PROPOSED TOWNSHIP DEVELOPMENT: VOSLOORUS EXTENSION 24, VOSLOORUS EXTENSION 41 AND VOSLOORUS EXTENSION 43.

Heritage Impact Assessment for the proposed development of Vosloorus Extension 24, Vosloorus Extension 41 and Vosloorus Extension 43 on Portion 144 of the farm Vlakplaats 138 IR, Boksburg Local Muncipality, Ekurhuleni District Municipality, Gauteng Province.

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Client: Enkanyini Projects

DECLARATION OF INDEPENDENCE

The report has been compiled by PGS Heritage, an appointed Heritage Specialist for Enkanyini Projects. The views stipulated in this report are purely objective and no other interests are displayed in the findings and recommendations of this Heritage Impact Assessment.

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Report Title	*Heritage Impact Assessment For The Proposed New Township: Vosloorus Extension 24, Vosloorus Extension 41 and Vosloorus Extension 43, Situated On Part Portion 144 Of The Farm Vlakplaats 138-IR, Boksburg Local Muncipality, Ekurhuleni District Municipality, Gauteng Province.*		
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EXPLANATION OF ABBREVIATIONS USED IN THIS DOCUMENT

Abbreviations	*Description*
AIA	Archaeological Impact Assessment
ASAPA	Association of Southern African Professional Archaeologists
CMP	Conservation Management Plan
CRM	Cultural Resource Management
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme Report
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Later Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PGS	PGS Heritage
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

EXECUTIVE SUMMARY

PGS Heritage was appointed by Enkanyini Projects to undertake a Heritage Impact Assessment (HIA) which forms part of the Environmental Impact Assessment (EIA) for the proposed establishment of Vosloorus Extension 24, Vosloorus Extension 41 and Vosloorus Extension 43 situated on portion 144 of the Farm Vlakplaats 138 IR, Boksburg Local Muncipality, Ekurhuleni District Municipality, Gauteng Province.

An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich history. However, the desktop study could not associate any historic events with the study area itself. The desktop study did include an assessment of two historic topographic maps, and a total of five potential heritage features were indicated on the two maps. During the fieldwork two of these sites were identified in the field.

The desktop study work was followed by fieldwork which comprised a walkthrough of the study area. Four heritage sites were identified within the study area and are included in this report. These sites comprise the following:

- the remains of a stone-built structure (VLR 001)
- the remains of a brick-built dam wall with associated structures (VLR 002)
- the remains of two circular stone-walled kraals associated with two brick structures (VLR 003)
- a circular brick and cement dam (VLR 004)

Of the four identified sites, two are located within the development area of Vosloorus Extension 24 (see VLR 003 and VLR 004), one site is located within the development area of Vosloorus Extension 41 (see site VLR 001) with no sites identified within the development area of Vosloorus Extension 43. The fourth site (VLR 002) is located within a portion of landed excluded from the development.

Impact risk calculations were undertaken on the expected impact of the proposed development on these four sites, which indicated that the proposed development poses a Very Low Impact Risk to VLR 002, a Low Impact Risk to VLR 001 and VLR 004 and a Moderate Impact Risk to VLR 003. While no mitigation measures are required for sites VLR 001, VLR 002 and VLR 004, the following mitigation measures are required for VLR 003.

- Preliminary social consultation to attempt to identify the former residents of these homesteads. This process may include the use of bilingual site notices, bilingual newspaper notices as well as consultation with local residents. This process may result in one of three outcomes.

    - If the social consultation process identified the presence of one or more infant burials at a particular homestead, a formal grave relocation process must be undertaken which would include obtaining permission from the family of the deceased for the relocation to take place, the necessary permit applications, excavation as well as reburial to a municipal cemetery.
    - If the social consultation process revealed that no infant burials are located at a particular homestead, no further mitigation measures would be required there.
    - If no information with regard to the former residents of these homesteads is revealed by way of the preliminary social consultation, archaeological test excavations must be undertaken around the homestead structures to assess whether any infant burials are located here.

Furthermore, a palaeontological desktop study was also undertaken and the following mitigation measures are required:

- The developer, EAP and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Malmani Subgroup and that the presence of Karst structures will be associated with highly significant Cenozoic aged Palaeontological heritage. No further action is needed for areas underlain by the Syenite Dyke, which occupies a very small area in the Northeastern part of the development.
- If deep excavation and exposure of bedrock are indicated in the Geotechnical reports, a palaeontologist must be appointed to record stromatolitic structures in the dolomite.
- If Karst topography and structures (cave breccias) are recorded in the Geotechnical reports on areas underlain by Malmani dolomite, a palaeontologist must be appointed to investigate these deposits before any further disturbance by construction equipment.

On the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development not to continue.

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LIST OF APPENDICES

1. INTRODUCTION

PGS Heritage was appointed by Enkanyini Projects to undertake a Heritage Impact Assessment (HIA) which forms part of the Environmental Impact Assessment (EIA) for the proposed establishment of Vosloorus Extension 24, Vosloorus Extension 41 and Vosloorus Extension 43 situated on portion 144 of the Farm Vlakplaats 138 IR, Boksburg Local Muncipality, Ekurhuleni District Municipality, Gauteng Province.

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The Heritage Impact Assessment (HIA) aims to inform the Environmental Impact Assessment (EIA) in the development of a comprehensive Environmental Management Plan (EMP) to assist the developer in managing the identified 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 Specialist Qualifications

This Heritage Impact Assessment was compiled by PGS Heritage, the staff of which has a combined experience of nearly 40 years in the heritage consulting industry and have extensive experience in managing Heritage Impact Assessment (HIA) processes. Mr. Polke Birkholtz, project manager and heritage specialist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a professional archaeologist and is a member of the Cultural Resource Management (CRM) Section of ASAPA. He has more than 15 years experience in the industry. Marko Hutten, the archaeologist, is also registered with the Association of Southern African Professional Archaeologists (ASAPA) as a professional archaeologist and is a registered member of the Cultural Resource Management (CRM) Section of ASAPA.

Dr Gideon Groenewald, who conducted the palaeontological desktop study, has a PhD in Geology from the University of Port Elizabeth (Nelson Mandela Metropolitan University) (1996) and the National Diploma in Nature Conservation from Technicon RSA (the University of South Africa) (1989). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeoecological aspects. He has extensive experience in the locating of

fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage sites located during the fieldwork do not necessarily represent all the heritage sites present within the area.

Should any heritage features or objects not included in the inventory be located or observed, a heritage specialist must immediately be contacted. Such observed or located heritage features and/or objects may not be disturbed or removed in any way, until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well.

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. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
iv. Development Facilitation Act (DFA) Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources:

i. National Environmental Management Act (NEMA) Act 107 of 1998
    a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
    b. Environmental Scoping Report (ESR) – Section (29)(1)(d)

c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
d. EMP (EMP) – Section (34)(b)

ii. National Heritage Resources Act (NHRA) Act 25 of 1999
a. Protection of Heritage Resources – Sections 34 to 36; and
b. Heritage Resources Management – Section 38

iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
a. Section 39(3)

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that "no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…". The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) "…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive and legally compatible HIA report is compiled.

1.5 Terminology and Abbreviations

Archaeological resources

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 a 10m buffer area;
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.

Development

This means any physical intervention, excavation or action other than those caused by natural forces, which may according to the heritage agency result in a change to the nature, appearance or physical nature of a place or influence its stability & 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

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

Later Stone Age

The archaeology of the last 20 000 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 ironworking and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age, dating to between 20 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past and any site which contains such fossilised remains or trace.

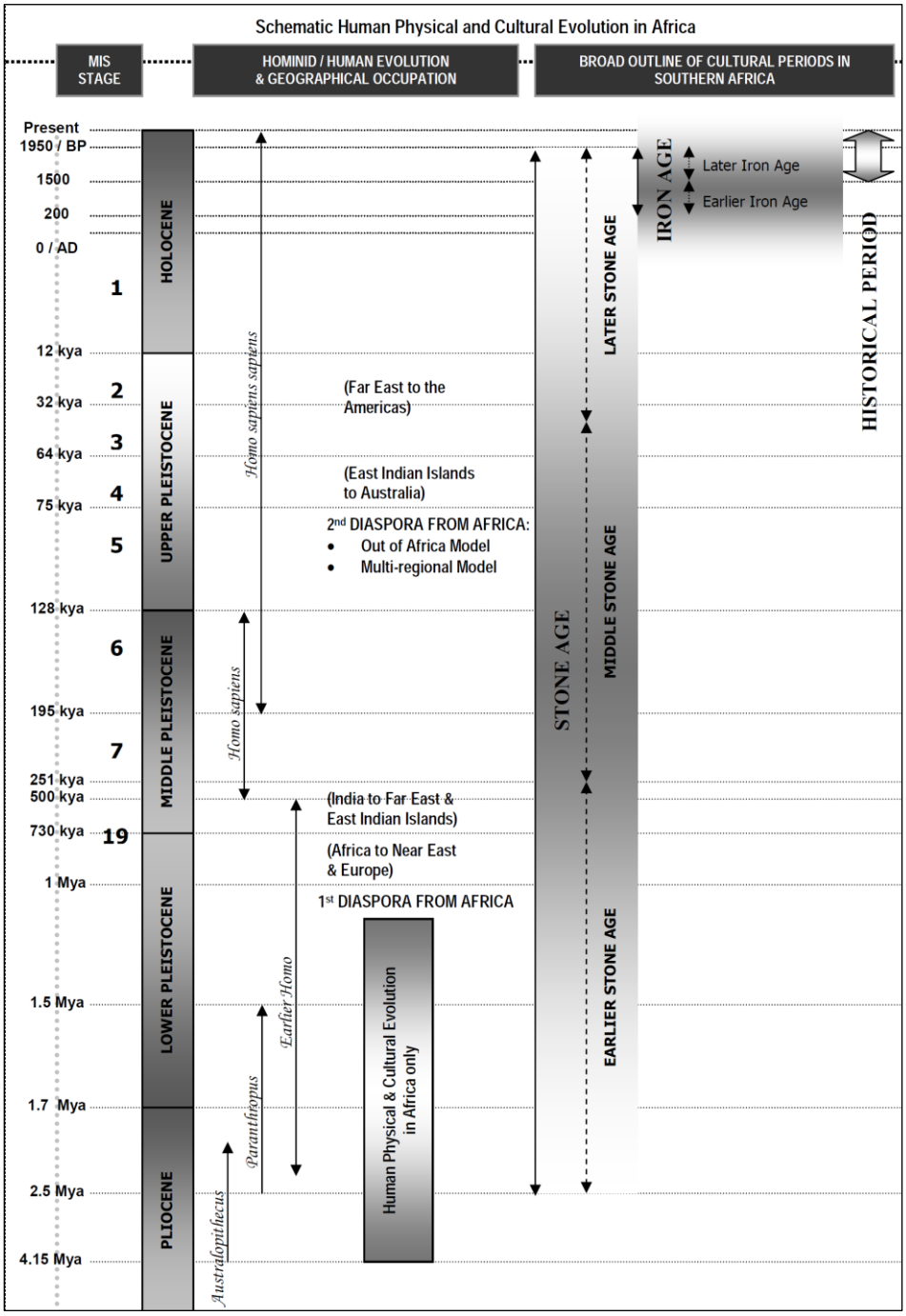


Figure 1 - Human and Cultural Time line in Africa (Morris, 2008)

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location and Description

Coordinates	North-Western Corner: S 26°19'59.12" E 28°11'26.35" North-Eastern Corner: S 26°20'2.50"; E 28°11'52.92"	South-Western Corner: S 26°20'22.67" E 28°11'26.66" South-Eastern Corner: S 26°20'19.63" E 28°11'42.71"
Property	Portion 144 of the farm Vlakplaats 138 IR, Vosloorus, Ekurhuleni Metropolitan Municipality, Gauteng Province.	
Location	The study area is located south-east of Johannesburg and is situated adjacent to Katlehong and Thokoza in the Ekurhuleni Metropolitan Municipality, Gauteng Province.	
Extent	The extent of the entire study area is roughly 32, 3395 hectares and is made up of Vosloorus Extension 24 (24,844 hectares), Vosloorus Extension 41 (2.2773 hectares) and Vosloorus Extension 43 (5.2182 hectares).	
Land Description	The land is not currently utilised and consists of fairly flat open terrain interposed with dense vegetation and thorn bushes.	

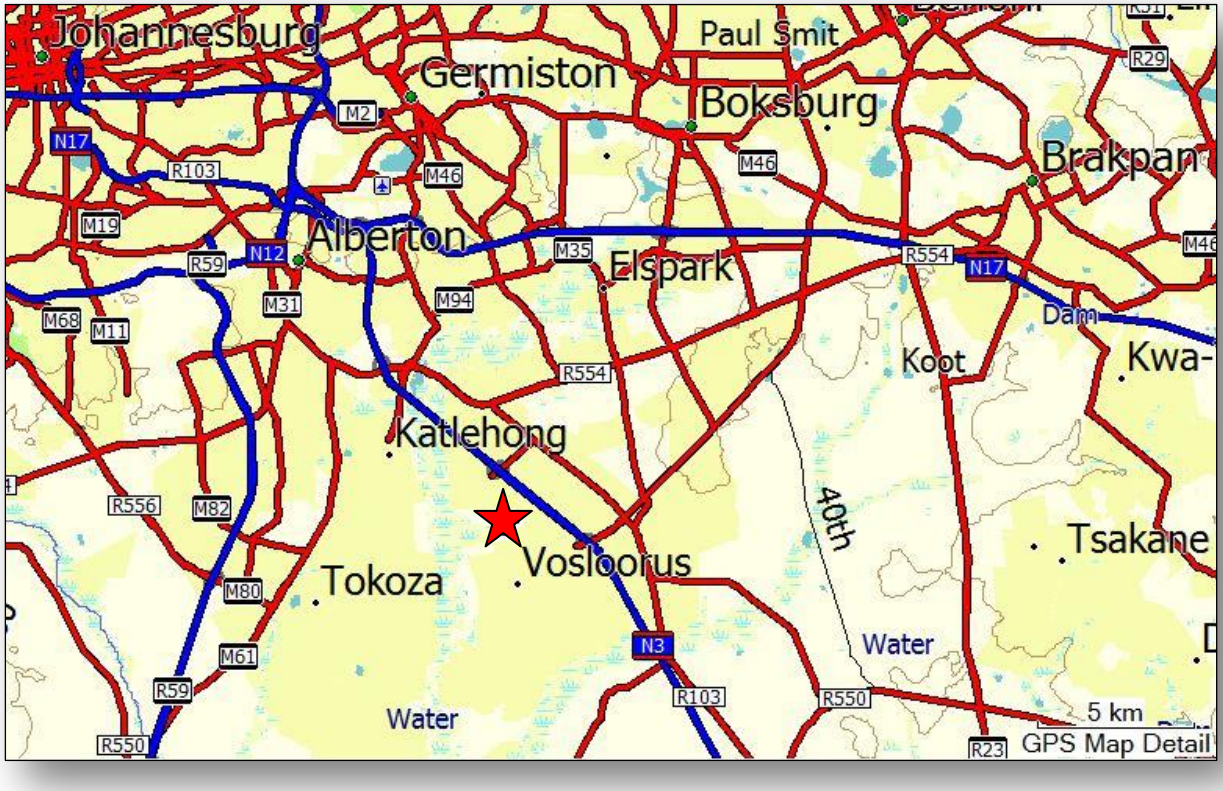


Figure 2–The study area within its regional context.

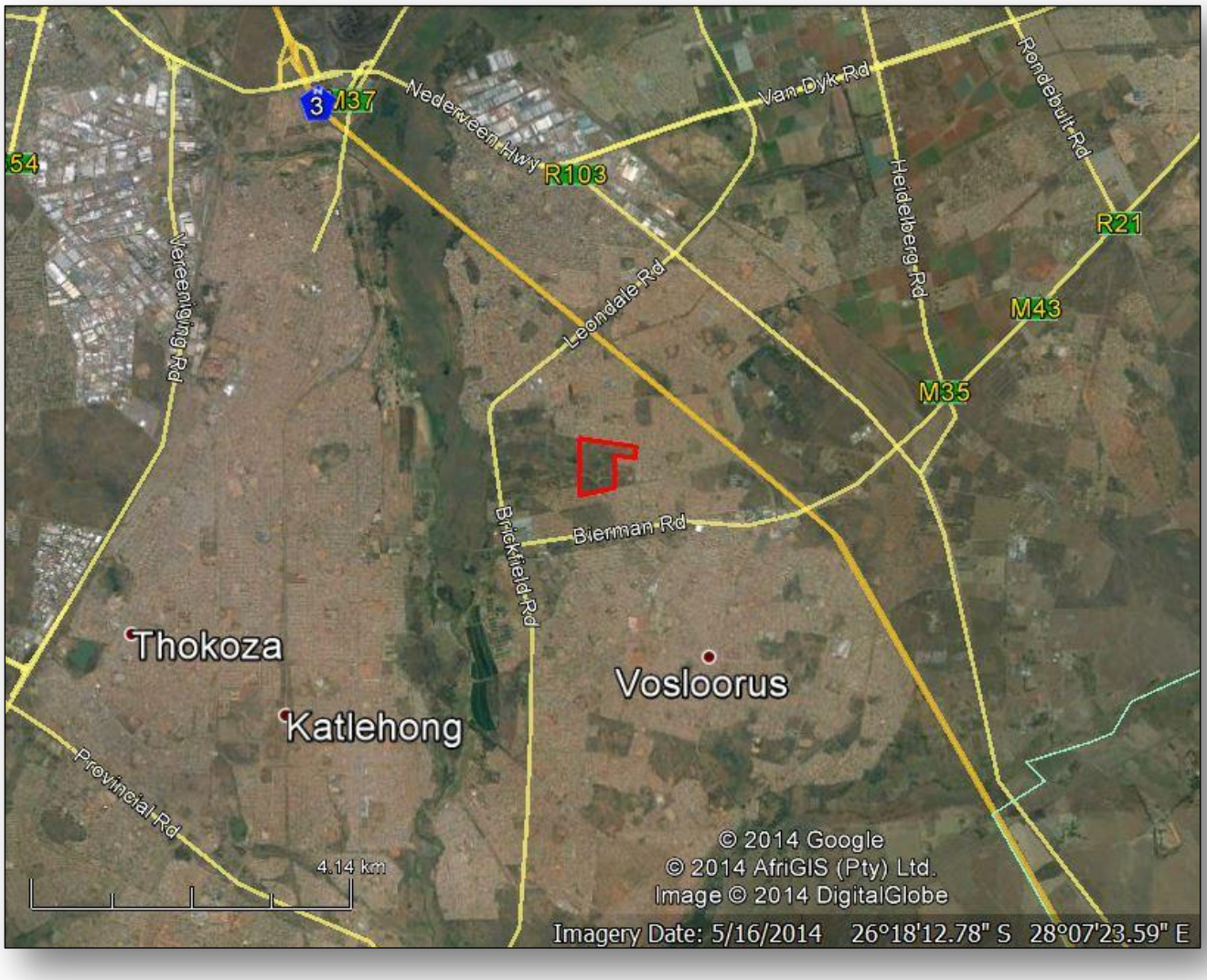
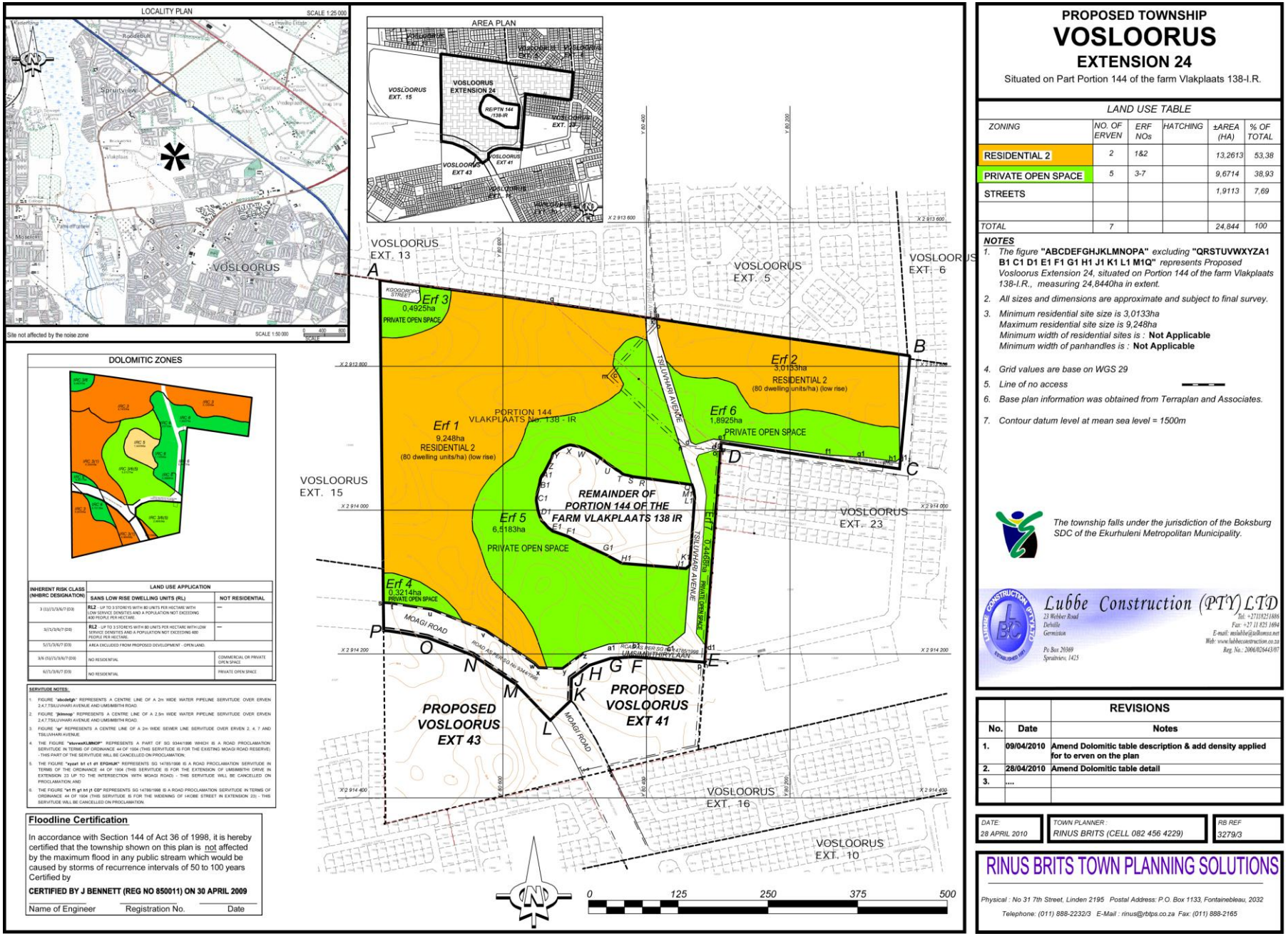


Figure 3–Google Earth image depicting the study area within its more localised context.

2.2 Technical Project Description

The establishment of three new township developments is proposed, namely Vosloorus Extension 24, Vosloorus Extension 41 and Vosloorus Extension 43. These three developments are all situated on portion 144 of the farm Vlakplaats 138 IR, Vosloorus, Ekurhuleni Metropolitan Municipality.

The proposed project can be described as a mixed use development, comprising two areas with residential and private open space (Vosloorus Ext 24 and Vosloorus Ext 43) and an area for business use (Vosloorus Ext 41).



PROPOSED TOWNSHIP

VOSLOORUS

EXTENSION 24

Situated on Part Portion 144 of the farm Vlakplaats 138-I.R.

LAND USE TABLE

ZONING	NO. OF ERVEN	ERF NOs	HATCHING	±AREA (HA)	% OF TOTAL
RESIDENTIAL 2	2	1&2		13,2613	53,38
PRIVATE OPEN SPACE	5	3-7		9,6714	38,93
STREETS				1,9113	7,69
TOTAL	7			24,844	100

NOTES

1. *The figure* **"ABCDEFGHJKLMNOPA"** *excluding* **"QRSTUVWXYZA1 B1 C1 D1 E1 F1 G1 H1 J1 K1 L1 M1Q"** *represents Proposed Vosloorus Extension 24, situated on Portion 144 of the farm Vlakplaats 138-I.R., measuring 24,8440ha in extent.*
2. *All sizes and dimensions are approximate and subject to final survey.*
3. *Minimum residential site size is 3,0133ha*
   Maximum residential site size is 9,248ha
   Minimum width of residential sites is : **Not Applicable**
   Minimum width of panhandles is : **Not Applicable**
4. *Grid values are base on WGS 29*
5. *Line of no access*
6. *Base plan information was obtained from Terraplan and Associates.*
7. *Contour datum level at mean sea level = 1500m*

The township falls under the jurisdiction of the Boksburg SDC of the Ekurhuleni Metropolitan Municipality.

Lubbe Construction (PTY) LTD
23 Webber Road
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Web: www.lubbeconstruction.co.za
Reg. No.: 2006/026443/07

REVISIONS

No.	Date	Notes
1.	09/04/2010	Amend Dolomitic table description & add density applied for to erven on the plan
2.	28/04/2010	Amend Dolomitic table detail
3.	....	

DATE:	TOWN PLANNER :	RB REF:
28 APRIL 2010	RINUS BRITS (CELL 082 456 4229)	3279/3

RINUS BRITS TOWN PLANNING SOLUTIONS
Physical : No 31 7th Street, Linden 2195 Postal Address: P.O. Box 1133, Fontainebleau, 2032
Telephone: (011) 888-2232/3 E-Mail : rinus@rbtps.co.za Fax: (011) 888-2165

Figure 4 – Development layout plan for Vosloorus Extension 24. The plan was supplied by Enkanyini Projects.

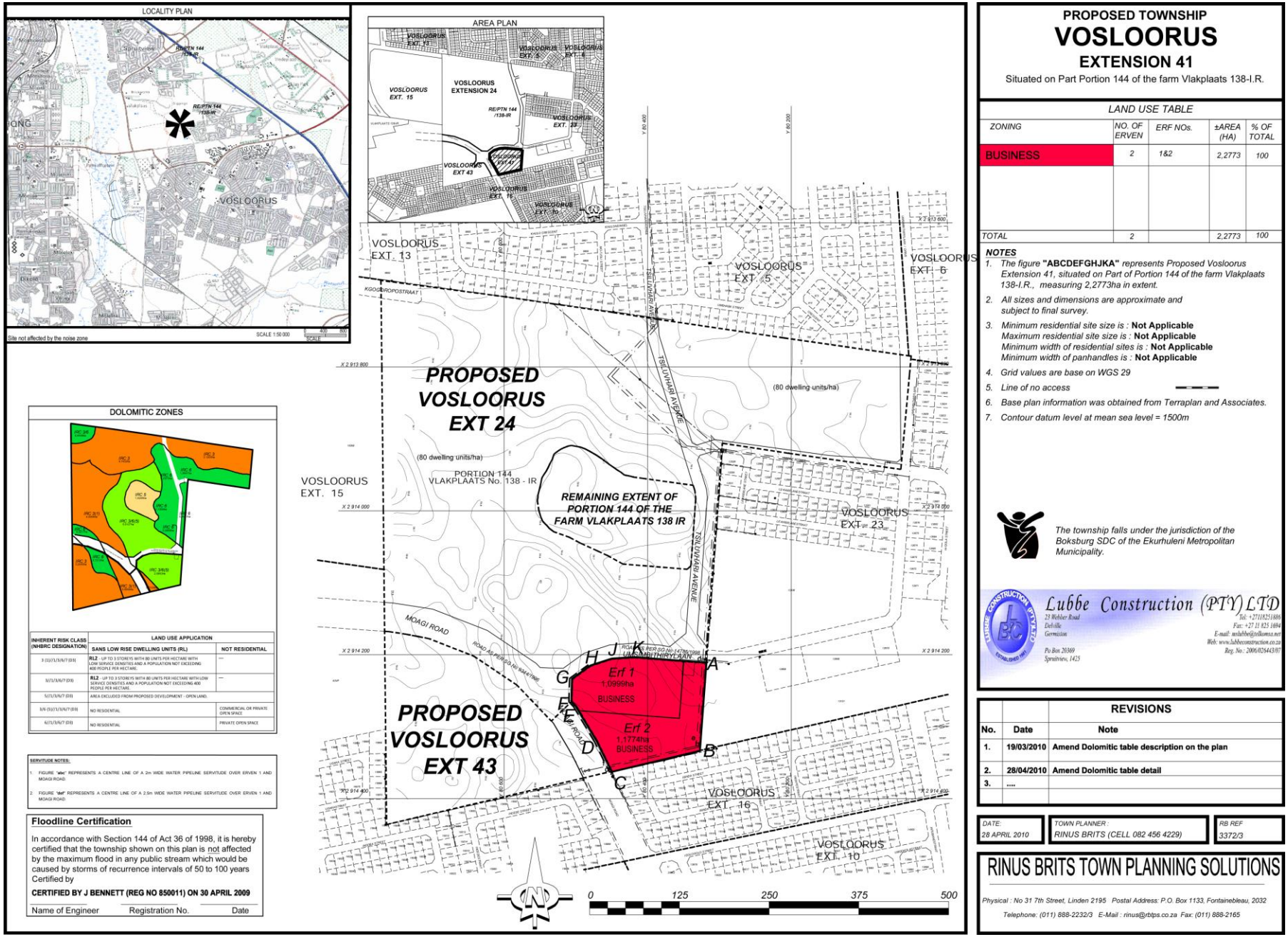

Figure 5 – Development layout plan for Vosloorus Extension 41. The plan was supplied by Enkanyini Projects.

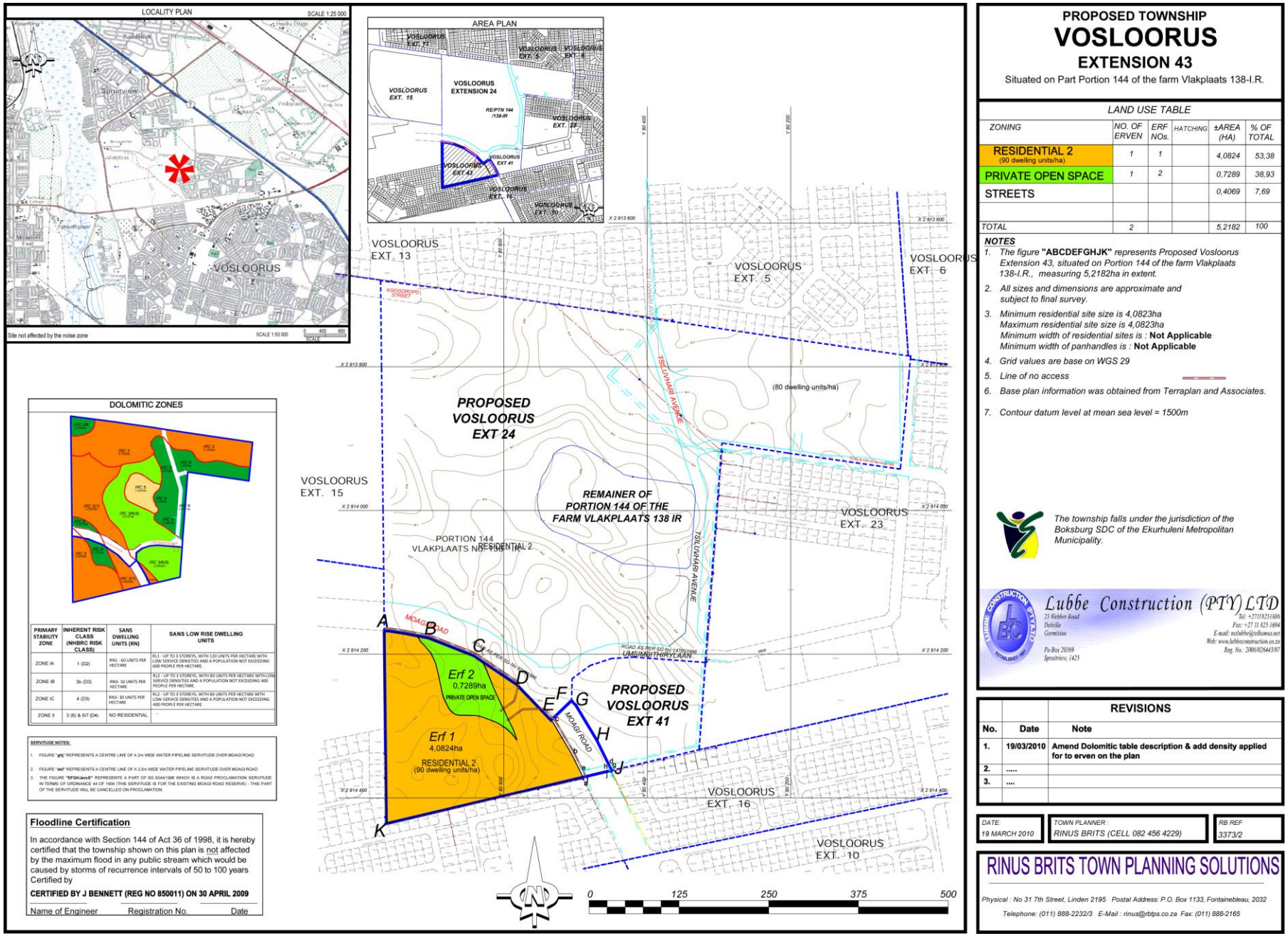

Figure 6 – Development layout plan for Vosloorus Extension 43. The plan was supplied by Enkanyini Projects.

3 ASSESSMENT METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

PGS Heritage was appointed by Enkanyini Projects to undertake a Heritage Impact Assessment (HIA) which forms part of the Environmental Impact Assessment (EIA) for the proposed establishment of Vosloorus Extension 24, Vosloorus Extension 41 and Vosloorus Extension 43 situated on portion 144 of the Farm Vlakplaats 138 IR, Boksburg Local Muncipality, Ekurhuleni District Municipality, Gauteng Province. The applicable maps, tables and figures are included as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey leans greatly on the archival and historical cartographic material assessed as part of the study as well as a study of the available literature.

Step II – Physical Survey: A physical survey was conducted over one day on Tuesday, 29 July 2014. The survey was undertaken by a team comprising a professional archaeologist (Marko Hutten) and field assistant (John Anderson) and was undertaken on foot and by vehicle.

Step III – Report: The final step involved the recording and documentation of relevant heritage resources, as well as the assessment of resources regarding the heritage impact assessment criteria and report writing, as well as mapping and recommendations.

The assessment of significance of heritage sites was based on five 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 - <10/50m2
    - Medium - 10-50/50m2
    - High - >50/50m2
- 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 development 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 (see **Table 1**).

Table 1: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	Grade 4A	High/Medium	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium	Recording before destruction
Generally Protected C (GP.C)	Grade 4C	Low	Destruction

3.2 Methodology for Impact Assessment

In order to ensure uniformity, a standard impact assessment methodology has been utilised so that a wide range of impacts can be compared. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors, along with the equivalent quantitative rating scale for each of the aforementioned criteria, is given in **Table 2**.

Table 2: Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	*Isolated corridor / proposed corridor*	Incidental
2	LOW	*Study area*	Short-term
3	MODERATE	*Local*	Medium-term
4	HIGH	*Regional / Provincial*	Long-term
5	VERY HIGH	*Global / National*	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

Significance Assessment

The significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these, since their importance in the rating scale is very relative. For example, 10 structures younger than 60 years might be affected by a proposed development, and if destroyed the impact can be considered as VERY LOW in that the structures are all of Low Heritage Significance. If two of the structures are older than 60 years and of historic significance, and as a result of High Heritage Significance, the impact will be considered to be HIGH to VERY HIGH.

A more detailed description of the impact significance rating scale is given in **Table** 3 below.

Table 3: Description of the significance rating scale

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	Impact is of substantial order within the bounds of impacts which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	MODERATE	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	NO IMPACT	There is no impact at all - not even a very low impact on a party or system.

Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in the table below..

Table 4: Description of the spatial significance rating scale

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of possible impacts, and will be felt at a regional scale (District Municipality to Provincial Level). The impact will affect an area up to 50 km from the proposed site / corridor.
3	Local	The impact will affect an area up to 5 km from the proposed site.
2	Study Area	The impact will affect an area not exceeding the boundary of the study area.
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the site.

Temporal/Duration Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment.

The temporal or duration scale is rated according to criteria set out in **Table 5**.

Table 5: Description of the temporal rating scale

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium-term	The environmental impact identified will operate for the duration of life of the project.
4	Long-term	The environmental impact identified will operate beyond the life of operation of the project.
5	Permanent	The environmental impact will be permanent.

Degree of Probability

The probability or likelihood of an impact occurring will be outlined in below.

Table 6: Description of the degree of probability of an impact occurring

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very likely
5	It's going to happen / has occurred

Degree of Certainty

As with all studies, it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used, as discussed in **Table 7**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making.

Table 7: Description of the degree of certainty rating scale

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.

Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner, in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale, as described below:

$$\textbf{\textit{Impact Risk}} = \frac{(\text{SIGNIFICANCE} + \textit{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown below:

Table 8: Example of Rating Scale

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Local	Medium Term	Could Happen	**Low**
Impact on heritage structures	2	3	3	3	**1.6**

Note: The significance, spatial and temporal scales are added to give a total of 8, which is divided by 3 to give a criterion rating of 2.67. The probability (3) is divided by 5 to give a probability rating of 0.6. The criteria rating of 2.67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the table below.

Table 9: Impact Risk Classes

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore, with reference to the example used for heritage structures above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

4 CURRENT STATUS QUO

4.1 Description of Study Area

The proposed development comprises the establishment of three township developments known as Vosloorus Extension 24, Vosloorus Extension 41 and Vosloorus Extension 43 situated on portion 144 of the Farm Vlakplaats 138 IR, Boksburg Local Muncipality, Ekurhuleni District Municipality, Gauteng Province.

The study area is reasonably level and comprises open secondary grassland areas interposed by occasional clumps of trees. Previous disturbances observed within the study area include a patch of land which had been used for small-scale agricultural activities, the remains of an old quarry and several occurrences of the dumping of refuse, building rubble, soil and rock.

The wider surroundings of the study area is characterised by existing residential development, namely the township of Vosloorus.

Figure 7 – The study area within its local context.

Figure 8 – General view of study area.

Figure 9 – General view showing grass and trees.

Figure 10 – View of old agricultural fields.

Figure 11 – An old quarry, located just outside the study area boundary.

Figure 12 – Example of dumped building rubble from within the boundaries of the study area.

Figure 13 – More evidence for dumping activities.

5 DESKTOP STUDY FINDINGS

5.1 Archival and Historic Maps of the Study Area and Surrounding Landscape

5.1.1. First Edition of the 2628AC Topographical Sheet

The relevant section of the First Edition of the 2628AC Topographical Sheet is depicted below. The map was surveyed and drawn by the Trigonometrical Survey Office in 1944.

In general terms, it is evident from the map that the south-western and north-eastern ends of the study area at the time were used for agricultural activities. The map also indicates that at the time the direct surroundings of the study area were used for farming activities, with 'Phyll Farm' situated directly north of the study area. Furthermore, a telephone (or telegraph line) crossed over the study as did a number of secondary roads. It seems likely that these roads were built and used to provide access to the different farms in the area.

Two possible heritage features can be identified on the map. These will be individually discussed below.

- Feature 1

  A wind or motor pump is depicted here.

- Feature 2

  An unidentified building is depicted here.

5.1.2. Second Edition of the 2628AC Topographical Sheet

The relevant section of the Third Edition of the 2628AC Topographical Sheet is depicted below. The map was based on aerial photography undertaken in 1952, was surveyed in 1957 and drawn by the Trigonometrical Survey Office in 1959.

In general terms, it is evident from the map that the south-western and northern ends of the study area at the time were used for agricultural activities. The map also indicates that at the time the direct surroundings of the study area were used for farming activities, with 'Ghyll Farm' and 'MacKenzie Farm;

depicted directly north of the study area. A comparison between this and the 1944 map clearly indicates that a large number of new huts were built in the direct surroundings of the study area. A cemetery is also depicted a short distance to the south of the study area. A section of a secondary road is still depicted within the study area.

Three possible heritage features can be identified on the map. These will be individually discussed below.

- Feature 3

  A hut is depicted here. This symbol used on these early maps indicates that the particular structure was a black homestead.

  During the fieldwork a cluster of two stone enclosures (kraals) and the remains of two dwellings (see site VLR003) were identified in close proximity to this feature. It is evident that Feature 3 depicts one of the two dwellings that were identified in the field.

- Feature 4

  A hut is depicted here. This symbol used on these early maps indicates that the particular structure was a black homestead.

  During the fieldwork a cluster of two stone enclosures (kraals) and the remains of two dwellings (see site VLR003) were identified in close proximity to this feature. It is evident that Feature 4 depicts one of the two dwellings that were identified in the field.

- Feature 5

  A pump house ('Pomphuis') is depicted here. This structure would have housed a water pump.

  During the fieldwork a brick-built dam associated with a number of demolished structures (see site VLR002) were identified in close proximity to the position of this feature on the map. It seems highly likely that the pump house depicted on the map formed part of the cluster of demolished structures identified in the field.

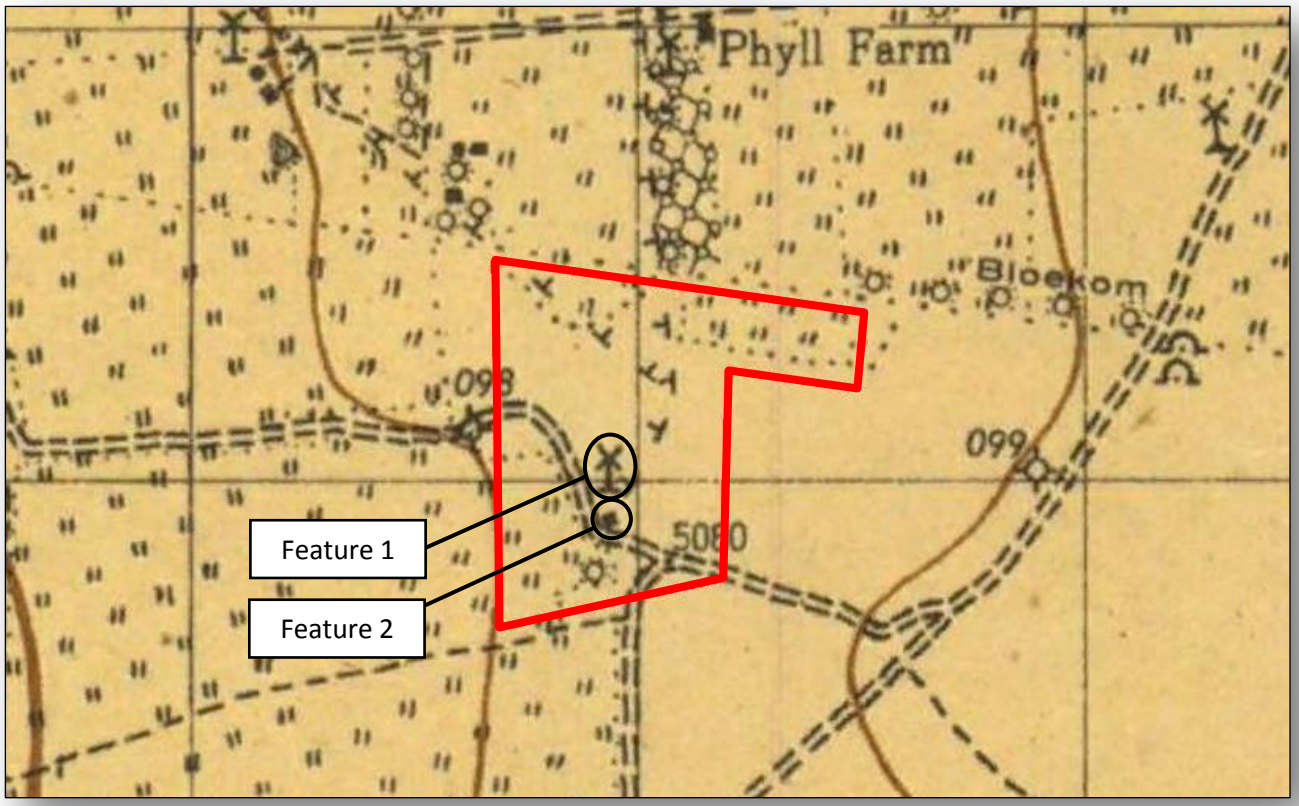

Figure 14 – Section of the First Edition of the 2628AC Topographical Sheet that was compiled in 1944.

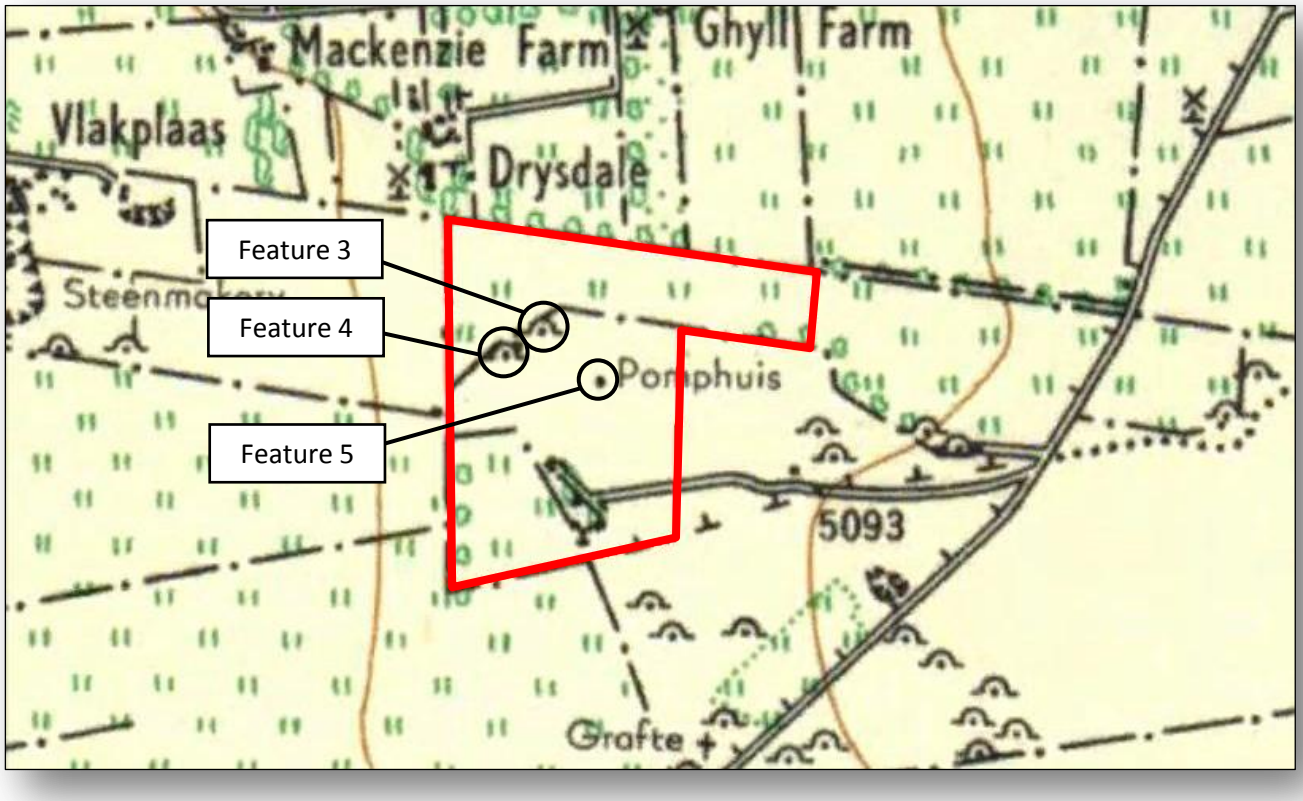

Figure 15 – Section of the Third Edition of the 2628AC Topographical Sheet that was surveyed in 1957.

5.2 Historic Overview of Study Area and Surrounding Landscape

DATE	DESCRIPTION
2.5 million to 250 000 years ago	The **Early Stone Age** (ESA) is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago. Two Early Stone Age sites were identified roughly 6.5km south-west of the present study area during a heritage impact assessment undertaken for the Kwenele South Extension 2 development (Birkholtz, 2002).
250 000 to 40 000 years ago	**The Middle Stone Age** (MSA) is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique. No Middle Stone Age sites are known from the direct vicinity of the study area.
40 000 years ago to the historic past	The **Later Stone Age** is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. No known Later Stone Age sites are located close to the study area
AD 1450 – AD 1650	The **Ntsuanatsatsi facies** of the Blackburn Branch of the Urewe Ceramic Tradition represents the earliest known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by a broad band of stamping in the neck, stamped arcades on the shoulder and appliqué (Huffman, 2007). No sites associated with the Ntsuanatsatsi facies are known from the surroundings of the study area.
AD 1500 - AD 1700	The **Olifantspoort facies** of the Moloko Branch of the Urewe Ceramic

	Tradition is the next Iron Age facies to be identified within the surroundings of the study area. The key features of the decoration used on the ceramics from this facies include multiple bands of fine stamping or narrow incision separated by colour (Huffman, 2007). No sites associated with the Olifantspoort facies are known from the surroundings of the study area.
AD 1650 – AD 1850	The **Uitkomst facies** of the Blackburn Branch of the Urewe Ceramic Tradition represents the third Iron Age period to be identified for the surroundings of the study area. The decoration on the ceramics associated with this facies is characterised by stamped arcades, appliqué of parallel incisions, stamping as well as cord impressions (Huffman, 2007). Based on the available archaeological and oral evidence from this period, the sixteenth and seventeenth centuries saw the movement of Sotho/Tswana communities from the lower lying Bushveld areas in the north (where they had been settled since AD 1500) toward the higher, predominantly grassland areas to the south. By AD 1650, these communities had successfully settled in these areas (Hall, 2007). No sites associated with the Uitkomst facies are known from the surroundings of the study area.
AD 1700-1840	The **Buispoort facies** of the Moloko branch of the Urewe Ceramic Tradition is the next phase to be identified within the study area's surroundings. It is most likely dated to between AD 1700 and AD 1840. The key features on the decorated ceramics include rim notching, broadly incised chevrons and white bands, all with red ochre (Huffman, 2007).It is believed that the Madikwe facies developed into the Buispoort facies. The Buispoort facies is associated with sites such as Boschhoek, Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007). No sites associated with the Buispoort facies are known from the surroundings of the study area.
AD 1823 - 1827	After leaving present-day KwaZulu-Natal the **Khumalo Ndebele** (more commonly known as the Matabele) of Mzilikazi migrated through the general vicinity of the study area under discussion before reaching the central

	reaches of the Vaal River in the vicinity of Heidelberg in 1823 (www.mk.org.za). Two different settlement types have been associated with the Khumalo Ndebele. The first of these is known as Type B walling and was found at Nqabeni in the Babanango area of KwaZulu-Natal. These walls stood in the open without any military or defensive considerations and comprised an inner circle of linked cattle enclosures (Huffman, 2007). The second settlement type associated with the Khumalo Ndebele is known as Doornspruit, and comprises a layout which from the air has the appearance of a 'beaded necklace'. This layout comprises long scalloped walls (which mark the back of the residential area) which closely surround a complex core which in turn comprises a number of stone circles. The structures from the centre of the settlement can be interpreted as kitchen areas and enclosures for keeping small stock. It is important to note that the Doornspruit settlement type is associated with the later settlements of the Khumalo Ndebele in areas such as the Magaliesberg Mountains and Marico and represent a settlement under the influence of the Sotho with whom the Khumalo Ndebele intermarried. The Type B settlement is associated with the early Khumalo Ndebele settlements and conforms more to the typical Zulu form of settlement. As the Khumalo Ndebele passed through the general vicinity of the study areas shortly after leaving Kwazulu-Natal, one can assume that their settlements here would have conformed more to the Type B than the Doornspruit type of settlement. It must be stressed however that no published information could be found which indicates the presence of Type B sites in the general vicinity of the study area. No sites associated with this period of the archaeological history of the surroundings of the study area are presently known.
1832	At the time a **Zulu impi** of King Dingane moved through the general vicinity of the study area on their way to attack the Matabele of Mzilikazi who were settled along the Magaliesberg Mountains (Bergh, 1999).
1836	The first **Voortrekker** parties started crossing the Vaal River (Bergh, 1999).

1839 - 1840	These years saw the **early establishment of farms by the Voortrekkers** in the general vicinity of the study area. The district of Potchefstroom was also established in 1839 (Bergh, 1999), of which the study area in all likelihood formed part.
1857	The **district of Pretoria** was established in this year. The study area now fell within this district (Bergh, 1999).
1866	The **district of Heidelberg** was established in this year. The study area now fell within this district (Bergh, 1999). It remained within the district of Heidelberg until the late 1950s (Bonner, 2001).
1886	**Gold was discovered** on the central Witwatersrand during early 1886. Closer to the present study area gold-bearing reefs were also discovered by Pieter J.J.D. Killian on the farms Leeuwpoort and Vogelfontein during September 1886 (Boksburg Town Council, n.d.). The farm Leeuwpoort is located roughly 7.4km north-east of the present study area.
21 March 1887	The town of **Boksburg** was established on this day and named in honour of Eduard Bok, the State Secretary of the Zuid-Afrikaansche Republiek (Erasmus, 2004). Boksburg is located 13.7km north-east of the present study area.
1899 – 1902	The **South African War** (also known as the Anglo Boer War) took place during this time. While no events or activities from this tumultuous period can be directly associated with the present study area, two such events and activities are known from the general vicinity. On or shortly before 29 May 1900 the main British army under the command of Lord Roberts were advancing on Johannesburg all along the Natalspruit (Cloete, 2000). Their route would have passed a few kilometres from the present study area. On 18 February 1901 a British train was held up by a Boer Commando along the railway line between the Klip River and Natalspruit Stations (www.vaalmeander.co.za) (Wallace, 1976). While Wallace (1976) states that the train was loaded with food and had been held up, the Vaal Meander

	website indicates that the train was derailed within the boundaries of the farm Palmietfontein after which a machine gun, cavalry greatcoats, saddles and other supplies were taken. The Klip River Station is situated 14km to the south-west and the Natalspruit Railway Station is located 5.5km north-west of the study area. With the suggestion that the attack on the train occurred on the farm Palmietfontein, the indication is that the event occurred within a range of between 5.5km and 7km from the present study area.
1904	**Alberton** was established in 1904 when a syndicate of property developers acquired a portion of the farm Elandsfontein and established a residential township on it. The town was named in honour of the chairman of the syndicate, General Hendrik Alberts (Erasmus, 2004). Alberton is located 9.4km north-west of the present study area.
1956 - 1959	During this time the Boksburg Town Council acquired a portion of the farm Vlakplaats for an amount of £189,920 with the intention of establishing a new township on the land. The reason for the new township was to remove the black residents of Stirtonville near Boksburg to this new township in accordance with the policies of the Apartheid Government. The Council experienced a number of difficulties with the **Vlakplaats** property including the fact that a mineral rights owner came to the fore as well as the geographic reality that the property was located in the district of Heidelberg. Only by 1960 were the boundaries of the district of Boksburg altered to also include the newly acquired property (Bonner, 2001).
1963	**Vosloorus** was eventually only established in 1963. Stirtonville was renamed Reiger Park and has since become home to Boksburg's coloured community (http://en.wikipedia.org/wiki/Vosloorus). According to Bonner (2001) the removal from Stirtonville to Vosloorus was only accomplished in 1964. He also indicates that the name Vosloorus was decided upon by the authorities in honour of the then chairman of the Boksburg Council's Committee of Non-European Affairs, W.I. Vosloo.
1971	The **Rondebult Bird Sanctuary** was established in this year to assist in the conservation of a number of resident and migratory aquatic birds (Erasmus,

	2004). The Rondebult Bird Sanctuary is located roughly 3.4km north-east of the study area.
1983	A **local authority** was established in 1983 when Vosloorus was given full municipal status (http://en.wikipedia.org/wiki/Vosloorus).
November 1987	**Vosloorus Extension 2** was established during November 1987. The new extension comprised 200 houses (Bonner, 2001).
1988	In 1988, the town councils of Vosloorus and Reiger Park staged a **consumer boycott** in Boksburg on the East Rand. The boycott by black and coloured residents followed the reintroduction of petty apartheid measures of the Boksburg Town Council which at the time was controlled by the Conservative Party (CP). In the local elections of October 1988 the CP won 12 of 20 council seats. At its first meeting, the new Council decreed that it would begin rigorously enforcing the Separate Amenities Act, a by-then largely ignored law that re-established whites-only toilets, parks and sports facilities. The two consumer boycott found enthusiastic corporate support. A number of multinational companies like Colgate-Palmolive, American Cyanamid and Unilever provided buses to ferry shoppers to shops in neighbouring towns, cancelled expansion plans and ran advertisements denouncing the racist Council. The economy of the town suffered and several businesses had to close down (http://www.sahistory.org.za/dated-event/vosloorus-and-reiger-park-call-consumer-boycott).
Late 1980s-Early 1990s	Vosloorus was one of the townships in the East Rand that was seriously affected by the **political violence** that occurred in the late 1980s and early 1990s. As much as 61 percent of the total number of deaths resulting from political violence in the then Transvaal during this time occurred on the East Rand, and specifically the townships of Thokoza, Vosloorus and Katlehong (Simpson, Mokwena and Segal, 1992). Gutteridge and Spence (2013) states that of the 136 political massacres which occurred between 1990 and 1993, 35 (25.74%) occurred in Katorus (i.e. Katlehong, Thokoza and Vosloorus).

5.3 Previous studies listed on the South African Heritage Resources Information System

At least six previous archaeological and/or heritage impact assessment reports are located on the South African Heritage Resources Information System (SAHRIS) database for the surroundings of the present study area. None of these assessments included the present study area or sections of it. Although four of the six assessments did not identify any heritage sites, one assessment identified two Early Stone Age sites and one historic structure (Birkholtz, 2002) whereas a second assessment identified one Early Stone Age site (Fourie, 2006). While the three sites identified in 2002 are located roughly 5.9km south-west of the present study area, the single Early Stone Age site identified in 2006 is located approximately 7.8km west by south-west. Furthermore, one assessment identified underlying geology with palaeontological significance (dolomite with presence of stromatolites). This was assessed as being of low significance due to being very poorly preserved (Van der Walt, 2009).

The list of previous archaeological and heritage reports is provided below:

- Birkholtz, P.D. June 2002. **Heritage Impact Assessment for the proposed Kwenele South Extension 2 development**. An unpublished report by CRM Africa. On file at SAHRA.
- Fourie, W. November 2006. **Heritage Impact Assessment for Albertsdal Extension 4.** An unpublished report by Matakoma.
- Van der Walt, J. & W. Fourie. December 2005. **Archaeological Impact Assessment for the proposed Vosloorus Hospital**. An unpublished report by Matakoma.
- Van der Walt, J. April 2009. **Archaeological Impact Assessment for a Proposed Development on Portion 83 of the farm Vlakplaats 183 JR**. An unpublished report by Wits.
- Van Schalkwyk, J. April 2003. **Proposed Vosloorus Cultural Village. An unpublished report by the National Cultural History Museum**. On file at SAHRA.
- Van Schalkwyk, J. October 2004. **Heritage Impact Assessment for Vosloorus Ext. 24**. An unpublished report by the National Cultural History Museum. On file at SAHRA.

5.4 Findings from the Palaeontological Desktop Study

5.4.1 Geology of the Area

The study area is underlain by Vaalian aged dolomite of the Malmani Subgroup, Chuniespoort Group, Transvaal Supergroup. The Malmani Subgroup consists of stromatolitic carbonates (limestones / dolomites), minor secondary cherts and mudrocks, including carbonaceous shales. A syenite dyke is present in the north-eastern part of the study area.

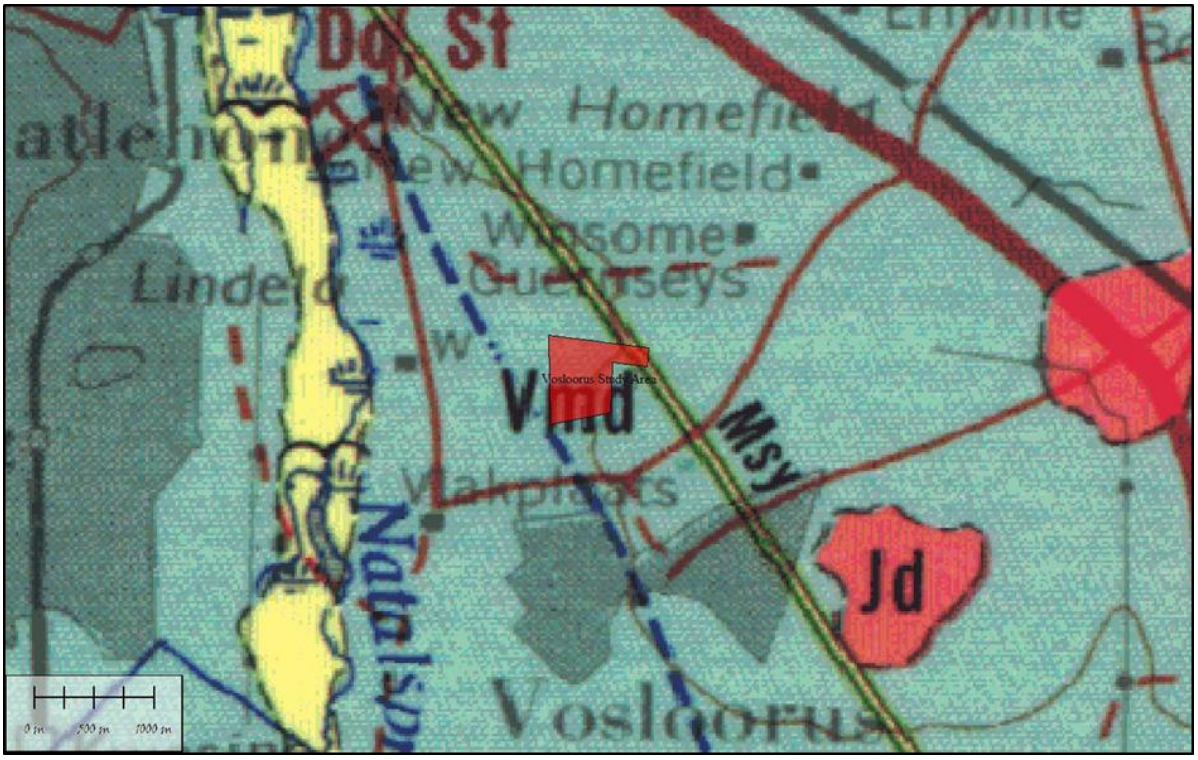

Figure 16 - Geology of the study area. Entire development is underlain by Malmani Dolomite (Vmd), with a syenite dyke (Msy) present in the north-eastern part of the development.

5.4.2 Palaeontological Sensitivity

Malmani Dolomite

The Malmani Dolomite is known to contain stromatolites. These structures will however only be exposed if major excavations are planned, which is not the case for this development. It is however important to note that Cenozoic aged fossils are associated with Karst structures and cave breccias that are invariably associated with dolomite of the Malmani Subgroup. If these structures are present on the development site they must be regarded as highly sensitive for palaeontological heritage. For this reason the areas underlain by Malmani Dolomite are allocated a Medium Palaeontological sensitivity. If Karst structures are present a palaeontologist must be appointed to inspect them for possible fossil content before any disturbances by construction equipment are allowed.

Syenite Dyke

Areas underlain by the syenite dyke is allocated a Low Palaeontological sensitivity. The dyke occupies a very small area in the north-eastern part of the area and due to scale, is not shown on the sensitivity map below.

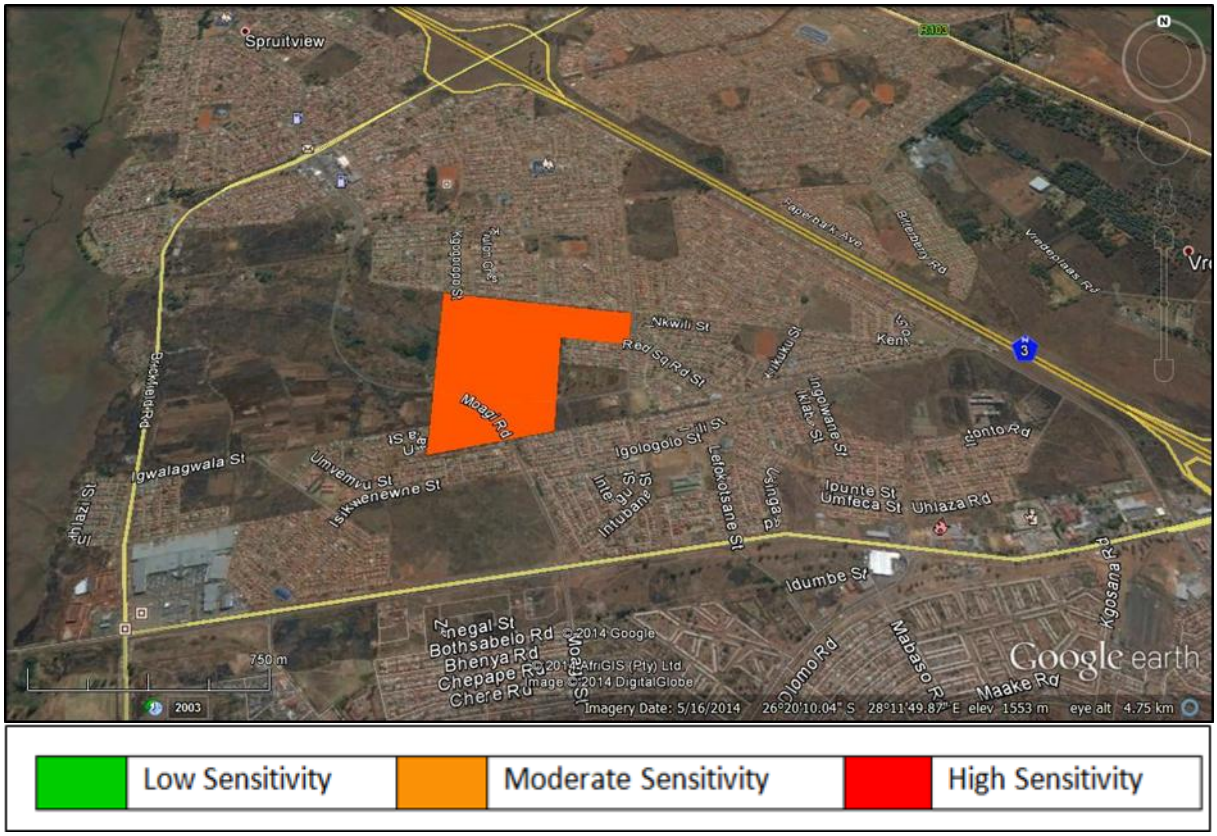

Figure 17 - Palaeosensitivity of the study area.

5.4.3 Recommendations

1. The developer, EAP and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Malmani Subgroup and that the presence of Karst structures will be associated with highly significant Cenozoic aged Palaeontological heritage. No further action is needed for areas underlain by the Syenite Dyke, which occupies a very small area in the Northeastern part of the development.
2. If deep excavation and exposure of bedrock are indicated in the Geotechnical reports, a palaeontologist must be appointed to record stromatolitic structures in the dolomite.
3. If Karst topography and structures (cave breccias) are recorded in the Geotechnical reports on areas underlain by Malmani dolomite, a palaeontologist must be appointed to investigate these deposits before any further disturbance by construction equipment.

6 FIELDWORK FINDINGS

A systematic walkthrough of the study area was undertaken by a fieldwork team comprising an archaeologist and field assistant. The archaeologist carried a hand-held GPS, and the recorded track log is depicted below.

Four sites of varying heritage significance were identified. They were each given a unique site number comprising a prefix identifying the geographic locality (in this case VLR for Vosloorus) as well as a number. As such the four identified sites were numbered from VLR 001 to VLR 004. A short description of each identified site will be provided further down.

Figure 18 – This Google Earth image depicts the recorded track logs as well as the sites that were identified within the study area.

The four identified sites were plotted on the relevant development layout plans using the overlay function of Google Earth. This was undertaken with the aim of providing a site distribution map as well as to depict the exact impact of the proposed development on each site.

The two depictions below clearly show that site VLR 001 will be impacted upon by the proposed commercial development at Vosloorus Extension 41 whereas sites VLR 003 and VLR 004 will be impacted upon by the proposed Residential 2 development of Vosloorus Extension 24. Site VLR 002 will not be impacted at all. It is also important to note that no sites were identified within the development area of Vosloorus Extension 43.

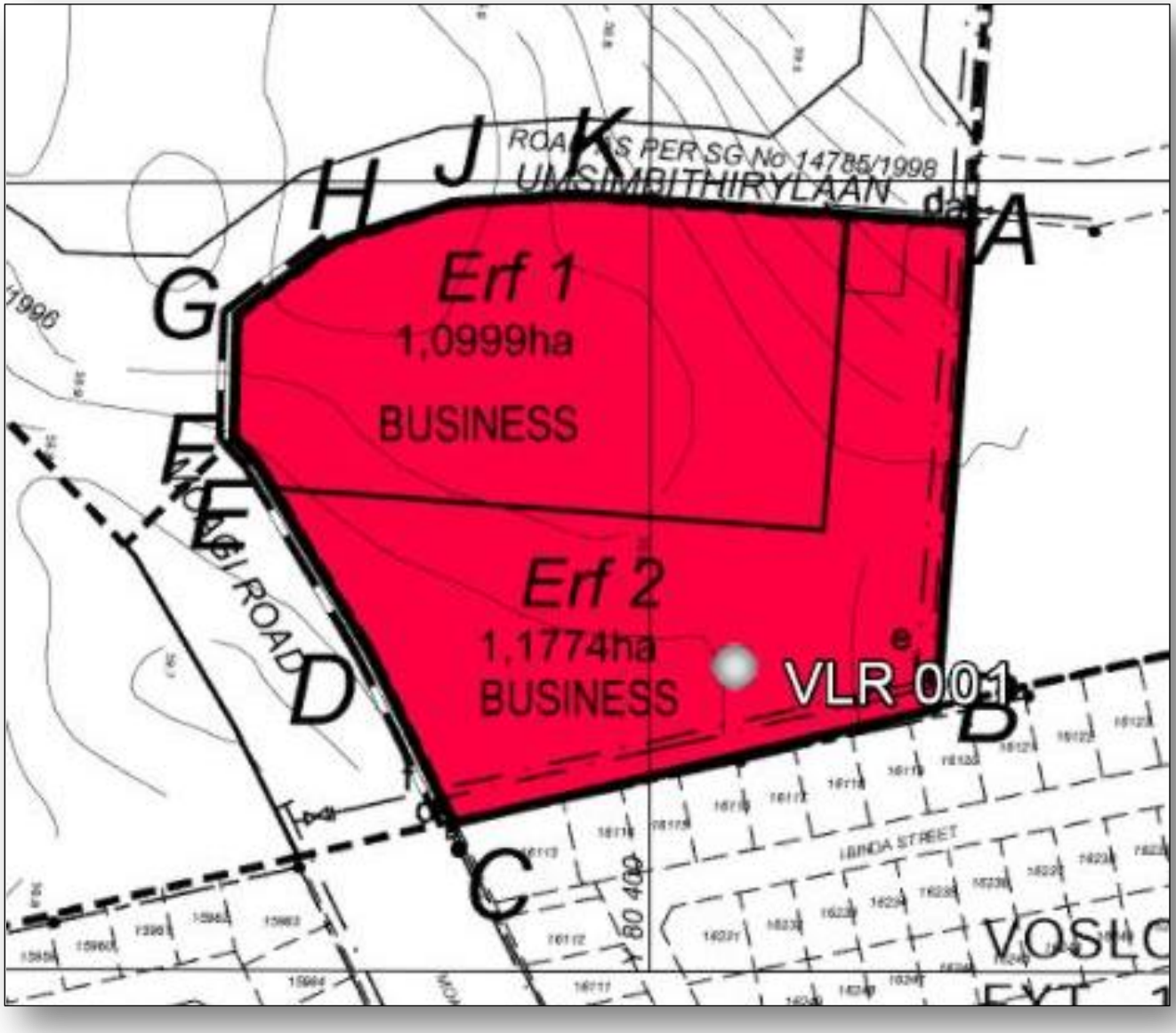

Figure 19 – This figure depicts an overlay of the identified sites over the development layout plan for Vosloorus Ext 41 by using the overlay function of Google Earth.

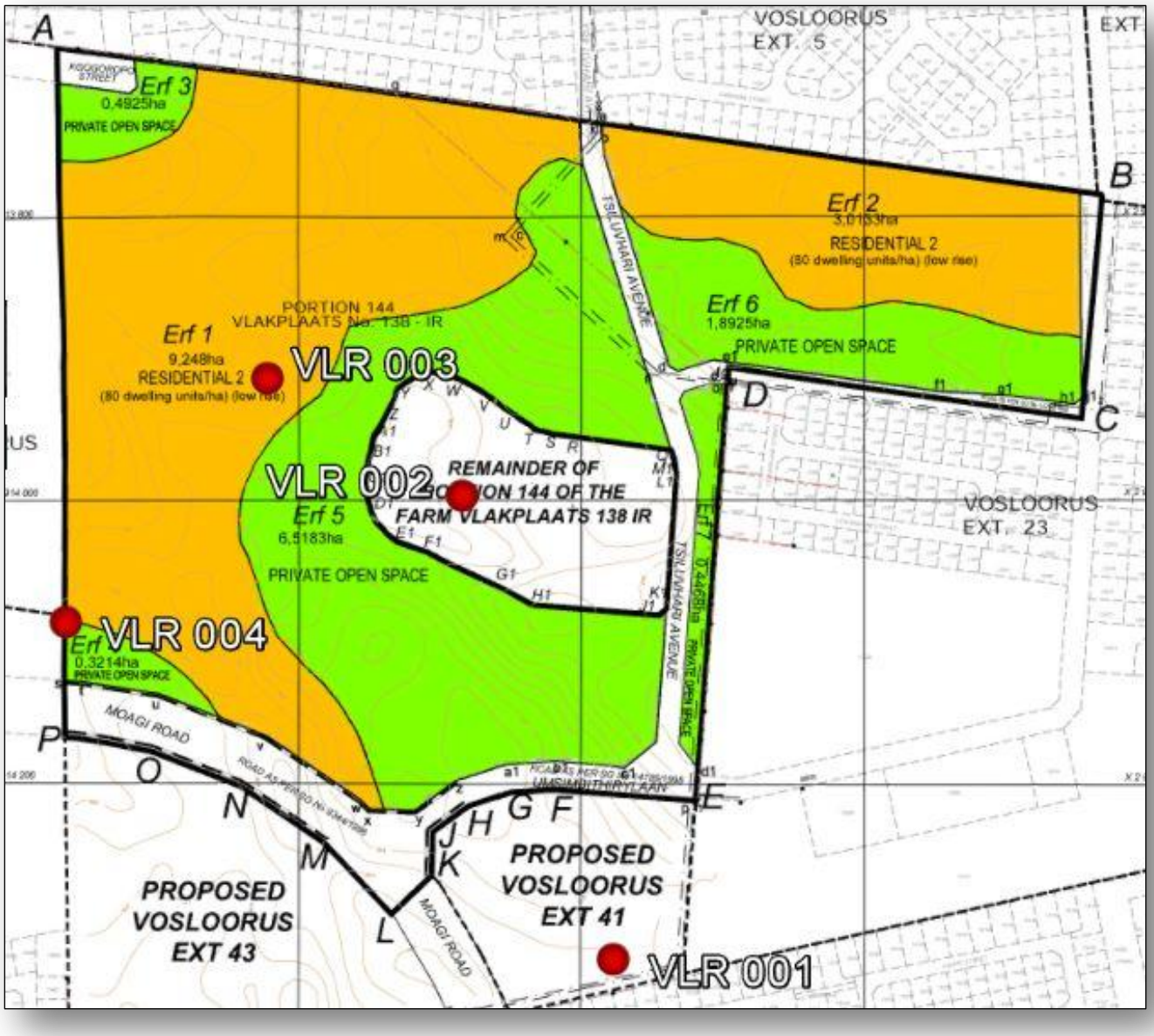

Figure 20 – This figure depicts an overlay of the identified sites over the development layout plan for Vosloorus Ext 24 by using the overlay function of Google Earth.

6.1 Heritage Sites Identified within the Study Area

Four heritage sites were identified within the overall study area. One of these sites (VLR 001) is situated within the development area of Vosloorus Extension 41 whereas two sites (VLR 003 and VLR 004) are located within the development area of Vosloorus Extension 24. The remaining site (VLR 002) is located within a portion of land known as the Remainder of Portion 144 of the farm Vlakplaats 138 IR. This portion of land is excluded from any development that is presently proposed. No heritage sites were identified within the development area of Vosloorus Extension 43.

6.1.1 Site VLR 001

Site Coordinates:

S 26° 20’ 19.7”
E 28° 11’ 40.6”

Site Description:

The remains of a stone-built structure were identified at this location. The structure is nearly completely demolished and only one corner and a short section of a wall could be seen. These remains are most probably part of the foundations of the structure. The foundations consist of packed rocks and mortar to form a square structure. The foundation measures approximately 0.5m wide. The rest of the structure was demolished and was also partially covered with rocks and soil which had been dumped on it. Several other dumps were identified in the immediate vicinity. Furthermore, the structure is also overgrown with vegetation. The function and age of the site is not known.

No associated cultural material could be observed on the surface of the site.

Neither the first edition (which dates to 1944) nor the third edition (which dates to 1957) of the 2628AC topographical sheet depicts any buildings or features in this locality. The suggestion is that the site is in all likelihood younger than 1957, although the possibility also exists for the site to be older than 1944. Due to the poor preservation of the site and complete lack of associated cultural material it would be impossible to accurately state which of these two suggestions are correct.

As mentioned elsewhere, the site is located within the development area of Vosloorus Extension 41. The impact of the proposed development on the site will be assessed in the next chapter.

Site Significance:

The structures are all in a poor condition. As a result the site is graded as Grade 4C which equates to a Low Significance. This indicates that the site may be destroyed without prior mitigation.

Figure 21 - View of identified remains of an unknown structure.

Figure 22 – Another view of the remains of the structure. The overgrown state of the site is evident.

6.1.2 Site VLR 002

Site Coordinates:

S 26° 20’ 09.1”
E 28° 11’ 36.7”

Site Description:

The remains of a brick-built dam wall were identified at this location. The structure measures approximately 80m in length and is approximately 0.5m wide. It measures some 1.5m high at its highest point.

More structures are situated at the eastern end of the dam wall. These structures were demolished and their functions are not known. The western extent of the dam wall consists of packed rocks and soil where the wall was most probably extended or repaired.

No associated cultural material could be observed on the surface of the site.

The first edition of the 2628AC topographical sheet which dates to 1944 does not depict any structures or features in this locality. However, the third edition of the same sheet which dates to 1957 depicts a pump house in this locality. The suggestion is that the site can be associated with the depicted pump house. As a result, sections of the site are in all likelihood at least 57 years old but not older than 70 years. Due to the poor preservation of the site and complete lack of associated cultural material it would be impossible to accurately state exactly how old the site is.

As mentioned elsewhere, the site is located within Remainder of Portion 144 of the farm Vlakplaats 138 IR. This portion of land is excluded from any development that is presently proposed.

Site Significance:

The structures are all in a poor condition and cannot be considered as unique elements in the farming landscape of the Highveld. As a result the site is graded as Grade 4C which equates to a Low Significance. This indicates that the site may be destroyed without prior mitigation.

Figure 23 - View of the identified dam wall as seen from its eastern side.

Figure 24 – View of one of the demolished structures at the eastern extent of the dam wall.

6.1.3 Site VLR 003

Site Coordinates:

S 26° 20’ 06.4”
E 28° 11’ 31.7”

Site Description:

The remains of two circular stone-walled kraals and two brick-built structures were identified at this location. The stone-walled kraals measure approximately 5m in diameter and the walls are roughly 0.5m wide and 0.7m high. The kraals are some 25m apart and the entire site is roughly 40m x 20m in extent. One of the two brick-built structures is almost completely demolished and is roughly 6m x 6m in extent. It has the appearance of a dwelling. The second brick-built structure is also demolished and measures approximately 5m x 2m in size. It is situated next to one of the stone walled kraals. This structure has a cement floor and two mounting points. The mounting points were most probably placed there for a pump to remove water from the nearby dam. The structure was most probably used as a pump room.

While no structures are depicted in this locality on the first edition of the 2628AC sheet (1944), two huts are depicted on the third edition of the same sheet (1957). It is evident that at least the one identified brick-built structure (and associated structures) and the depicted huts on this map are the same. This indicates that the site is at least 57 years old and certainly represents the remains of one black homesteads associated with two kraals or potentially two homesteads each of which had a kraal.

Based on the information that is presently available, it would appear that the structure was built and used by black people. Past experience has shown that in some cases stillborn babies were buried in close proximity to such black homesteads and aspecially along the sides of the parents’ dwelling. This seems to be especially true for older sites. As this site was abandoned some time ago, no direct information with regards to the presence (or not) of stillborn graves are currently available.

The site is located within the development area of Vosloorus Extension 24.

Site Significance:

Until such time that the presence of graves here has been confirmed or disproved, the site must be viewed as containing graves. All graves have high levels of emotional, religious and in some cases

historical significance. As such the site is of Generally Protected A (GP. A) or High/Medium Significance. This indicates that the site may not be impacted upon without prior mitigation. The mitigation measures to be undertaken for the site can be found below.

Figure 25 - View of one of the stone-walled kraals.

Figure 26 – View of the other stone-walled kraal.

Figure 27 - One of the brick structures.

Figure 28 – Another view of the same structure.

Figure 29 - View of the second brick structure.

Figure 30 – The mounting points at the structure.

6.1.4 Site VLR 004

Site Coordinates:

S 26° 07’ 16.9”
E28° 54’ 01.0”

Site Description:

The remains of a brick-built dam were identified at this location. The dam is situated on the western extent of the study are. The dam is circular and measures approximately 20m in diameter. The walls of the dam are approximately 2m high. The age of this structure is not known.

Neither the first edition (which dates to 1944) nor the third edition (which dates to 1957) of the 2628AC topographical sheet depict any buildings or features in this locality. The suggestion is that the site was in all likelihood built after 1957 and as a result is younger than 57 years.

As mentioned elsewhere, the site is located within the development area of Vosloorus Extension 24.

Site Significance:

The structure is in a poor condition, cannot be considered as unique and has no historic or scientific value. As a result the site is graded as Grade 4C which equates to a Low Significance. This indicates that the site may be destroyed without prior mitigation.

Figure 31 - View of the brick dam at site VLR 004.

7 IMPACT OF PROPOSED DEVELOPMENT ON HERITAGE RESOURCES

In this section the impact of the proposed development on the four sites that were identified in proximity to the footprint areas will be calculated.

7.1 Risk Calculation for the Impact of the Proposed Development on Site VLR 001

As depicted in Figure 18 above, the site is located within an area earmarked for commercial development as part of the proposed development of Vosloorus Extension 41. In this section the impact of the proposed development on site VLR 001 will be established.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(1 + 1 + 2)}{3} \times \frac{5}{5}$$

IMPACT RISK = 1.3

Table 10: Risk Calculation for Development Impact on Site VLR 001

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Incidental	Short-Term	Will Happen	**Low**
Impact on VLR 001	1	1	2	5	**1.3**

This calculation has revealed that the impact risk of the proposed development on site VLR 001 falls within Impact Class 2, which represents a Low Impact Risk. As a result no mitigation measures would be required. However, please note the general recommendations below.

7.2 Risk Calculation for the Impact of the Proposed Development on Site VLR 002

As depicted in Figure 19 above, the site is located within an area where no development is currently planned. In this section the impact of the proposed development on site VLR 002 will be established.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(1 + 1 + 2)}{3} \times \frac{2}{5}$$

IMPACT RISK = 0.5

Table 11: Risk Calculation for Development Impact on Site VLR 002

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Incidental	Short-Term	Unlikely	**Very Low**
Impact on VLR 002	1	1	2	2	**0.5**

This calculation has revealed that the impact risk of the proposed development on site VLR 002 falls within Impact Class 1, which represents a Very Low Impact Risk. As a result no mitigation measures would be required. However, please note the general recommendations below.

7.3 Risk Calculation for the Impact of the Proposed Development on Site VLR 003

In this section the impact of the proposed development on Site VLR 003 will be established. As shown above, the site is located within the development area of Vosloorus Extension 24.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(3 + 2 + 3)}{3} \times \frac{5}{5}$$

IMPACT RISK = 2.7

Table 12: Risk Calculation for Development Impact on Site VLR 003

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	High / Medium	Study Area	Medium-Term	Will Happen	**Moderate**
Impact on VLR 003	3	2	3	5	**2.7**

This calculation has revealed that the impact risk of the proposed development on Site VLR 003 falls within Impact Class 3, which represents a Moderate Impact Risk. As a result mitigation measures would be required. See Section 8.

7.4 Risk Calculation for the Impact of the Proposed Development on Site VLR 004

The site is located within the development area of Vosloorus Extension 24. In this section the impact of the proposed development on site VLR 004 will be established.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(1 + 1 + 2)}{3} \times \frac{4}{5}$$

IMPACT RISK = 1.1

Table 13: Risk Calculation for Development Impact on Site VLR 004

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Incidental	Short-Term	Very Likely	**Low**
Impact on VLR 004	1	1	2	4	**1.1**

This calculation has revealed that the impact risk of the proposed development on site VLR 004 falls within Impact Class 2, which represents a Low Impact Risk. As a result no mitigation measures would be required. However, please note the general recommendations below.

8 MITIGATION MEASURES AND GENERAL RECOMMENDATIONS

8.1 Mitigation measures required for identified heritage sites

As indicated elsewhere, no mitigation measures are required for sites VLR 001, VLR 002 and VLR 004. The mitigation measures required for VLR 003 will be outlined below.

The unmitigated impact of the proposed development of Vosloorus Extension 24 will result in a moderate negative impact on site VLR 003. As a result, mitigation measures would be required for this

site. The measures outlined below are entirely focussed on the mitigation of the potential presence of infant burials at the site as the structural components of the site are of no significance. The following mitigation measures are required:

- Preliminary social consultation to attempt to identify the former residents of these homesteads. This process may include the use of bilingual site notices, bilingual newspaper notices as well as consultation with local residents. This process may result in one of three outcomes.

    - If the social consultation process identified the presence of one or more infant burials at a particular homestead, a formal grave relocation process must be undertaken which would include obtaining permission from the family of the deceased for the relocation to take place, the necessary permit applications, excavation as well as reburial to a municipal cemetery.
    - If the social consultation process revealed that no infant burials are located at a particular homestead, no further mitigation measures would be required there.
    - If no information with regard to the former residents of these homesteads is revealed by way of the preliminary social consultation, archaeological test excavations must be undertaken around the homestead structures to assess whether any infant burials are located here.

8.2 Mitigation measures required for Palaeontology

The palaeontological desktop study has identified the following mitigation measures:

- The developer, EAP and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Malmani Subgroup and that the presence of Karst structures will be associated with highly significant Cenozoic aged Palaeontological heritage. No further action is needed for areas underlain by the Syenite Dyke, which occupies a very small area in the Northeastern part of the development.
- If deep excavation and exposure of bedrock are indicated in the Geotechnical reports, a palaeontologist must be appointed to record stromatolitic structures in the dolomite.
- If Karst topography and structures (cave breccias) are recorded in the Geotechnical reports on areas underlain by Malmani dolomite, a palaeontologist must be appointed to investigate these deposits before any further disturbance by construction equipment.

9 CONCLUSIONS

PGS Heritage was appointed by Enkanyini Projects to undertake a Heritage Impact Assessment (HIA) which forms part of the Environmental Impact Assessment (EIA) for the proposed establishment of Vosloorus Extension 24, Vosloorus Extension 41 and Vosloorus Extension 43 situated on portion 144 of the Farm Vlakplaats 138 IR, Boksburg Local Muncipality, Ekurhuleni District Municipality, Gauteng Province.

An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich history. However, the desktop study could not associate any historic events with the study area itself. The desktop study did include an assessment of two historic topographic maps, and a total of five potential heritage features were indicated on the two maps. During the fieldwork two of these sites were identified in the field.

The desktop study work was followed by fieldwork which comprised a walkthrough of the study area. Four heritage sites were identified within the study area and are included in this report. These sites comprise the following:

- the remains of a stone-built structure (VLR 001)
- the remains of a brick-built dam wall with associated structures (VLR 002)
- the remains of two circular stone-walled kraals associated with two brick structures (VLR 003)
- a circular brick and cement dam (VLR 004)

Of the four identified sites, two are located within the development area of Vosloorus Extension 24 (see VLR 003 and VLR 004), one site is located within the development area of Vosloorus Extension 41 (see site VLR 001) with no sites identified within the development area of Vosloorus Extension 43. The fourth site (VLR 002) is located within a portion of landed excluded from the development.

Impact risk calculations were undertaken on the expected impact of the proposed development on these four sites, which indicated that the proposed development poses a Very Low Impact Risk to VLR 002, a Low Impact Risk to VLR 001 and VLR 004 and a Moderate Impact Risk to VLR 003. While no mitigation measures are required for sites VLR 001, VLR 002 and VLR 004, the following mitigation measures are required for VLR 003.

- Preliminary social consultation to attempt to identify the former residents of these homesteads. This process may include the use of bilingual site notices, bilingual newspaper notices as well as consultation with local residents. This process may result in one of three outcomes.

    - If the social consultation process identified the presence of one or more infant burials at a particular homestead, a formal grave relocation process must be undertaken which would include obtaining permission from the family of the deceased for the relocation to take place, the necessary permit applications, excavation as well as reburial to a municipal cemetery.
    - If the social consultation process revealed that no infant burials are located at a particular homestead, no further mitigation measures would be required there.
    - If no information with regard to the former residents of these homesteads is revealed by way of the preliminary social consultation, archaeological test excavations must be undertaken around the homestead structures to assess whether any infant burials are located here.

Furthermore, a palaeontological desktop study was also undertaken and the following mitigation measures are required:

- The developer, EAP and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Malmani Subgroup and that the presence of Karst structures will be associated with highly significant Cenozoic aged Palaeontological heritage. No further action is needed for areas underlain by the Syenite Dyke, which occupies a very small area in the Northeastern part of the development.
- If deep excavation and exposure of bedrock are indicated in the Geotechnical reports, a palaeontologist must be appointed to record stromatolitic structures in the dolomite.
- If Karst topography and structures (cave breccias) are recorded in the Geotechnical reports on areas underlain by Malmani dolomite, a palaeontologist must be appointed to investigate these deposits before any further disturbance by construction equipment.

On the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development not to continue.

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Historic Topographic Maps

The historic topographic maps used in this report were obtained from the Directorate: National Geo-spatial Information of the Department of Rural Development & Land Reform, Cape Town.

Google Earth

All the satellite depictions used in this report are from Google Earth.

APPENDIX A

PALAEONTOLOGICAL IMPACT ASSESSMENT

PALAEONTOLOGICAL DESKTOP ASSESSMENT FOR THE PROPOSED HOUSING DEVELOPMENT AT VOSLOORUS, GAUTENG PROVINCE.

For:

HIA CONSULTANTS

DATE: 3 August 2014

By

GIDEON GROENEWALD
Cell: 0823399202

EXECUTIVE SUMMARY

Gideon Groenewald was appointed by PGS Heritage to undertake a desktop survey, assessing the potential palaeontological impact of the proposed development of a residential housing complex located at Vosloorus Extension 24, situated on Part Portion 144 of the farm Vlakplaats 138-IR in the Gauteng Province.

This report forms part of the Environmental Impact Assessment and complies with the requirements of the South African National Heritage Resource Act, No 25 of 1999. In accordance with Section 38 (Heritage Resources Management), a Heritage Impact Assessment (HIA) is required to assess any potential impacts to palaeontological heritage within the development footprint of the development.

The project entails the development of a housing complex at Vosloorus, Gauteng Province.

The study area is underlain by Vaalian-aged dolomite of the Malmani Subgroup, Chuniespoort Group, Transvaal Supergroup. The Malmani Subgroup consists of stromatolitic carbonates (limestones / dolomites), minor secondary cherts and mudrocks, including carbonaceous shales. A syenite dyke is present in the Northeastern part of the study area.

The Malmani Dolomite contains a range of shallow marine to intertidal stromatolites (domes, columns, etc) whilst organic-walled microfossils have been described from rocks of this subgroup. Significant Cenozoic aged fossil remains of advanced mammals, including Hominins, have been recorded from Karst structures (normally recorded as cave breccias and sinkholes in dolomitic terrains), associated with the Malmani Dolomite Subgroup and if Karst structures are present, they must be regarded as highly sensitive for palaeontological heritage.

The study area is underlain by Vaalian-aged dolomite of the Malmani Subgroup, Chuniespoort Group, Transvaal Supergroup. The dolomite might be stromatolitic, and if bedrock is exposed during excavation of foundations and infrastructure development, the presence of stromatolites must be recorded and representative samples taken for further studies. It is also important to note that the Malmani Dolomites are prone to Karst formations, where Cenozoic aged cave breccias can contain significant fossils of advanced vertebrates, mammals and Hominin remains. If Karst topography is present, a palaeontologist must be appointed to inspect these deposits before any disturbance by construction equipment is allowed. For this reason, a Medium Palaeontological sensitivity is allocated to the areas underlain by Malmani Dolomite. Areas underlain by syenite are allocated a Low Palaeontological sensitivity.

Recommendations:

1. The developer, EAP and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Malmani Subgroup and that the presence of Karst structures will be associated with highly significant Cenozoic aged Palaeontological heritage. No further action is needed for areas underlain by the Syenite Dyke, which occupies a very small area in the Northeastern part of the development.
2. If deep excavation and exposure of bedrock are indicated in the Geotechnical reports, a palaeontologist must be appointed to record stromatolitic structures in the dolomite.
3. If Karst topography and structures (cave breccias) are recorded in the Geotechnical reports on areas underlain by Malmani dolomite, a palaeontologist must be appointed to investigate these deposits before any further disturbance by construction equipment.

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1 INTRODUCTION

1.1 Background

Gideon Groenewald was appointed by PGS Heritage to undertake a desktop survey, assessing the potential palaeontological impact of the proposed development of a residential housing complex located at Vosloorus Extension 24, situated on Part Portion 144 of the farm Vlakplaats 138-IR in the Gauteng Province.

This report forms part of the Environmental Impact Assessment and complies with the requirements of the South African National Heritage Resource Act No 25 of 1999. In accordance with Section 38 (Heritage Resources Management), a Heritage Impact Assessment (HIA) is required to assess any potential impacts to palaeontological heritage within the development footprint of the development.

Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act, and which therefore fall under its protection, include:

- geological sites of scientific or cultural importance;
- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
- objects with the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.

1.2 Aims and Methodology

Following the *"SAHRA APM Guidelines: Minimum Standards for the Archaeological & Palaeontological Components of Impact Assessment Reports"* the aims of the palaeontological impact assessment are:

- to identify exposed and subsurface rock formations that are considered to be palaeontologically significant;
- to assess the level of palaeontological significance of these formations;
- to comment on the impact of the development on these exposed and/or potential fossil resources and
- to make recommendations as to how the developer should conserve or mitigate damage to these resources.

In preparing a palaeontological desktop study, the potential fossiliferous rock units (groups, formations, etc.) represented within the study area are determined from geological maps. The known fossil heritage within each rock unit is inventoried from the published scientific literature and previous palaeontological impact studies in the same region.

The likely impact of the proposed development on local fossil heritage is determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the extent of fresh bedrock excavation envisaged. The different sensitivity classes used are explained in Table 1.1 below.

Table Error! No text of specified style in document..**1** Palaeontological Sensitivity Analysis Outcome Classification

Sensitivity	Description
Low Sensitivity	Areas where a negligible impact on the fossil heritage is likely. This category is reserved largely for areas underlain by igneous rocks. However, development in fossil bearing strata with shallow excavations or with deep soils or weathered bedrock can also form part of this category.
Moderate Sensitivity	Areas where fossil bearing rock units are present but fossil finds are localised or within thin or scattered sub-units. Pending the nature and scale of the proposed development the chances of finding fossils are moderate. A field-based assessment by a professional palaeontologist is usually warranted.
High Sensitivity	Areas where fossil bearing rock units are present with a very high possibility of finding fossils of a specific assemblage zone. Fossils will most probably be present in all outcrops and the chances of finding fossils during a field-based assessment by a professional palaeontologist are very high. Palaeontological mitigation measures need to be incorporated into the Environmental Management Plan

1.3 Scope and Limitations of the Desktop Study

The study will include: i) an analysis of the area's stratigraphy, age and depositional setting of fossil-bearing units; ii) a review of all relevant palaeontological and geological literature, including geological maps, and previous palaeontological impact reports; iii) data on the proposed development provided by the developer (e.g. location of footprint, depth and volume of bedrock excavation envisaged); and iv) where feasible, location and examination of any fossil collections from the study area (e.g. museums).

The key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologists carrying out fieldwork in RSA. Most development study areas have never been surveyed by a palaeontologist.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and without supporting field assessments may lead to either:

- an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by tectonism or weathering, or are buried beneath a thick mantle of unfossiliferous "drift" (soil, alluvium etc.).

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The project entails the development of a housing complex at Vosloorus, Gauteng Province (Figure 2.1).

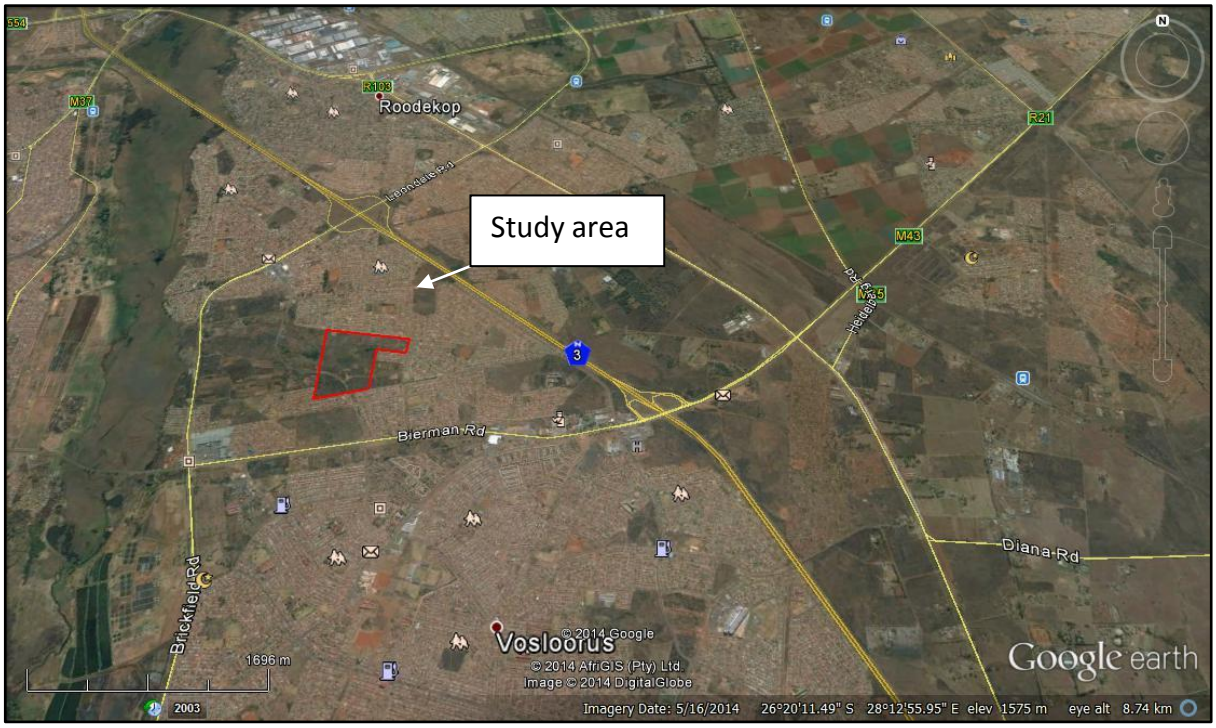

Figure 32. Image showing the locality of the site

3 GEOLOGY

The study area is underlain by Vaalian-aged dolomite of the Malmani Subgroup, Chuniespoort Group, Transvaal Supergroup (Figure 3.1). The Malmani Subgroup consists of stromatolitic carbonates (limestones / dolomites), minor secondary cherts and mudrocks, including carbonaceous shales (Johnson et al, 2006). A syenite dyke is present in the northeastern part of the study area.

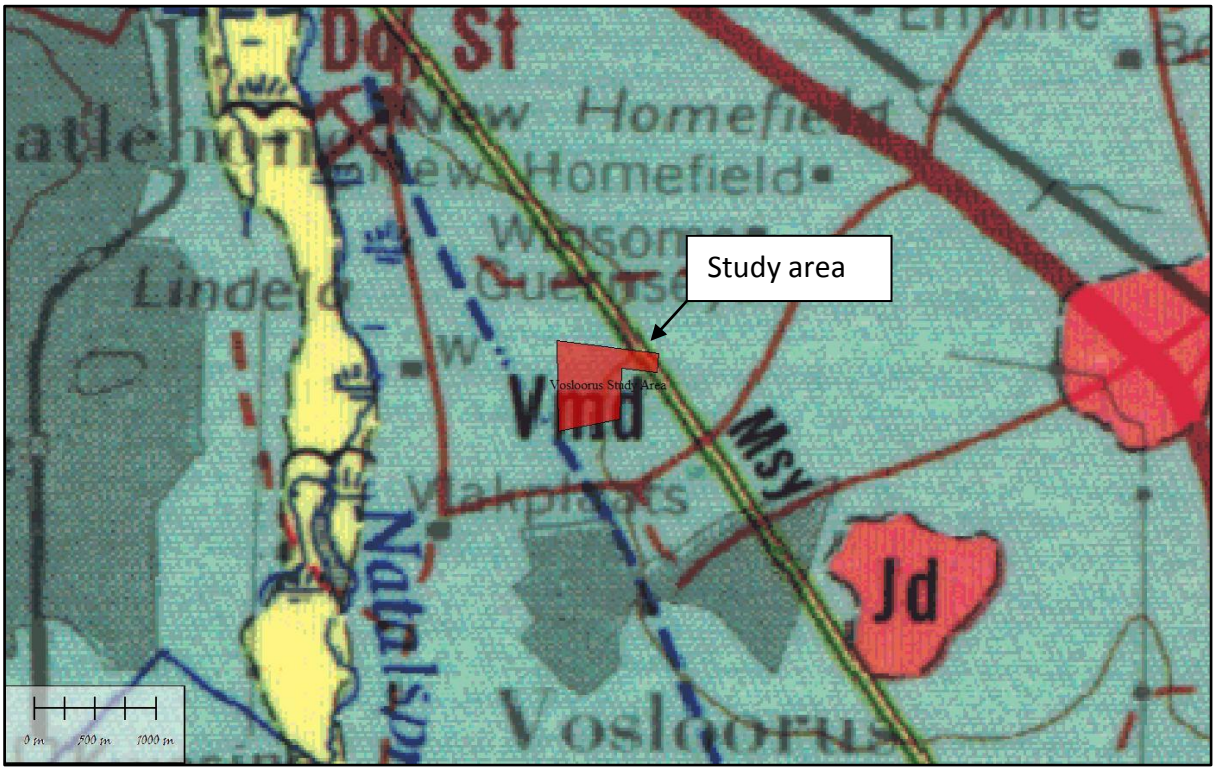

*Figure **Error! No text of specified style in document.**.33 Geology of the study area. Entire development is underlain by Malmani Dolomite (Vmd), with a syenite dyke (Msy) present in the northeastern part of the development.*

4 PALAEONTOLOGY OF THE AREA

Malmani Dolomite Subgroup

The Malmani Dolomite contains a range of shallow marine to intertidal stromatolites (domes, columns, etc), whilst organic-walled microfossils have been described from rocks of this subgroup (Mac Rae, 1999). Significant Cenozoic-aged fossil remains of advanced mammals, including Hominins, have been recorded from Karst structures (normally recorded as cave breccias and sinkholes in dolomitic terrains) associated with the Malmani Dolomite Subgroup (MacRae, 1999) and if Karst structures are present, they must be regarded as highly sensitive for palaeontological heritage.

Syenite Dyke

Due to the igneous nature of this rock type it will not contain fossils.

5 PALAEONTOLOGICAL SENSITIVITY

Malmani Dolomite

The Malmani Dolomite is known to contain stromatolites. These structures will however only be exposed if major excavations are planned, which is not the case for this development. It is however important to note that Cenozoic-aged fossils are associated with Karst structures and cave breccias that are invariably associated with dolomite of the Malmani Subgroup. If these structures are present on the development site, they must be regarded as highly sensitive for palaeontological heritage. For this reason the areas underlain by Malmani Dolomite are allocated a **Medium** Palaeontological

sensitivity. If Karst structures are present a palaeontologist must be appointed to inspect them for possible fossil content before any disturbances by construction equipment are allowed.

Syenite Dyke

Areas underlain by the syenite dyke is allocated a **Low** Palaeontological sensitivity.The dyke occupies a very small area in the Northeastern part of the area and due to scale, is not shown on the sensitivity map (see geological map for approximate location).

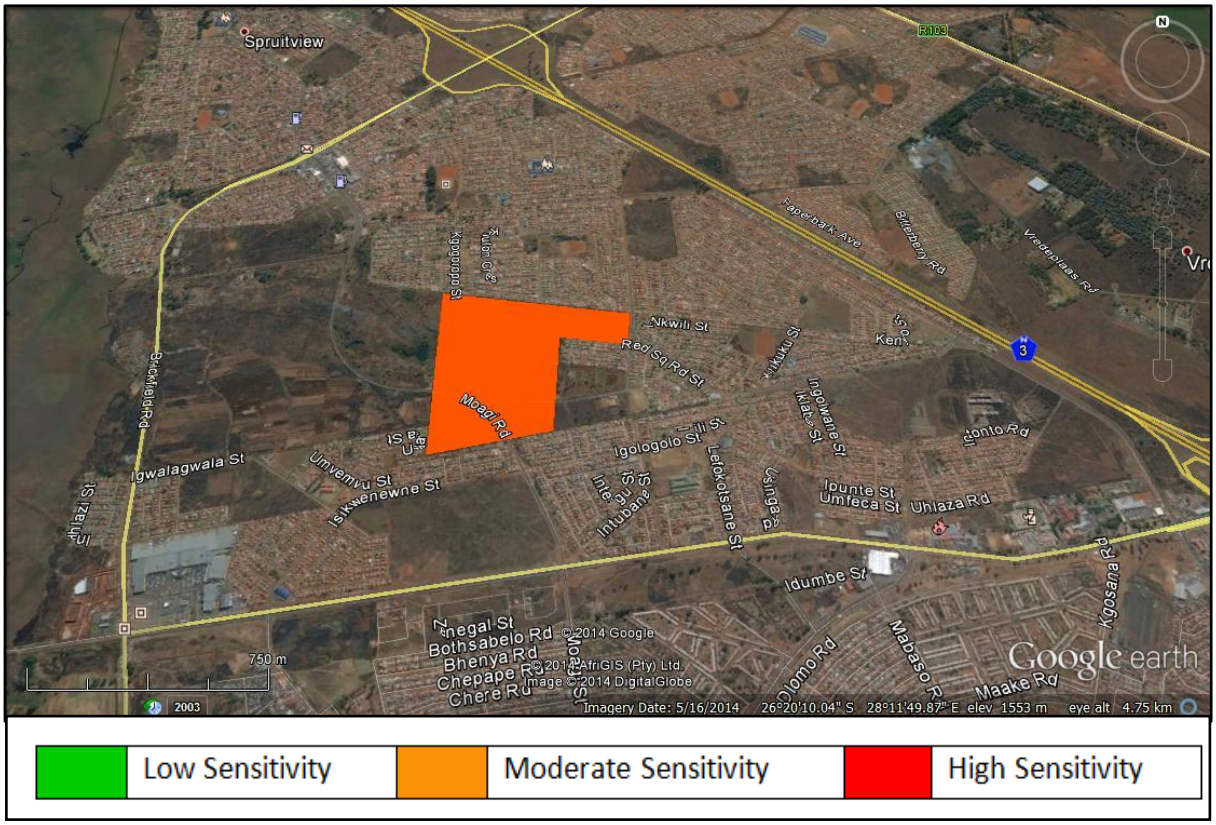

*Figure **Error! No text of specified style in document.**.34 Palaeosensitivity of the study area.*

6 CONCLUSION AND RECOMMENDATIONS

The study area is underlain by Vaalian-aged dolomite of the Malmani Subgroup, Chuniespoort Group, Transvaal Supergroup. The dolomite might be stromatolitic, and if bedrock is exposed during excavation of foundations and infrastructure development, the presence of stromatolites must be recorded and representative samples taken for further studies. It is also important to note that the Malmani Dolomites are prone to Karst formations, where Cenozoic-aged cave breccias can contain significant remains of advanced vertebrates, mammals and Hominin skeletons. If Karst topography is present, a palaeontologist must be appointed to inspect these deposits before any disturbances by construction equipment are allowed. For this reason, a **Medium** Palaeontological sensitivity is allocated to the areas underlain by Malmani Dolomite. Areas underlain by syenite are allocated a **Low** Palaeontological sensitivity.

Recommendations:

1. The developer, EAP and the ECO of the project must be informed of the fact that stromatolites have been recorded from rock units in the Malmani Subgroup and that the presence of Karst structures will be associated with highly significant Cenozoic-aged Palaeontological heritage. No further action is needed for areas underlain by Syenite.
2. If deep excavation and exposure of bedrock are indicated in the Geotechnical reports, a palaeontologist must be appointed to record stromatolitic structures in the dolomite.
3. If Karst topography and structures (cave breccias) are recorded in the Geotechnical reports on areas underlain by Malmani dolomite, a palaeontologist must be appointed to investigate these deposits before any further disturbance by construction equipment.

7 REFERENCES

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MacRae C, 1999. Life Etched in Stone. Geological Society of South Africa.

8 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Dr Gideon Groenewald has a PhD in Geology from the University of Port Elizabeth (Nelson Mandela Metropolitan University) (1996) and the National Diploma in Nature Conservation from Technicon RSA (the University of South Africa) (1989). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeoecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

9 DECLARATION OF INDEPENDENCE

I, Gideon Groenewald, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of palaeontological heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

Dr Gideon Groenewald
Geologist

Appendix B

LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

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 terms of the heritage legislation, permits are required to damage, destroy, alter, or disturb them. Furthermore, individuals who already possess heritage material are required to register it. The management of heritage resources is 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 located in a cemetery (such as ancestral graves in rural areas), are protected. The legislation also protects the interests of communities that have an interest in the graves: they should be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle are to be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resources authority and, if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company 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 prehistoric cultural remains, including graves and human remains.

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 under 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 reinternment 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 under the jurisdiction of the South African Heritage Resources 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 administrated by a local authority. Graves in the category located inside a formal cemetery administrated 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.