



iLifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

NOTIFICATION OF INTENT TO DEVELOP

Completion of this form is required by Heritage Western Cape for the initiation of all impact assessment processes under Section 38(1) & (8) of the National Heritage Resources Act.

Whilst it is not a requirement, it may expedite processes and in particular avoid calls for additional information if certain of the information required in this form is provided by a heritage specialist/s with the necessary qualifications, skills and experience.

A. BASIC DETAILS

PROPERTY DETAILS:

Name of property:

Street address or location (eg: off R44): Divisional Road 01721, Prince Albert

Erf or farm number/s:

Coordinates: 22.26'47.44"S 33.21'34.6"E
 (A logical centre point. Format based on WGS84.)

Town or District: Central Karoo

Responsible Municipality: Prince Albert Local Municipality

Extent of property:

Current use: Borrow pit

Predominant land use/s of surrounding properties: Agricultural land for grazing livestock

REGISTERED OWNER OF PROPERTY:

Name Road Reserve c/o Department Transport and Public Works
 0.9: Avondrust Family Trust, 3.7: Avondrust Family Trust and 8.4: Avondrust Family Trust
 16.15: Blue Sky Mountain Farms (Pty) Ltd

Address c/o Dept. Transport & Public Works: WCPA: P O Box 2603, Cape Town, 8000

Telephone 021 483 2020

Cell

E-mail

quahnita@vidamemoria.co.za

By the submission of this form and all material submitted in support of this notification (ie: 'the material'), all applicant parties acknowledge that they are aware that the material and/or parts thereof will be put to the following uses and consent to such use being made: filing as a public record; presentations to committees, etc; inclusion in databases; inclusion on and downloading from websites; distribution to committee members and other stakeholders and any other use required in terms of powers, functions, duties and responsibilities allocated to Heritage Western Cape under the terms of the National Heritage Resources Act. Should restrictions on such use apply or if it is not possible to copy or lift information from any part of the digital version of the material, the material will be returned unprocessed.

I confirm that I enclose with this form four hardcopies of all material submitted together with a CD ROM containing digital versions of all of the same.

Signature of owner or authorised agent
(Agents must attach copy of power of attorney to this form.)

Date 14 / 09 / 2011

DEVELOPMENT DETAILS:

Please indicate below which of the following Sections of the National Heritage Resources Act, or other legislation has triggered the need for notification of intent to develop.	
<input type="checkbox"/> S38(1)(a) Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.	S38(1)(c) Any development or activity that will change the character of a site -
<input type="checkbox"/> S38(1)(b) Construction of a bridge or similar structure exceeding 50m in length.	
<input type="checkbox"/> S38(1)(d) Rezoning of a site exceeding 10 000m ² in extent.	
<input checked="" type="checkbox"/> Other triggers, eg: in terms of other legislation, (ie: National Environment Management Act, etc.) Please set out details: Environmental Management Programmes (EMProgs) as called for by the Mineral and Petroleum Resources Development Act (49 of 2008)	<input checked="" type="checkbox"/> (i) exceeding 5 000m ² in extent; <input type="checkbox"/> (ii) involving three or more existing erven or subdivisions thereof; <input type="checkbox"/> (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years.
If you have checked any of the three boxes above, describe how the proposed development will change the character of the site: Borrow pits are used to obtain material for the maintenance of gravel roads	
If an impact assessment process has also been / will be initiated in terms of other legislation please provide the following information: Authority / government department (ie: consenting authority) to which information has been /will be submitted for final decision: Department of Mineral Resources Present phase at which the process with that authority stands: Submission of EMProg pending comment from Heritage Western Cape	
Provide a <u>full</u> description of the nature and extent of the proposed development or activity including its potential impacts (eg: changes in land use, envisaged timeframes, provision of additional bulk services, excavations, landscaping, total floor area, height of development, etc. etc.): As per the requirements of the Minerals and Petroleum Resources Development Act. all mining activities including extraction of material from borrow pits and quarries requires authorisation from the Department of Mineral Resources. Where the WCPA: Dept Transport and Public Works is undertaking the maintenance and / or upgrading of roads under its control, no application needs to be submitted for a mining right or permit, however, as per the provisions of Section 106(2) of the MPRDAct, they are required to prepare and submit an EMProg to DMR for their approval, prior to the extraction of any material from a proposed borrow pit or quarry. According to the MPRDAct, mineral resources are in the custodianship of the State, where the WCPA would temporarily acquire the right to mine the borrow pits, subject to approval by the DMR. Material excavated from the borrow pits will be used for the re-gravelling to portions of road DR01721 km 0 to 13 so as to benefit road users in terms of road safety and user economy as well as to minimise maintenance-related disruptions.	

DR01721 at km 0.9, 6.3km northwest of Klaarstroom is a new site located on the left hand side (southern side) of road accessed directly from DR01721. The material consists of Bokkeveld shale, of the Beaufort Group (Karoo Supergroup), which is suitable for use as gravel wearing course for the maintenance of gravel roads. This source is located on disturbed land in the road reserve adjacent to the farm Avondrust. There is evidence for past brick buildings. Estimated Proven Reserves: ~25 000 m³ over an area of about 250 m x 50 m wide to a maximum depth of about 3 m utilising 1v:3h cut face slopes. A discontinuous overburden layer consists of organic rich sandy silty gravel with a variable thickness up to about 0,2m in places.

An existing borrow pit is located 6.5km west-northwest of Klaarstroom, at kilometer 3.7 of DR01721 on the northeast side of the road accessed directly from the edge of DR01721. It is proposed to enlarge the pit upslope towards the east. The geology of the site consists of shale of the Bokkeveld Group, which is well suited for the purpose of gravel wearing course used in the maintenance of gravel roads. This is overlain by a thin horizon of gravelly silty shale and siltstone approximately 0.2m thick. This site is likely to be a strategic source of material and be used repeatedly over time. As such, mining will be phased and be carried out in a clockwise rotation. Estimated Proven Reserves: ~30 000 m³ over an area of about 150 m x 100 m wide to a maximum depth of about 2,5 m utilising 1v:3h cut face slopes. A discontinuous overburden layer consists of organic rich sandy silty gravel with a variable thickness up to about 0,1m in places.

The existing borrow pit located at kilometre 8.4 on DR01721, approximately 8.7km southwest of Klaarstroom was converted into a dam which stores water used for irrigation. The proposed borrow pit under discussion is located up-slope of the dam, and its final use would be incorporation into the existing dam. Approximately 52,400m³ of material will be mined from this pit. This site contains 0.2 to 0.3m of sandy-clayey silt and colluvial gravel which overlies weathered shale of the Bokkeveld Group. This material is suitable for use as gravel wearing course, provided the pit is worked full face in order to mix silt and colluvial gravels with the weathered shale. Estimated Proven Reserves: ~45 000 m³ over an area of about 150 m x 100 m wide to a maximum depth of about 3,5 m utilising 1v:3h cut face slopes. A discontinuous overburden layer consists of organic rich sandy silty gravel with a variable thickness up to about 0,1m in places.

An existing borrow pit located south of DR01721 at km 16.15, 5.6km southwest of Klaarstroom and 3km southwest of the intersection of DR01721 and MR00542, situated on agricultural land used for livestock grazing. It is accessed from DR01721 via a short existing farm gate and track which runs along the northern side of the borrow pit. The material consists of highly weathered and closely to mediumly fractured shale/phyllite of the Bokkeveld Group, which is suitable for use as gravel wearing course. This is overlain by a thin layer of gravelly topsoil. Estimated Proven Reserves: ~27 500 m³ over a triangular area of about 170 m long x 80 m wide to a maximum depth of about 3,5 m utilising 1v:3h cut face slopes. A partially discontinuous overburden layer consists of organic rich sandy silty gravel with a variable thickness up to about 0,1m in places.

Existing borrow pits are used as water retention facilities (dams) to supply water for livestock. The expanded borrow pits and the new borrow pits proposed will serve the same purpose and will not have a significant negative impact on the visual aesthetics of the area. No new roads would have to be constructed as borrow pits / quarries are accessed either directly off main / divisional roads or via existing access tracks. The borrow pits and access tracks would be fenced for the duration of the mining activities. There will be no site buildings located at the borrow pits / quarry sites.

The Central Karoo District Municipality will be undertaking the work on behalf of the WCPA. Formal agreements will be entered into between the landowner and the WCPA and the municipality will manage the site until decommissioning and closure.

B. HERITAGE RESOURCES AND IMPACTS THEREUPON

Section 3 of the National Heritage Resources Act sets out the following categories of heritage resource as forming part of the national estate. Please indicate the known presence of any of these by checking the box alongside and then providing a description of each occurrence, including nature, location, size, type

Failure to provide sufficient detail or to anticipate the likely presence of heritage resources on the site may lead to a request for more detailed specialist information.

(The assistance of relevant heritage professionals is particularly relevant in completing this section.)

Provide a short history of the site and its environs (Include sources where available): The town was founded in 1842 on the farm Kweekvallei, and named after Queen Victoria's husband, Albertsburg. (Fransen H 2004: 510 The Old Buildings of the Cape). Prince Albert is located at the foot of the Swatberg Pass preserving a 19th century character, partly as a result of the national road which does not pass through the town (Fransen H 2006: 292 – 293 in Old Towns and Villages of the Cape). The DR01721 does not form a historic component of the town, but does serve as an important transport link.

Please indicate which heritage resources exist on the site and in its environs, describe them and indicate the nature of any impact upon them:

<input type="checkbox"/>	<p>Places, buildings, structures and equipment of cultural significance</p> <p>Description of resource: None</p> <p>Description of impact on heritage resource: None</p>
<input type="checkbox"/>	<p>Places to which oral traditions are attached or which are associated with living heritage</p> <p>Description of resource:</p> <p>Description of impact on heritage resource:</p>
<input type="checkbox"/>	<p>Historical settlements and townscapes</p> <p>Description of resource:</p> <p>Description of impact on heritage resource:</p>
<input type="checkbox"/>	<p>Landscapes and natural features of cultural significance</p> <p>Description of resource:</p> <p>Description of impact on heritage resource:</p>
<input type="checkbox"/>	<p>Geological resources of scientific or cultural importance</p> <p>Description of resource: Material was found to be suitable for use as gravel wearing course (Aurecon geological strategic gravel pit summary report by R M Galliers Jan 2011) Geotechnical investigations were carried out by Aurecon (borrow pit exploration) and Outeniqua Lab (laboratory testing)</p> <p>Description of impact on heritage resource: None</p>
<input type="checkbox"/>	<p>Archaeological resources (Including archaeological sites and material, rock art, battlefields & wrecks):</p> <p>Description of resource: Late Stone Age sites may be present in this area. Rock paintings may exist in rocky outcrops and there is a possibility of herder sites along the drainage lines close to borrow pit 8.4 No studies are known from the immediate vicinity, however the general context is predicted to be of medium significance based on a desktop study (Manhire & Patrick September 2011) of sites known to exist in the general area.</p> <p>Description of impact on heritage resource: None</p>
<input type="checkbox"/>	<p>Palaeontological resources (ie: fossils):</p> <p>Description of resource: Key Geological Units and age are Waboomberg or Karies Formation of early middle Devonian age Gydo and Voorstehoek Formation of early Devonian age with potential shelly fossil assemblages, land plants and trace fossils as well as diverse shelly</p>

	<p>invertebrate biot, fish remains and microfossils (desktop survey conducted by Dr John Almond, August 2011)</p> <p>Description of impact on heritage resource: None</p>
<input type="checkbox"/>	<p>Graves and burial grounds (eg: ancestral graves, graves of victims of conflict, historical graves & cemeteries):</p> <p>Description of Resource:</p> <p>Description of Impact on Heritage Resource:</p>
<input type="checkbox"/>	<p>Other human remains:</p> <p>Description of resource:</p> <p>Description of impact on heritage resource:</p>
<input type="checkbox"/>	<p>Sites of significance relating to the history of slavery in South Africa:</p> <p>Description of resource:</p> <p>Description of impact on heritage resource:</p>
<input type="checkbox"/>	<p>Other heritage resources:</p> <p>Description of resource:</p> <p>Description of impact on heritage resource:</p>

Describe elements in the environs of the site that could be deemed to be heritage resources:
Description of impacts on heritage resources in the environs of the site: None

Summary of anticipated impacts on heritage resources: Sites have been identified as possessing no cultural significance and / or value and proposed expansion of existing borrow pits will result in no impact on heritage resources. Therefore no further studies are required in terms of Section 38.

If any archaeological and / or palaeontological material is discovered during earth moving activities, work should be stopped and HWC notified immediately.

ILLUSTRATIVE MATERIAL (This form will not be processed unless the following are included):

Attach to this form a minimum A4 sized locality plan showing the boundaries of the area affected by the proposed development, its environs, property boundaries and a scale. The plan must be of a scale and size that is appropriate to creating a clear understanding of the development.

Attach also other relevant graphic material such as maps, site plans, satellite photographs and photographs of the site and the heritage resources on it and in its environs. These are essential to the processing of this notification.

Please provide all graphic material on paper of appropriate size and on CD ROM in JPEG format. It is essential that graphic material be annotated via titles on the photographs, map names and numbers, names of files and/or provision of a numbered list describing what is visible in each image.

C. RECOMMENDATION

In your opinion do you believe that a heritage impact assessment is required? Yes No

Recommendation made by:

Name Quahnita Samie

Capacity Town planner and heritage consultant at vidamemoria heritage consultants

PLEASE NOTE: No Heritage Impact Assessment should be submitted with this form or conducted until Heritage Western Cape has expressed its opinion on the need for such and the nature thereof.

D. INFORMATION TO BE PROVIDED AND STUDIES TO BE CONDUCTED AS PART OF THE HERITAGE IMPACT ASSESSMENT (HIA)

If it is recommended that an HIA is required please complete this section of the form.

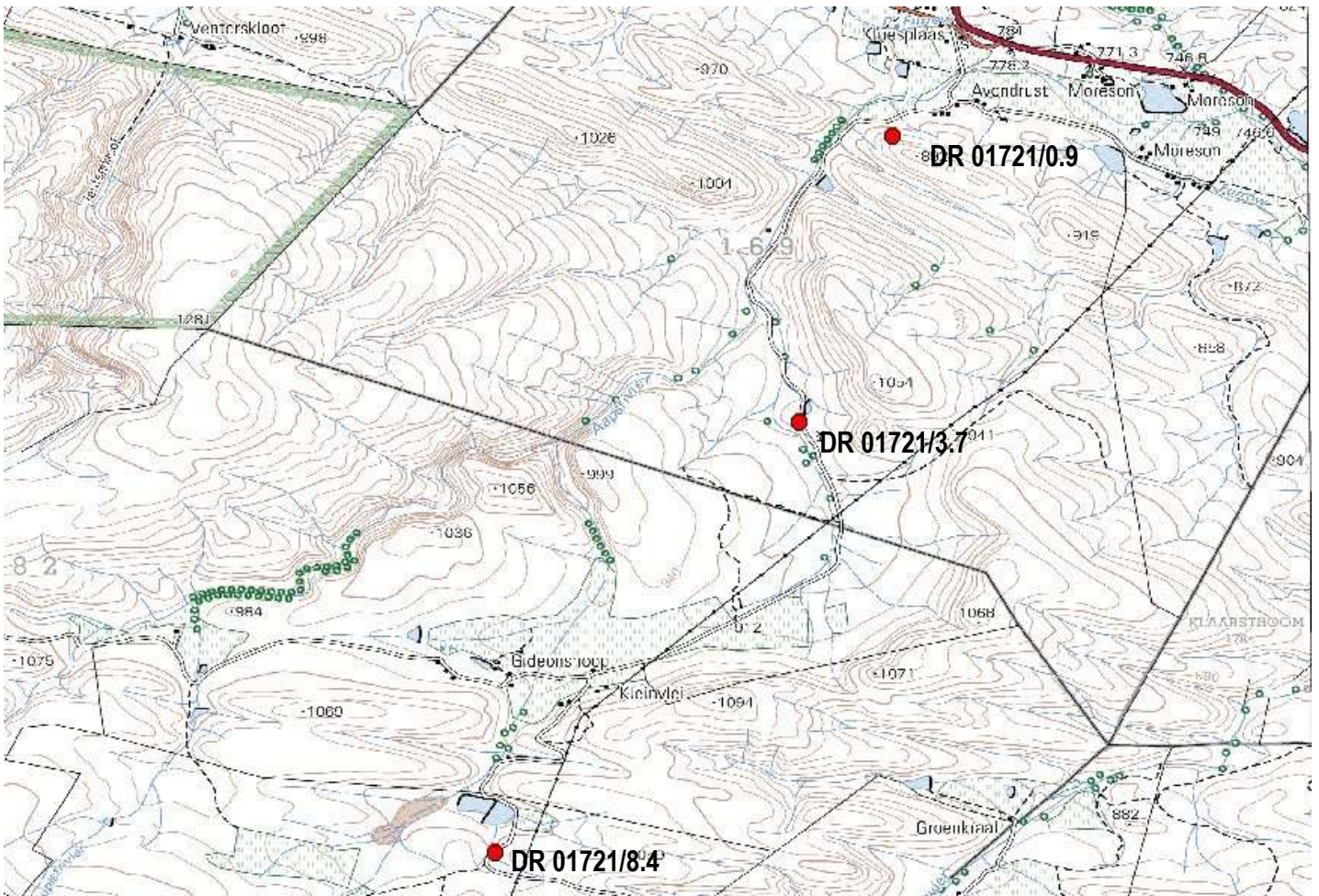
DETAILS OF HERITAGE PRACTITIONERS AND SPECIALISTS INTENDING TO CONDUCT THE HIA:

1.	<p>Name of individual: Name of Practice: Area of specialisation:</p> <p>Qualifications:</p> <p>Experience:</p> <p>Standing in heritage resource management:</p> <p>E-mail Address: Telephone: Cell:</p>
2.	<p>Name of individual: Name of Practice: Area of specialisation:</p> <p>Qualifications:</p> <p>Experience:</p> <p>Standing in heritage resource management:</p> <p>E-mail Address: Telephone: Cell:</p>
3.	<p>Name of individual: Name of Practice: Area of specialisation:</p> <p>Qualifications:</p> <p>Experience:</p> <p>Standing in heritage resource management:</p> <p>E-mail Address: Telephone: Cell:</p>
4.	<p>Name of individual: Name of Practice: Area of specialisation:</p> <p>Qualifications:</p> <p>Experience:</p> <p>Standing in heritage resource management:</p> <p>E-mail Address: Telephone: Cell:</p>

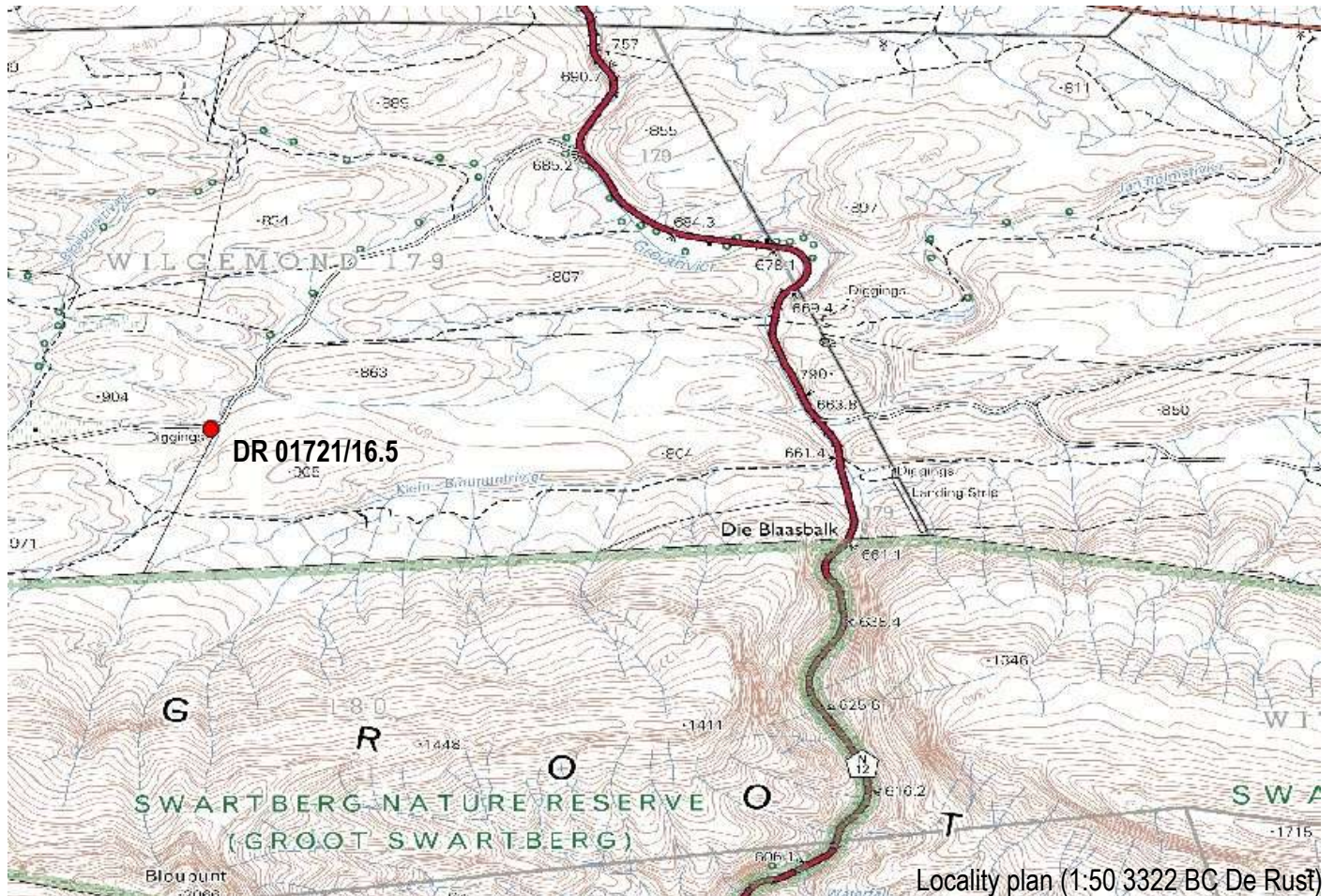
5.	Name of individual:	Name of Practice:	Area of specialisation:
	Qualifications:		
	Experience:		
	Standing in heritage resource management:		
	E-mail Address:	Telephone:	Cell:
If this submission is made in terms of Section 38(8) of the National Heritage Resources Act indicate below the particulars of the principle environmental consultant on the project.			
Name of individual:	Name of Practice:	Area of specialisation:	
E-mail Address:	Telephone:	Cell:	
Postal Address:			

DETAILS OF STUDIES TO BE CONDUCTED IN THE INTENDED HIA

In addition to the requirements set out in Section 38(3) of the NHRA, indicate envisaged studies:	
<input type="checkbox"/>	Heritage resource-related guidelines and policies.
<input type="checkbox"/>	Local authority planning and other laws and policies.
<input type="checkbox"/>	Details of parties, communities, etc. to be consulted.
<input type="checkbox"/>	Specialist studies, eg: archaeology, palaeontology, architecture, townscape, visual impact, etc. Provide details:
<input type="checkbox"/>	Other. Provide details:
PLEASE NOTE: Any further studies which Heritage Western Cape may resolve should be submitted must be in the form of a single, consolidated report with a single set of recommendations. Specialist studies must be incorporated in full, either as chapters of the report, or as annexures thereto.	



Locality plan (1:50 3322 AD Rosselerf)



Locality plan (1:50 3322 BC De Rust)



DR 01721/0.9 View stockpile of pit 4 stockpile



Looking east from the edge of road DR01721 towards the site of the proposed pit (April 2011).



Looking south across the site of the proposed borrow pit. Road DR01721 is on the right (April 2011).



Looking southwest across site with building rubble in the foreground (April 2011).



Rubble (April 2011).



DR 01721/03.7View of TP6 stockpile and up-slope extension terrain



Looking east at the existing borrow pit from the edge of DR01721 (April 2011).



Looking south from the northern edge of the existing pit towards DR01721 and the Swartberg Mountains (April 2011).



Looking southeast from the edge of the existing pit at the fynbos vegetation (April 2011). The expanded pit will lie in the foreground of the photo.



Looking east-northeast at a test pit and the area into which the pit will expand (April 2011).



DR 01721/08.4 View from TP1 across old pit towards up-slope extension terrain



Looking northwest across the site of the proposed BP, located between road DR01721 and existing dam (April 2011).



Looking west across the site of the proposed borrow pit located to the south and east of the existing farm dam (April 2011).



Looking east across the proposed site towards DR01721 is in the background (April 2011).



Looking north across the site of the proposed borrow pit at vegetation in the existing dam (April 2011).



DR 01721/016.5 Pit 4 - typical stockpile and surroundings and view towards existing pit



Looking north-east from hillock towards existing borrow pit and DR01721 (March 2011).



Looking north, onto adjacent DR01721 (March 2011).



Looking south up the nearby ephemeral watercourse, east of the existing borrow pit (March 2011).



Looking west from existing borrow pit berm with DR01721 in the background (March 2011).

GENERAL APPROACH TO PALAEOONTOLOGICAL HERITAGE SPECIALIST STUDIES

John E. Almond (PhD, Cantab.)

Natura Viva cc

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tel: (021) 462 3622

The RSA has an unusually rich fossil heritage stretching back in time for over 3.5 billion years. Fossil sites of national and international significance occur along the coast as well as throughout much of the interior, including the Karoo, the Cape Fold Mountains and elsewhere. This wealth of palaeontological heritage is protected as a valuable but vulnerable public good by the **South African Heritage Resources Act** (Act No. 25 of 1999). The various categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act include, among others:

- geological sites of scientific or cultural importance
- palaeontological sites
- palaeontological objects and material, meteorites and rare geological specimens

According to Section 35 (Archaeology, palaeontology and meteorites) and Section 38 (Heritage Resources Management) of the South African Heritage Resources Act, palaeontological heritage studies (previously referred to as PIAs) are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged. Depending on the sensitivity of the fossil heritage and the scale of the development concerned, the palaeontological study required may take the form of (a) a stand-alone desktop study, or (b) a field assessment *plus* desktop study leading to a consolidated report. In some cases these studies may recommend further palaeontological mitigation, usually at the construction phase. These recommendations would normally be endorsed by the responsible heritage management authority (e.g. Heritage Western Cape or SAHRA) to whom the reports are submitted for review. Heritage Western Cape now requires that the results and recommendations of the palaeontological study be combined with those of other heritage specialists as part of an integrated heritage impact assessment report with an integrated set of recommendations.

In order to compile an authoritative **palaeontological desktop study** for a proposed development the contracted palaeontologist will need to know in advance:

- the location and extent of the development (e.g. boundaries of all land parcels concerned delineated on a map or satellite image). Note that the precise development footprint is often less critical since PIAs are essentially regional in character.
- the nature of the development (e.g. outline in BID document)
- the extent (area, depth, location) of bedrock excavations envisaged. These may include quarries or borrow pits for building materials as well as excavations for infrastructure (roads, buildings, pylons *etc*)
- the companies or organisations proposing the development and responsible for commissioning the palaeontological study
- any RODs concerning palaeontological heritage issued by the responsible heritage management authority (e.g. SAHRA, HWC). Here it is important to clarify whether a desktop study alone or a field assessment study has been required.

In preparing a palaeontological desktop study the potentially fossiliferous rock units (groups, formations *etc*) represented within the study area are determined from geological maps. The known fossil heritage within each rock unit is inventoried from the published scientific literature, previous palaeontological impact studies in the same region, and the author's field experience (Consultation with professional colleagues as well as examination of institutional fossil collections may play a role

here, or later during the compilation of the final report). This data is then used to assess the palaeontological sensitivity of each rock unit to development (Provisional tabulations of palaeontological sensitivity of all formations in the Western, Eastern and Northern Cape have already been compiled by J. Almond and colleagues). The likely impact of the proposed development on local fossil heritage is then determined on the basis of (1) the palaeontological sensitivity of the rock units concerned and (2) the nature of the development itself, most notably the extent of fresh bedrock excavation envisaged. When rock units of moderate to high palaeontological sensitivity are present within the development footprint, a field assessment study by a professional palaeontologist is usually warranted.

The focus of **palaeontological field assessment** work is *not* simply to survey the development footprint or even the development area as a whole (e.g. farms or other parcels of land concerned in the development). Rather, the palaeontologist seeks to assess the diversity, density and distribution of fossils within and beneath the study area, as well as their heritage or scientific interest. This is primarily achieved through a careful field examination of one or more representative exposures of all the sedimentary rock units present (*N.B.* Metamorphic and igneous rocks rarely contain fossils). The best rock exposures are generally those that are easily accessible, extensive, fresh (*i.e.* unweathered) and include a large fraction of the stratigraphic unit concerned (e.g. formation). These exposures may be natural or artificial and include, for example, rocky outcrops in stream or river banks, cliffs, quarries, dams, dongas, open building excavations or road and railway cuttings. Uncemented superficial deposits, such as alluvium, scree or wind-blown sands, may occasionally contain fossils and should also be included in the field assessment study where they are well-represented in the study area. It is normal practice for impact palaeontologists to collect representative, well-localized (e.g. GPS and stratigraphic data) samples of fossil material during field assessment studies. The palaeontologist concerned will require a valid collection permit from SAHRA, and all fossil material collected must be properly curated within an approved repository (usually a museum or university collection).

Note that while fossil localities recorded during field assessment work within the study area itself are obviously highly relevant, most fossil heritage here is embedded within rocks beneath the land surface or obscured by surface deposits (soil, alluvium *etc*) and by vegetation cover. In many cases where levels of fresh (*i.e.* unweathered) bedrock exposure are low, the hidden fossil resources have to be *inferred* from palaeontological observations made from better exposures of the same formations elsewhere in the region but outside the immediate study area. Therefore a palaeontologist might reasonably spend far *more* time examining road cuts and borrow pits close to, but outside, the study area than within the study area itself. Field data from localities even further afield (e.g. an adjacent province) may also be adduced to build up a realistic picture of the likely fossil heritage within the study area.

Here it is assumed that fossil heritage is fairly uniformly distributed throughout the outcrop area of a given formation. Experience shows that this assumption does not always hold, however. The original depositional setting of sediments within a formation that now stretches cross-country for hundreds of kilometres may vary significantly from place to place - e.g. from a nearshore alluvial plain across a coastline into a deeper water environment. This obviously has profound palaeoecological implications affecting the types and density of fossils preserved in different areas. Furthermore fossil organisms, like living ones, were often patchy in their occurrence. Most importantly, the levels of tectonic deformation (folding, cleavage development *etc*), as well as the intensity and nature of metamorphism and weathering experienced by a given formation may change markedly across its outcrop area. These factors, which can often only be assessed during the field assessment phase, may seriously compromise the preservation of fossil remains originally present within the sedimentary rock and hence *lower* the palaeontological sensitivity of the development concerned. Palaeontological field assessment might therefore either (a) identify and delineate areas within the development area of high palaeontological sensitivity that will trigger specialist mitigation, usually at the construction phase, or (b) exclude the need for any further mitigation concerning rock units that are often highly fossiliferous

but which are found *in this particular region* to be too weathered, metamorphosed or deformed to warrant special protection.

The **palaeontological field assessment report** provides an illustrated, fully-referenced review of the (a) actual or known as well as (b) inferred palaeontological heritage within all rock units represented in the study area based on the initial desktop study as well as new data from fieldwork and any subsequent palaeontological analysis (e.g. lab identification of fossil material). Palaeontological sensitivity is highly dependent on rock formations whose distribution is depicted on geological maps. A geological map of the study area therefore forms a standard component of a PIA report. Normally the report will also incorporate:

- identification and ranking of highlights and sensitivities to development of fossil heritage within the study area (e.g. distribution of sensitive formations and specific fossil sites)
- specific recommendations for further palaeontological mitigation (if any)
- recommendations and suggestions regarding fossil heritage management on site, including conservation measures as well as promotion of local fossil heritage (e.g. for public education, schools)

It should be emphasized that an authoritative palaeontological assessment report is not only of value to the developer who commissions the study, in terms of fulfilling the legislative requirements and outlining the need for any further palaeontological mitigation. By summarizing and updating our understanding of the palaeontological resources within a specific area a good, well-referenced and -illustrated report also fulfils a valuable archival function for heritage managers, the scientific community and the interested public.

Projects entailing large-scale excavation into potentially fossil-rich rocks will usually trigger **palaeontological mitigation** – normally at the construction phase since adverse palaeontological impacts (e.g. destruction, disturbance or sealing-in of fossils) can be expected at this time rather than during the operational phase. Mitigation by a professional palaeontologist normally involves the recording and judicious sampling of fossil material and associated geological information (e.g. sedimentological data). This work is contracted at the developer's expense and is usually most effective during the construction phase when fresh fossiliferous bedrock has been exposed by new excavations but has not yet been sealed-in. In order to carry out mitigation, the palaeontologist concerned will need to apply for a palaeontological collection permit from the relevant heritage management authority (i.e. Heritage Western Cape for the Western Cape, Amafa for Kwazulu-Natal and SAHRA for all the remaining provinces). Feedback from any mitigation work, including new palaeontological observations and any recommendations for further mitigation, will need to be provided to the developer and the responsible heritage management authorities in the form of one or more reports, culminating in a **final palaeontological assessment report**.

It should be emphasized that most developments do not trigger specialist palaeontological mitigation. Even when this is required, timely consultation between the developer and contracted palaeontologist - well before construction begins - should ensure that mitigation does not delay or otherwise interfere with the construction programme. Finally, *providing appropriate mitigation is carried out*, the majority of developments involving bedrock excavation can make a *positive* contribution to our understanding of local palaeontological heritage. A collaborative relationship between palaeontologists, heritage managers and developers is therefore the desirable norm.

WESTERN CAPE BORROW PITS – INITIAL PALAEOONTOLOGICAL HERITAGE ASSESSMENT (August 2011)

Dr John E. Almond, *Natura Viva* cc, CAPE TOWN

Borrow pit	Location (DMS)		Key Geological Units & Age	Potential fossil heritage	Palaeontological sensitivity	Recommended mitigation
	East	South				
<p>23</p> <p>Prince Albert DR01721/0.9/0.02L New</p>	22°28'22.66"	33°18'43.16"	<p>Waboomberg Formation or Karies Formation</p> <p>(Upper Bokkeveld Group)</p> <p>Middle Devonian</p>	Locally abundant shelly fossil assemblages (Waboomberg Fm) or land plants (lycopods) and trace fossils (Karies)	MEDIUM TO HIGH	Palaeontological field assessment before excavation commences
<p>24</p> <p>Prince Albert DR01721/3.7/0.02L Existing</p>	22°28'0.19"	33°19'51.53"	<p>Gydo Formation</p> <p>(Ceres Subgroup, Bokkeveld Group)</p> <p>Early Devonian</p>	Diverse shelly invertebrate biota (trilobites, molluscs, brachiopods, echinoderms <i>etc</i>) and trace fossils, rare fish remains & plants (lycopods), microfossils	HIGH	Palaeontological field assessment before further excavation commences
<p>25</p> <p>Prince Albert DR01721/8.4/0.02R Existing</p>	22°26'47.44"	33°21'34.6"	<p>Voorstehoek Formation</p> <p>(Ceres Subgroup, Bokkeveld Group)</p> <p>Early Devonian</p>	Moderately diverse shelly invertebrate biota (trilobites, molluscs, brachiopods, echinoderms <i>etc</i>) and trace fossils, rare fish remains & plants (lycopods), microfossils	MEDIUM	Palaeontological field assessment before further excavation commences
<p>19</p> <p>Prince Albert DR01721/16.15/0.01R Existing</p>	22°31'2.07"	33°22'46.67"	<p>Probably Voorstehoek Formation</p> <p>(Ceres Subgroup, Bokkeveld Group)</p> <p>Early Devonian</p>	Moderately diverse shelly invertebrate biota (trilobites, molluscs, brachiopods, echinoderms <i>etc</i>) and trace fossils, rare fish remains & plants (lycopods), microfossils	MEDIUM	Palaeontological field assessment before further excavation commences

Borrow Pit	Location (DMS)		1:50 000 Map Sheet	Key archaeological components and age	Potential archaeological heritage	Archaeological sensitivity	Recommended mitigation
	(East)	(South)					
23	22°28'22.66"	33°18'43.16"	3322 AD	The range of possibilities include:	Although this is a mountainous area	MEDIUM	As very little is known about
Prince Albert			Rosselerf	Early Stone Age artefacts	ESA & MSA artefacts are quite likely		the area and as this is a new
DR01721/0.9/0.02L				(older than 100 000 years)	to be found.		borrow pit it is recommended
New				Middle Stone Age artefacts	LSA sites may also be present.		that a Scoping Fieldwork
				(approx. 100 000 to 30 000 years)	Rock paintings may exist in rocky		Study, which includes GIS
				Later Stone Age artefacts	outcrops.		mapping and analysis, is
				(dating to within the last 30 000 years)			mapped out prior to any
				The presence of Khoekhoe herders			earthmoving or digging
				(over the last 1500 years)	These predictions are based		activities.
				Rock paintings & rock engravings	on a desktop study (Manhire &		
				(mainly within last 5000 years)	Patrick 2011) of all the sites known		
				Graves and unmarked burials	to exist in the general area.		
24	22°28'0.19"	33°19'51.53"	3322 AD	The range of possibilities include:	ESA & MSA artefacts are quite likely	MEDIUM	No archaeological
Prince Albert			Rosselerf	Early Stone Age artefacts	to be found in this area.		survey was carried out
DR01721/3.7/0.02L				(older than 100 000 years)	LSA sites may also be present.		when the existing borrow pit
Existing				Middle Stone Age artefacts	Rock paintings may exist in rocky		was excavated and no
				(approx. 100 000 to 30 000 years)	outcrops.		studies are known from the
				Later Stone Age artefacts	It is also possible that herder sites		immediate vicinity.
				(dating to within the last 30 000 years)	exist along the drainage lines		
				The presence of Khoekhoe herders	close to borrow pit 24.		It is recommended that a
				(over the last 1500 years)			Scoping Fieldwork Study,
				Rock paintings & rock engravings	These predictions are based		which includes GIS
				(mainly within last 5000 years)	on a desktop study (Manhire &		mapping and analysis,
				Graves and unmarked burials	Patrick 2011) of all the sites known		is carried out prior to any
					to exist in the general area.		further development.
25	22°26'47.44"	33°21'34.6"	3322 AD	The range of possibilities include:	ESA & MSA artefacts are quite likely	MEDIUM	No archaeological
Prince Albert			Rosselerf	Early Stone Age artefacts	to be found in this area.		survey was carried out
DR01721/8.4/0.02R				(older than 100 000 years)	LSA sites may also be present.		when the existing borrow pit
Existing				Middle Stone Age artefacts	Rock paintings may exist in rocky		was excavated and no
				(approx. 100 000 to 30 000 years)	outcrops.		studies are known from the
				Later Stone Age artefacts	It is also possible that herder sites		immediate vicinity.
				(dating to within the last 30 000 years)	exist along the drainage lines		
				The presence of Khoekhoe herders	close to borrow pit 25.		It is recommended that a
				(over the last 1500 years)			Scoping Fieldwork Study,
				Rock paintings & rock engravings	These predictions are based		which includes GIS
				(mainly within last 5000 years)	on a desktop study (Manhire &		mapping and analysis,
				Graves and unmarked burials	Patrick 2011) of all the sites known		is carried out prior to any
					to exist in the general area.		further development.
20	22°31'2.07"	33°22'46.67"	3322 BC	The range of possibilities include:	ESA & MSA artefacts are quite likely	MEDIUM	No archaeological
Prince Albert			De Rust	Early Stone Age artefacts	to be found in this area.		survey was carried out
DR01721/16.5/0.01R				(older than 100 000 years)	LSA sites may also be present.		when the existing borrow pit
Existing				Middle Stone Age artefacts	Rock paintings may exist in rocky		was excavated and no
				(approx. 100 000 to 30 000 years)	outcrops.		studies are known from the
				Later Stone Age artefacts			immediate vicinity.
				(dating to within the last 30 000 years)			
				The presence of Khoekhoe herders	These predictions are based		It is recommended that a
				(over the last 1500 years)	on a desktop study (Manhire &		Scoping Fieldwork Study,
				Rock paintings & rock engravings	Patrick 2011) of all the sites known		which includes GIS
				(mainly within last 5000 years)	to exist in the general area.		mapping and analysis,
				Graves and unmarked burials			is carried out prior to any
							further development.