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Environmental Authorisation Process for the Moordrift Prospecting Right Application

Heritage Basic Assessment Report Addendum

Prepared for:

PalRho Exploration (Pty) Ltd

Project Number:

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1. Introduction

PalRho Exploration Pty (Ltd) (PalRho), a subsidiary of Ivanhoe Mines Ltd. (Ivanhoe) intends to obtain a Prospecting Right in terms of Section 16 of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). PalRho intends to undertake prospecting activities on three adjacent properties within the Limpopo Province; this application considers the prospecting activities on the farm Moordrift 289 KR (the Project).

The proposed Project triggers activities included in the Listed Activities in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R982 of 4 December 2014, as amended) (EIA Regulations, 2014, as amended) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The Project therefore requires the completion of a Basic Assessment (BA) process required for Environmental Authorisation (EA).

To this end, PalRho appointed Digby Wells Environmental (Digby Wells) to undertake the BA process. This includes a specialist Heritage Resources Management (HRM) process in compliance with the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Digby Wells compiled a Heritage Basic Assessment Report (HBAR) in support of the BA process, though site access was restricted. This prevented Digby Wells from undertaking a heritage pre-disturbance survey of the proposed Project area. The HBAR was consequently completed as a desktop assessment only.

Digby Wells, however, completed a pre-disturbance survey of the proposed Project area after submission of the Draft Basic Assessment Report (DBAR). This document therefore serves as an addendum to the specialist Heritage Basic Assessment Report (HBAR). It presents the results of the pre-disturbance survey and includes an updated impact assessment for identified heritage resources.

Like the original HBAR, this document was also submitted to the appropriate Heritage Resources Authorities (HRAs); in this case the South African Heritage Resources Agency (SAHRA) and Limpopo Provincial Heritage Resources Authority (LIHRA).

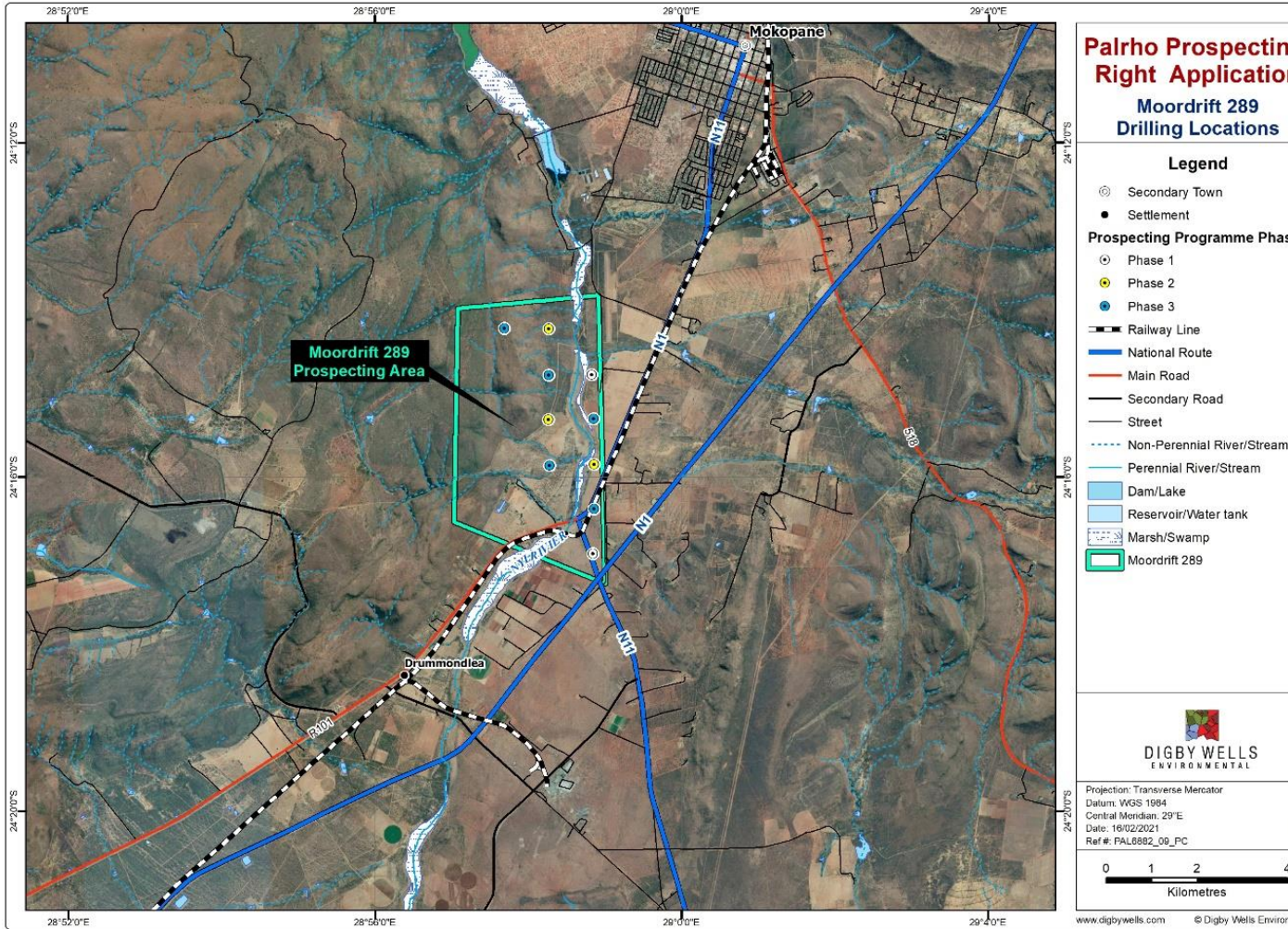
2. Project Description

PalRho intends to use invasive and non-invasive prospecting methods to prospect for several minerals on the farm Moordrift 289 KR. The Project area is located approximately 10 km southwest of Mokopane in the Mogalakwena Local Municipality (MLM) of the Waterberg District Municipality (WDM) within the Limpopo Province. The Project area comprises 2 543 ha and includes the Portions 1, 4 and 6 to 19.

The minerals to be prospected for include chromium, cobalt, copper, fluorspar, gold, iridium, iron, nickel, phosphate ore, platinum and platinum group elements, palladium, rhodium, ruthenium, osmium, tin ore, vanadium, and Rare Earth Metals (including scandium).

Invasive activities will include the borehole drilling of multiple cores (approximately ten) to ascertain the stratigraphic sequence and reef horizons of the minerals and ore bodies. Each borehole will require the clearing of land covering approximately 20 m by 25 m, or 500 m².

PaIRho will not construct any permanent infrastructure to undertake the prospecting activities. However, temporary tracks or access routes will be established between existing roads and the drilling sites and vegetation will be cleared for the drill rig. PaIRho will confirm the exact location of the individual boreholes through a Stakeholder Engagement Process (SEP) and in consultation with the landowners. The borehole locations will consider potential environmental and heritage sensitivities and will be repositioned where necessary to avoid or minimise impacts to these landscapes.

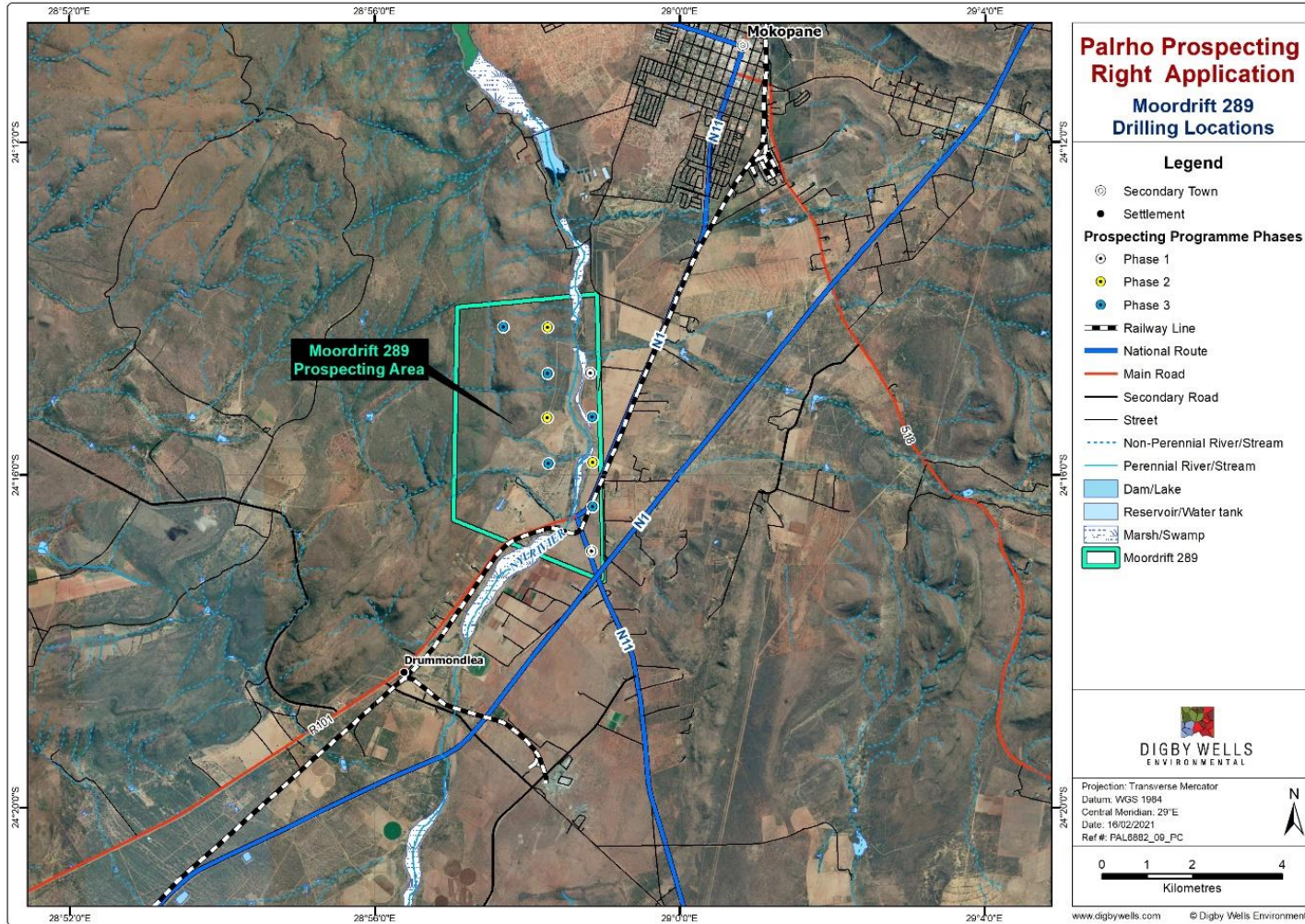


Plan 1 presents the proposed Project design and infrastructure layout. Table 2-1 presents an overview of the activities to be undertaken during the Project lifecycle.

Table 2-1: Project Phases and Associated Activities

Project Phase	Activities
Construction Phase	Establishment of temporary access routes or tracks between existing roads and drill locations
	Establishment of site and three sumps or trenches (per drilling site) to separate and store oil, sludge and water
	Clearing of vegetation for the drill rig
	Stockpiling of topsoil
Operational Phase	Drilling of approximately ten prospecting boreholes
	Handling of general and hazardous waste
	Use of heavy vehicles

Project Phase	Activities
	Maintenance of newly-established roads
Decommissioning Phase	Capping and marking of boreholes
	Removal of temporary infrastructure, decommissioning of camps and drilling equipment
	Backfilling of prospecting areas
	Natural revegetation or reseedling of indigenous vegetation



Plan 1: Proposed Infrastructure Layout

3. Assumptions, Limitations and Exclusions

Table 3-1 provides an overview of constraints and limitations that influenced the findings of this report.

Table 3-1: Constraints and Limitations

Description	Consequence
<p>Dense vegetation cover and leaf litter limited surface visibility at the time of the pre-disturbance survey. Whilst every attempt was made to survey the extent of each accessible site-specific study area, the list of identified heritage resources is not exhaustive.</p>	<p>Potential chance finds of unrecorded heritage resources including buried archaeological resources. PalRho must alert the appropriate HRAs of any chance finds and may need to enlist the services of a suitably qualified archaeologist to advise them on the way forward.</p>
<p>Archaeological and palaeontological resources commonly occur below the ground. These types of resources cannot be adequately recorded or documented by specialists without destructive and intrusive methodologies that require NHRA section 35 permits.</p>	

4. Methodology: Primary Data Collection

Johan Nel, a qualified archaeologist, undertook a non-intrusive (i.e., no physical sampling done, such as collecting artefacts or fossils) pre-disturbance survey of the site-specific study areas on 22 and 23 July 2021 that focused on proposed drilling locations.

The pre-disturbance survey was completed predominantly on foot, although it included vehicular surveys between the focus areas. Where found, animal burrows and dry watercourses were inspected for any exposed archaeological material.

The survey undertook to:

- Visually record the current state of the cultural landscape; and
- Record a representative sample of the visible, tangible heritage resources present within the development footprint area, site-specific study area and greater study area.

Identified heritage resources were recorded as waypoints using a handheld GPS device. The heritage resources were also recorded through written and photographic records. Plan 2 includes the results of the pre-disturbance survey.

5. Results from the Pre-disturbance Survey

This section describes the pre-disturbance survey findings.

5.1. Existing Environment

Evidence of anthropogenic and animal activities are present in the general Project area. Anthropogenic changes i.e., various human-induced transformations of the environment include activities such as agriculture, settlement and structures, roads, irrigation, and others. An example of such anthropogenic change noted during the survey was extensive vegetation clearing for crop cultivation.

Table 5-1 summarises the current natural environment of the Project area and Figure 5-1 presents a visual overview of the current state of the environment at the time of the pre-disturbance survey.

Table 5-1: Summary of the Vegetation Setting of the Project

Biome	Bioregion	Vegetation Type
Savanna	Central Bushveld	<p><u>Waterberg Mountain Bushveld (SVcb 17)</u></p> <p>This vegetation type is characterised by rugged mountains with vegetation grading from bushveld on the higher slopes (which in turn grades to Gm 29) through broad-leaved deciduous bushveld on rocky mid- and foot-slopes to savanna on the lower-lying valleys and deeper sands on plateaus. This unit is associated with the lithologies of the Kransberg Subgroup and the Swaershoek Formation of the Nylstroom Subgroup, all within the Mokolian Waterberg Group.</p> <p>This unit is considered least threatened an approximately 3% has been transformed, mainly due to cultivation. Within the area associated with this vegetation type, population density is low. The carrying capacity for domestic stock is low, especially during the dry season. Within this type, erosion is generally very low to low.</p>
		<p><u>Makhado Sweet Bushveld (SVcb 20)</u></p> <p>Vegetation in this type is characterised by short and shrubby bushveld occurring on slightly to moderately undulating plains with some hills. This vegetation occurs on the gneisses and migmatites of the Hout River Gneiss, the potassium-deficient gneisses of the Goudplaats Gneiss and the sandstones and mudstones of the Matlabas Subgroup of the Mokolian Waterberg Group.</p> <p>This vegetation type is considered vulnerable and approximately 27% has been transformed. Cultivation is the main factor in this transformation, but urban and built-up areas have also contributed to this transformation. The southwestern half of the area associated with this unit is characterised by densely populated rural communities. Erosion in this unit ranges from low to high.</p>

Biome	Bioregion	Vegetation Type
Grassland	Mesic Highveld Grassland	<p><u>Waterberg-Magaliesberg Summit Sourveld (Gm 29)</u></p> <p>This vegetation unit is characterised by higher slopes, summit positions (including crests), steep rocky scarps and cliff faces covered with grassland dominated by wiry tussock grasses. Patches of open savannoid vegetation and open shrubland are common and typical of this type. Succulents occur in the abundant rocky sheets on exposed mountain tops abundant within the unit. These sheets also support sparse grassland and herbland.</p> <p>This vegetation is underlain by the coarse, clastic sedimentary sandstone, quartzite, conglomerate or shale of the Kransberg Subgroup within the Waterberg Group.</p> <p>This vegetation type is considered least threatened as a large part is statutorily or privately conserved, and a small area has been transformed. Erosion is low to very low.</p>

Adapted from Mucina & Rutherford (2010)

5.2. Identified Heritage Resources



Eight heritage resources were identified including historical burial grounds and graves, Iron Age stonewalling and pottery within the property. Three sites are situated within 150 m of proposed borehole locations, namely ARC001 (<80 m), ARC003 (<150 m), and BGG007 (<70 m). All the Iron Age resources occur roughly on the same contour and could represent evidence of contemporary occupations along the foothill of the adjacent mountain. Digby Wells does not envisage any impact to the heritage resources of significance from the above-mentioned activities and has therefore not assessed these impacts further in this report.


Table 5-2 below provides a summary of the identified resources







Figure 5-1: Current State of Conservation of the Environment at Proposed Prospecting Borehole Sites


Table 5-2: Identified Heritage Resources

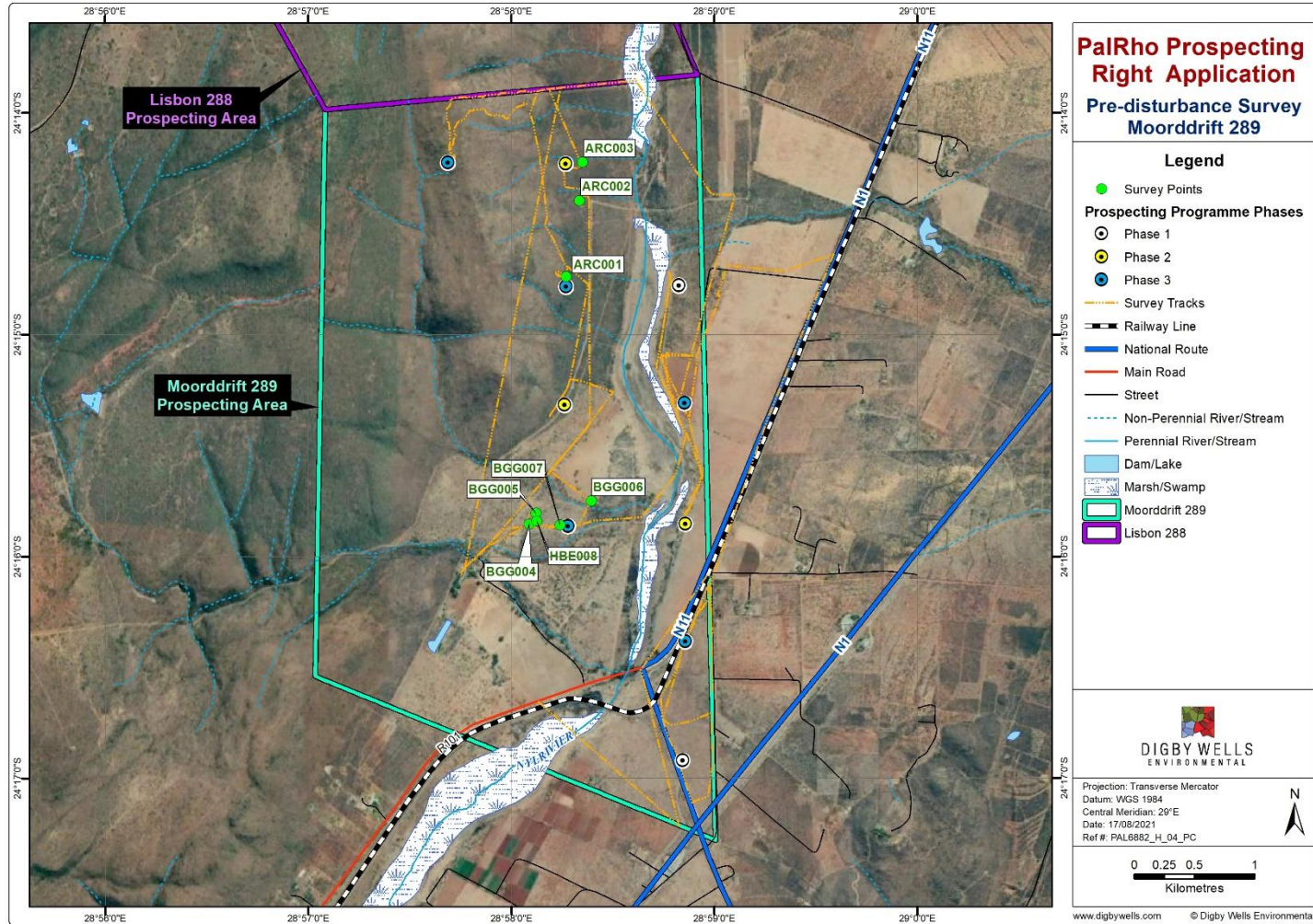
Resource ID	Brief Description	Photographic Record
ARC001	<p>Scatter of Iron Age pottery located within a single track. Single decorated piece.</p> <p>No other visible evidence of occupation such as stonewalling.</p> <p>Very dense vegetation cover and leaf litter.</p> <p>Approximately 600 m from ARC002 and 900 m from ARC003.</p> <p>These three observation points may represent part of a single Iron Age or very early historic occupation along contour.</p>	 

Resource ID	Brief Description	Photographic Record
ARC002	<p>Large clearing surrounded by a stonewall following the same contour as that of sites ARC001 and 003.</p> <p>Clearing created by landowners who use the site as gathering place / overnight camp.</p> <p>No material culture noted.</p>	
ARC003	<p>Single, low stonewall following lower contour of mountain.</p> <p>Approximately 300 m from ARC002 and 900 m from ARC001.</p>	

Resource ID	Brief Description	Photographic Record
BGG004	<p>At least four visible graves, associated with farmworkers and possibly also HBE008.</p> <p>Family names according to landowner include Spalela, Witboot, and Sanego.</p>	
BGG005	<p>At least one visible grave associated with a Sithole family and possibly also HBE008.</p>	

Resource ID	Brief Description	Photographic Record
BGG006	At least one visible grave associated with a Poto family.	
BGG007	<p>At least nine visible graves, associated with farmworkers and possibly also HBE008.</p> <p>Family names according to landowner include Spalela, Witboot, and Sanego.</p>	

Resource ID	Brief Description	Photographic Record
HBE008	Remains of old farm worker's housing.	



Plan 2: Results from the Pre-disturbance Survey

6. Impact Assessment

This section presents a description of the CS of identified heritage resources informed through primary and secondary data collection. The CS of the heritage resources informs the minimum required mitigation encapsulated in the NHRA and the SAHRA Minimum Standards.

6.1. Cultural Significance of the Identified Landscape

Heritage resources are intrinsic to the history and beliefs of communities. They characterise community identity and cultures and are finite, non-renewable and irreplaceable. Considering the innate value of heritage resources, it is acknowledged that these have lasting worth as evidence of the origins of life, humanity and society. Notwithstanding the inherent value ascribed to heritage, it is incumbent on the assessor to determine the significance of these resources to allow for the implementation of appropriate management. This is achieved through assessing the value of heritage resources relative to the prescribed criteria encapsulated in policies and legal frameworks. Table 6-1 following CS ratings are assigned to the identified heritage resources:

Table 6-1: Cultural Significance of Identified Heritage Resources

Resource IDs	Motivation	CS Rating
ARC001 – 003	<p>Individually, these sites represent low to negligible cultural significance. However, given the history of the region and the farm Moordrift itself, the sites could form part of a larger occupation event that could be linked to the Battle of Moordrift and early Langa settlement in the area.</p> <p>The sites cannot therefore be assessed individually.</p>	<p>Medium High</p> <p>Resource will require mitigation</p>
BGG004-007	<p>All burials are considered be of very high CS due to social, historic, information, and other intrinsic attributes.</p>	<p>Very High</p> <p>Resources must be conserved and included in a management plan</p>
HBE008	<p>This site comprises some remnants of farm workers' houses. The site's integrity</p>	<p>Negligible</p> <p>Not mitigation required</p>

Resource IDs	Motivation	CS Rating
	is totally lost. Other than possible connections to BGG0004, 005, and 007 the site is of negligible CS.	

All burial grounds are considered to be of very high cultural significance.

The individual archaeological sites

6.2. Construction Phase

Table 6-2 presents the activities expected to occur during the Construction Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 6-2: Interactions and Impacts of Construction Phase Activities

Interaction	Impact
Establishment of temporary access routes or tracks between existing roads and drill locations	Digby Wells does not foresee any impact to the cultural heritage landscape, given the nature of the proposed activities and their flexibility in terms of their location.
Establishment of site and contractors camp and three sumps or trenches to separate and store oil, sludge and water	
Clearing of vegetation for the drill rig	
Stockpiling of topsoil	

Of the eight identified heritage resources, only three could potentially be affected by the construction phase activities, i.e., ARC001 (<80 m from a borehole point), ARC003 (<150 m from a borehole point), and BGG007 (<70 m from a borehole point).

However, given the nature of the proposed activities and the flexibility in terms of the location of the of boreholes, any impact can be avoided either through changing borehole locations or implementing mitigation measures such as a Watching Brief and temporary securing of burial sites.

6.3. Operational Phase

Table 6-3 presents the activities expected to occur during the Operational Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 6-3: Interactions and Impacts of Operational Phase Activities

Interaction	Impact
Drilling of approximately ten prospecting boreholes	Digby Wells does not foresee any impact to the cultural heritage landscape, given the nature of the proposed activities and the consideration of the heritage landscape in the placement of the drilling sites and associated infrastructure.
Utilisation of portable toilet facilities	
Handling of general and hazardous waste	
Use of heavy vehicles	
Maintenance of newly-established roads	

No heritage resources were identified in proximity to or within the proposed Project layout. Digby Wells does not envisage any impact to the heritage resources of significance from the above-mentioned activities and has therefore not assessed these impacts further in this report.

6.4. Decommissioning Phase

Table 6-4 presents the activities expected to occur during the Decommissioning Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 6-4: Interactions and Impacts of Decommissioning Phase Activities

Interaction	Impact
Concurrent rehabilitation: mined-out areas will be backfilled with stockpiled topsoil and waste material from the screening plant.	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the temporary nature of the proposed infrastructure.
Backfilled material will be levelled and contoured to avoid ponding of water.	
Revegetation: either naturally or through use of an indigenous seed mix where vegetation is not suitably established.	

No heritage resources were identified in proximity to or within the proposed Project layout. Digby Wells does not envisage any impact to the heritage resources of significance from the above-mentioned activities and has therefore not assessed these impacts further in this report.

7. Results of Consultation and Stakeholder Engagement

Site surveys can often present an opportunity for informal consultation with specific stakeholders (usually farm owners, managers and employees). This consultation can result in

the identification of burial grounds and graves – importantly, sometimes with no visible surface markers – or in the identification of sacred sites or other places of importance, which may not otherwise be identified.

During the pre-disturbance survey, the Digby Wells heritage specialist was accompanied by informants that included the landowner of this property and others. These informants indicated there were burial grounds present on the property, although on a different portion. These burial grounds are located close to the foothills of the hills in the Project area. Given their location relative to the proposed Project area, the location and condition of these additional burial grounds were not verified in the field.

8. Recommendations

Considering the nature and scope of the Project, and the outcomes of the pre-disturbance survey, Digby Wells recommends the following:

- Implementing a Watching brief during the construction phase, especially for those boreholes near ARC001;
- Demarcate BGG004, 005, and BGG007 for the duration of the drilling programme and include specific management measures such as declaring these sites no-go zones.

9. Reasoned Opinion Whether Project Should Proceed

Based on the understanding of the Project while considering the results of this assessment, Digby Wells does not object to the Project provided the recommendations detailed in Section 8 above are adopted.

10. Conclusion

This document comprises an update to the current HBAR to provide the results of the pre-disturbance survey and additional recommendations for PalRho to implement prior to the commencement of the construction phase of the proposed Project.

Based on the results of the pre-disturbance survey and the understanding of the Project while considering the results of this assessment, Digby Wells does not object to the Project provided the recommendations detailed above are adopted.