED1 (Port Elizabeth)**

**South Africa 1:50 000 3325DC & DD/3425BA 1963 ED2 Port Elizabeth.**

This map was based on air photography from 1958 and surveyed and drawn in 1963. Examination of this map did not show the presence of any buildings or graves sites within the study area at the time of publication of the map (1963). By this date there is only one footpath shown crossing the study area, in the approximate position of the previous road located on the eastern side of the study area. A small water body is also indicated as being located on the south eastern boundary of the study area, in the approximate position of the water body which exists currently on the study area (**Figure 10**).



**Figure 10: South Africa 1:50 000 3325DC & DD/3425BA 1963 ED2 Port Elizabeth.**

### 5.1.3 *Heritage sensitivities*

No heritage sensitive areas were indicated on the study area from information available from the previous heritage studies or from examination of the historical topographical maps.

### 5.1.4 *Possible finds*

Based on the information from previous studies, together with the information from the historical topographic maps, it is deemed likely that at least occasional archaeological material/artefacts (stone tools) could be identified in the field survey. The possibility of identifying historical remains or graves is not considered likely.

## **5.2 Historical and Archaeological Information**

### 5.2.1 *Archaeological Background*

Most archaeological material in the south-eastern Cape / Port Elizabeth region is found near water sources such as rivers, pans and springs, as well as on hills and in rock shelters. Binneman (2010a, 2010b) notes that little is known about the archaeology of the immediate area, mainly because no systematic research has been conducted in the greater Port Elizabeth area. However, the gravels of old river terraces, which line most of the Coega River and estuary, contain archaeological remains. Most of these remains date to the Stone Age period.



Large handaxes dating to the Earlier Stone Age (ESA) have been collected from the banks and gravels of the Coega River and were reported from Coega Kop as well as between the N2 national road and the salt works (Albany Museum collections). One of the more important ESA sites occurs at Ananzi Springs, near Uitenhage. This is the only ESA site in the Eastern Cape which has been excavated (Webley and Hall, 1998) and it is situated a few kilometres north-west of the surveyed area. Ananzi Springs was excavated by the late HJ Deacon in the 1970s and unusually well-preserved wood and seed material, as well as a large number of stone artefacts, was found *in situ* in the spring deposits (Binneman et al, 2011). The site is estimated to date to between 800 000 to 250 000 years old. Scatters of ESA tools are also often found in hollows between sand dunes, like the site of Geelhoutboom near Humansdorp (Webley and Hall, *ibid*).

Middle Stone Age (MSA) and Later Stone Age (LSA) stone tool artefacts are also found in the gravels and along the banks of the Coega River. These stone artefacts are in secondary context with no other associated archaeological material. Occurrences of fossil bone remains and Middle Stone Age stone tools were reported from the Aloes site situated south of Coega Kop (Gess 1969). The excavations exposed a large number and variety of bones, teeth and horn cores uncovered some 1-1.5 metres below the surface, which suggested deliberate deposition by early humans. A radiocarbon date of greater than 37 000 years was obtained for the site (Binneman, 2010a & b).

A number of Late Stone Age (LSA) sites are known to occur in the region, located to the west and north of the study area. These sites are difficult to find because they are situated in the open veld and often covered by vegetation and sand. Sometimes the sites are represented only by a few stone tools and fragments of bone (Deacon & Deacon 1999).

Archaeologists believe that LSA people moved between the coast and the inland areas according to a seasonal pattern. Rock art sites are also associated with the LSA. Some rock art sites are found in the sandstone caves and shelters around Uitenhage (Webley and Hall, 1998) and in the nearby Elandsberg and Groot Winterhoekberg Mountains. The last San/KhoiSan group was killed by Commandos in the Groendal area in the 1880s (Binneman 2010a, 2010b). LSA sites also occur as large numbers of shell middens situated closer to the coast and often associated with river mouths (e.g. Coega River Mouth). Some of these midden sites were sampled and excavated before the construction of the present harbour. Middens, are also situated between the Coega and Sunday's River Mouths. These contain ceramic pot sherds (from Khoekhoen pastoralist origin) and other archaeological material and date mainly from Holocene Later Stone Age (2 000 to 10 000 years ago). Human remains have also been found in the dunes along the coast (Binneman, 2010a & b).



## Iron Age

In the Eastern Cape, Early Iron Sites dating to around the eighth century AD (700s) have been identified on the Kei River and near East London. However, Canasta Place probably represents the most southerly evidence of early farmers in the Eastern Cape. (Webley and Hall, 1998; Feely and Bell-Cross, 2011).

### 5.2.2 *Historical Background*

#### **Colonial / Historical**

From about 1700, amaXhoseni, the place of the Xhosa or Xhosaland, stretched roughly along the seaboard of South Africa between the Mbashe River and the Sundays River, from the slopes of the Kahlamba, Amathole and Winterberg mountains down the coast.

([http://v1.sahistory.org.za/pages/library-resources/articles\\_papers/forts\\_of\\_ec/preface.htm](http://v1.sahistory.org.za/pages/library-resources/articles_papers/forts_of_ec/preface.htm))

#### ***Port Elizabeth***

The first Europeans to visit the area were the Portuguese explorers Bartholomew Dias, who landed on St Croix Island in Algoa Bay in 1488, and Vasco da Gama who noted the nearby Bird Island in 1497. For centuries, the area was simply marked on navigation charts as "a landing place with fresh water" (<http://www.port-elizabeth.org.za/history.html>). According to Erasmus (2014), the name Algoa Bay comes from the name, Bahia de Lagoa (bay of the lagoon) given by an explorer, Manuel de Perestrelo, who followed in the footsteps of Bartholomew Dias in 1576.

The first occupation by European farmers occurred around 1776 and this became the permanent settlement (Erasmus, 2014). In 1799, during the first British occupation of the Colony during the Napoleonic Wars, a wooden structure was built to protect against a possible landing of French troops, overlooked the site of what later became Port Elizabeth and is now a monument (Erasmus, 2014; (<http://www.port-elizabeth.org.za/history.html>)).

By 1819 there were 39 white residents and a tannery and a blacksmith's shop. Later, a stone fort was built on a hill above the wooden structure and named Fort Frederick for the Duke of York, who was the commander in chief of the British army. Port Elizabeth was formally founded in 1820 when the British settlers landed in Algoa Bay. Sir Rufant Donkin, the acting governor at the Cape, visited the area on 6 June to welcome the settlers and gave instructions that a village and port be developed there. He named the new settlement in honour of his wife Elizabeth who had died in India in 1818 (Erasmus, 2014; <http://www.port-elizabeth.org.za/history.html>).

By 1846, the population had grown to about 4000. The town became a municipality in 1861 and a city in 1913. The first substantial harbour development began in 1928. By the late 1930s the city was known as the "Detroit of South Africa", due to the major automotive manufacturers

constructing their assembly plants there, starting with General Motors and Ford in the 1920s (Erasmus, 2014).

In the South Africa (Anglo-Boer) War of 1899-1902, Port Elizabeth was the main port of entry of mounts for the British cavalry units. A memorial to the horses that died during the War was subsequently erected in the city. While the city itself did not see any conflict, many refugees from the war moved into the city. (Erasmus, 2014; <http://www.port-elizabeth.org.za/history.html>).

Under the apartheid government, forced relocation of the non-white population in Port Elizabeth area under the Group Areas Act began in 1962, causing various townships to be built. The whole of the South End district, was forcibly depopulated and flattened in 1965; relocations continued until 1975. In 1977 Steve Biko, the black anti-apartheid activist, was interrogated and tortured by the security police in Port Elizabeth, before being transported to Pretoria where he died. Other notable deaths in the city during this time included the Cradock Four (<http://www.port-elizabeth.org.za/history.html>)

### ***Uitenhage Town***

This town is located approximately 20 km north-west of Port Elizabeth (Erasmus, 2014) In 1811 Uitenhage became the focus for military operations against the amaXhosa in the frontier war of 1811-12, and in 1815 its garrison played a leading role in the suppression of the Slachter's Nek rebellion. Another important development took place in 1829 when the springs on the farm Sandfontein, situated 8km above Uitenhage, were purchased by the government and added to its commonage. The town was now assured of a reliable and abundant source of water (<http://www.sahistory.org.za/places/uitenhage>). The town is named for commissioner-general Uitenhage De mist, who arrived in Cape Town in 1802 to oversee the return of the Cape Colony by the British to the Batavian Republic (Holland). De Mist visited all of the outlying districts and found several sheep farmers settled in the valley of the Swarkops or kwaZunga River and decided to establish a new magistracy for this frontier territory. The new village was founded in 1804 by the landdrost (magistrate) Jacob Glen Cuyler, on the loan farm of Gert Scheepers (Erasmus, 2014).

### ***Despatch***

The town of Despatch, which is located 26km north-west of Port Elizabeth and 10km from Uitenhage, became an independent municipality in 1945. It is now incorporated into the greater Nelson Mandela Bay Metropolitan Municipality. The unusual name comes from the days when large quantities of locally manufactured bricks were “despatched” from the railway station (Erasmus, 2014).

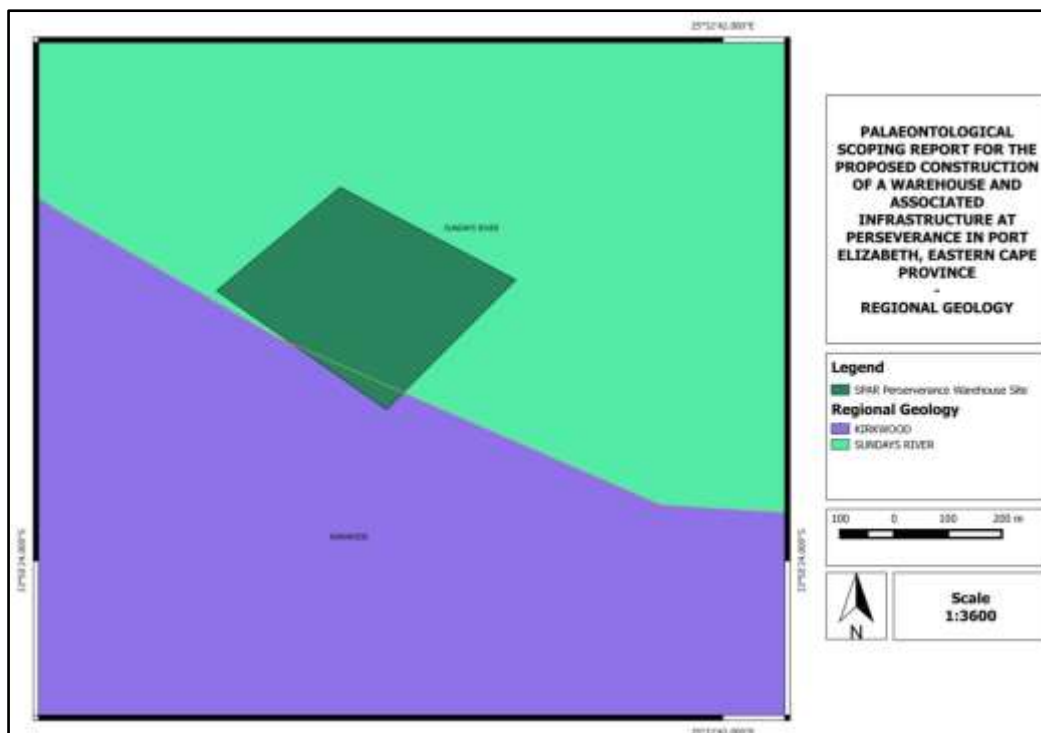
### ***Bethelsdorp***

This township, was founded in 1803 by Dr JT van der Kemp and Rev. James Read as a station of the London Missionary Society, which would offer support to remnants of scattered Khoe communities in the region. The land was granted on the farm Roodepas, belonging to Theunis Botha. Bethelsdorp is separated from the township to the east, kwaZakhele, by a large saltpan. In the beginning, each man with a residential plot on the mission station was given a polder or baan ('track') from which he could produce salt by evaporation. The pan was later leased to a salt company (Erasmus, 2014).

### 5.3 Palaeontology

The following section has been compiled by Elize Butler for PGS Heritage. The full report can be viewed in Appendix D of this report

The development footprint of the proposed Spar warehouse and associated infrastructure is underlain by the Cretaceous aged Sundays River and Kirkwood Formations of the Uitenhage Group. The development footprint consists largely of the Sundays River Formation and only a small portion in the south east is underlain by the Kirkwood Formation (Error! Reference source not found.).



**Figure 11: The surface geology of the proposed SPAR Warehouse and associated infrastructure on Erf No. 1902 of the property Redhouse, Perseverance in Nelson Mandela Bay Metropolitan Municipality, Eastern Cape Province. The development area is completely underlain by the Uitenhage Group (Kirkwood and Sundays River Formations).**

The Sundays River Formation is known for its shallow–marine deposits which may also have included estuarine, lagoonal and even shallow shelf settings. Invertebrate shells, plant remains, vertebrate fragments and microfossils are common. Most fossils remains are fragmentary but almost complete skeletons of the marine plesiosaur were recovered from this formation. Ammonites, commonly found in the Sundays River Formation have been extensively studied (Klinger and Kennedy, 1979).

The Kirkwood Formation is known for its terrestrial biotas. Fossils include vascular plants (petrified logs, lignite beds, charcoal), tetrapod vertebrates (especially dinosaurs) and freshwater invertebrates (Du Toit 1954, McLachlan & McMillan 1976, Almond 2010). Numerous dinosaur remains are known from the Kirkwood Formation and include isolated vertebrae, leg bones and teeth. The most completely preserved Kirkwood dinosaur is the small coelurosaur *therapod Nquebasaurus* (De Klerk et al., 2000), but most of the Kirkwood dinosaur fossils found so far is highly fragmentary. Woody vegetation was dominated by gymnosperms which include conifers, extinct cycad-like *bennettitaleans* and true cycads. An advanced group of freshwater algae *charophytes* (stoneworts), *bryophytes* (liverworts) and *pteridophytes* (ferns), pollens and spores are abundantly found (McLachlan & McMillan 1976, 1979, Anderson & Anderson 1985, Bamford 1986, MacRae 1999).

Amber and charcoal are also common, but thus far no fossil insects have been noted within the amber, which represents the oldest Cretaceous material recorded from Gondwana. Other vertebrate fossil groups from the Kirkwood Formation include frogs, crocodiles, turtles, sphenodontid and other lizards, mammals and freshwater fish (De Klerk et al., 1998, Rich et al., 1983, Ross et al., 1999). Non-marine invertebrate fossils in the Kirkwood Formation include freshwater or estuarine molluscs, unusual insects such as beetles, and several groups of small crustaceans (McLachlan & McMillan 1976, Dingle et al. 1983, MacRae 1999, Rich et al. 1983, Ross et al. 1999, Mostovski & Muller 2010). Trace fossils include borings into petrified tree trunks which is attributed to bivalves and insects (possibly beetles).

## 6 FIELD WORK FINDINGS

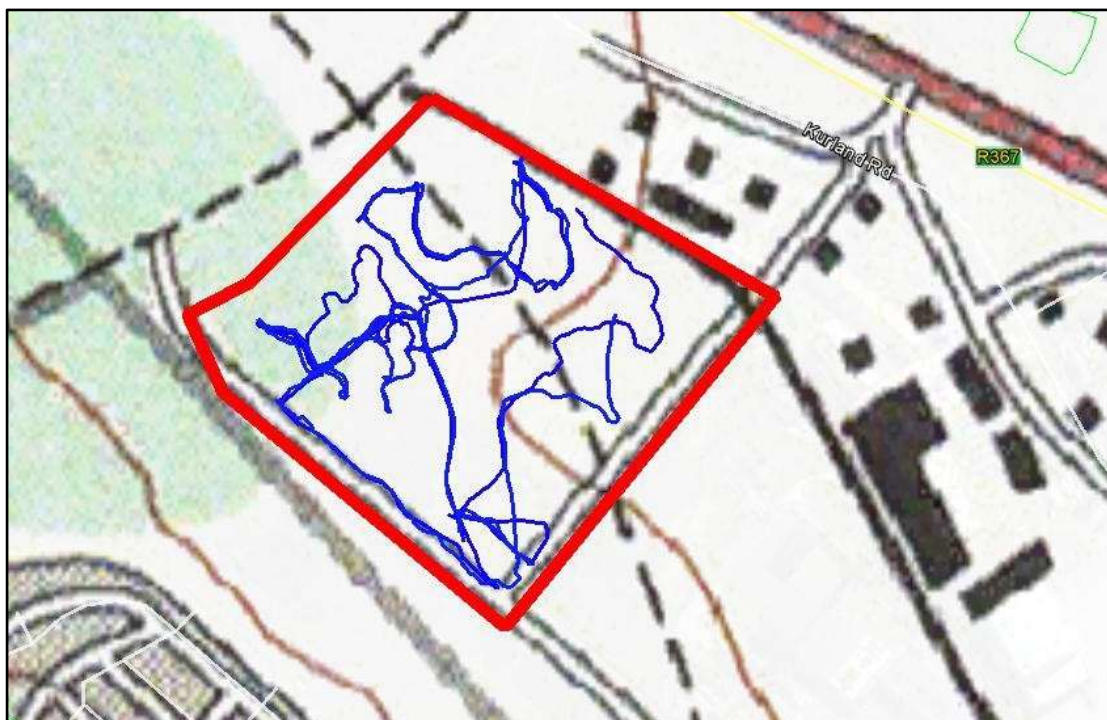
### 6.1 Methodology

The study area was surveyed by an archaeologist and a fieldwork assistant on 19 January 2017. The fieldwork was logged with a GPS to provide a record of the areas covered (**Figure 13**). The site is approximately 14ha in size and is situated on the fringes of an existing industrial area. Ground visibility was very good, except for the north-western portion of the site which is covered by impenetrable vegetation. Most of the site has been used for the illegal dumping of building material and household rubbish. Several footpaths and an informal road run through

the site. A large area in the centre of the site is covered by a wetland/pan with standing water. Indications are that the wetland might be much larger in the wet season.



**Figure 12: Position of heritage resources (SP1, SP2) within the study area**



**Figure 13: Study area with Track logs**

The proposed study area site is situated on Erf No. 1902 of the Property Redhouse, at Perseverance in Port Elizabeth, situated roughly 7km south-east of the town of Despatch. An industrial area is located immediately to the south and east of the site, while the northern side



is bordered by an area of dense shrub thicket growth, which has been partially cleared outside the northern and western sides. The partially cleared area to the immediate north of the site contains informal settlement plots demarcated by walls. The township of Kwamagxaki is situated approximately 200m to the west of the study area site. The vegetation of the surrounding area and the western section of the proposed site is Motherwell Karroid Thicket and Sundays Doringveld Thicket (Information from SiVEST).

On the 1941 and 1960 Topographical maps, a road/track can be seen bisecting the site from the south-west to the north-east. What might be the remnants of this road can be observed on the current Google Earth image of the site. Unfortunately, it is very difficult, at ground level, to establish what remains of this track.



**Figure 14: View of the site looking east**



**Figure 16: View of the site looking down the southern boundary. It is clear from this picture that the dumping of building rubble is prevalent on the site.**

**Figure 15: View of the site looking west.  
Note the building rubble covering large  
parts of the site**



**Figure 17: This area to the north of the  
site is probably submerged in the wet  
season**

**Figure 18: The north-western part of the  
site is covered by very thick vegetation.**

The fieldwork identified two heritage resources that were then classified as find spots<sup>1</sup> or sites<sup>2</sup>. The following sections list and describe the finds.

## 6.2 Find spots

Two lithic artefacts were found during the survey, both out of context (**Figure 12**). The first, an ESA chopper, were found on top of a recently backfilled excavation and the second, an MSA core, was a surface find. None of these constitutes an archaeological site. Both artefacts were found in the western part of the site at the foot of the hills rising to the west of the site. This part of the site contains many more rocks in the form of large, medium and small stone pebbles than the rest of the site.

**Table 2: Find spots**

Site Number	Lat	Lon	Description	Sensitivity	Heritage Rating
SP1	-33.835217°	25.536435°	ESA chopping tool found on a backfilled excavation in the	Low	4C

<sup>1</sup> Can be classified as an area where only a single artefact or low density of artefacts occurs. The absence of associated material or artefacts that indicate a temporal shallow or ephemeral occupation

<sup>2</sup> The association of numerous artefacts or structures and /or cultural deposits that all combine to indicate a temporal depth and information to a site.

			western section of the study area		
SP2	-33.834704°	25.536769°	An MSA core found on the surface on the western portion of the study area	Low	4C



Figure 19: SP1 – ESA chopper



Figure 20: SP1 - View of findspot



Figure 21: SP2 – MSA core



Figure 22: view of SP2 findspot (red arrow)

### 6.3 Sites

No other archaeological material or sites were identified during the field survey. However, due to the presence of impenetrable thicket vegetation on the western portion of the study area, there is a possibility that archaeological material could be located within this area (most probably as additional isolated stone tools).

### 6.4 Palaeontology

No fieldwork has been undertaken for the study area yet, although the desktop PIA report recommends that a full PIA survey should be undertaken.



## 7 IMPACT ASSESSMENT

The impact rating and analysis was done based on the methodology as explained and summarised in **Appendix C** of this report. As indicated under the field work section, two archaeological findspots were identified, which are assessed as being of low significance. However, the desktop PIA report has identified the presence of palaeontological resources of very high significance underlying the entire study area. See the Impact Matrix tables below.

### 7.1 Impact matrix

**Table 3: Impact rating - Palaeontology**

<b>IMPACT TABLE</b>	
Environmental Parameter	Prevent the loss of Palaeontological Heritage
Issue/Impact/Environmental Effect/Nature	Disturb, damage, destroy or permanently seal-in fossils at or below the ground surface that are then no longer available for scientific study
<i>Extent</i>	The entire development footprint of the study area is underlain by the Cretaceous aged Sundays River and Kirkwood Formations of the Uitenhage Group. The Palaeontological sensitivity of these areas is rated as very high. Excavation of the ground surface <i>of the site</i>
<i>Probability</i>	Since fossil heritage is known from these formations, the probability of impacts on palaeontological heritage during the construction phase is high (definite).
<i>Reversibility</i>	Impacts on fossil heritage are generally irreversible. Well-documented records and further palaeontological studies of any fossils exposed during construction would represent a positive impact from a scientific perspective. The possibility of a negative impact on the palaeontological heritage of the area can be reduced by the implementation of adequate mitigation procedures. If mitigation is properly undertaken the benefit scale for the project will lie within the beneficial category.
<i>Irreplaceable loss of resources</i>	Stratigraphic and geographical distribution of fossil heritage within the Sundays River and Kirkwood Formations has been documented in the literature. By taking a precautionary approach, an insignificant loss of fossil resources is expected.
<i>Duration</i>	The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be <b>permanent</b> .
<i>Cumulative effect</i>	The cumulative effect of the development of the Spar warehouse and associated infrastructure within the proposed location is

	considered to be high. This is as a result of the broader Port Elizabeth area being considered as fossiliferous.	
<i>Intensity/magnitude</i>	Probable significant impacts on palaeontological heritage during the construction phase are high, and the intensity of the impact on fossil heritage is rated as high. (however the implementation of the recommended mitigation measures changes this to a Low magnitude of impact.)	
<i>Significance Rating</i>	Should the project progress without due care to the possibility of fossils being present at the proposed site within the Sundays River and Kirkwood Formation of the Uitenhage Group, the resultant damage, destruction or inadvertent relocation of any affected fossils will be <b>permanent and irreversible</b> . Thus, any fossils occurring within the site are potentially scientifically and culturally significant and any negative impact on them would be of high significance (without the implementation of mitigation measures).	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	1
Reversibility	2	1
Irreplaceable loss	4	1
Duration	3	3
Cumulative effect	4	4
Intensity/magnitude	3	1
Significance rating	-51 (negative high)	-11 (negative low)
Mitigation measures	<ol style="list-style-type: none"> <li>1. It is recommended that a full EIA level palaeontology report be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage.</li> <li>2. Depending on the results of the full PIA, it may be recommended that a Palaeontologist should <b>apply</b> for a SAHRA permit and field work would entail <b>surveying, recording and describing</b> fossil heritage, and obtaining relevant data concerning the surrounding sedimentary matrix) and the well preserved fossils must be <b>excavated</b> and sent to a <b>permitted institution</b>. All of the information regarding the process followed must be compiled into a <b>report</b> after fossils have been excavated.</li> <li>3. The recommendations must be included in the EMPr of the project.</li> </ol>	

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**Table 4: Archaeological resources**

<b>IMPACT TABLE</b>		
Environmental Parameter	<i>Archaeological resources</i>	
Issue/Impact/Environmental Effect/Nature	<i>Two isolated Stone Age resources were identified during the fieldwork, having low archaeological significance.</i>	
	<i>All the identified find spots could be impacted by construction activities, however the impact is seen as negligible.</i>	
<i>Extent</i>	<i>Site - localised</i>	
<i>Probability</i>	<i>Unlikely</i>	
<i>Reversibility</i>	<i>Non- renewable.</i>	
<i>Irreplaceable loss of resources</i>	<i>Archaeological sites are irreplaceable</i>	
<i>Duration</i>	<i>Permanent</i>	
<i>Cumulative effect</i>	<i>Low</i>	
<i>Intensity/magnitude</i>	<i>Low</i>	
<i>Significance Rating</i>	<i>Low negative before mitigation and low negative after mitigation</i>	
	<b>Pre-mitigation impact rating</b>	<b>Post-mitigation impact rating</b>
Extent	1	1
Probability	1	1
Reversibility	4	4
Irreplaceable loss	4	4
Duration	4	4
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	- 16	-16
Mitigation measures	1. No mitigation measures are required	

**Table 5: Impact rating – Chance finds**

<b>IMPACT TABLE</b>		
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Environmental Parameter	<i>Unidentified heritage / archaeological resources</i>	
Issue/Impact/Environmental Effect/Nature	<i>Due mainly to the dense vegetation occurring over the western portion of the area assessed the possibility of encountering heritage resources in unsurveyed areas does exist.</i>	
<i>Extent</i>	<i>Localised on site and in most cases no more than 1000m<sup>2</sup></i>	
<i>Probability</i>	<i>Possible</i>	
<i>Reversibility</i>	<i>Heritage / archaeological resources are non-renewable.</i>	
<i>Irreplaceable loss of resources</i>	<i>Heritage / archaeological resources are irreplaceable</i>	
<i>Duration</i>	<i>Permanent</i>	
<i>Cumulative effect</i>	<i>Low</i>	
<i>Intensity/magnitude</i>	<i>Low</i>	
<i>Significance Rating</i>	<i>Low negative before mitigation and low negative after mitigation.</i>	
	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Extent	1	1
Probability	2	2
Reversibility	4	4
Irreplaceable loss	2	2
Duration	4	4
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	- 15 (low negative)	- 15 (low negative)
Mitigation measures	If any heritage resources are uncovered during construction, a heritage specialist should be contacted to undertake a specialist assessment and make recommendations	

## 7.2 Confidence in Impact Assessment

It is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some heritage sites. In addition, extremely dense shrub thicket vegetation was encountered on the western portion of the study area during the field survey.

The impact assessment conducted for heritage sites assumes the possibility of finding heritage resources during the construction phase of the project and has been conducted as such.

### **7.3 Cumulative Impacts**

This section evaluates the possible cumulative impacts (CI) on heritage resources with the addition of the SPAR Warehouse. It must further be noted that the evaluation is based on available heritage studies (and cannot take the findings of outstanding studies on current ongoing EIA's in consideration.)

Since most of the previous heritage studies for the surrounding area noted that the landscape has been disturbed severely in the past, and most of them recorded only isolated archaeological resources, together with the study area itself being located within an industrial area, the CI on heritage resources for the general area is deemed to be low for archaeological resources. However, the CI for palaeontological resources would be medium-high due to the highly disturbed nature of the surrounding area and the very high sensitivity recorded for palaeontological resources.

**Table 6: Impact rating – Cumulative**

<b>IMPACT TABLE</b>		
Environmental Parameter	Archaeological Resources	
Issue/Impact/Environmental Effect/Nature	The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources	
Extent	Region	
Probability	Possible	
Reversibility	Non- reversible.	
Irreplaceable loss of resources	The nature of heritage resources is that they are non-renewable. The proper mitigation and documentation of these resources can however preserve the data for research	
Duration	Permanent	
Cumulative effect	It is my reserved but considered opinion that this additional load on the overall impact on heritage resources will be low. With a detailed and comprehensive regional dataset this rating could possibly be adjusted and more accurate.	
Intensity/magnitude	Low	
Significance Rating	Negative low impact before mitigation and low negative after mitigation.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	2	1
Reversibility	4	4
Irreplaceable loss	2	2
Duration	4	3
Cumulative effect	2	1
Intensity/magnitude	1	1
Significance rating	-17 (Low Negative impact)	-14 (Low negative)
Mitigation measures	No mitigation measures are required	

<b>IMPACT TABLE</b>	
Environmental Parameter	Palaeontological Resources
Issue/Impact/Environmental Effect/Nature	The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources

Extent	Region	
Probability	Probable	
Reversibility	Non- reversible.	
Irreplaceable loss of resources	The nature of heritage resources is that they are non-renewable. The proper mitigation and documentation of these resources can however preserve the data for research	
Duration	Permanent	
Cumulative effect	It is my reserved but considered opinion that this additional load on the overall impact on palaeontological resources will be medium to high. However, this will depend on the results of the full PIA study. With a detailed and comprehensive regional dataset this rating could possibly be adjusted and more accurate.	
Intensity/magnitude	Medium	
Significance Rating	Medium to high negative before mitigation, appropriate mitigation measures could adjust the significance rating to medium to low negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	2	1
Reversibility		
Irreplaceable loss		
Duration		
Cumulative effect	4	3
Intensity/magnitude	3	2
Significance rating	-23	-20
Mitigation measures		

It is my considered opinion that this additional load on the overall impact on heritage resources will be low for archaeological resources. With a detailed and comprehensive regional dataset this rating could possibly be adjusted and more accurate.

It is the reserved and considered opinion of the palaeontological specialist that this additional load on the overall impact on palaeontological resources will be medium to high. However, this will depend on the results of the full PIA study. With a detailed and comprehensive regional dataset this rating could possibly be adjusted and more accurate.

## **7.4 Reversibility of Impacts**

Although heritage resources are seen as non-renewable, the mitigation of impacts on possible finds through scientific documentation will provide sufficient mitigation on the impacts on possible heritage resources.

## **7.5 Comparative Assessment of Alternatives**

No alternative layouts or sites for the proposed warehouse have been provided. Therefore, the only alternative to the proposed development is the “no-go” option. Since only two archaeological resources of low significance were identified, while palaeontological resources of very high significance underlie most of the proposed development site; a comparative assessment of the “no-go” option with respect to the “construction” option has shown that the No-Go alternative will have no impact on heritage resources and the current status quo will be kept.

# **8 CONCLUSIONS AND RECOMMENDATIONS**

PGS Heritage (Pty) Ltd (PGS) was appointed by SiVEST Environmental Division (SiVest) to undertake a Heritage Impact Assessment (HIA) that forms part of the Basic Assessment Report (BAR) and Environmental Management Programme (EMPr) for the construction of a Warehouse and associated infrastructure for the SPAR Group (Pty) Ltd, at Erf 1090 at Red House in Port Elizabeth, Eastern Cape Province.

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

The archival research undertaken for the project indicated that there was not expected to be any significant archaeological or historical resources present on the study area. However, the desktop PIA has indicated that the development footprint of the study area is underlain by the Cretaceous aged Sundays River and Kirkwood Formations of the Uitenhage Group. The Palaeontological sensitivity of these areas is rated as very high.

The subsequent field work completed for the HIA component in January 2017, has confirmed that two heritage sites /find spots were identified within the project study area.

Therefore, the following mitigation measures are required.

## **8.1 Pre-Construction / Archaeology**

Since only two isolated archaeological findspots were recorded, which are considered to be of low to negligible significance, no mitigation measures will be required.



## 8.2 Palaeontology

4. The development area is completely underlain by sediments of the Algoa Basin, Sundays River and Kirkwood Formation of the Uitenhage Group. The Palaeontological sensitivity of these areas is rated as very high.
5. It is thus recommended that a full EIA level palaeontology report be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage.
6. Depending on the results of the full PIA, it may be recommended that a Palaeontologist should apply for a SAHRA permit and field work would entail surveying, recording and describing fossil heritage, and obtaining relevant data concerning the surrounding sedimentary matrix) and the well preserved fossils must be excavated and sent to a permitted institution. All of the information regarding the process followed must be compiled into a report after fossils have been excavated.

The recommendations must be included in the EMP of the project.

## 8.3 Comparative Assessment of Alternatives

No alternative layouts or sites for the proposed warehouse have been provided. Therefore, only alternative to the proposed development is the “no-go” option. Since only two archaeological resources of low significance were identified, while palaeontological resources of very high significance underlie most of the proposed development site; a comparative assessment of the “no-go” option with respect to the “construction” option has shown that the No-Go alternative will have no impact on heritage resources and the current status quo will be kept.

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Appendix A

**LEGISLATIVE PRINCIPLES**

## LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

### 3.1 General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and palaeontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the new legislation, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it. The management of heritage resources are integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have interest in the graves: they may be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle will be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the developer's cost. Thus, developers will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that:

An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;
- numismatic objects;
- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 ( Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection, to all historic and pre-historic cultural remains, including graves and human remains.

### 3.2 Graves and cemeteries

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning, or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administered by a local authority. Graves in the category located inside a formal cemetery administered by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.



Appendix B

**Heritage Assessment Methodology**



The section below outlines the assessment methodologies utilised in the study.

The Heritage Impact Assessment (HIA) report to be compiled by PGS Heritage (PGS) for the proposed Eureka Grid will assess the heritage resources found on site. This report will contain the applicable maps, tables and figures as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002). The HIA process consists of three steps:

- Step I – Literature Review: The background information to the field survey leans greatly on the Heritage Scoping Report completed by PGS for this site.
- Step II – Physical Survey: A physical survey was conducted on foot and by vehicle through the proposed project area by two qualified archaeologists and two field assistants, aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.
- Step III – The final step involved the recording and documentation of relevant archaeological resources, as well as the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and constructive recommendations

The significance of heritage sites was based on four main criteria:

- **site integrity** (i.e. primary vs. secondary context),
- **amount of deposit, range of features** (e.g., stonewalling, stone tools and enclosures),
  - Density of scatter (dispersed scatter)
    - Low - <10/50m<sup>2</sup>
    - Medium - 10-50/50m<sup>2</sup>
    - High - >50/50m<sup>2</sup>
- **uniqueness** and
- **potential** to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and
- E - Preserve site

## Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report.

Table 7: Site significance classification standards as prescribed by SAHRA

<b>FIELD RATING</b>	<b>GRADE</b>	<b>SIGNIFICANCE</b>	<b>RECOMMENDED MITIGATION</b>
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	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)	Grade 4A	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	Grade 4C	Low Significance	Destruction



Appendix C

**Impact Assessment Methodology to be utilised  
during EIA phase**

# 1 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

## 1.1 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 3.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

## 1.2 Impact Rating System

Impact assessment must take account of the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

### 1.2.1 Rating System Used To Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

<b>NATURE</b>		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
<b>GEOGRAPHICAL EXTENT</b>		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
<b>PROBABILITY</b>		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
<b>REVERSIBILITY</b>		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
<b>IRREPLACEABLE LOSS OF RESOURCES</b>		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.

4	Complete loss of resources	The impact is result in a complete loss of all resources.
<b>DURATION</b>		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
<b>CUMULATIVE EFFECT</b>		
This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects
3	Medium Cumulative impact	The impact would result in minor cumulative effects
4	High Cumulative Impact	The impact would result in significant cumulative effects
<b>INTENSITY / MAGNITUDE</b>		
Describes the severity of an impact		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.

2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

### SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

**(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.**

The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.

51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.





Appendix D

**Palaeontological Desktop Assessment**

**PALAEONTOLOGICAL SCOPING REPORT FOR THE  
PROPOSED CONSTRUCTION OF A WAREHOUSE  
AND ASSOCIATED INFRASTRUCTURE AT  
PERSEVERANCE IN PORT ELIZABETH, EASTERN  
CAPE PROVINCE**

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**28 JANUARY 2017**

## **EXECUTIVE SUMMARY**

SiVEST has appointed PGS Heritage to conduct the Basic Assessment for the proposed construction of a Warehouse and associated infrastructure on Erf No. 1902 of the Property Redhouse, Perseverance in Nelson Mandela Bay Metropolitan Municipality, Eastern Cape Province. The site is undeveloped but located in the industrial area.

According to the National Heritage Resources Act (Act No 25 of 1999, section 38), a palaeontological impact assessment is required to detect the presence of fossil material within the proposed development footprint and to assess the impact on the palaeontological resources.

The development area is completely underlain by sediments of the Sundays River and Kirkwood Formation of the Uitenhage Group. The Palaeontological sensitivity of these areas is rated as very high.

It is thus recommended that an EIA level palaeontology report be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage.

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# 1 INTRODUCTION

SiVEST have been appointed by SPAR to conduct the Basic Assessment for the proposed construction of a Warehouse and associated infrastructure on Erf No. 1902 of the property Redhouse, Perseverance in Nelson Mandela Bay Metropolitan Municipality, Eastern Cape Province (Fig. 1). The undeveloped site is located in the industrial area and is approximately 14.6463 Hectares (Ha) in extent.

The site currently belongs to the Nelson Mandela Bay Metropolitan Municipality. However, the ownership of the property is in the process of being transferred to SPAR and thus ultimately the property will belong to SPAR.



Figure 1. Location of the proposed Warehouse and associated infrastructure on Erf No. 1902 of the property Redhouse, Perseverance in Nelson Mandela Bay Metropolitan Municipality, Eastern Cape Province (image provided by SiVEST)

# 2 OUTLINE OF PROPOSED DEVELOPMENT

The central point of the proposed development is approximately

**33° 50'7.11" S and 25° 32'15.61"E**

Due to the growing market demands, SPAR aim to construct a self-sustainable facility which includes a new Dry Goods Warehouse with an internal Returns Area and Workshop/Charging Bay. In addition, the following buildings are included:

- Conference Facility, including Entrance Foyer, IT Centre, Training Rooms, Bar Facility, Conference Ablutions & Entertainment Area
- Security Entrance & Staff Ablution
- Canteen
- Guardhouse / Entrance Canopy
- Truck Workshop & Truck Wash
- Services Room, accommodating electrical transformer and generator
- Municipal Sub-station
- Truck Entrance and Guard House
- Fire Pump House

The following information should also be noted:

- The site is undeveloped but is located within an industrial area;
- The site is therefore zoned as industrial;
- The site currently belongs to the municipality. The ownership of the property is however in the process of being transferred to SPAR. The property will thus ultimately belong to SPAR;
- The site is approximately 14.6463 Hectares (Ha) in extent;
- The infrastructure proposed above is expected to cover a total area of approximately 16 945 m<sup>2</sup> (approx. 1.7 Ha)
- In addition, SPAR are also proposing to construct internal access roads and storm water infrastructure

Examination of satellite (Google Earth) imagery of the development site shows that the development footprint is an area with a low relief with no sharp outcrops. The site falls within a Terrestrial and Aquatic Critical Biodiversity 2 Area and the Ecosystem Status of the site is rated as 'endangered'. Vegetation types mapped on the site are Motherwell Karroid Thicket and Sundays Doringveld Thicket (Information provided by SiVEST).

### **3 GEOLOGICAL AND PALAEOLOGICAL HISTORY**

The development footprint of the proposed Spar warehouse and associated infrastructure is underlain by the Cretaceous aged Sundays River and Kirkwood Formations of the Uitenhage Group. The development footprint consists largely of the Sundays River Formation and only a small portion in the south east is underlain by the Kirkwood Formation (Fig. 2).

#### **3.1 GEOLOGY**

The proposed development area is located in the Algoa Basin and is underlain by sediments of the Cretaceous aged (approximately 140 million years old) Kirkwood and Sundays River Formations of the Uitenhage Group. The Kirkwood Formation consists of readily-weathered variegated (reddish-brown and green) silty mudrocks and subordinate sandstones of fluvial origin while the Sundays River Formation consists largely of grey coloured mudstone, siltstone and subordinate sandstone. The geology of the Algoa Group consists of clastic limestone and conglomerates (Johnson et al, 2009).

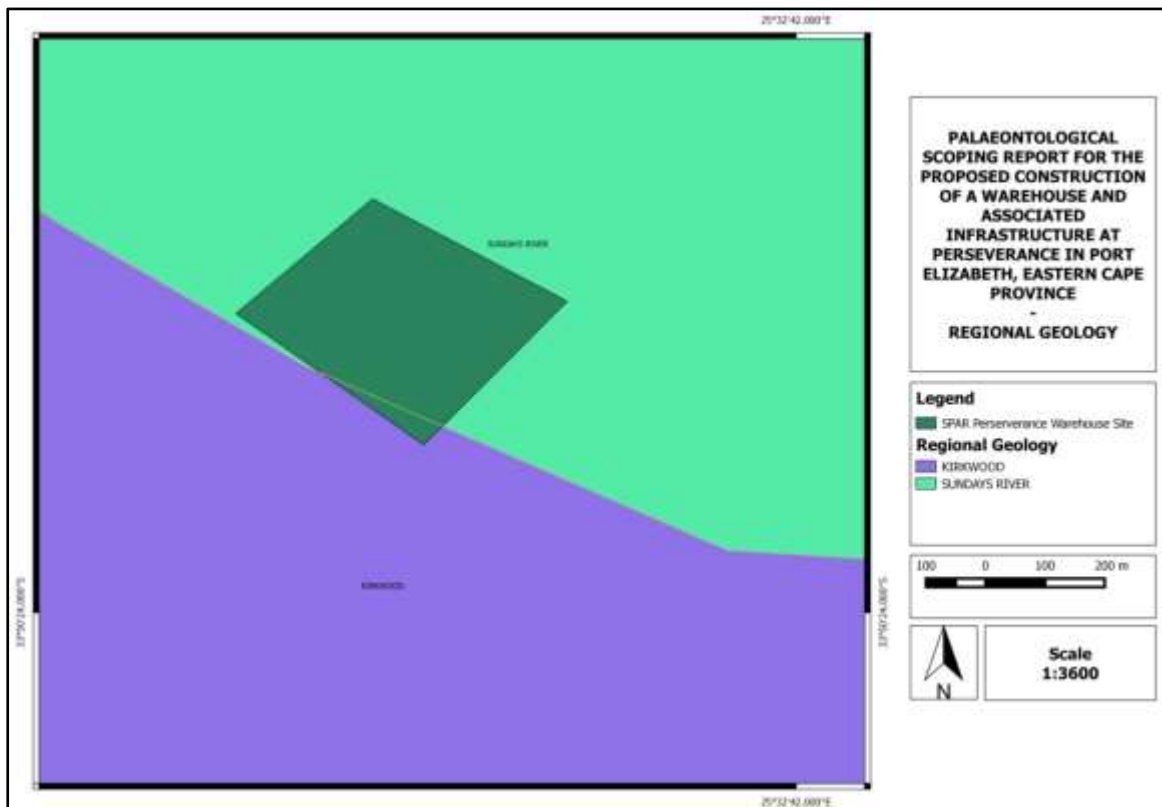


Figure 2. The surface geology of the proposed SPAR Warehouse and associated infrastructure on Erf No. 1902 of the property Redhouse, Perseverance in Nelson Mandela Bay Metropolitan Municipality, Eastern Cape Province. The development area is completely underlain by the Uitenhage Group (Kirkwood and Sundays River Formations).

### 3.2 PALAEOLOGY

The **Sundays River Formation** is known for its shallow–marine deposits which may also have included estuarine, lagoonal and even shallow shelf settings. Invertebrate shells, plant remains, vertebrate fragments and microfossils are common. Most fossils remains are fragmentary but almost complete skeletons of the marine plesiosaur were recovered from this formation. Ammonites, commonly found in the Sundays River Formation have been extensively studied (Klinger and Kennedy, 1979).

The **Kirkwood Formation** is known for its terrestrial biotas. Fossils include vascular plants (petrified logs, lignite beds, charcoal), tetrapod vertebrates (especially dinosaurs) and freshwater invertebrates (Du Toit 1954, McLachlan & McMillan 1976, Almond 2010). Numerous dinosaur remains are known from the Kirkwood Formation and include isolated vertebrae, leg bones and teeth. The most completely preserved Kirkwood dinosaur is the small coelurosaur theropod *Nquebasaurus* (De Klerk et al., 2000), but most of the Kirkwood dinosaur fossils found so far is highly fragmentary. Woody vegetation was dominated by gymnosperms which include conifers, extinct cycad-like bennettitaleans and true cycads. An advanced group of freshwater algae charophytes (stoneworts), bryophytes (liverworts) and pteridophytes (ferns), pollens and spores are abundantly found (McLachlan & McMillan 1976, 1979, Anderson & Anderson 1985, Bamford 1986, MacRae 1999). Amber and charcoal are also common, but thus far no fossil insects have been noted within the amber, which represents the oldest Cretaceous material recorded from Gondwana. Other vertebrate fossil groups from the Kirkwood Formation include frogs, crocodiles, turtles, sphenodontid and other lizards, mammals and freshwater fish (De Klerk et al.,

1998, Rich et al., 1983, Ross et al., 1999). Non-marine invertebrate fossils in the Kirkwood Formation include freshwater or estuarine molluscs, unusual insects such as beetles, and several groups of small crustaceans (McLachlan & McMillan 1976, Dingle et al. 1983, MacRae 1999, Rich et al. 1983, Ross et al. 1999, Mostovski & Muller 2010). Trace fossils include borings into petrified tree trunks which is attributed to bivalves and insects (possibly beetles).

#### 4 FINDINGS AND RECOMMENDATIONS

The development area is completely underlain by sediments of the Algoa Basin, Sundays River and Kirkwood Formation of the Uitenhage Group. The Palaeontological sensitivity of these areas is rated as very high.

**Table 8: Impact rating - Palaeontology**

<b>IMPACT TABLE</b>	
Environmental Parameter	Prevent the loss of Palaeontological Heritage
Issue/Impact/Environmental Effect/Nature	Disturb, damage, destroy or permanently seal-in fossils at or below the ground surface that are then no longer available for scientific study
<i>Extent</i>	The entire development footprint of the study area is underlain by the Cretaceous aged Sundays River and Kirkwood Formations of the Uitenhage Group. The Palaeontological sensitivity of these areas is rated as very high. Excavation of the ground surface <i>of the site</i>
<i>Probability</i>	Since fossil heritage is known from these formations, the probability of impacts on palaeontological heritage during the construction phase is high (definite).
<i>Reversibility</i>	Impacts on fossil heritage are generally irreversible. Well-documented records and further palaeontological studies of any fossils exposed during construction would represent a positive impact from a scientific perspective. The possibility of a negative impact on the palaeontological heritage of the area can be reduced by the implementation of adequate mitigation procedures. If mitigation is properly undertaken the benefit scale for the project will lie within the beneficial category.
<i>Irreplaceable loss of resources</i>	Stratigraphic and geographical distribution of fossil heritage within the Sundays River and Kirkwood Formations has been documented in the literature. By taking a precautionary approach, an insignificant loss of fossil resources is expected.
<i>Duration</i>	The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be <b>permanent</b> .
<i>Cumulative effect</i>	The cumulative effect of the development of the Spar warehouse and associated infrastructure within the proposed location is



	considered to be high. This is as a result of the broader Port Elizabeth area being considered as fossiliferous.	
<i>Intensity/magnitude</i>	Probable significant impacts on palaeontological heritage during the construction phase are high, and the intensity of the impact on fossil heritage is rated as high. (however the implementation of the recommended mitigation measures changes this to a Low magnitude of impact.)	
<i>Significance Rating</i>	Should the project progress without due care to the possibility of fossils being present at the proposed site within the Sundays River and Kirkwood Formation of the Uitenhage Group, the resultant damage, destruction or inadvertent relocation of any affected fossils will be <b>permanent and irreversible</b> . Thus, any fossils occurring within the site are potentially scientifically and culturally significant and any negative impact on them would be of high significance (without the implementation of mitigation measures).	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	1
Reversibility	2	1
Irreplaceable loss	4	1
Duration	3	3
Cumulative effect	4	4
Intensity/magnitude	3	1
Significance rating	-51 (negative high)	-11 (negative low)
Mitigation measures	<ol style="list-style-type: none"> <li>1. It is recommended that a full EIA level palaeontology report be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage.</li> <li>2. Depending on the results of the full PIA, it may be recommended that a Palaeontologist should <b>apply</b> for a SAHRA permit and field work would entail <b>surveying, recording and describing</b> fossil heritage, and obtaining relevant data concerning the surrounding sedimentary matrix) and the well preserved fossils must be <b>excavated</b> and sent to a <b>permitted institution</b>. All of the information regarding the process followed must be compiled into a <b>report</b> after fossils have been excavated.</li> <li>3. The recommendations must be included in the EMPr of the project.</li> </ol>	

It is thus recommended that an EIA level palaeontology study be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage.

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## **6 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR**

The author (Elize Butler) has an MSc in Palaeontology from the University of the Free State, Bloemfontein, South Africa. She has been working in Palaeontology for more than twenty years. She has been conducting Palaeontological Impact Assessments since 2014.

## **7 DECLARATION OF INDEPENDENCE**

I, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise my objectivity in this work.