

APPENDIX D:

SPECIALIST REPORTS



Environmental Management Group (Pty) Ltd

*Specialists in Environmental Management Integrating Industry and Infrastructure
with the Environment*

APPENDIX D1:

HERITAGE IMPACT ASSESSMENT



Environmental Management Group (Pty) Ltd

*Specialists in Environmental Management Integrating Industry and Infrastructure
with the Environment*

PALAEONTOLOGICAL AND HERITAGE IMPACT ASSESSMENT FOR
EXISTING CATTLE FEEDLOTS AND A PROPOSED FEEDLOT
EXPANSION AREA ON FARMS BRAKPAN 700 & VAALDAM
SETTLEMENT 1777, NEAR ORANJEVILLE
METSIMAHOLO LM, FREE STATE PROVINCE.



Report prepared for

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Specialist Info

Lloyd Rossouw is a professionally accredited heritage practitioner with more than three decades of field experience in South African archaeology and Quaternary palaeontology. He holds a Ph.D. in Palaeoenvironmental Science from the University of the Free State, an M.Sc. in Quaternary Vertebrate Palaeontology (*cum laude*) from the University of the Witwatersrand, and a BA (Hons) in Archaeology from Stellenbosch University, supplemented by formal training in human anatomy. He previously served as Head of Department for two research departments at the National Museum, Bloemfontein, and is currently the director of Paleo Field Services, specialising in heritage impact assessments and regulatory compliance across South Africa. His field experience spans Stone Age archaeological sites, palaeontological localities, rock art landscapes, and historical-period homesteads.

Declaration of Independence

Paleo Field Services remains financially independent, with no vested interest in project activities or outcomes except for professional fees. Its sole remuneration comes from agreed-upon services for each project. Paleo Field Services accepts client-provided information as accurate.

Yours truly,

A handwritten signature in blue ink, appearing to read "L Rossouw".

July 2026

SUMMARY

A Phase 1 Palaeontological and Heritage Impact Assessment (PIA/HIA) was undertaken for existing cattle feedlots and a proposed feedlot expansion area on adjacent farms Brakpan 700 and Vaaldam Settlement 1777 near Oranjeville, Metsimaholo Local Municipality, Free State Province. The palaeontological findings indicate that the development footprint is underlain by dolerite intrusions of negligible fossil sensitivity. As intrusive igneous rock, dolerite is not conducive to fossil preservation, and the affected areas are therefore regarded as having negligible intrinsic palaeontological significance. From an archaeological and broader heritage perspective, Areas 1–4 and 6 comprise stockyards, encampments and associated working surfaces that have been extensively altered by trampling, levelling, stock concentration, vehicle movement and recent agricultural infrastructure, while Area 5 consists of heavily trampled and grazed grassland that is likewise highly disturbed. No in situ Stone Age archaeological material, prehistoric structures, graves, or historically significant buildings older than 60 years were identified within Areas 1–6 during the assessment. In terms of the National Heritage Resources Act (Act No. 25 of 1999), no heritage resources were identified within the assessed footprints that would constitute a constraint sufficient to halt the proposed development. The affected areas are accordingly assigned a field rating of *Generally Protected C (GP.C)*, indicating low heritage significance. No further archaeological work is required for operational activities in Areas 1–4 and 6 or prior to development in Area 5. From a heritage perspective, the development may proceed, provided that all construction- and operational-phase activities remain confined to the demarcated footprints.

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INTRODUCTION

A Phase 1 Palaeontological and Heritage Impact Assessment (PIA/HIA) was undertaken for existing cattle feedlots and a proposed feedlot expansion area on adjacent farms Brakpan 700 and Vaaldam Settlement 1777, near Oranjeville in the Free State Province (**Fig. 1**). The sites, designated as Areas 1–5, are situated on gently undulating terrain approximately 1.3 km northwest of the Vaal Dam shoreline and about 5.5 km west of Oranjeville by road (**Fig. 2**).



Figure 1. Study area marked on portion of 1:50 000 scale topographic map 2628CC Deneysville, aerial view on the right.

Map Reference: 1:50 000 scale topographic map 2628CC Deneysville and 1:250 000 scale geological map 2628 East Rand.

Farm Reference: Brakpan 700/1, Brakpan700/RE and Vaaldam Settlement 1777/26.

GPS Coordinates Areas 1, 2, 5 & 6:

- A) 26°59'6.75"S 28° 9'3.06"E
- B) 26°59'5.58"S 28° 9'6.66"E
- C) 26°59'1.17"S 28° 9'7.57"E
- D) 26°58'59.26"S 28° 9'10.57"E
- E) 26°58'57.54"S 28° 9'13.53"E
- F) 26°59'1.57"S 28° 9'18.24"E
- G) 26°59'2.68"S 28° 9'17.62"E
- H) 26°59'5.70"S 28° 9'22.30"E
- I) 26°59'8.87"S 28° 9'13.15"E

J) 26°59'8.05"S 28° 9'10.09"E

GPS Coordinates Areas 3 & 4:

K) 26°59'8.78"S 28° 9'8.99"E

L) 26°59'9.54"S 28° 9'11.83"E

M) 26°59'10.98"S 28° 9'11.06"E

N) 26°59'10.17"S 28° 9'8.32"E

LEGAL FRAMEWORK

The assessment is required as a prerequisite for new development in terms of the National Heritage Resources Act (NHRA) 25 of 1999. The NHRA identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. The NHRA prescribes a system of grading of places/objects via Section 7 and makes provision for the general protection of heritage resources via Sections 34, 35, 36, and 37 (in respect of the built environment, archaeology/palaeontology, burial grounds/graves and monuments/memorials, respectively), while Section 38 sets out guidelines under which heritage impact assessments are required when new developments may impact upon heritage resources.

Section 38(1) applies when a development triggers heritage assessment requirements but does not require an environmental authorisation from another regulatory authority, including:

1. Construction of a road, powerline or pipeline, canal or other similar form of linear development or barrier longer than 300m.
2. Construction of a bridge or similar structure exceeding 50 m.
3. Development exceeding 5,000 m².
4. Rezoning of land exceeding 10,000 m², or
5. Any development that may impact recognized heritage resources (e.g., archaeological sites, graves, buildings older than 60 years).

Section 38(3) of the NHRA sets the minimum information requirements for a Heritage Impact Assessment report: the responsible heritage resources authority must ensure that any report submitted includes, at least, the core elements listed in Section 38(3)(a)–(g), namely identification and mapping of heritage resources, significance assessment, impact

assessment, evaluation against socio-economic benefits, consultation outcomes, consideration of alternatives (where impacts occur), and mitigation planning. **Section 38(8)** of the NHRA applies when a development requires environmental authorisation from another regulatory authority, including environmental authorisation under NEMA (Act 107 of 1998).

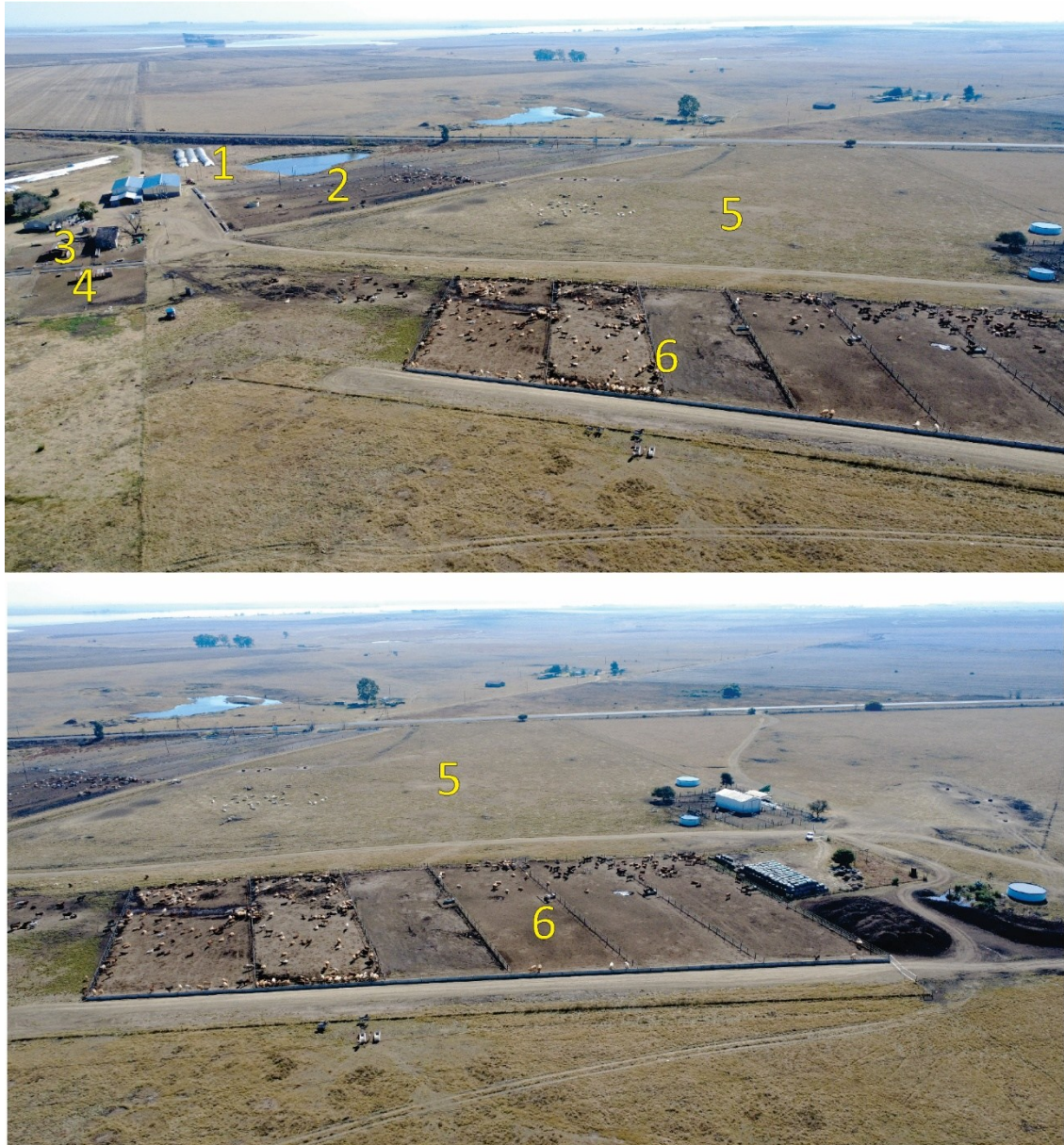


Figure 2. Composite aerial (drone) imagery of the study area, looking west and northwest. Areas 1–4, include farm buildings, sheds, modern ancillary infrastructure and existing feedlot enclosures. Area 5 comprises heavily grazed grassland with water storage tanks located near its boundary, while Area 6 demarcates existing feedlot enclosures. Areas 1-4 & 6 show heavily modified, denuded surfaces within the feedlot enclosures where prolonged livestock concentration and trampling have substantially altered the original land surface.

DISCLAIMER, ASSUMPTIONS AND LIMITATIONS

Information provided by the Client and/or Environmental Assessment Practitioner (EAP) was assumed to be accurate and complete for the purposes of this assessment. Observations presented in this report are based solely on aboveground visibility of features and outcrops as encountered during field survey. The reliability and completeness of these observations are subject to several inherent limitations:

- Fossiliferous outcrops are often limited to exposed lithologies and may be obscured by colluvium, vegetation, or soil mantling; the degree of weathering affects the preservation and visibility of fossil material, with heavily weathered surfaces potentially masking fossil content or fragmenting specimens; stratigraphic context is inferred from visible lithologies only; subsurface fossil-bearing horizons may remain undetected without trenching or coring; access limitations may restrict inspection of key geological exposures, particularly in rugged terrain or areas with restricted land access.
- The surface visibility of archaeological remains is variable and may be significantly reduced by vegetation cover, soil accumulation, or recent land disturbance (e.g., ploughing, erosion, construction); subsurface archaeological remains (e.g., buried structures, features, or artefact scatters) may not be detectable without excavation or remote sensing; weathering and exposure can obscure diagnostic features such as stone alignments, midden deposits, or low-relief structures, especially in areas with high sedimentation or seasonal vegetation growth; accessibility constraints (e.g., fenced properties, steep terrain, or dense bush) may prevent systematic coverage, resulting in partial or biased spatial data.

METHODOLOGY

The site assessment was carried out in line with the National Heritage Resources Act (Act No. 25 of 1999) and the 2007 SAHRA Minimum Standards for Archaeological and Palaeontological Impact Assessments. Initial site ratings were based on existing field data, relevant databases, and published literature. Topographic, aerial and geological maps were used for illustrative



Figure 3. General view of Area 1, looking north (A), Area 2, looking northeast and southwest (B & C), Area 3 and 4, looking north (D & E), Area 5, looking south and northwest (F & G) and Area 6, looking east and southeast (H & I).

purposes and to identify potential fossil-bearing formations. Aerial (drone) photos of the site were provided by the EAP. Fieldwork involved direct observation through foot surveys, with vehicle access where possible. A Garmin Etrex Vista handheld GPS (set to the WGS 84 datum) and a digital camera were used to record spatial and visual data throughout the survey. GPS coordinates are presented in *Degrees, Minutes, Seconds* format in the report.

TERMS OF REFERENCE

The Terms of Reference outlines the scope and objectives for assessing potential impacts on heritage resources—both tangible and intangible—arising from the proposed development, in accordance with relevant legislative standards.

1. Conduct site investigation for a Heritage *Impact Assessment (HIA)* to identify and map heritage sites and occurrences in the affected area(s) and provide an assessment of their significance. This must be done regardless of the sensitivity indicated on the *DESTEA National Web Based Environmental Screening Tool*, as the Department of Environmental Affairs and its entities make no warranty—express or implied—regarding the accuracy, reliability, usefulness, or completeness of the *archaeological and cultural heritage theme layer*.
2. Conduct a site investigation for a Palaeontological Impact Assessment (PIA) using the SAHRIS PalaeoSensitivity Map (**Fig. 4**), regardless of the sensitivity indicated on the *DESTEA National Web Based Environmental Screening Tool*. Identify and map fossils or exposures in the area and assess their significance. This is required as the Department of Environmental Affairs does not guarantee the accuracy or completeness of the *palaeontology theme layer*.
3. Assess impacts of the proposed development on heritage resources relative to the sustainable social and economic benefits to be derived from the development *if planned impacts will result in the loss of any resources*.
4. Provide a system of grading of places and objects which form part of the national estate, and which distinguishes between at least the categories as prescribed under Section 7 of the NHRA (**Table 1**).



Figure 4. Yellow polygon marks the study area on portion of SAHRIS palaeosensitivity map.

Table 1. Description of Field Rating categories as prescribed in Section 7(1) of the NHRA where SAHRA must by regulation establish a system of grading of places and objects which form part of the national estate, and which distinguishes between at least the categories— (a) Grade 1: Heritage resources with qualities so exceptional that they are of special national significance; (b) Grade 2: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; (c) Grade 3: Heritage resources which can be considered to have special qualities which make them locally significant; and Generally Protected: Other heritage resources which may require mitigation before destruction.

Field Rating	Grade (NHRA No. 25 of 1999, Section 7)	Significance	Mitigation
National Significance (NS)	Grade 1	-	Conservation: national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation: provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation: mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A	-	High/medium significance	Mitigation before destruction

Generally Protected B	-	Medium significance	Recording before destruction
Generally Protected C	-	Low significance	Destruction

PALAEONTOLOGICAL BACKGROUND

Potentially fossil-bearing sedimentary successions occurring to the east and west of the study area are represented by Permian strata of the Vryheid Formation and overlying Volksrust Formation of the Ecca Group (Karoo Supergroup). The Ecca Group records deposition that evolved from predominantly marine conditions to marginal-marine, deltaic and continental settings during the Early to Middle Permian. Within this succession, the Vryheid Formation is well known for coal-bearing, fluviodeltaic deposits that host a diverse fossil assemblage dominated by glossopterid vegetation (*Glossopteris* flora), together with associated invertebrates and trace fossil assemblages indicative of delta-plain to marginal-marine environments. In contrast, the overlying Volksrust Formation comprises predominantly argillaceous mudrocks and siltstones deposited under relatively low energy, offshore to nearshore conditions associated with a marine transgression followed by regression. Although macrofossil remains are comparatively sparse in this unit, fossil occurrences include rare bivalves such as *Megadesmus*, plant-bearing horizons, and trace fossil assemblages reflecting quiet-water sedimentation and marginal-marine to brackish conditions. The scarcity of body fossils is consistent with the fine-grained, often poorly oxygenated depositional environments. Vertebrate occurrences are rare but may include amphibian (temnospondyl) remains and associated ichnofossils.

According to the 1:250 000 scale geological map of the area (Sheet 2628 East Rand) Brakpan 700 and the northern part of Vaaldam Settlement 1777 are primarily underlain by Jurassic-aged dolerite intrusions of the Karoo Dolerite Suite (**Fig. 5**). These igneous bodies represent part of the Karoo Large Igneous Province emplaced as sills and dykes within the sedimentary succession. As intrusive igneous rocks formed from molten magma, dolerites are inherently unfavourable for the preservation of fossils and may locally thermally alter or destroy fossiliferous horizons at contact zones.

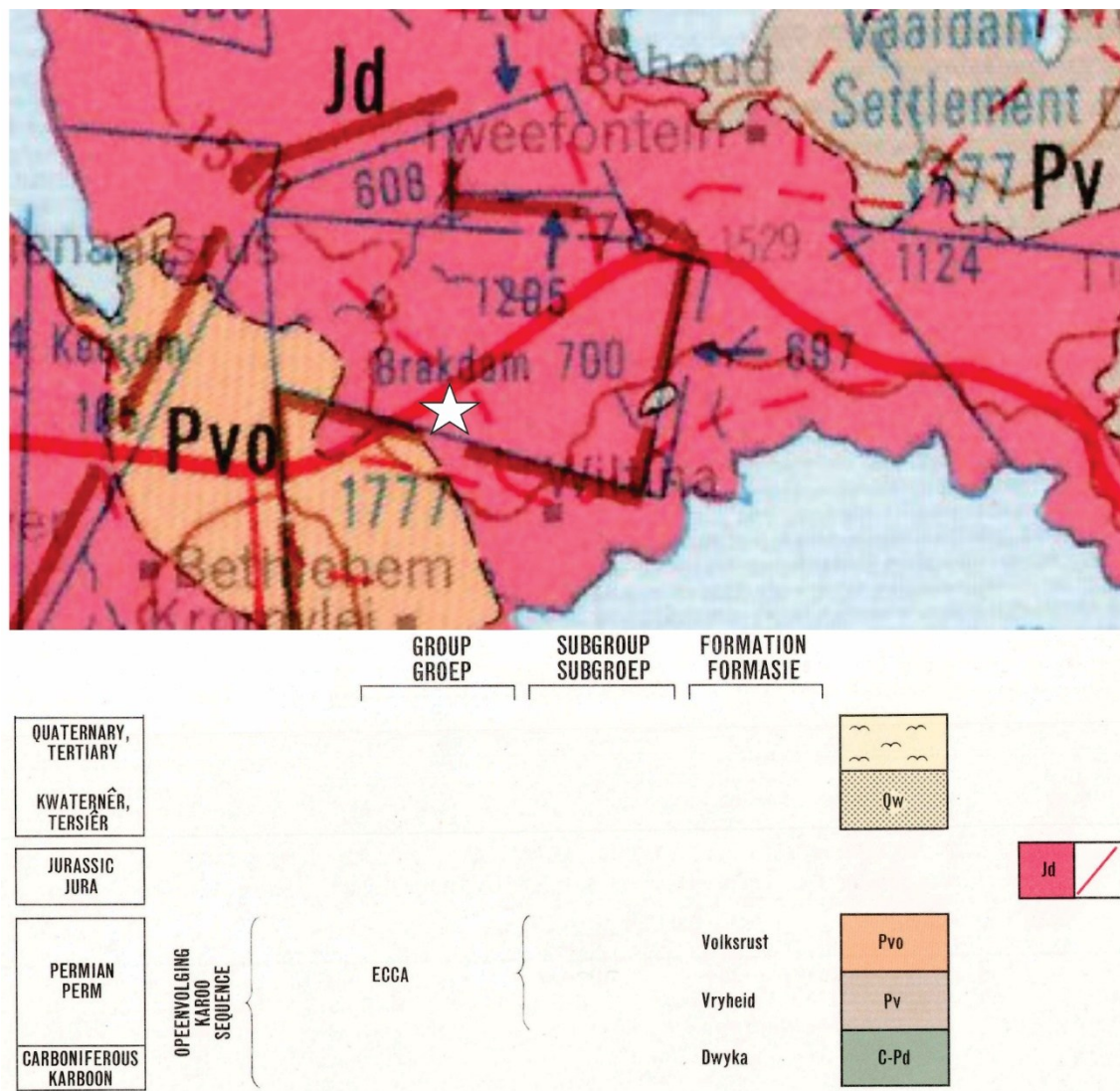


Figure 5. Study area marked by white star portion of 1:250 000 scale geological map (Sheet 2628 East Rand). Potentially fossil-bearing sedimentary successions occurring to the east and west of the study area and are represented by Permian strata of the Vryheid Formation (*Pv*) and overlying Volksrust Formation of the Eccra Group (*Pvo*), with Brakpan 700 primarily underlain by Jurassic-aged dolerite intrusions of the Karoo Dolerite Suite (*Jd*).

PALAEONTOLOGICAL FIELD ASSESSMENT

Findings from the site inspection confirm that the likelihood of significant impact on palaeontological within Areas 1–6 is very low. The affected footprint is underlain by palaeontologically insignificant dolerite intrusions which is not conducive to the preservation of fossils (**Fig. 6**). Consequently, the development footprint is considered to have negligible intrinsic palaeontological sensitivity.

In accordance with the types and ranges of palaeontological resources protected under the National Heritage Resources Act (Act No. 25 of 1999), no palaeontological features were identified within Areas 1–6 that would constitute a constraint significant enough to halt the proposed development. The combined results of the desktop review and site inspection indicate that the affected areas are of low palaeontological significance and are appropriately assigned a field rating of Generally Protected C (GP.C).

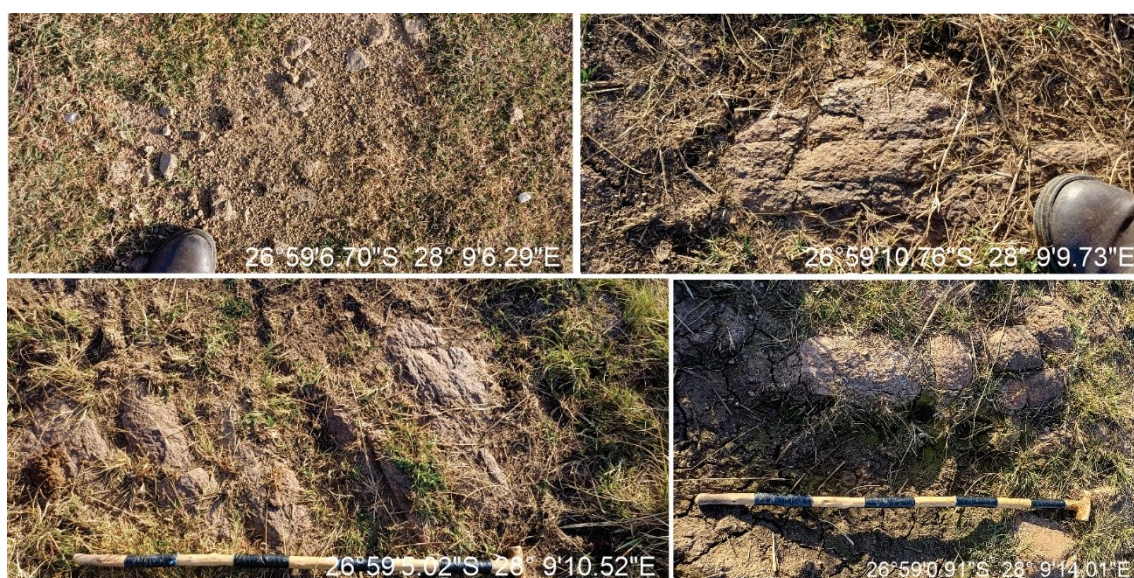


Figure 6. Areas 1 - 6 are underlain by palaeontologically insignificant dolerite intrusions which is not conducive to the preservation of fossils. Scale 1 = 10 cm.

ARCHAEOLOGICAL BACKGROUND

Pending field investigation, archaeological and historical heritage resources likely to occur within undisturbed areas in the surrounding region, may include:

- Stone Age localities and Iron Age sites.
- Unmarked graves, graveyards and historically significant structures older than 60 years old.

Stone Age archaeology is well represented within the upper Vaal River basin between Vereeniging and the Vaal Dam, where Early Stone Age and Middle Stone Age lithic material has previously been recovered from a number of donga systems along the Taaibosspruit, approximately 30 km northwest of the study area. The upper Vaal region is also known for the occurrence of Late Iron Age stone-walled settlements, including sites formerly located

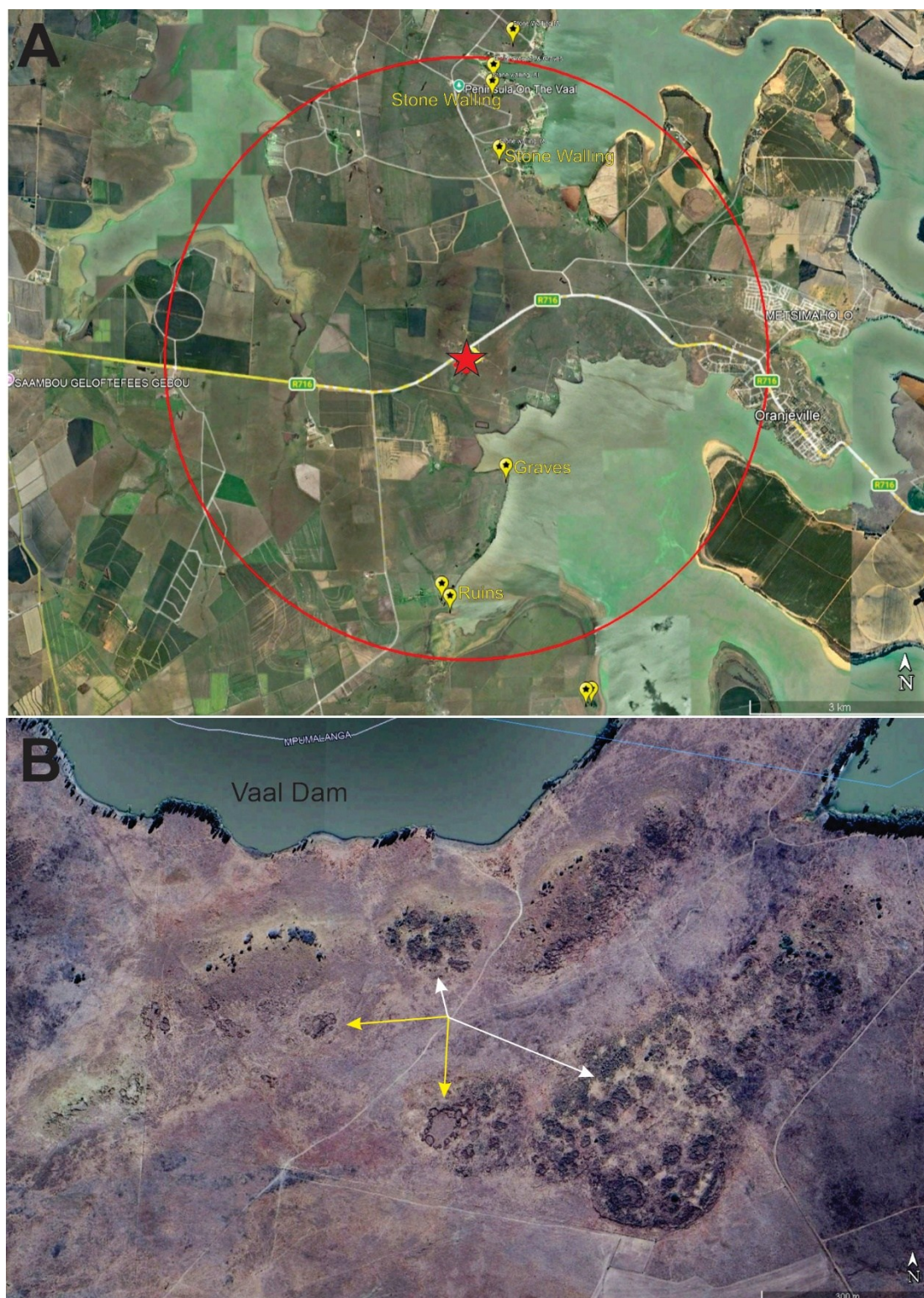


Figure 7. (A) Distribution of Iron Age settlements within the flooding area of the Vaal Dam (study area marked by red star). (B) Aerial view of a Type N settlement showing primary enclosures arranged in a ring, linked by secondary walling and enclosed by an outer surrounding wall (white arrows), as well as converted Type V settlement units (yellow arrows) consisting of primary enclosures linked by secondary walling, but without an outer surrounding wall (settlement types after Maggs 1976).

within the area inundated by the construction of the Vaal Dam (**Fig. 7**). Large tracts of low-lying land, and potentially many archaeological and historical sites, were submerged following the construction of the dam from 1936 onward. These regional patterns indicate that archaeological resources may also occur in the broader landscape, particularly in undisturbed contexts associated with drainage lines, erosional exposures, high relief areas and older land surfaces.

ARCHAEOLOGICAL FIELD ASSESSMENT

Areas 1–4 and 6 consist of stockyards, encampments and associated working surfaces that have been repeatedly modified through trampling, levelling, stock concentration, vehicle movement and the emplacement of recent agricultural infrastructure (**Fig. 8**). These activities have significantly reduced the integrity of any original ground surface and have left no aboveground indications of archaeological material, historical structures or graves within these footprints. Area 5 comprises heavily trampled and grazed grassland and is likewise regarded as highly disturbed (**Fig. 9**). No evidence was identified for in situ Stone Age archaeological material, whether preserved as capped subsurface assemblages or as intact surface scatters, nor were any prehistoric structures, historically significant buildings older than 60 years, or aboveground indications of graves recorded during the assessment.

SECTION 38(3) - ALIGNED COMPLIANCE STATEMENT

The archaeological component of the assessment included the identification and mapping of potential heritage resources within the development footprint by means of desktop review, the use of topographic, aerial and geological maps, and field verification through pedestrian survey. Areas 1–4 and 6 were identified as stockyards, encampments and associated working surfaces that have been repeatedly modified by trampling, levelling, vehicle movement, stock concentration and the installation of recent agricultural infrastructure. Area 5 comprises heavily trampled and grazed grassland, with surface integrity substantially reduced by ongoing agricultural use. No archaeological sites, historical structures older than 60 years, graves, or visible in situ Stone Age material were recorded within Areas 1–6 during the survey.

The observed man-made features are attributable to recent and ongoing agricultural activity and do not constitute heritage resources of conservation significance.



Figure 8. Areas 1–4 & 6 consist of stockyards, encampments and associated working surfaces that have been repeatedly modified through trampling, levelling, stock concentration, vehicle movement and the emplacement of recent agricultural infrastructure.

a) Assessment of the significance of identified heritage resources.

No archaeological or historical heritage resources of conservation significance were identified within Areas 1–6. The features observed on site are modern agricultural features associated with stock management and cultivation and do not possess archaeological, historical, architectural, or cultural significance under the NHRA. Because no archaeological resources were identified, and because the surveyed surfaces have been substantially altered by previous and ongoing farming activities, the archaeological significance of the affected footprint is considered low. Areas 1–6 are therefore assigned a field rating of Generally Protected C (GP.C).



Figure 9. Area 5 shows surface modification attributable to prolonged modification by livestock trampling and sustained grazing pressure.

b) Assessment of the nature and extent of potential impacts.

Based on the survey results, the extent of potential impact on archaeological heritage is assessed as very low, because the affected areas have already undergone substantial prior disturbance and no archaeological features were identified within the surveyed footprints. In

Areas 1–4 and 6, repeated trampling, levelling, stock concentration, vehicle movement and the emplacement of agricultural infrastructure have reduced the integrity of the original ground surface. Area 5 is similarly disturbed as a result of ongoing trampling and grazing. Given the degraded condition of the terrain and the absence of identified archaeological resources, the proposed development is not expected to result in significant direct impacts on known archaeological heritage resources.

c) Evaluation of impacts in relation to the anticipated social and economic benefits of the proposed development.

Potential archaeological cost of development within Areas 1–6 is expected to be low, as no archaeological resources of conservation significance were identified within the demarcated footprints. On that basis, the proposed development is not constrained by archaeological considerations of a scale that would justify halting the proposed development. The low archaeological sensitivity of the affected footprint supports the view that the development may proceed without material loss of identified archaeological heritage resources, subject to compliance with the recommended development controls.

d) Consultation with affected communities and other interested parties regarding potential impacts on heritage resources.

No objections or concerns relating to archaeological heritage were raised by the property owner during the EAP consultation process.

e) Consideration of alternatives where heritage resources may be adversely affected, including alternative layouts or development options.

Because no archaeological heritage resources were identified within Areas 1–6, no redesign, relocation or layout alternatives are required on archaeological grounds.

f) Specification of mitigation measures to avoid, minimise, or manage adverse impacts on heritage resources during construction, operation, and operational phases of the development.



Figure 10 Aerial (drone) imagery of the study area: Area 1 and existing Feedlot Areas 2–4 encompass the current farmyard complex, including farm buildings, sheds, and modern ancillary infrastructure along with the operational feedlot enclosures. Area 5 currently comprises heavily trampled and grazed grassland and Feedlot Area 6 delineates existing, operational enclosures.

Given the absence of identified archaeological resources within Areas 1–6, no further specialist archaeological mitigation is required, but it is recommended that all construction and operational activities must remain confined to the surveyed and demarcated footprints.

CONCLUSION

In accordance with the categories of archaeological and cultural heritage resources protected under the National Heritage Resources Act (Act No. 25 of 1999, NHRA) — specifically Section 35 (archaeological and palaeontological resources), Section 34 (structures older than 60 years), and Section 36 (burial grounds and graves) — no heritage features were identified within Areas 1–6 that would constitute a constraint significant enough to halt the proposed development.

The combined results of the desktop review and site inspection indicate that the affected areas are of low archaeological significance and are appropriately assigned a field rating of Generally Protected C (GP.C) (**Table 1**).

In line with the impact management principles set out under Section 38(3)(b) and (c) of the NHRA — which require the identification and evaluation of potential impacts and the specification of mitigation or management measures — any further development associated with the proposed project will remain strictly confined to the affected areas (Areas 1–6). These footprints correspond to the already established modern camps, farm buildings, sheds, ancillary infrastructure, and operational feedlot enclosures, all of which occupy heavily modified, denuded surfaces where prolonged livestock concentration and trampling have already substantially altered the original land surface (**Fig. 10**).

Specifically:

- **Areas 1–4** encompass the current farmyard complex, including farm buildings, sheds, and modern ancillary infrastructure along with operational feedlot enclosures.
- **Area 5** currently comprises heavily grazed grassland with water storage tanks located near its boundary and remains undeveloped as a feedlot at the time of assessment; however, this area is earmarked for future feedlot development and will be incorporated into the operational footprint going forward.
- **Area 6** delineates existing, operational feedlot enclosures.

Accordingly, all further development activities — including the planned future expansion into Area 5 — will be restricted to previously transformed or heavily grazed surfaces.

Man-made features observed within the site are attributable to recent and ongoing agricultural use and do not represent heritage resources of conservation significance in terms of Sections 34, 35, or 36 of the NHRA.

From a heritage perspective no fatal flaws were identified, and the proposed development may proceed. The identified disturbance has resulted in a low residual heritage impact, provided that all construction- and operational-phase activities remain confined to the demarcated footprints and that the standard Chance Find Protocols for archaeological and palaeontological resources are adhered to for the duration of the project.

REFERENCES

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APPENDIX 1 – ARCHAEOLOGICAL CHANCE FINDS PROTOCOL FOR DEVELOPER

Although the likelihood of encountering archaeological heritage resources during the construction and operational phases of this development is considered very low, a precautionary chance find procedure should be implemented in the event that previously unrecorded material is exposed. This protocol applies if any suspected archaeological material is uncovered during earthmoving, maintenance, excavation, vehicle movement, trenching, or any other surface- or subsurface-disturbing activity. Such material may include stone artefacts, pottery, bone, shell, ash concentrations, historical debris, foundations, or any other cultural material of possible heritage significance.

Procedural Steps:

1. Stop work immediately

All activity in the immediate vicinity of the find must cease as soon as potentially significant material is identified.

2. Secure and avoid the area

The find spot must be demarcated and treated as a temporary no-go area to prevent further disturbance until it has been assessed by a qualified heritage specialist.

3. Record the find

The Environmental Control Officer (ECO), Site Manager, or other responsible site representative should photograph the material in situ; record the GPS coordinates and location details; and document the nature of the exposure and the activity that led to its discovery.

4. Do not disturb, clean, or collect material unless necessary for protection

As far as possible, the find must be left in situ and undisturbed. Material must not be washed, cleaned, or handled unnecessarily.

5. Protect exposed remains

If the material is exposed and at risk of damage, it should be protected using a light but rigid cover such as a box, bucket, board, or metal sheet, provided this can be done without further disturbance.

6. Temporary storage of portable material

If archaeological material has already been inadvertently removed or newly excavated material is clearly portable and vulnerable to loss or damage, it should be placed in a safe, secure location pending specialist inspection. Such material must remain unwashed, uncleaned, and clearly labelled with the date and precise location of recovery.

7. Obtain specialist confirmation

The South African Heritage Resources Agency (SAHRA) must be informed immediately (Tel. 021 462 4502) and a qualified archaeological or heritage specialist must inspect the find as soon as reasonably possible in order to confirm whether the material is of heritage significance and to recommend the appropriate course of action.

8. Implement further mitigation if required

If the material is confirmed to be significant, further work in the affected area must remain suspended until the required mitigation has been determined. This may include a Phase 2 rescue or sampling operation, subject to any permits or approvals that may be required from SAHRA.

9. Removal only by an appointed specialist

Where authorised mitigation is required, the developer must appoint an appropriately qualified heritage specialist to undertake the recovery, recording, and transport of the material in accordance with the relevant permit conditions and heritage requirements.

APPENDIX D2:

TERRESTRIAL ECOLOGY COMPLIANCE STATEMENT REPORT



Environmental Management Group (Pty) Ltd

*Specialists in Environmental Management Integrating Industry and Infrastructure
with the Environment*



Environmental
Management Group
(PTY) LTD.

July 2026

SITE SENSITIVITY AND TERRESTRIAL ECOLOGY COMPLIANCE STATEMENT REPORT

COMPILED FOR THE
PROPOSED CATTLE FEEDLOT
ON FARM BRAK DAM NO. 700
PORTION 1 AND RE/700, NEAR
ORANJEVILLE, FREE STATE
PROVINCE.

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Specialist investigator: Mr JN Giddy

South African Council for Natural Scientific Professions (SACNASP) in Botanical Science (Cand. Sci. Nat. 167254)

BSc. Honours majoring in Botany – University of the Free State (2021)

BSc. Majoring in Botany and Genetics – University of the Free State (2020)

Declaration of independence:

I, the above-mentioned specialist investigator responsible for conducting this particular specialist ecological study, declare that

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development, except for financial compensation for work done in a professional capacity.
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part.
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse the proposed development, but aim to present facts, findings and recommendations based on relevant professional experience, and scientific data;
- I do not have any influence over decisions made by the governing authorities;
- I have the necessary qualifications and guidance from professional experts (registered Pr. Nat. Sci.) in conducting specialist reports relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity
- This document and all information contained herein are and will remain the intellectual property of Environmental Management Group. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the respective specialist investigator.



Joshua Giddy

Specialist investigator Co-author: Mr R Nel

South African Council for Natural Scientific Professions (SACNASP) in Ecological Science (Cand. Sci. Nat. 144943)

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SAAB No. 800

Declaration of independence:

I, the above-mentioned specialist investigator responsible for conducting this particular specialist ecological study, declare that

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development, except for financial compensation for work done in a professional capacity;
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part;
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse the proposed development, but aim to present facts, findings and recommendations based on relevant professional experience, and scientific data;
- I do not have any influence over decisions made by the governing authorities;
- I have the necessary qualifications and guidance from professional experts (registered Pr. Nat. Sci.) in conducting specialist reports relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity
- This document and all information contained herein are and will remain the intellectual property of Environmental Management Group. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the respective specialist investigator.



Ricus Nel

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Executive summary:

A cattle feedlot development has been proposed within a 6 km radius of Oranjeville. The proposed development will trigger listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and therefore requires environmental authorisation.

As per the DFFE screening tool, the proposed development area affects an area with a low sensitivity for the plant species theme and very high sensitivity for the terrestrial biodiversity theme. **This report found the site to be of low sensitivity for both themes. Thus, a terrestrial biodiversity compliance statement is required.**

As part of the environmental authorisation requirements, this document serves as a terrestrial biodiversity compliance statement for the proposed development site. This compliance statement aligns with NEMA procedures for the assessment and minimum criteria for reporting on identified environmental themes when applying for environmental authorisation (NEMA, 2020).

This report aims to verify and evaluate the present-day *in situ* environmental conditions of the surrounding environment at the location of the proposed cattle feedlot development area. Additionally, this report assesses the anticipated environmental impacts of the proposed development on the receiving environment and provides recommendations and mitigation measures.

Vegetation found surrounding the site showed signs of severe agricultural disturbances, which lead to poor site functionality and overall poor species richness in the affected areas. The proposed development has a history of agricultural land use up to date and is located in a developing agricultural environment. Roughly 99% of the site has been disturbed through previous agricultural land use practices. Less than 1% of the proposed development area consists of undisturbed indigenous vegetation. However, this remaining vegetation has been impacted by surrounding agricultural practices and alien invasions. The vegetation composition of the surrounding area is lacking in respect to its original form of the Frankfort Highveld Grassland (Gm 6) vegetation type, with species diversity consisting mostly of alien and invasive species, naturalised alien species and some heavily grazed indigenous grass species. Few indigenous species remain, with no floral SCC or nationally/ provincially protected species observed within the proposed development area. In the surrounding vegetations current state, with little ecological functioning, the possible occurrence of floral SCC or protected species is low.

The environmental impact assessment in terms of habitat and floral components is expected to be very low, with or without mitigation measures.

Thus, the establishment of the proposed development is not expected to have had a drastic negative influence on the surrounding environment at the site. However, these influences will be permanent, and care must be taken to minimise the long-term effect of the development on the environment.

1. Introduction:

1.1. Project background:

The proposed cattle feedlot development is located on Brak Dam No. 700 Portion 1 and RE/700 (Figure 1). As the crow flies, the proposed development is 5.4km West of Oranjeville and 11.8km South-East of Deneysville.

Surrounding broadscale vegetation is majorly influenced by agricultural practices. Within the study area, the land has not been disturbed by previous intensive agricultural practices such as tilling or planting however it is likely this area has been utilized for low impact practices such as livestock grazing.

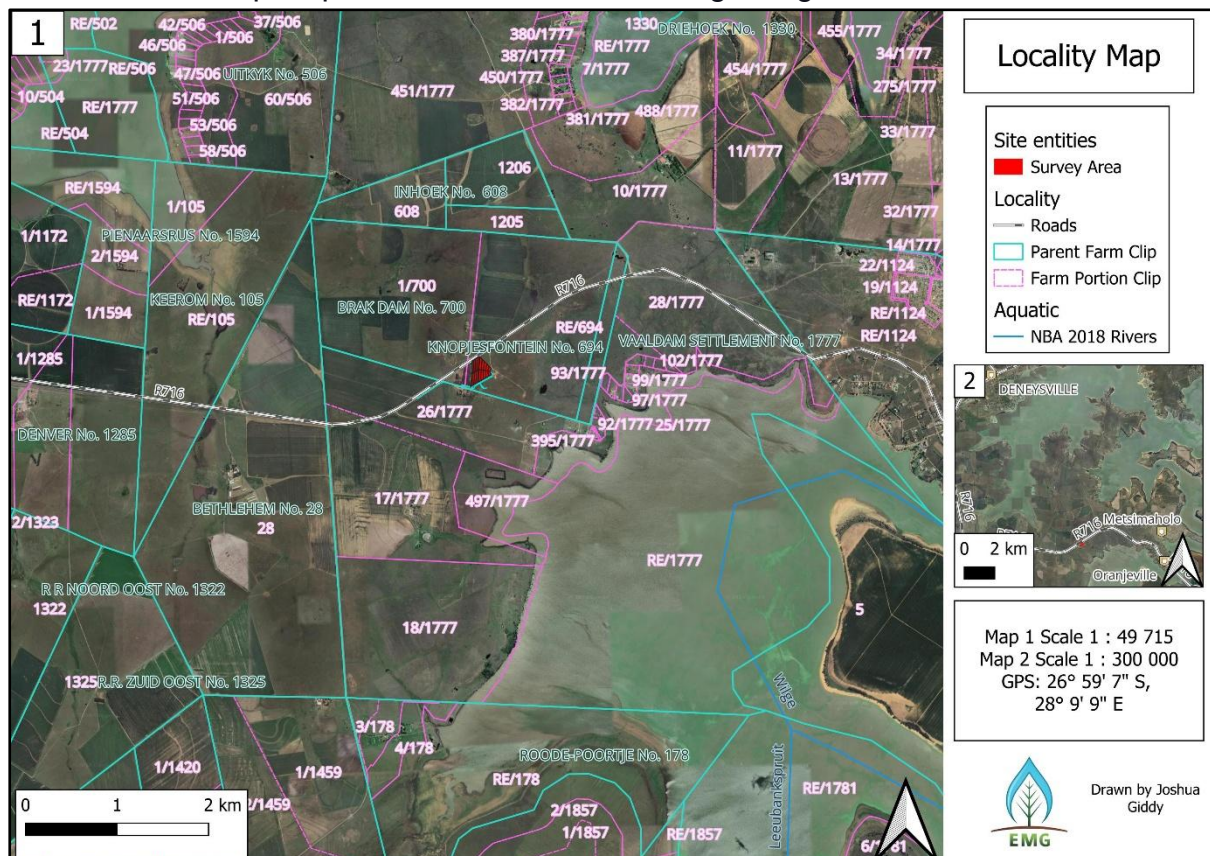


Figure 1: Locality map of the proposed cattle feedlot development. Located adjacent to the R716, the affected area is on Farm Brak Dam No. 700 portion 1 and RE/700.

1.2. Terms of reference:

In accordance with the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2017, a site sensitivity verification has been undertaken to confirm the current land use and environmental sensitivity of the project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

Procedures and minimum criteria to be met in the site verification have been reported on in accordance with the Procedures for the Assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, When applying for Environmental Authorisation (GNR 320, 20 March 2020).

1.3. DFFE screening tool identified theme sensitivities:

As per the DFFE screening tool, the proposed development area will affect an area with a low sensitivity for the Plant Species theme and a very high sensitivity for the Terrestrial Biodiversity theme. No sensitive species were identified under the Plant Species theme.

According to the Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2006-2008), the proposed development is majorly located in the **Frankfort Highveld Grassland** vegetation type. The **Frankfort Highveld Grassland** vegetation type was identified under the Terrestrial Biodiversity theme, which is of low sensitivity. According to the Free State province Biodiversity Plan's Terrestrial critical biodiversity areas (Collins, 2018), the proposed development site is located largely in areas classified as ESA 2.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme		X		
Aquatic Biodiversity Theme				X
Archaeological and Cultural Heritage Theme				X
Civil Aviation Theme			X	
Defence Theme				X
Paleontology Theme			X	
Plant Species Theme				X
Terrestrial Biodiversity Theme	X			

Figure 2: Environmental screening results and assessment outcomes according to the DFFE screening tool.

1.4. Procedures according to the DFFE screening tool outcomes:

The low sensitivity for the plant species theme identified by the DFFE screening tool requires a Terrestrial Plant Species Compliance Statement to confirm or dispute the environmental sensitivity highlighted in the DFFE screening tool. A very high sensitivity for the Terrestrial Biodiversity Theme was identified in the DFFE screening tool. A full ecological assessment is required for all medium - very high sensitivity assessed themes, unless a site sensitivity verification proves the site's sensitivity should be classified as Low.

For the reasons discussed above, it is necessary to conduct a Terrestrial Ecology verification assessment to assess the possible environmental impacts generated by developmental activities. The verification assessment resulted in this specialist disagreeing with the very high sensitivity of the terrestrial biodiversity sensitivity, further information can be seen in Chapter 4 - Findings. Recommendations and mitigation measures provided in this report should be used to minimise the effects of development.

2. Scope and limitations of the study:

- Perform a site inspection to determine the presence or likely presence or confirmed absence of SCC
- Perform a site sensitivity verification and evaluation for the study area's "*in situ*" environment.
- Identifying and assessing possible environmental impacts the proposed cattle feedlot development generates.

2.1. Assumptions and limitations:

- This report assumes the vegetation type description was unbiased and all relevant botanical/ ecological related information was accurately described.
- Not all plants have the same growth and/or flowering period; thus, it is likely that the survey could have occurred outside of a specific species' growth and/or flowering period.
- Some geophytic and succulent plants have specialised in mimicking their surrounding habitat. Thus, some of these plants might have been overlooked due to their cryptic nature.
- The survey area has experienced a significant amount of grazing. This has limited the availability of identifiable floral characteristics of some species. Notably grasses and other forbs have mostly been influenced by grazing.
- Species of conservation concern (SCC) are generally uncommon and/or localised. Thus, locating such species can be challenging when attempts to locate such species occur outside the SCC's flowering season.
- Some aspects may have been overlooked, as ecology is inherently vast, dynamic, and highly complex. Additionally, heavy grazing in the surrounding areas may have reduced grass inflorescences and affected the vegetation as a whole. While this impact may have altered the environment from its natural state, it nevertheless reflects the current condition of the area prior to development, thereby providing an accurate baseline for this report. As such, the information presented here is sufficient to support informed decision-making.
- Most plant species in central northern South Africa experience summer rainfall, which allows for spring growth periods and summer-spring flowering season. The growing and flowering periods allow for the presence of identifiable characters. The presence of identifiable characters increases the accuracy and possibility of species identification, making vegetation community interpretation more thorough.
- The survey took place in early winter (June) which is not considered an optimal survey window for grassland vegetation types which exhibits strong affinity towards a summer rainfall flowering period.

3. Methodology:

3.1. Verification of the *in-situ* environment:

A desktop study was performed prior to field surveys with emphasis on the following:

- Vegetation type verification
- Possible species occurrence verification
- Current and past land use through satellite imagery

The survey was conducted on 09 June 2025. The assessment was conducted over 2 hours (11h30- 13h30).

The survey was performed by focusing on ground truthing of information acquired during the desktop study. The survey was performed by means of transects traversed on foot. Attention was given to the current state of the environment regarding grazing impacts, anthropogenic disturbances, erosion and the presence of alien or invasive species.

3.2. Sources used for additional information:

Broader habitat:

- Satellite imagery (QGIS) was used in order to view the broader area on a landscape level.

Vegetation:

- The South African Red List of Plants (Raimondo et al. 2009).
- Vegetation types (Mucina and Rutherford, 2006; SANBI, 2006-2018).
- The [INaturalist](#) website was also consulted to obtain probable species presence identified by the general public.
- Field guides used for species identification (van Wyk and Malan, 1998; van Oudtshoorn, 2014; Manning, 2019).
- The national screening tool was consulted to determine possible SCC, initial site sensitivity and the sensitivity of the surrounding terrestrial environment.

4. Findings:

4.1. The physical environment:

The proposed development is located within a **6 km radius of Oranjeville**, in the **Free State Province**. Overall, the study area is larger than the proposed development area. The proposed development area is located in areas which have been agriculturally transformed.

The entire study area is severely modified consisting of patches of bare soil and interspersed invasive species along the outer boundaries of the feedlots. Due to this the surrounding vegetation was assessed in order to determine a baseline of the environment pre-disturbance.

The proposed development area's landscape is moderately sloped with minimal elevation difference between the area's Northern and Southern parts at an altitude of 1 514 m at the highest point and 1 505 m at its lowest.

The physical landscape features of the Frankfort Highveld Grassland (Gm 6) are typically flat to undulating bottomland with grassland dominated by *Eragrostis curvula* and *Themeda triandra*. The vegetation type occurs between 1 460- 1 800 m, however, mainly occurs below 1 660 m.

The description of the physical environment observed on site more or less agree with that of the vegetation type of Mucina and Rutherford (2006) in which the study area is located (SANBI, 2006-2018).

4.2. Vegetation type and bioregional areas:

The proposed development is located entirely in the Frankfort Highveld Grassland vegetation type (Figure 3) (Dayaram, 2018; Mucina and Rutherford, 2006).

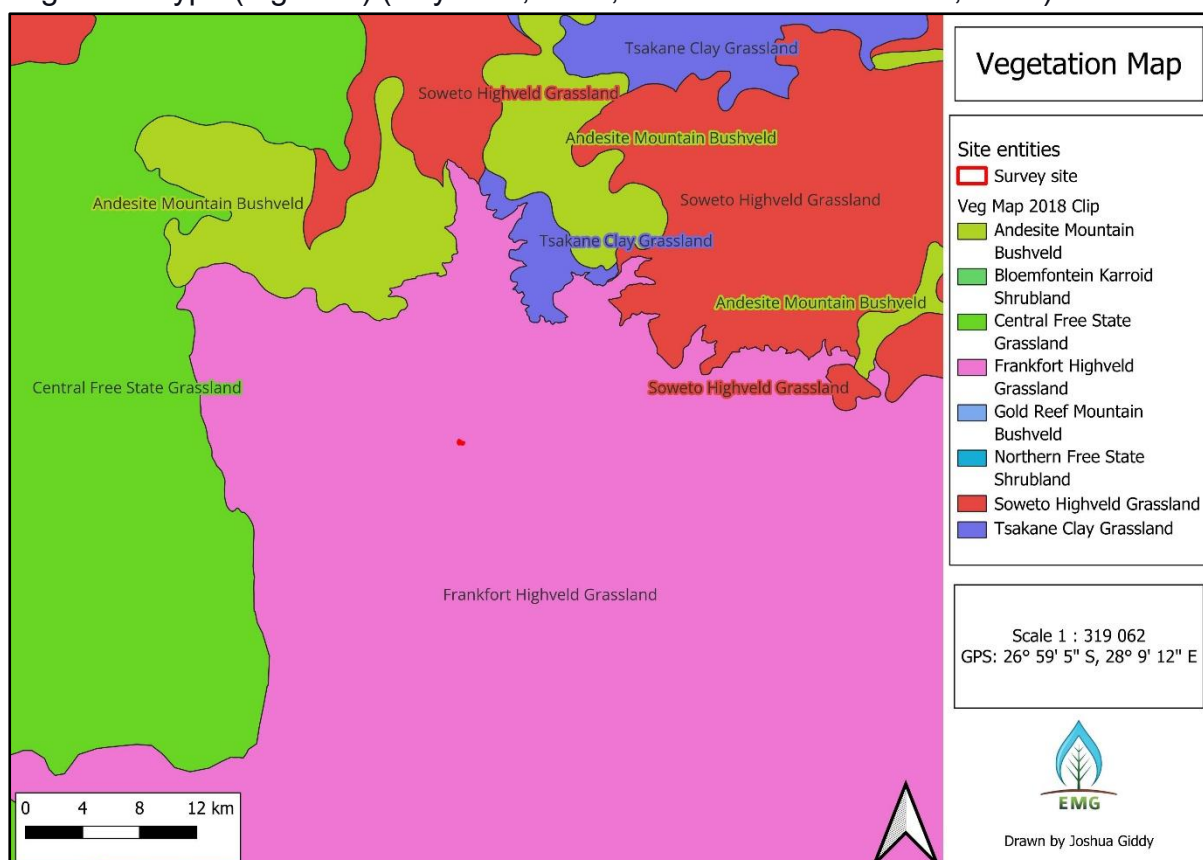


Figure 3: The regional vegetation type and remnants in relation to the study area.

The Frankfort Highveld Grassland vegetation type is grassland dominated by *Aristida bipartita*, *A. diffusa*, *Brachiaria serrata*, *Cymbopogon pospischilii*, *Cynodon dactylon*, *Digitaria tricholaenoides*, *Elionurus muticus*, *Eragrostis chloromelas*, *E. curvula*, *E. plana*, *E. racemosa*, *Harpochloa falx*, *Heteropogon contortus*, *Hyparrhenia hirta*, *Setaria nigrirostris*, *S. sphacelata*, *Themeda triandra* and *Tristachya leucothrix*.

The dominant herbs within the vegetation type are *Dicoma anomala* and *Vernonia oligocephala*.

The vegetation observed within the study area is **severely modified**. With the invasive and encroaching species slowly becoming a prominent feature most likely due to their pioneering nature or their unpalatability to the present livestock (primarily *Solanum nigrum*).

The findings of this report disagree with the **very high sensitivity of the terrestrial biodiversity theme** in the DFFE screening tool. The findings of this report **agree with the low sensitivity** for the Plant Species theme in the DFFE screening tool.

The Frankfort Highveld Grassland (Gm 6) vegetation type has a conservation status of Least Concern (LC) according to the Red List of Terrestrial Ecosystems of South Africa June 2021 (SANBI & DEFF, 2021). Previously the Frankfort Highveld Grassland had a conservation status of Vulnerable (VU) (Mucina & Rutherford, 2006) due to the vegetation type not having any formal protection with more than a third already being irreversibly transformed. However, the vegetation type did not meet the criterion for vulnerable (VU) according to NBA (2018) and was downgraded to Least Concern with 56.7% remaining natural extent.

The findings of the DFFE Screening tool report indicate the site was found to be within the extent of remaining Gm 6 and is found in **ESA 2 areas (Figure 4)**. However, the area has been utilised for low to high intensity agricultural practices for decades and have remained in use according to image retrieved from the CDNGI historical imagery archive (see figure 5). Thus, the findings of this report **disagree** with that of the DFFE screening tool report's **very high terrestrial biodiversity sensitivity**.

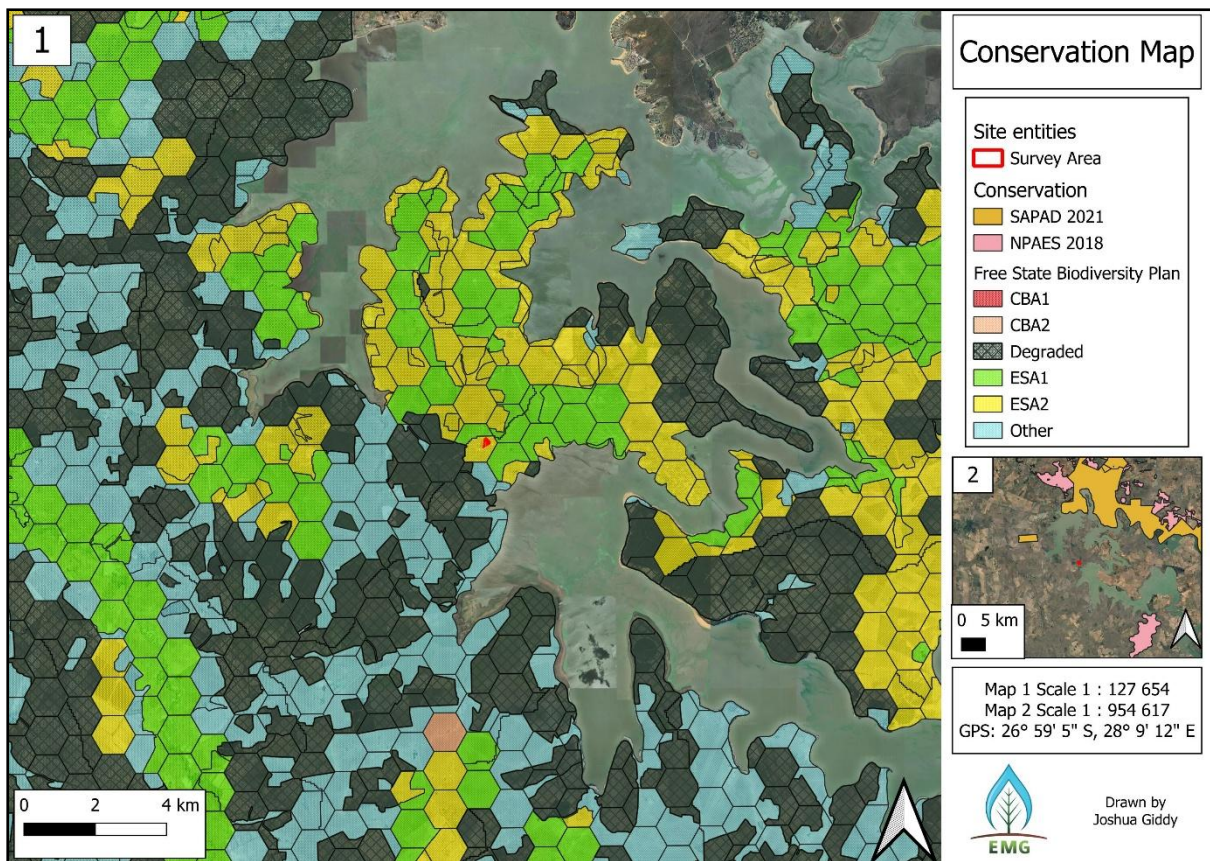


Figure 4: A map of the study area in relation to the map of the Free State province's biodiversity plan map (Collins, 2018), SAPAD (DFFE, 2021) and NPAES (DEA, 2018) data.

4.3 Previous land use:

Historically, the proposed development area has been utilised for agricultural land uses, specifically that of cultivation (Figure 2). Figure 2 contains aerial photographs of the approximate study area (Size on image may vary) dating to 1944 (1), 1955 (2), 1969 (3) and 1991 (4).

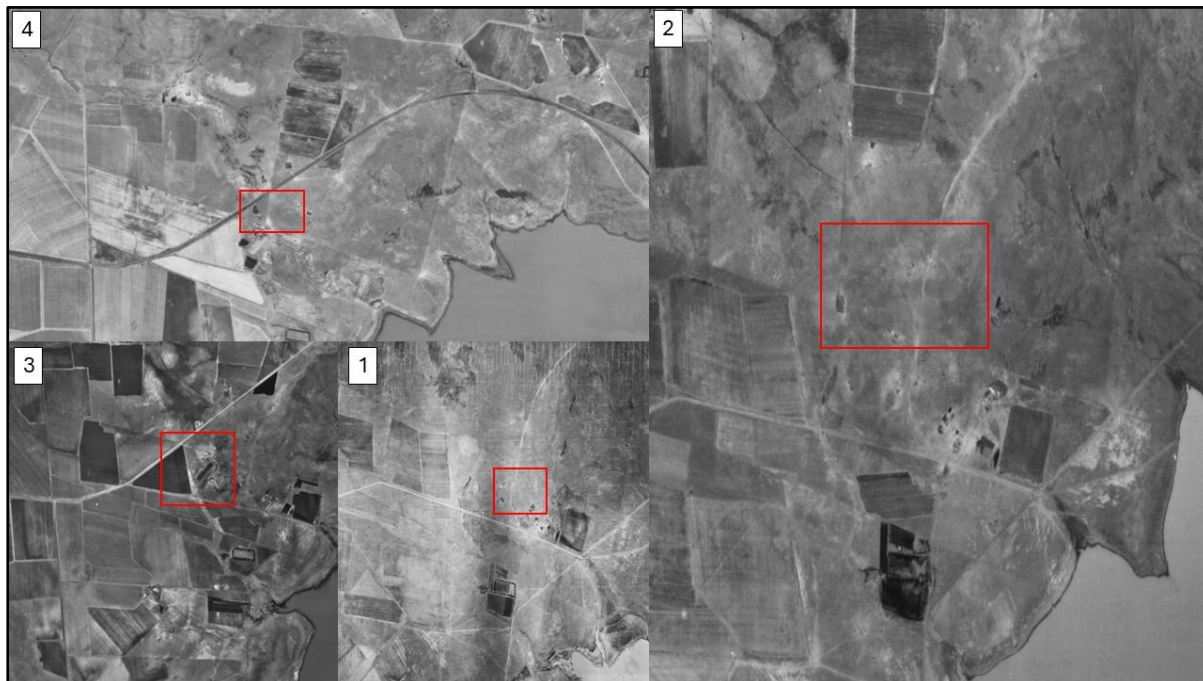


Figure 5: Approximate location of study area throughout history. 1). aerial imagery from 1944. 2). aerial imagery from 1955. 3). aerial imagery from 1969 and 4). aerial imagery from 1991.

4.4 Vegetation features:

The study site's physical environment more or less agrees with the physical environment description of the Frankfort Highveld Grassland (Mucina & Rutherford, 2006). However, the vegetation composition and structure observed within the study area does not match the vegetation description of Mucina and Rutherford (2006). The vegetation remaining within the study area has been severely influenced by the low to high intensity agricultural practices which have occurred within the area.

Survey area – severely modified

The entirety of the proposed development area has been modified from its natural state. The site can be seen in figure 6 with frequent patches of bare soil and heavily disturbed indigenous grass species. The surrounding area (used as a natural base level) shows indications of agricultural influence in the form of cow dung, hoof prints, trampling, low biomass and soil compaction. This indicates the area was likely used as rangeland for livestock which were present when this survey was conducted (present species included *Bos* sp. (cow) and *Ovis* sp (sheep).

In the base line area, the grass layer consisted of patches of *Cynodon dactylon*, *Eragrostis* sp., *E. racemosa*, *E. curvula* and *E. plana*, all of were heavily grazed. The

understory of this area was all but non-existent with no noted ground layer forbs. The shrub layer within the baseline area consisted of scattered single occurrence shrubs of *Felicia filifolia*, *Berkheya onopordifolia*, *Solanum nigrum* (*naturalized alien species*) and *Datura ferox* (*Category 1b invasive*). The final element noted was a single individual of *Vachellia karoo*.

Within the surrounding area, in areas of high disturbance, invasives such as the *Solanum nigrum* and *Datura ferox* dominate. Agricultural species such as *Helianthus annuus* can also be seen occurring in the area surrounding the proposed development area. As a result of historical and current agricultural disturbances, this vegetation does not resemble any form of a natural habitat. As such, the ecological functioning of this area is considered **very poor**.

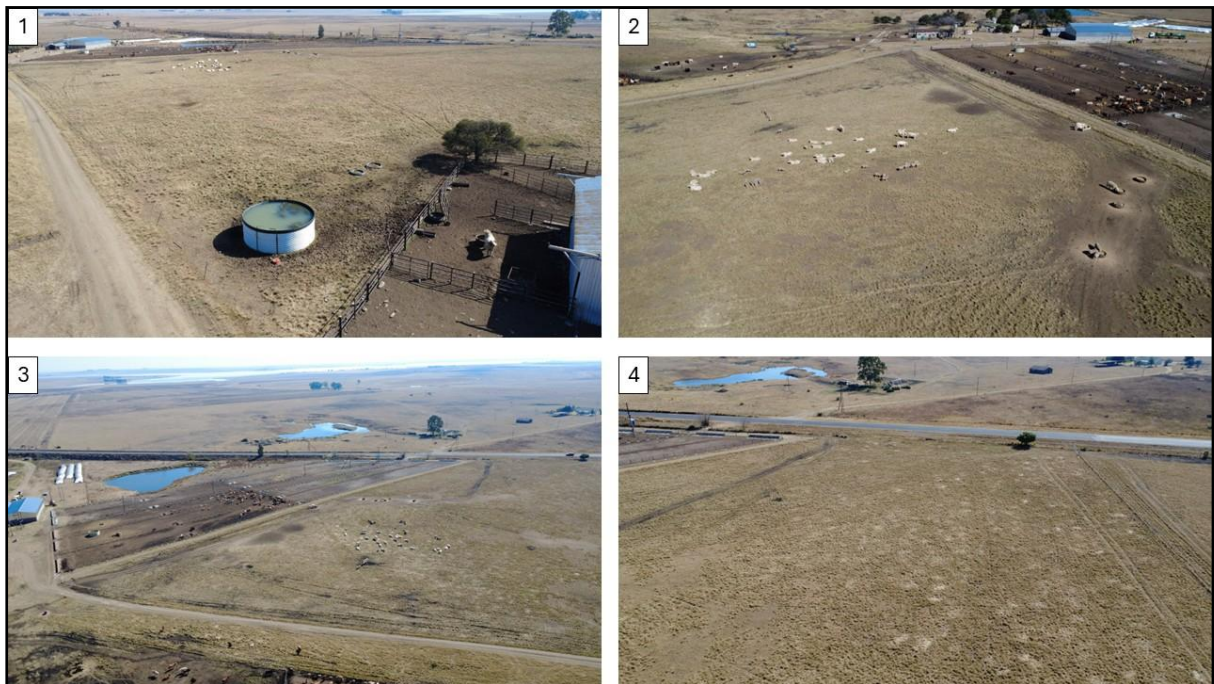


Figure 6: Drone images of the affected development area described under the severely modified area. 1). Survey area facing north-west, 2) Survey area facing south-west, 3). Survey area facing north-west and 4). Survey area facing north.

Active disturbances



Figure 7: Disturbances present within the survey area at the time of survey. Picture 1 is of the Southern corner facing Northeast. Pictures 2-4 are in the Northern area facing Southeast (2), Northeast (3) and East (4). Approximate GPS of all four pictures; 26°59'2.91"S 28° 9'12.21"E.

A comprehensive floral survey was not conducted for this report due to the site's poor ecological functioning. Severe modification of the environment within the study area has been recorded. The environment has been modified through high levels of disturbance from agricultural land use practices (i.e. livestock grazing see figure 7 above).

The vegetation observed within the study area is largely transformed, disturbed and invaded with alien and invasive species and naturalised alien species. Transformed areas contain little to no undisturbed vegetation with few occurrences of invasive alien species (Category 1b and naturalized alien species). Overall, the entire study area has been influenced by long term agricultural practices, landscaping and general neglect in areas which were not the primary focus of agricultural practices. Thus, the majority of the site is in a **degraded and poor ecological condition**.

No nationally protected flora was observed on site, and no provincially protected species were found on site. No confirmed or highly likely occurrence of SCC or range-restricted species were recorded for the site. The proposed development largely affects agriculturally transformed areas. Conservation importance of the proposed development area is **very low** due to the very **little to no natural habitat remaining on site**. Site functional integrity for the proposed development area is **medium to low** due to the site's locality having **medium habitat connectivity but low rehabilitation potential** as well as due to the **several minor and major current negative ecological impacts** observed on and around the site. These impacts include but are not limited to cultivation, mowing, grazing, loss of species diversity, unintentional introduction of alien and invasive species, intentional introduction of selective grazers

(cattle and sheep), trampling, soil compaction and disrupted general animal behaviours (shelter removal and food source removal). Alien and invasive species were observed on site. Biodiversity importance is thus very low. The proposed area's resilience is expected to be **low** due to the loss of more than 50% of the natural vegetation. Thus, the site ecological importance is **very low**. **Minimisation mitigation** is therefore acceptable.

5. Impact assessment and recommendations:

5.1. Impact assessment

The proposed development will influence approximately 5 ha of an agricultural environment and will not affect any nationally/provincially protected flora. Total vegetation clearance is expected to influence all 5 ha which has been influenced by long-term agricultural use. Strict monitoring and the effective implementation of all the mentioned mitigation measures will reduce the overall impact on the receiving environment.

Table 1 Impact assessment evaluation for concerned aspects relating to the proposed development.

Concerned aspect	Impact evaluation pre and post mitigation		Mitigation
Habitat loss	Very low	Very low	- Habitat disturbance and vegetation clearance should be restricted to the authorised area. - Cleared indigenous vegetation should be mulched for use in rehabilitation. - All barren/unvegetated spaces cleared for use, which also includes the creation of topsoil stockpiles, should be kept clear of vegetation (i.e. alien invasive species). - Topsoil should not be accidentally mixed with waste or other contaminants. - An alien and invasive management plan should be drafted and implemented. - Alien and invasive species monitoring and eradication must take place quarterly. - Cleared alien and invasive vegetation should be burned within a controlled area (such as a metal drum) or removed from site and taken to a registered waste facility.
Loss of nationally protected flora	Very low	Very low	
Loss of floral SCC	Very low	Very low	
Alien invasive species	Low	Very Low	

5.2. Recommendations

Given the intensive agricultural land use in the surrounding area, a reduced level of mitigation may be considered acceptable. This section recommends that a monitoring and adaptive management approach be adopted. All recommended management plans should be prepared and implemented, and any remaining site activities should be adjusted to align with the mitigation objectives. For example, any soil stockpiles remaining on site should be appropriately managed, stockpiled correctly, and kept free of invasive or unwanted vegetation.

6. Conclusion:

Vegetation found within the survey area showed signs of severe agricultural disturbances, which lead to poor site functionality and overall poor species richness in the affected area. The proposed development has a history of agricultural land use up to development and is located in a developing agricultural environment. Roughly 99% of the survey site has been severely modified due to the present disturbances in the form of livestock. The vegetation composition for the proposed development area is lacking in respect to its original form of the Frankfort Highveld Grassland vegetation type, with species diversity consisting mostly of alien and invasive species and naturalised alien species with heavily grazed indigenous species occurring in clumps surrounded by bare soil patches. Few indigenous species remain with species richness limited to a handful of species and no floral SCC or nationally protected species observed within the proposed development area and its surrounds. No provincially protected species was observed in the surrounding area. In the vegetation's current state, with little ecological functioning, the occurrence of floral SCC or protected species is low.

The environmental impact assessment in terms of habitat and floral components is expected to be very low, with or without mitigation measures. Therefore, the proposed development is not expected to have a significantly negative impact on the surrounding environment. However, these influences will be permanent, and care must be taken to minimise the long-term effect of the development on the environment.

7. References:

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Appendix A

This appendix is to provide verifiable evidence of the specialists site inspection in alignment with the Amendment to the protocols for the specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Animal and Plant Species in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998. (GNR 3717 of 28 July 2023).

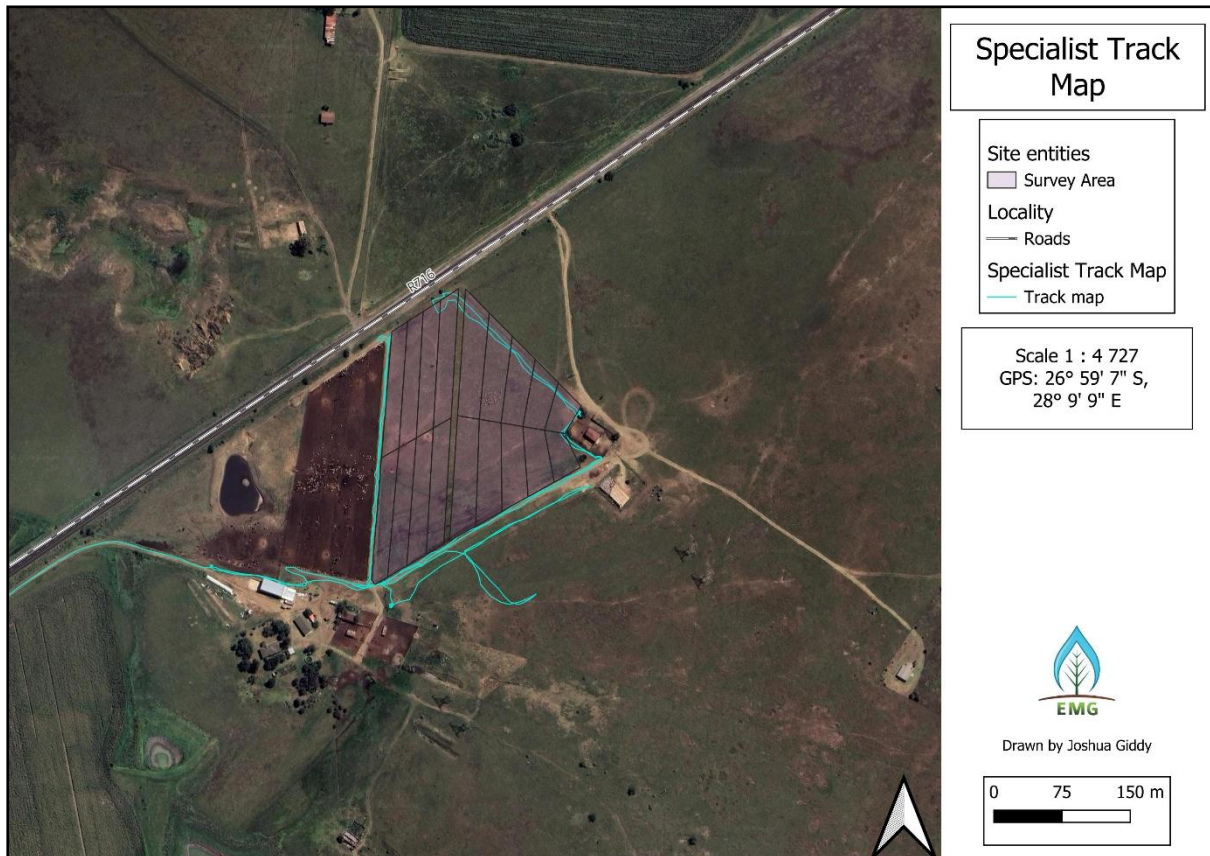


Figure 9: A map showing the specialist's GPS track in relation to the study area.