GLEN DOUGLAS DOLOMITE (PTY) LTD: PROPOSED GLEN DOUGLAS DOLOMITE BURNING PLANT ON PORTIONS OF THE FARMS WITKOPPIES 373 IR, FARM SLANGFONTEIN 372 IR AND ERF 303 OF HIGHBURY TOWNSHIP, MEYERTON, GAUTENG PROVINCE

Archaeological Impact Assessment

An EOH Company

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Innovation in Sustainability

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ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF PORTIONS OF THE FARMS WITKOPPIES 373 IR, FARM SLANGFONTEIN 372 IR AND ERF 303 OF HIGHBURY TOWNSHIP FOR THE PROPOSED GLEN DOUGLAS DOLOMITE BURNING PLANT, MEYERTON, GAUTENG PROVINCE

July 2014

Conducted on behalf of:

Glen Douglas Dolomite (PTY) Ltd
Exigo3 Sustainability

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Document History

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DECLARATION

I, Nelius Le Roux Kruger, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Glen Douglas Dolomite Burning Plant Project in an objective manner, even if this results in views and findings that are not favourable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this declaration are true and correct.

_____

Signature of specialist
Company: Exigo3 Sustainability
Date: 28 July 2014.

EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study on the remaining extent of portion 3 and portion 4 of the farm Witkoppies 373 IR, portion 65 of the farm Slangfontein 372 IR and the remaining extent of the Erf 303 of Highbury Township, subject to a Basic Assessment (BA) process for the proposed construction of a dolomite burning plant at the Glen Douglas Dolomite Mine in Meyerton, Gauteng Province. The report includes background information on the area's archaeology, its representation in southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the South African Heritage Resources Agency (SAHRA) and recommendations contained in this document will be reviewed.

A number of archaeological and historical studies have been conducted in the southern Gauteng region and many of these studies infer a varied heritage landscape. However, the landscape around the proposed burning plant sites at the Glen Douglas mine has been largely developed and altered as a result of mining and urbanization. As such, only one area of archaeological or heritage potential were located during the AIA survey of three potential alternatives for the burning plant, each measuring approximately 2ha respectively.

Historical/ Colonial Period:

The original Witkoppie farmstead is situated on farm portions outside of the study area but an old horse stable (**Exigo-GD-HP01: S26.516630° E28.067090°)** occurs within Site Alternative 3. The structures, consisting out of two separate buildings connected by a small enclosed yard, are probably older than 60 years and they date to the Historical Period. The site is significant in terms of Historical architectural developments and farming settlement patters in the area. It is recommended that Area 3 not be considered for development and that any activities in the area be monitored in order to avoid any possible impact on the site, and to previously undetected heritage remains in the area. However, should the structures be directly impacted by development activities, destruction permit from the relevant heritage resources authority (SAHRA) should be obtained

A Palaeontological Impact Assessment is recommended for the study area and, should fossil remains such as fossil fish, reptiles or petrified wood be exposed during construction, these objects should carefully safeguarded and the relevant heritage resources authority (SAHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist.

One site of heritage value has been documented in Area 3 considered as alternative for the Glen Douglas Dolomite Burning Plant Project and impact on the resource could be anticipated should this site be developed. However, in the opinion of the author of this Archaeological Impact Assessment Report, the proposed Glen Douglas Dolomite Burning Plant Project on the remaining extent of Portion 3 and Portion 4 of the farm Witkoppies 373 IR, Portion 65 of the farm Slangfontein 372 IR and the remaining extent of the Erf 303 of Highbury Township may proceed from a culture resources management perspective, provided that mitigation measures provided in this assessment, endorsed by the relevant Heritage Resources authority, are implemented for the heritage resource.

It is essential that cognisance be taken of the larger archaeological landscape of the Northwest Province and the Pilanesberg region in order to avoid the destruction of previously undetected heritage sites. Water sources such as salt pans, drainage lines and rivers should also be regarded as potentially sensitive in terms of possible Stone Age deposits. Should any previously undetected heritage resources be exposed or uncovered during

construction phases of the proposed project, these should immediately be reported to SAHRA. Since the intrinsic heritage and social value of graves and cemeteries are highly significant, these resources require special management measures. Should human remains be discovered at any stage, these should be reported to the Heritage Specialist and relevant authorities (SAHRA) and development activities should be suspended until the site has been inspected by the Specialist. The Specialist will advise on further management actions and possible relocation of human remains in accordance with the Human Tissue Act (Act 65 of 1983 as amended), the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the National Heritage Resources Act (Act no. 25 of 1999) and any local and regional provisions, laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.

This report details the methodology, limitations and recommendations relevant to these heritage areas, as well as areas of proposed development. It should be noted that recommendations and possible mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

NOTATIONS AND TERMS/TERMINOLOGY

Absolute dating:

Absolute dating provides specific dates or range of dates expressed in years.

Archaeology:

The study of the human past through its material remains.

Archaeological record:

The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

Artefact:

Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artefact are not altered by removal of the surroundings in which they are discovered. In the southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

Assemblage:

A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

^{14}C or radiocarbon dating:

The ^{14}C method determines the absolute age of organic material by studying the radioactivity of carbon. It is reliable for objects not older 70 000 years by means of isotopic enrichment. The method becomes increasingly inaccurate for samples younger than ±250 years.

Ceramic Facies:

In terms of the cultural representation of ceramics, a facies is denoted by a specific branch of a larger ceramic tradition. A number of ceramic facies thus constitute a ceramic tradition.

Ceramic Tradition:

In terms of the cultural representation of ceramics, a series of ceramic units constitutes as ceramic tradition.

Context:

An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context,* disturbance or displacement by later ecological action or human activities occurred.

Culture:

A contested term, "culture" could minimally be defined as the learned and shared things that people have, do and think.

Cultural Heritage Resource:

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural landscape:

A cultural landscape refers to a distinctive geographic area with cultural significance.

Cultural Resource Management (CRM):

A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

Ecofact:

Non artefactual material remains that has cultural relevance which provides information about past human activities. Examples would include remains or evidence of domesticated animals or plant species.

Excavation:
The principal method of data acquisition in archaeology, involving the systematic uncovering of archaeological remains through the removal of the deposits of soil and the other material covering and accompanying it.

Feature:
Non-portable artefacts, in other words artefacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

GIS:
Geographic Information Systems are computer software that allows layering of various types of data to produce complex maps; useful for predicting site location and for representing the analysis of collected data within sites and across regions.

Historical archaeology:
Primarily that aspect of archaeology which is complementary to history based on the study of written sources. In the South African context it concerns the recovery and interpretation of relics left in the ground in the course of Europe's discovery of South Africa, as well as the movements of the indigenous groups during, and after the "Great Scattering" of Bantu-speaking groups – known as the *mfecane* or *difaqane*.

Impact: A description of the effect of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Iron Age:
Also known as "Farmer Period", the "Iron Age" is an archaeological term used to define a period associated with domesticated livestock and grains, metal working and ceramic manufacture.

Lithic:
Stone tools or waste from stone tool manufacturing found on archaeological sites.

Management / Management Actions:
Actions – including planning and design changes - that enhance benefits associated with a proposed development, or that avoid, mitigate, restore, rehabilitate or compensate for the negative impacts.

Matrix:
The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

Megalith:
A large stone, often found in association with others and forming an alignment or monument, such as large stone statues.

Midden:
Refuse that accumulates in a concentrated heap.

Microlith:
A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

Monolith:
A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

Oral Histories:
The historical narratives, stories and traditions passed from generation to generation by word of mouth.

Phase 1 CRM Assessment:
An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

Phase 2 CRM Study:
In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including

historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

Phase 3 CRM Measure:

A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

Prehistoric archaeology:

That aspect of archaeology which concerns itself with the development of humans and their culture before the invention of writing. In South Africa, prehistoric archaeology comprises the study of the Early Stone Age, the Middle Stone Age and the greater part of the Later Stone Age and the Iron Age.

Probabilistic Sampling:

A sampling strategy that is not biased by any person's judgment or opinion. Also known as statistical sampling, it includes systematic, random and stratified sampling strategies.

Provenience

Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association,* the co-occurrence of an artefact with other archaeological remains; and *superposition,* the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

Random Sampling:

A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

Relative dating:

The process whereby the relative antiquity of sites and objects are determined by putting them in sequential order but not assigning specific dates.

Remote Sensing:

The small or large-scale acquisition of information of an object or phenomenon, by the use of either recording or real-time sensing device(s) that is not in physical or intimate contact with the object (such as by way of aircraft, spacecraft or satellite). Here, ground-based geophysical methods such as Ground Penetrating Radar and Magnetometry are often used for archaeological imaging.

Rock Art Research:

Rock art can be "decoded" in order to inform about cultural attributes of prehistoric societies, such as dress-code, hunting and food gathering, social behaviour, religious practice, gender issues and political issues.

Scoping Assessment:

The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an impact assessment. The main purpose is to focus the impact assessment on a manageable number of important questions on which decision making is expected to focus and to ensure that only key issues and reasonable alternatives are examined. The outcome of the scoping process is a Scoping Report that includes issues raised during the scoping process, appropriate responses and, where required, terms of reference for specialist involvement.

Sensitive:

Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.

Site (Archaeological):

A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

Slag:
The material residue of smelting processes from metalworking.

Stone Age:
An archaeological term used to define a period of stone tool use and manufacture.

Stratigraphy:
This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

Stratified Sampling:
A probabilistic sampling strategy whereby a study area is divided into appropriate zones – often based on the probable location of archaeological areas, after which each zone is sampled at random.

Systematic Sampling:
A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

Tradition:
Artefact types, assemblages of tools, architectural styles, economic practices or art styles that last longer than a phase and even a horizon are describe by the term *tradition*. A common example of this is the early Iron Age tradition of Southern Africa that originated ± 200 AD and came to an end at about 900 AD.

Trigger: A particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an *issue* and/or potentially significant *impact* associated with that proposed development that may require specialist input. Legal requirements of existing and future legislation may also trigger the need for specialist involvement.

Tuyère:
A ceramic blow-tube used in the process of iron smelting / reduction.

LIST OF ABBREVIATIONS

Abbreviation	Description
AGES	Africa Geo Environmental Services Gauteng Pty Ltd
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
CRM	Culture Resources Management
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
K2/Map	K2/Mapungubwe Period
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MRA	Mining Right Area
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authorities
SAFA	Society for Africanist Archaeologists
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

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1 BACKGROUND

1.1 Scope and Motivation

Exigo3 Sustainability was commissioned by Glen Douglas Dolomite (PTY) Ltd for an Archaeological Impact Assessment (AIA) study on the remaining extent of portion 3 and portion 4 of the farm Witkoppies 373 IR, portion 65 of the farm Slangfontein 372 IR and the remaining extent of the Erf 303 of Highbury Township, subject to a Basic Assessment (BA) process for the proposed construction of a dolomite burning plant at the Glen Douglas Dolomite Mine in Meyerton, Gauteng Province. The rationale of this AIA is to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance in previously unstudied areas; to consider the impact of the proposed project on such heritage resources, and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

1.2 Project Direction

Exigo3's expertise ensures that all projects be conducted to the highest international ethical and professional standards. As archaeological specialist for Exigo, Mr Neels Kruger acted as field director for the project; responsible for the assimilation of all information, the compilation of the final consolidated AIA report and recommendations in terms of heritage resources on the demarcated project areas. Mr Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA) as well as a Master's Degree candidate in archaeology at the University of Pretoria.

1.3 Project Brief

The existing Glen Douglas mine is a conventional open-pit mine producing products comprising metallurgical dolomite, aggregates and agricultural lime. The mine supplies ArcelorMittal Steel's Vanderbijlpark and Newcastle Works for which it was opened 60 years ago by the State Owned Company, Iscor. Given the use of burnt dolomite in the metallurgical and steel making industry, Afrimat has proposed expansion into the production of burnt dolomite with the Glen Douglas Burnt Dolomite Project. The preferred alternative is for the expansion of the existing mining operations by constructing 2 x 300 ton/day vertical shaft kilns. This application includes the following:

- The construction of 2 x 300 ton/day vertical shaft kilns, with a plant footprint of 0,2 ha and 41m high.
- Coal storage stockpiling and milling area, approximately 0,1ha
- Dolomite stockpiling area, approximately 0,2ha
- Burnt Dolomite plant area, approximately 0,5ha
- Roads associated with hauling products to and from the site, approximately 1ha.

Three alternative areas have been identified for the Glen Douglas Burning Plant (see Figure 1-1)

Area Alternative 1 (Preferred Alternative) is located to the north western boundary of the Glen Douglas mine, close to the Daleside residential community. Following from the baseline studies this is the preferred alternative for the following reasons:

- This site is located within an existing mining area; therefore there will be no need for additional rezoning applications.

- The costs of transporting the dolomite to the kilns will be minimal.
- Alternative 1 also is situated closer to the processing plant and is more accessible for burnt dolomite collections, thereby reducing the travelling distance along the unpaved roads.
- This alternative will not include the added cost of property and facility purchasing.
- The overall impression and conclusion is that this site is not botanically sensitive and has low conservation value.
- The vegetation is highly disturbed on this site due to the 4x4 activities.
- There are no wetlands, red or orange list data species or a CBA located on the site.
- Alternative 1 is the least visually intrusive and therefore the preferred site from a visual perspective
- Alternative 1 is closer to the existing quarry and will maximize the efficiency of the mine.

Area Alternative 2 is located along the Eastern boundary of the existing Glen Douglas Mine. The site is flanked on the East by the Klip River. Following from the baseline studies this is not the preferred alternative for the following reasons:

- Alternative 2 is flanked on the east side by the Klip River.
- Alternative 2 was confirmed to include a seasonal wetland, at least in part, and therefore is not suitable for the proposed construction of dolomite burning kilns as the wetland will require a 500m buffer as stipulated by the National Water Act.
- The site's proximity to the Klip River would also mean that the riverine system would have to be adequately buffered, making it non-viable in terms of the area available for construction.
- Alternative 2 is located next to the Klip River and therefore no construction is allowed within 100m from the river.
- Most of Alternative 2 is mapped as a CBA, and therefore the vegetation is highly vulnerable.

Area Alternative 3 is located south of Alternative 2 along the eastern boundary of the Glen Douglas Mine. Alternative 3 is largely a transformed agricultural area. It may be divided into an eastern third with horse stables and grazed paddocks and a western wedge-shaped two-thirds. Following from the baseline studies this is not the preferred alternative for the following reasons:

- Alternative 3 has high merit in terms of grassland conservation. If rested from grazing it is likely to provide a good example of Carletonville Dolomite Grassland.
- Placing of dolomite burning kilns on the eastern third of Alternative 3 would result in very low negative impacts on any vegetation or flora. In contrast, construction of such kilns west of the fence would result in medium to high negative impacts.
- The area has been mapped as a CBA.
- There is the possibility of Orange and/or Red List species occurring on Alternative 3.

Other key features of the project are to ensure a high level of reliability, operational and maintenance safety, low water consumption. The expected operational life of the plant is deemed of approximately 25-30 years.

Figure 1-1: General regional context indicating Areas demarcated as alternatives for the proposed Glen Douglas Dolomite Burning Plant Project.

1.4 Terms of Reference

Heritage specialist input into the Environmental Impact Assessment (EIA) process is essential to ensure that through the management of change, developments still conserve our heritage resources. Heritage specialist input in EIA processes can play a positive role in the development process by enriching an understanding of the past and its contribution to the present. It is also a legal requirement for certain development categories which may have an impact on heritage resources (Refer to Section 2.5.2).

Thus, EIAs should always include an assessment of Heritage Resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National Heritage Resources Act (NHRA - Act 25 of 1999)**. In addition, the NHRA protects all structures and features older than 60 years (see Section 34), archaeological sites and material (see Section 35) and graves as well as burial sites (see Section 36). The objective of this legislation is to ensure that developers implement measures to limit the potentially negative effects that the development could have on heritage resources.

Based hereon, this project functioned according to the following **terms of reference for** heritage specialist input**:**

- *Assess findings in the previous Archaeological Impact Assessment Study by ACRM (2007).*
- *Provide detailed updated description of all additional archaeological artefacts, structures (including graves) and settlements which may be affected, if any.*
- *Assess the nature and degree of significance of such resources within the area.*
- *Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance.*
- *Assess any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities.*
- *Propose possible heritage management measures provided that such action is necessitated by the development.*
- *Obtain a comment from Heritage Western Cape (HWC).*

1.5 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

1.5.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

a. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act of 1999 a historical site is any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years. This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

The Act identifies heritage objects as:

- 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
- any other prescribed category

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."

and

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."

b. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

1.5.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

The National Heritage Resources Act (Act No. 25 of 1999, section 38) provides guidelines for Cultural Resources Management and prospective developments:

"38. *(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as:*

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site:

(i) exceeding 5 000 m^2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within

the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

And:

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64)."

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIAs) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or significance to be protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects. Heritage resources management and conservation

1.6 Assessing the Significance of Heritage Resources

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places

in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable.* Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

- Categories of significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

- *Aesthetic value:*

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

- *Historic value:*

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually a place has historical value because of some kind of influence by an event, person, phase or activity.

- *Scientific value:*

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

- *Social value:*

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of

heritage resources; i.e. formally protected and generally protected sites:

Formally protected sites:

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the provincial HRA.
- Grade 3 or local heritage sites.

Generally protected sites:

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 70 years.
- Structures older than 60 years.

With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories.

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, augering), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on six 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),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

A fundamental aspect in assessing the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data / information, which would otherwise be lost.

2 REGIONAL CONTEXT

2.1 Area Location

The proposed dolomite burning plant will be constructed on the grounds of the existing Glen Douglas Dolomite Mine. The mine is situated in Henley on Klip in Gauteng, approximately 25 km south of Johannesburg in the Sedibeng District Municipality, generally at **S26.513739 E 28.059904° (**1:50 000 Map Reference 2628CA**)** (see Figure 2-1). The Glen Douglas Dolomite mine is located on the Remaining extent of portion 3 and portion 4 of the farm Witkoppies 373 IR, portion 65 of the farm Slangfontein 372 IR and the remaining extent of the Erf 303 of Highbury Township in Bokmakierie Road, Meyerton.

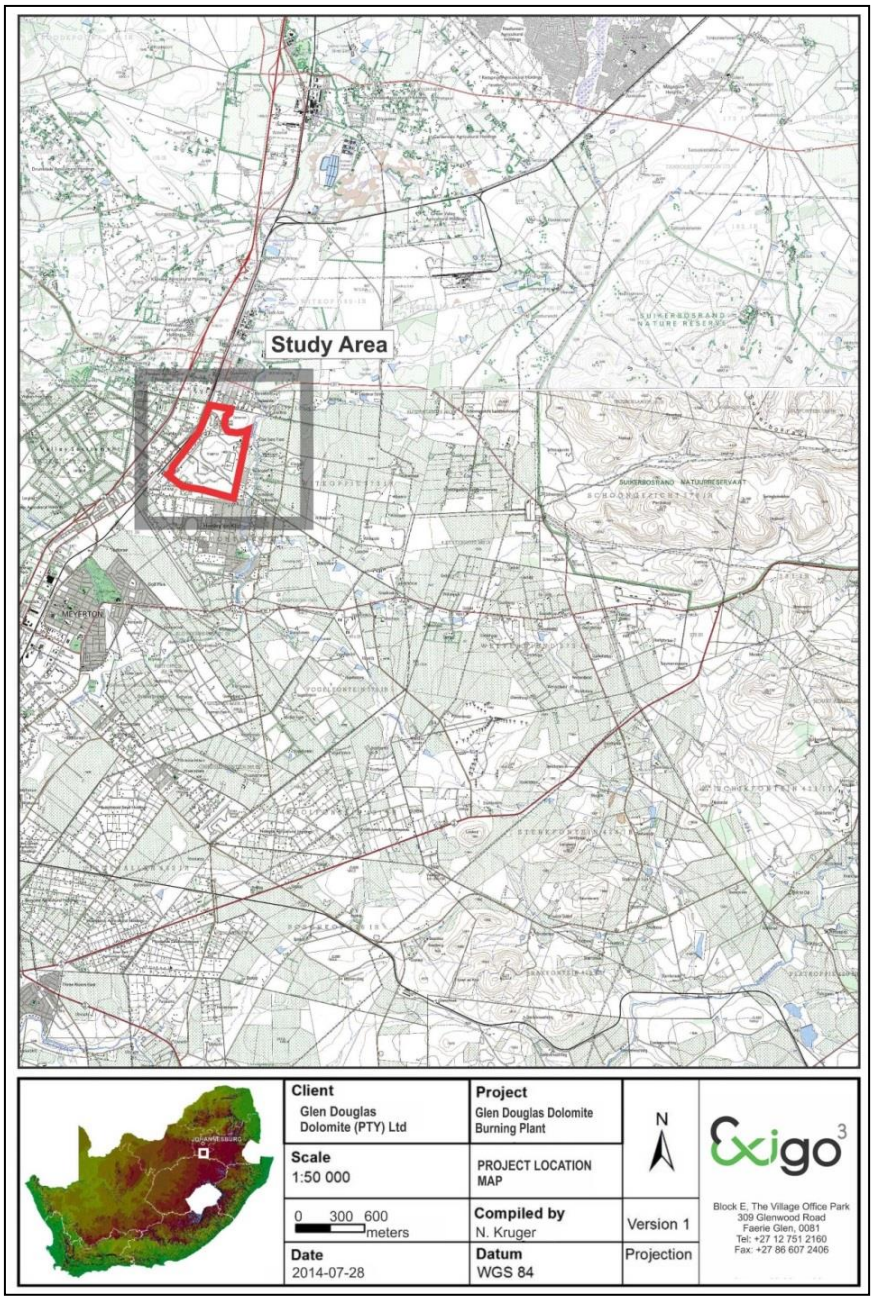

Figure 2-1: 1:50 00 Map representation of the location of the Glen Douglas Dolomite Mine (2628CA).

2.2 Area Description: Receiving Environment

The development site lies within the Savanna biome which is the largest biome in Southern Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants (trees and shrubs). Even though the area has been completely urbanized, the original vegetation in the larger landscape is classified as Moist Cool Highveld Grassland. The general landscape is characterised by undulating, Highveld grassland that is drained by the Klein-Rietspruit. The Vaal River flows approximately 20km south of the study area. The Henley on Klip area is situated approximately 1 500m above sea level. It has an annual summer rainfall of 650 mm per annum.

Figure 2-2: General surroundings at the Glen Douglas Dolomite Mine at the time of the field survey (May 2014).

2.3 Site Description

Glen Douglas is an open pit-mine producing products comprising metallurgical dolomite, aggregate and agricultural lime. The mine is situated in an urbanized area. The Klip River flows through the eastern portion of the mine property with the R59 running past the mine on the left. Bass Lake, an old pit located on the property, is used for public recreational purposes.

Surroundings at Alternative 1 to the north western boundary of the mine are highly disturbed on this site due to the 4x4 and outdoor tourism activities.

Alternative 2 along the Eastern boundary of the Glen Douglas Mine is flanked on the East by the Klip River and includes a seasonal wetland.

Alternative 3, south of Alternative 2 along the eastern boundary of the Mine, is largely a transformed agricultural area consisting of horse stables and grazed paddocks.

Figure 2-3: Aerial representation of the regional setting of proposed Glen Douglas Dolomite Burning Plant Project area indicating Areas 1 – 3 considered as alternatives for the burning plant. .

3 METHOD OF ENQUIRY

3.1 Sources of Information

Data from detailed desktop, aerial and field studies were employed in order to sample surface areas systematically and to ensure a high probability of heritage site recording.

3.1.1 Desktop Study

A desktop study was prepared in order to contextualize the proposed project within a larger historical milieu. The study focused on relevant previous studies, archaeological and archival sources, aerial photographs, historical maps and local histories, all pertaining to the Highveld and Vaal River areas.

3.1.2 Aerial Representations and Survey

Aerial photography is often employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. This method was applied to great success in the pedestrian survey for the project where contour lines of elevations, depressions, variation in vegetation, soil marks and landmarks were examined. Specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their height, vigour and type) and soil marks (e.g. differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. By superimposing high frequency aerial photographs with images generated with Google Earth, potential sensitive areas were subsequently identified, geo-referenced and transferred to a handheld GPS device. In addition, based on existing knowledge of the local heritage landscape, the different alternatives were divided into smaller survey zones centred around areas of higher site catchment probability (where human activity was likely to occur in prehistoric and historic times e.g. around water sources, near soils fit for agriculture, on ridges). These survey zones were then transferred to a handheld GPS device. These areas served as referenced points from where further vehicular and pedestrian surveys were carried out.

3.1.3 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. An archaeological survey of the 3 alternatives for the burning plant was conducted in May 2014. The process encompassed a systematic field survey in accordance with standard archaeological practice by which heritage resources are observed and documented. In order to sample surface areas systematically and to ensure a high probability of site recording the differing alternatives were systematically surveyed on foot and by motor vehicle, GPS reference points were visited and random spot checks were made (see detail in previous section). Using a Garmin E-trex Legend GPS objects and structures of archaeological / heritage value were recorded and photographed with a Canon 450D Digital camera. Real time aerial orientation, by means of a mobile Google Earth application was also employed to investigate possible disturbed areas during the survey.

As most archaeological material occur in single or multiple stratified layers beneath the soil surface, special attention was given to disturbances, both man-made such as roads and clearings, as well as those made by natural agents such as burrowing animals and erosion.

3.1.4 General Public Liaison

Correspondence with employees from the Glen Douglas Mine provided information on the possible locations of heritage resources and brief commentaries on the recent history of the area. They indicated that, besides for an informal cemetery that was destroyed some decades ago when the mine was established, no heritage resources were present within the mine borders.

3.2 Limitations

3.2.1 Access

The Glen Douglas Mine is accessed via a residential road from Henley on Klip. Access control is applied to the areas demarcated as alternatives relevant to this assessment but no restrictions were encountered during the site visit as the author of this report was accompanied by mine employees at all times. A number of mine service roads provided vehicular access to areas subject to the site inspections.

3.2.2 Visibility

The surrounding vegetation in the study area is mostly comprised out of mixed grasslands and scattered trees. Generally, the visibility at the time of the AIA site inspection (May 2014) ranged was moderate to high visibility since most areas subject to the study have been vastly disturbed (see Figures 3-1 to 3-7). In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.

Figure 3-1: View of general surroundings in Area 1 which is currently used as a 4x4 track and recreation zone.

Figure 3-2: View of general surroundings in Area 1 which is currently used as a 4x4 track and recreation zone.

Figure 3-3: View of general surroundings and vegetation cover in Area 1, looking south towards the Glen Douglas Mine.

Figure 3-4: View of general surroundings along a wetland in Area 2 on the banks of the Klip River.

Figure 3-5: View of general surroundings along the Klip River in Area 2.

Figure 3-6: View of cleared agricultural fields in Area 3.

Figure 3-7: View of grazing land and general surroundings in Area 3.

3.2.3 Limitations and Constraints

The pedestrian site survey for the Glen Douglas Dolomite Burning Plant Project AIA primarily focused around areas tentatively identified as sensitive and of high heritage probability (i.e. those noted during the aerial survey) as well as areas of high human settlement catchment. The following constraints were encountered:

- **Visibility:** Visibility constrained site identification in areas with denser surface cover, as well as portions where vegetation is more pristine.

Thus, even though it might be assumed that survey findings are representative of the heritage landscape of the project area for the Glen Douglas Dolomite Burning Plant, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology. Therefore, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources identified during the study do not necessarily represent all the heritage resources present in the project area. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

3.3 Impact Assessment

For consistency among specialists, the impact assessment ratings for this report in Section 6 were done using a general direct impact assessment as well as the more standardised the Plomp[1] impact assessment matrix scale supplied by Exigo3. Each heritage receptor in the study area is given an impact assessment. A cumulative assessment for the proposed project is also included

4 ARCHAEO-HISTORICAL CONTEXT

4.1 The archaeology of Southern Africa

Archaeology in southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table provides a concise outline of the chronological sequence of periods, events, cultural groups and material expressions in Southern African pre-history and history.

Table 1 Chronological Periods across southern Africa

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: *Australopithecines* *Homo habilis* *Homo erectus*	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First *Homo sapiens* species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	*Homo sapiens sapiens* including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD	Holocene	First Bantu-speaking groups	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 – 1350 AD	Holocene	Bantu-speaking groups, ancestors of present-day groups	Typically distinct ceramics, bead ware and iron / gold / copper objects, trade goods and grinding stones.
Late Iron Age / Later Farmer	Holocene	Various Bantu-speaking	Distinct ceramics, grinding stones, iron

[1] Plomp, H.,2004

Period 1400 AD -1850 AD		groups including Venda, Thonga, Sotho-Tswana and Zulu	objects, trade objects, remains of iron smelting activities including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g. homesteads, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

4.1.1 The Stone Ages

- **The Earlier Stone Age (ESA)**

Earlier Stone Age deposits typically occur on the flood-plains of perennial rivers and may date to between 2 million and 250 000 years ago. These ESA open sites sometimes contain stone tool scatters and manufacturing debris ranging from pebble tool choppers to core tools such as handaxes and cleavers. These stone tools were made by the earliest hominins. These groups seldom actively hunted and relied heavily on the opportunistic scavenging of meat from carnivore fill sites.

- **The Middle Stone Age (MSA)**

The majority of Middle Stone Age (MSA) sites occur on flood plains and sometimes in caves and rock shelters. Sites usually consist of large concentrations of knapped stone flakes such as scrapers, points and blades and associated manufacturing debris. Tools may have been hafted but organic materials, such as those used in hafting, seldom remain preserved in the archaeological record. Limited drive-hunting activities are also associated with the MSA.

- **The Later Stone Age (LSA)**

Sites dating to the Later Stone Age (LSA) are better preserved in rock shelters, although open sites with scatters of mainly stone tools can occur. Well-protected deposits in shelters allow for stable conditions that result in the preservation of organic materials such as wood, bone, hearths, ostrich eggshell beads and even bedding material. By using San (Bushman) ethnographic data a better understanding of this period is possible. South African rock art is also associated with the LSA.

4.1.2 The Iron Age Farmer Period

- **Early Iron Age (Early Farming Communities)**

The Early Iron Age (also Early Farmer Period) marks the movement of Bantu speaking farming communities into South Africa at around 200 A.D. These groups were agro-pastoralists that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Artefact evidence from Early Farmer Period sites is mostly found in the form of ceramic assemblages and the origins and archaeological identities of this period are largely based upon ceramic typologies and sequences, where diagnostic pottery assemblages can be used to infer group identities and to trace movements across the landscape. Early Farmer Period ceramic traditions are classified by some scholars into different “streams” or trends in pot types and decoration that, over time emerged in southern Africa. These “streams” are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). More specifically, in the northern regions of South Africa at least three settlement phases have been distinguished for prehistoric Bantu-speaking agropastoralists. The first phase of the Early Iron Age, known as Happy Rest (named after the site where the ceramics were first

identified), is representative of the Western Stream of migrations, and dates to AD 400 - AD 600. The second phase of Diamant is dated to AD 600 - AD 900 and was first recognized at the eponymous site of Diamant in the western Waterberg. The third phase, characterised by herringbone-decorated pottery of the Eiland tradition, is regarded as the final expression of the Early Iron Age (EIA) and occurs over large parts of the North West Province, Northern Province, Gauteng and Mpumalanga. This phase has been dated to about AD 900 - AD 1200. Early Farmer Period ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. The Early Iron Age continued up to the end of the first millennium AD.

- **Middle Iron Age / K2 Mapungubwe Period (early Later Farming Communities)**

The onset of the middle Iron Age dates back to ±900 AD, a period more commonly known as the Mapungubwe / K2 phase. These names refer to the well known archaeological sites that are today the pinnacle of South Africa's Iron Age heritage. The inhabitants of K2 and Mapungubwe, situated on the banks of the Limpopo, were agriculturalists and pastoralists and were engaged in extensive trade activities with local and foreign traders. Although the identity of this Bantu-speaking group remains a point of contestation, the Mapungubwe people were the first state-organized society southern Africa has known. A considerable amount of golden objects, ivory, beads (glass and gold), trade goods and clay figurines as well as large amounts of potsherds were found at these sites and also appear in sites dating back to this phase of the Iron Age. Ceramics of this tradition take the form of beakers with upright sides and decorations around the base (K2) and shallow-shouldered bowls with decorations as well as globular pots with long necks. (Mapungubwe). The site of Mapungubwe was deserted at around 1250 AD and this also marks the relative conclusion of this phase of the Iron Age.

- **Later Iron Age (Later Farming Communities)**

The late Iron Age of southern Africa marks the grouping of Bantu speaking groups into different cultural units. It also signals one of the most influential events of the second millennium AD in southern Africa, the difaqane. The difaqane (also known as "the scattering") brought about a dramatic and sudden ending to centuries of stable society in southern Africa. Reasons for this change was essentially the first penetration of the southern African interior by Portuguese traders, military conquests by various Bantu speaking groups primarily the ambitious Zulu King Shaka and the beginning of industrial developments in South Africa. Different cultural groups were scattered over large areas of the interior. These groups conveyed with them their customs that in the archaeological record manifest in ceramics, beads and other artefacts. This means that distinct pottery typologies can be found in the different late Iron Age groups of South Africa.

- **Bantu Speaking Groups in the South African interior**

It should be noted that terms such as "Nguni", "Sotho", "Venda" and others refer to broad and comprehensive language groups that demonstrated similarities in their origins and language. It does not imply that these Nguni / Sotho groups were homogeneous and static; they rather moved through the landscape and influenced each other in continuous processes marked by cultural fluidity.

Ethnographers generally divide major Bantu-speaking groups of southern Africa into two broad linguistic groups, the Nguni and the Sotho with smaller subdivisions under these two main groups. Nguni groups were found in the eastern parts of the interior of South Africa and can be divided into the northern Nguni and the southern Nguni. The various Zulu and Swazi groups were generally associated with the northern Nguni whereas the southern Nguni comprised the Xhosa, Mpondo, Thembu and Mpondomise groups. The same geographically based divisions exist among Sotho groups where, under the western Sotho (or Tswana), groups

such as the Rolong, Hurutshe, Kwena, Fokeng and Kgatla are found. The northern Sotho included the Pedi and amalgamation of smaller groups united to become the southern Sotho group or the Basutho. Other smaller language groups such as the Venda, Lemba and Tshonga Shangana transpired outside these major entities but as time progressed they were, however to lesser or greater extend influenced and absorbed by neighbouring groups.

4.1.3 Historical and Colonial Times and Recent History

The Historical period in southern Africa encompass the course of Europe's discovery of South Africa and the spreading of European settlements along the East Coast and subsequently into the interior. In addition, the formation stages of this period are marked by the large scale movements of various Bantu-speaking groups in the interior of South Africa, which profoundly influenced the course of European settlement. Finally, the final retreat of the San and Khoekhoen groups into their present-day living areas also occurred in the Historical period in southern Africa.

4.2 The Southern Highveld: Specific Themes.

A number of Archaeological Impact Assessments (e.g. Coetzee 2003, Roodt 2008, Van Schalkwyk 2010 and Pistorius 2007) have been conducted in the Vanderbijlpark area. Generally, sites documenting Earlier, Middle and Later Stone Age habitation occur across the Highveld, mostly in open air locales or in sediments alongside rivers or pans. Sites dating to the Iron Age occur on the Highveld where environmental factors and population density delegated that the spread of Iron Age farming. Moving into recent times, the archaeological record reflects the development of a rich colonial frontier, characterised by, amongst others, a complex industrial archaeological landscape such as mining developments and war events, which herald the modern era in South African history.

4.2.1 Early History

According to archaeological research, the earliest ancestors of modern humans emerged some two to three million years ago. The remains of Australopithecine and Homo habilis have been found in dolomite caves and underground dwellings in the Bankeveld at places such as Sterkfontein and Swartkrans near Krugersdorp. Homo habilis, one of the Early Stone Age hominids, is associated with Oldowan artefacts, which include crude implements manufactured from large pebbles. The Acheulian industrial complex replaced the Oldowan industrial complex during the Early Stone Age. This phase of human existence was widely distributed across South Africa and is associated with *Homo erectus*, who manufactured hand axes and cleavers from as early as one and a half million years ago. Oldowan and Acheulian artefacts were also found four to five decades ago in some of the older gravels (ancient river beds and terraces) of the Vaal River and the Klip River in Vereeniging. The earliest ancestors of modern man may therefore have roamed the Vaal valley at the same time that their contemporaries occupied some of the dolomite caves near Krugersdorp. Middle Stone Age sites dating from as early as two hundred thousand years ago have been found all over South Africa. Middle Stone Age hunter-gatherer bands also lived and hunted in the Orange and Vaal River valleys. These people, who probably looked like modern humans, occupied campsites near water but also used caves as dwellings. They manufactured a wide range of stone tools, including blades and point s that may have had long wooden sticks as hafts and were used as spears. The Late Stone Age commenced twenty thousand years ago or somewhat earlier. The various types of Stone Age industries scattered across the country are associated with the historical San and Khoi-Khoi people. The San were renowned as formidable hunter-gatherers, while the Khoi-Khoi herded cattle and small stock during the last two thousand years. Late Stone Age people manufactured tools that were small

but highly effective, such as arrow heads and knives. The Late Iron Age people were also known for their rock art skills. At least one rock engraving site exists near Vereeniging, at Redan

4.2.2 Later History

Complex stone wall clusters are scattered across the landscapes of the Southern Highveld and the Free State. These stone structures, commonly associated with Bantu speaking farming communities, are the remnants of a complex 500 year old sequence of stone wall building in central interior of South Africa. Tim Maggs, noted archaeologist of the later Farmer Period in southern Africa, named the first phase in this sequence "Type N" walling, dating to the 15th to 17th centuries AD (Maggs 1976). This phase, which mostly developed in the Free State, was characterised by central cattle kraals linked by outer walls, while the whole settlement was surrounded by a perimeter wall which also incorporated small stock enclosures. After the 17th century, the "Type N" style of building spread across the Vaal River in consecutive phases where it later became known as "Klipriviersberg" type walling (Taylor 1979a). These settlements typically displayed outer scalloped walls that demarcated back courtyards, a large number of small stock kraals and straight walls which separated household units in the domestic zone. Beehive huts would have housed communities on these sites. The Klipriviersberg walling type dates to the 18th and 19th centuries and are associated with the Fokeng cluster of the Sotho-Tswana speaker group.

Knowledge of the early history of the Fokeng is limited but we do know that a group of Fokeng predecessors settled in the Free State by the 14th century. Later, two Fokeng groups detached from the main entity and settled near Broederstroom at the foot of the Magaliesberg, and near the Vaal River respectively. The latter yet again divided and one of these divisions settled over a large area in the northern Free State and the southern Highveld. Stone walled settlements on the farms Rietfontein 461IR and Grootvlei 604IR can probably be related to these relatives of the Fokeng.

Figure 4-1: Characteristic Klipriviersberg-type stone walled settlements east of Vereeniging on the Highveld (after Huffman [2007]).

4.2.3 Burial Sites / Human Remains

Human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. If any human bones are found during the course of construction work then they should be reported to an

archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial they would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500).

4.2.4 European Occupation and Recent History

The village of Henley on Klip was founded in 1904, by Advocate Horace Kent. Born in 1855 in Henley on Thames, England, Kent came to South Africa in 1898. The area where Henley on Klip is located, reminded Kent of his hometown, in England, Henley on Thames. Kent, in conjunction with the Small Farms Company (SFC), bought the land from a Mr Van Der Westhuizen, for a price of 5000 Pounds, and the land was divided into smallholdings from 1 to 80 acres (320,000 m^2).

In 1904, the SFC decided to build the Kidson Weir on the Klip River in Henley on Klip. The weir was named after Fenning Kidson, the grandson of an 1820 settler. Fenning was educated in England, but returned to South Africa as a young man and became a transport rider, a contemporary of Sir Percy Fitzpatrick. Soon after the outbreak of the Anglo Boer War, news came to Kidson that a commando was on his way to his farm to arrest him. Under the noses of the Boers he escaped, riding sidesaddle, his burly frame crammed into his wife's riding habit. He finally made his way to Natal, but returned to the Transvaal after the war, settling in Henley on Klip with his wife, Edith. The family home was named Tilham, which is the manor house on the river at the corner of Regatta and Shillingford Roads. On 12 September 1860, Mattys Wynand Pretorius and his wife Magdalena Gerbrecht bought the farm Slangfontein on the banks of the Klipriver for the purchase price of eight Pounds Sterling. This farm stretched from beyond the Klipriver to the Meyerton Border. The largest portion of this farm is now known as Henley on Klip. Mattys Wynand Pretorius sr. died on the 10 December 1892, and was buried inside the family graveyard on the banks of the river. In accordance with his final will and testament, the farm was divided between his beneficiaries. A portion of this farm was situated on the East Bank of the river and was known as "Bloemhok".

In October 1903 the Small Farm Company Limited agreed to buy this portion from C.J van der Westhuizen. The company was approached by Mattys Cornelius and Johannes Pretorius who owned some 1250 morgen on the west side of the Klip River and agreed to buy 781 morgen, including 7000 feet of river frontage. Another company known as the Settlers Syndicate bought the residue of 781 morgen with a river frontage of 800 feet, which is now known as Highbury. In 1904 three Portable buildings were erected, one of these was to be used as the Henley on Klip Hotel. The second building was converted to the townships owner's residence and the third became the Manor Hotel but was originally the Henley Golf Club. The construction of the Kidson weir started in 1904 with the object of impounding 80 acres of water varying in width from 80 feet to 500 feet with a maximum depth of 17 feet. Advocate Horace Kent played a dominant part in the development and expansion of Henley on Klip. He, together with the Small Farms Company, bought the above mentioned properties, and because it reminded him of his birth place he named it the township of Henley on Klip.

During the South African War, British troops were stationed in the village to guard a nearby railway line to Johannesburg. Block houses were constructed normally a thousand yards apart and set in concrete, and aimed down the line of wire were several rifles which could be fired at night without the aid of Very Lights.

The farm Witkoppie as well as adjacent farms were proclaimed in the first part of the previous century.

Figure 4-2: Entrance to the original Glen Douglas farm on Witkoppies.

5 RESULTS: ARCHAEOLOGICAL SURVEY

The site of heritage potential identified in the Glen Douglas Dolomite Burning Plant study area was arbitrarily coded **Exigo-GD-HPxx** (Exigo3 Glen Douglas Historical Period).

5.1 The Stone Age

No Stone Age remains were observed in the study area but it should be noted that Stone Age material (particularly Middle and Later Stone Age) might be encountered around sources of water and drainage lines such as the Klip River.

5.2 The Iron Age Farmer Period

No Iron Age (Farmer Period) occurrences were observed in the survey area.

5.3 Historical / Colonial Period and recent times

- **Site Exigo-GD-HP01: S26.516630° E28.067090° (Historical Period Structures)**

The town of Henly on Klip is surrounded by small farms and Historical and Colonial Period houses, labourer's quarters and other related infrastructure remain in the area on farming properties. The original Witkoppie farmstead is situated on farm portions outside of the study area but an old horse stable occurs within Site Alternative 3. The structures, consisting out of two separate buildings connected by a small enclosed yard, have been constructed out of stone, mud brick and cement. The well preserved buildings display Historical Period building and architectural characteristics such as the application of mud clay as cement and the use of crude stone and wood in wall and window construction. As such, the structures are probably older than 60 years and they date to the Historical Period. The site is significant since it might yield an understanding of architectural developments and Colonial farming expansion in the area.

Figure 5-1: View of horse stables at Site Exigo-GD-HP01.

Figure 5-2: A section of stone wall at Site Exigo-GD-HP01. Note the use of mud clay as cement in the construction.

5.4 Graves and Human Burials

No human burials were observed in the survey area but graves may be exposed or uncovered during bush clearing, earth moving and construction operations.

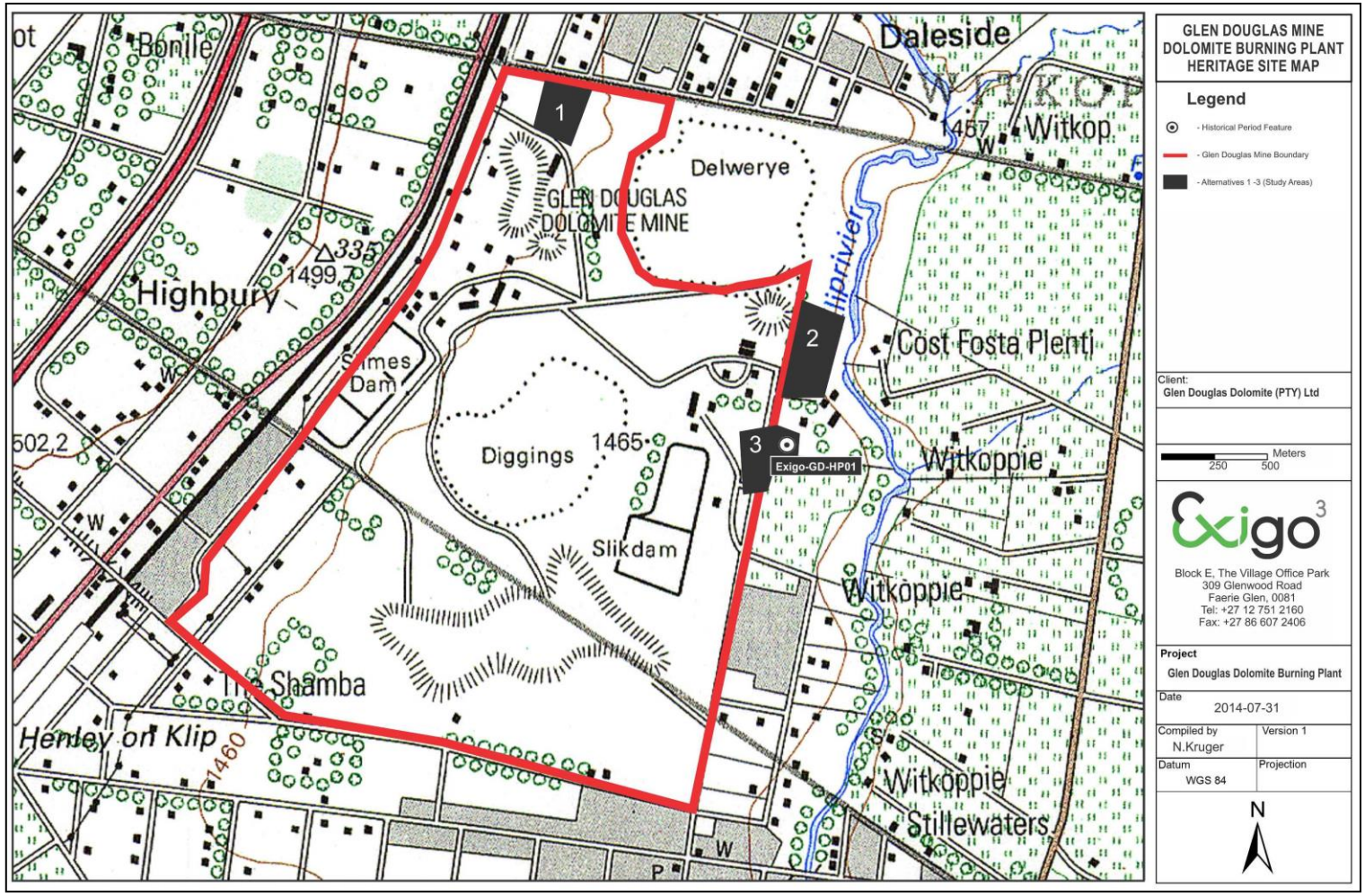

Figure 5-3: Map indicating the location of the potential heritage site discussed in the text.

6 RESULTS: STATEMENT OF SIGNIFICANCE AND IMPACT RATING

6.1 Potential Impacts and Significance Ratings[2]

The following section provides a background to the identification and assessment of possible impacts and alternatives, as well as a range of risk situations and scenarios commonly associated with heritage resources management. A guideline for the rating of impacts and recommendation of management actions for areas of heritage potential at Glen Douglas within the study area is supplied in Section 10.2 of the Addendum.

6.1.1 General assessment of impacts on resources

Generally, the value and significance of archaeological and other heritage sites might be impacted on by any activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). Thus, the destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. However, in the long run, the proximity of operations in any given area could result in secondary indirect impacts. The EIA process therefore specifies impact assessment criteria which can be utilised from the perspective of a heritage specialist study which elucidates the overall extent of impacts.

6.1.2 Direct impact rating

Direct or primary effects on heritage resources occur at the same time and in the same space as the activity, e.g. loss of historical fabric through demolition work. **Indirect effects or secondary effects** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access (refer to Section 10.3 in the Addendum for an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected). Significant archaeological material was not found on the property within the study area and the potential impacts to archaeology are thus considered to be very low. The following table summarizes impacts to archaeological material anticipated for the Glen Douglas Dolomite Burning Plant Project:

- **Exigo-GD-HP01: Historical Period Structure**

NATURE OF IMPACT: Impacts could involve displacement or destruction of features possibly dating to the Historical Period in the Area Alternative 3 area demarcated for the Glen Douglas Burning Plant.		
	Without mitigation	**With mitigation**
EXTENT	Local	Local
DURATION	Permanent	Permanent
MAGINITUDE	Major	Minor
PROBABILITY	Probable	Improbable

[2] Based on: W inter, S. & Baumann, N. 2005. *Guideline for involving heritage specialists in EIA processes: Edition 1.*

SIGNIFICANCE	Moderate	Low
STATUS	Negative	Neutral
REVERSIBILITY	Non-reversible	Non-reversible
IRREPLACEABLE LOSS OF RESOURCES?	Yes	No
CAN IMPACTS BE MITIGATED?	Yes	
MITIGATION: Avoidance, Monitoring by ECO.		
CUMULATIVE IMPACTS: No cumulative impact is anticipated if mitigatory measures are implemented.		
RESIDUAL IMPACTS: n/a		

6.1.3 Discussion: Evaluation of Results and Impacts

Previous studies conducted around Henley on Klip infer a rich and diverse archaeological and historical landscape, representative of most phases of human and cultural development in southern Africa. However, on a local scale most surface areas of the Glen Douglas Mine property have already been transformed and modified as a result of mining activities. One area of heritage potential was documented during the site survey in Area Alternative 3. The site (**Exigo-GD-HP01)** has been rated as of medium significance since the structures might yield information on the regional expansion of Colonial farming and architectural developments in the area. Should development take place in Area 3, the impact on the resource by the proposed activity is anticipated to be direct and permanent.

As such, the significance of the impact on the heritage resources is considered to be MODERATE but the threshold of the impact can be limited to a NEGLIBLE impact by the implementation of mitigation measures (avoidance/monitoring) for the site, if / when required.

6.1.4 Impact Assessment Glen Douglas Dolomite Burning Plant Project: PLOMP (see Section 3.3)

Site	Activity	Impact	P	D	S	M/S	Significance Before Mitigation		Mitigation Measures	P	D	S	M / S	Significance After Mitigation
Pre-Construction, Construction, Operation and Closure									Pre-Construction and Construction Phase					
Site Exigo-GD-HP01	Pre-Construction, Construction, Operation and Closure	Loss of Heritage Resource and Attributes	5	5	1	6	60	Moderate	Monitoring / Avoidance	1	1	1	2	4	Negligible

Aspect	Description	Weight	Aspect	Description	Weight	Aspect	Description	Weight	Aspect	Description	Weight	Aspect	Description	Weight
Probability	Improbable	1	Duration	Short term	1	Scale	Local	1	Magnitude/Severity	Low	2	Significance	Sum(Duration, Scale, Magnitude) x Probability	
	Probable	2		Medium term	3		Site	2		Medium	6		Negligible	<20
	Highly Probable	4		Long term	4		Regional	3		High	8		Low	<40
	Definite	5		Permanent	5								Moderate	<60
													High	>60

6.2 Management actions

Recommendations for relevant heritage resources management actions are vital to the conservation of heritage resources. A general guideline for recommended management actions is included in Section 10.4 of the Addendum. The following management measures would be required during implementation of the proposed Glen Douglas Dolomite Burning Plant Project.

- **Site Exigo-GD-HP01**

OBJECTIVE: prevent unnecessary disturbance and/or destruction of previously undetected archaeological material.

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/disturbance to subsurface archaeology.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To avoid destruction of heritage resources, locate archaeological heritage as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		**RESPONSIBILITY**	**TIMEFRAME**
Avoidance of structure. **Regular examination of trenches and excavations.**		ECO	Monitor as frequently as practically possible.
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

7 RECOMMENDATIONS

Since one site of heritage significance were documented in Area 3 considered as Alternative for on the proposed Glen Douglas Dolomite Burning Plant, the following recommendations are made based on general observations at the site:

- A Palaeontological Impact Assessment should be considered for the selected development area and, should fossil remains such as fossil fish, reptiles or petrified wood be exposed during construction, these objects should carefully safeguarded and the relevant heritage resources authority (SAHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist.
- The old horse stables in Area 3 (**Site Exigo-GD-HP01)** are of medium significance since the site might yield information on the regional expansion of Colonial farming and architectural developments in the area. It is recommended that Area 3 not be considered for development and that any activities in the area be monitored in order to avoid any possible impact on the site, and to previously undetected heritage remains in the area. However, should the structures be directly impacted by development activities, destruction permit from the relevant heritage resources authority (SAHRA) should be obtained.
- It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites. It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along

water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the Dolomite Burning Plant. As such, all development areas should be carefully monitored by the ECO in order to avoid the destruction of previously undetected heritage sites. Should any subsurface paleontological / archaeological / historical material and /or graves/human remains be uncovered, all activities should be suspended and the archaeological specialist should be alerted immediately.

- It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

In addition to these site-specific recommendations, careful cognizance should be taken of the following:

- As Palaeontological remains occur where bedrock has been exposed, all geological features should be regarded as sensitive.
- Water sources such as drainage lines, fountains and pans would often have attracted human activity in the past. As Stone Age material the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits.

8 GENERAL COMMENTS AND CONDITIONS

Heritage resources were found in one of the areas considered as alternative for the Glen Douglas Dolomite Burning Plant site. Also, the larger Highveld and Vaal River landscape encompass a rich and diverse archaeological landscape and cognisance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits. If, during construction, any possible archaeological material culture are uncovered, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:

- Formal Earlier Stone Age stone tools.
- Formal Middle Stone Age stone tools.
- Formal Later Stone Age stone tools.
- Potsherds
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- Faunal remains.
- Human remains/graves.
- Stone walling or any sub-surface structures.
- Historical glass, tin or ceramics.
- Fossils.

If such site were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by SAHRA, the National Resources Act and the CRM section of ASAPA will be required.

It must be emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately **(*cf*. NHRA (Act No. 25 of 1999)**, Section 36 (6)).

It must also be clear that Archaeological Specialist Reports will be assessed by the relevant heritage resources authority (SAHRA). They will provide a comment to DEA&DP. A permit may be required for the destruction of archaeological remains.

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10 ADDENDUM 1: SITES OF HERITAGE POTENTIAL ACCESSION FORM

1. SITE : Site Exigo-GD-HP01							
1.1 General Site Description							
Historical Period Horse Stables							
1.2 Site features / artefacts / Other							
Site Location							
Province / District	Gauteng Province			Map Number	2628CA		
Farm / Settlement / Zone	Witkoppies						
Co-ordinates	**Site Exigo-GD-HP01**	**S26.516630°**		**E28.067090°**			
Site Type							
Surface sites	**X**			Caves and rock shelters			
Larger open-air sites				Sealed sites (deposits			
River deposits				Other			
Site Function							
Living / habitation				Kill			
Ceremonial				Burial			
Trading / Barter				Art			
Quarry / Mining / Smelting				Other	**X – Stables**		
Site Placement							
Valley floor		Hill top		Vlei/swamp		River Mouth	
Dam		River Bank		Slope		Plains	**X**
Other / Comments							
Vegetation							
Riverine forest		Bushveld		Savannah	**X**	Mountain forest	
Thornveld		Grassland	**X**	Cultivated	**X**	Other	**Urbanized**
Age Classification							
Stone Age		Early Iron Age		Middle Iron Age		Later Iron Age	
Historical	**X**	Other					
Material Culture							
Midden		House Remains		Stone Walling		Stone Structures	**X**
Granary		Grinding Stone (L)		Grinding Stone (U)		Granary Stand	
Metal	**X**	Ceramics (Potter)		Ceramics (Porcelain)		Stone (non-lithic)	
Metal slag		Tuyere		Fauna		Bead (Glass)	
Bead (OES / Shell)		Glass		Lithics		Smelting Residues	
Other: **X - Concrete**				Other: **X - wood**			
1.3 Site Condition							
Site preservation is good and structures are currently in use.							
2. SITE EVALUATION							
2.1 Heritage Value (NHRA, section 2 [3])				**High**	**Medium**	**Low**	
It has importance to the community or pattern of South Africa's history or pre-colonial history.					**X**		

It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.		X	
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.		X	
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.		X	
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.		X	
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			X
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).		X	
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.		X	
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			X
It has significance relating to the history of slavery in South Africa.			X
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.		X	

2.2 Field Register Rating	
National/Grade 1 [should be registered, retained]	
Provincial/Grade 2 [should be registered, retained]	
Local/Grade 3A [should be registered, mitigation not advised]	
Local/Grade 3B [High significance; mitigation, partly retained]	
Generally Protected A [High/Medium significance, mitigation]	X
Generally protected B [Medium significance, to be recorded]	
Generally Protected C [Low significance, no further action]	

2.3 Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Local		X	
Specific community			

3. IMPACT RATING AND MITIGATION

3.1 Impact assessment

APPROXIMATE DISTANCE FROM DEVELOPMENT: 0 - 100 METERS

NATURE OF IMPACT: HISTORICAL, AESTHETIC, ARCHITECTURAL

EXTENT OF IMPACT: Local

SPECIALIST LEVEL OF CONFIDENCE IN DEGREE OF IMPACT AND SEVERITY: High

3.2 Direct Impact Rating

Direct impact on resource	None (the potential development does not adversely or positively affect the heritage resource)	
	Peripheral / Indirect (the heritage resource or its setting is located in proximity to the footprint of the potential development)	
	Destruction / Direct (the heritage resource or site is physically located within the footprint of the potential development)	X
Direct impact rating (Refer to Section 7.3.2) Note that a default "no impact expected" value applies where a heritage resource occurs		**Moderate Heritage Impact Anticipated.**

outside the impact matrix or applicable conservation buffers of the development.	
3.3 Recommended Management* (refer to section 7.3.3)	
Avoidance, Monitoring	
Comments on recommended management	
Avoidance. **Monitoring: It is necessary that the sites be monitored to ensure that previously undetected heritage resources are not impacted on.**	
4. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS	
- **National Heritage Resources Act (Act no. 25 of 1999)** - **Local and regional provisions, laws and by-laws**	

11 ADDENDUM 2: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE

11.1 Site Significance Matrix

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these. The following matrix is used for assessing the significance of each identified site/feature.

2. SITE EVALUATION			
2.1 Heritage Value (NHRA, section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.			
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.			
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.			
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			
It has significance relating to the history of slavery in South Africa.			
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.			
2.2 Field Register Rating			
National/Grade 1 [should be registered, retained]			
Provincial/Grade 2 [should be registered, retained]			
Local/Grade 3A [should be registered, mitigation not advised]			
Local/Grade 3B [High significance; mitigation, partly retained]			
Generally Protected A [High/Medium significance, mitigation]			
Generally protected B [Medium significance, to be recorded]			
Generally Protected C [Low significance, no further action]			
2.3 Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Local			
Specific community			

11.2 Impact Assessment Criteria

The following table provides a guideline for the rating of impacts and recommendation of management actions for sites of heritage potential.

Significance of the heritage resource

This is a statement of the nature and degree of significance of the heritage resource being affected by the activity. From a heritage management perspective it is useful to distinguish between whether the significance is embedded in the physical fabric or in associations with events or persons or in the experience of a place; i.e. its visual and non-visual qualities. This statement is a primary informant to the nature and degree of significance of an impact and thus needs to be thoroughly considered. Consideration needs to be given to the significance of a heritage resource at different scales (i.e. sitespecific, local, regional, national or international) and the relationship between the heritage resource, its setting and its associations.

Nature of the impact

This is an assessment of the nature of the impact of the activity on a heritage resource, with some indication of its positive and/or negative effect/s. It is strongly informed by the statement of resource significance. In other words, the nature of the impact may be historical, aesthetic, social, scientific, linguistic or architectural, intrinsic, associational or contextual (visual or non-visual). In many cases, the nature of the impact will include more than one value.

Extent

Here it should be indicated whether the impact will be experienced:

- On a site scale, i.e. extend only as far as the activity;
- Within the immediate context of a heritage resource;
- On a local scale, e.g. town or suburb
- On a metropolitan or regional scale; or
- On a national/international scale.

Duration

Here it should be indicated whether the lifespan of the impact will be:

- Short term, (needs to be defined in context)
- Medium term, (needs to be defined in context)
- Long term where the impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention; or
- Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Of relevance to the duration of an impact are the following considerations:

- Reversibility of the impact; and
- Renewability of the heritage resource.

Intensity

Here it should be established whether the impact should be indicated as:

- Low, where the impact affects the resource in such a way that its heritage value is not affected;
- Medium, where the affected resource is altered but its heritage value continues to exist albeit in a modified way; and
- High, where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed.

Probability

This should describe the likelihood of the impact actually occurring indicated as:

- Improbable, where the possibility of the impact to materialize is very low either because of design or historic experience;
- Probable, where there is a distinct possibility that the impact will occur;
- Highly probable, where it is most likely that the impact will occur; or
- Definite, where the impact will definitely occur regardless of any mitigation measures

Confidence

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.
- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Impact Significance

The significance of impacts can be determined through a synthesis of the aspects produced in terms of the nature and degree of heritage significance and the nature, duration, intensity, extent, probability and confidence of impacts and can be described as:

- Low; where it would have a negligible effect on heritage and on the decision
- Medium, where it would have a moderate effect on heritage and should influence the decision.
- High, where it would have, or there would be a high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision;
- Very high, where it would have, or there would be high risk of, an irreversible and possibly irreplaceable negative impact on heritage. Impacts of very high significance should be a central factor in decision-making.

11.3 Direct Impact Assessment Criteria

The following table provides an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected

	TYPE OF DEVELOPMENT			
HERITAGE CONTEXT	**CATEGORY A**	**CATEGORY B**	**CATEGORY C**	**CATEGORY D**
CONTEXT 1 High heritage Value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
CONTEXT 2 Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
CONTEXT 3 Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
CONTEXT 4 Low to no heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage value expected	Moderate heritage impact expected

NOTE: A DEFAULT "LITTLE OR NO HERITAGE IMPACT EXPECTED" VALUE APPLIES WHERE A HERITAGE RESOURCE OCCURS OUTSIDE THE IMPACT ZONE OF THE DEVELOPMENT.

HERITAGE CONTEXTS	CATEGORIES OF DEVELOPMENT
Context 1: Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources **Context 2:** Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources. **Context 3:** Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential	**Category A: Minimal intensity development** - No rezoning involved; within existing use rights. - No subdivision involved. - Upgrading of existing infrastructure within existing envelopes - Minor internal changes to existing structures - New building footprints limited to less than 1000m2. **Category B: Low-key intensity development** - Spot rezoning with no change to overall zoning of a site. - Linear development less than 100m

Grade 3C heritage resources **Context 4:** Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage.	- Building footprints between 1000m2-2000m2 - Minor changes to external envelop of existing structures (less than 25%) - Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%). **Category C: Moderate intensity development** - Rezoning of a site between 5000m2-10 000m2. - Linear development between 100m and 300m. - Building footprints between 2000m2 and 5000m2 - Substantial changes to external envelop of existing structures (more than 50%) - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%) **Category D: High intensity development** - Rezoning of a site in excess of 10 000m2 - Linear development in excess of 300m. - Any development changing the character of a site exceeding 5000m2 or involving the subdivision of a site into three or more erven. - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%)

11.4 Management and Mitigation Actions

The following table provides a guideline of relevant heritage resources management actions is vital to the conservation of heritage resources.

No further action / Monitoring

Where no heritage resources have been documented, heritage resources occur well outside the impact zone of any development or the primary context of the surroundings at a development footprint has been largely destroyed or altered, no further immediate action is required. Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage\ remains are destroyed.

Avoidance

This is appropriate where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. Mitigation is not acceptable or not possible. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources.

Mitigation

This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated to a degree of medium to low significance, e.g. the high to medium impact of a development on an archaeological site could be mitigated through sampling/excavation of the remains. Not all negative impacts can be mitigated.

Compensation

Compensation is generally not an appropriate heritage management action. The main function of management actions should be to conserve the resource for the benefit of future generations. Once lost it cannot be renewed. The circumstances around the potential public or heritage benefits would need to be exceptional to warrant this type of action, especially in the case of where the impact was high.

Rehabilitation

Rehabilitation is considered in heritage management terms as a intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:

- The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.
- Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.
- Where the rehabilitation process will not result in a negative impact on the intrinsic value of the resource.

Enhancement

Enhancement is appropriate where the overall heritage significance and its public appreciation value are improved. It does not imply creation of a condition that might never have occurred during the evolution of a place, e.g. the tendency to sanitize the past. This management action might result from the removal of previous layers where these layers are culturally of low significance and detract from the significance of the resource. It would be appropriate in a range of heritage contexts and applicable to a range of resources. In the case of formally protected or significant resources, appropriate enhancement action should be encouraged. Care should, however, be taken to ensure that the process does not have a negative impact on the character and context of the resource. It would thus have to be carefully monitored