HERITAGE IMPACT ASSESSMENT

In terms of Section 38(8) of the NHRA for the

Proposed development of a service station at Portion 7 of Farm Jacobuskraal Farm No. 554, Yzerfontein

Prepared by CTS Heritage

CTS HERITAGE

For

CK Rumboll

February 2023

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EXECUTIVE SUMMARY

1. Site Name:

Jacobus Kraal Service Station

2. Location:

The site includes only Portion 7 of the Farm 554 Malmesbury RD which is 10,369ha in extent and of which ± 9.8ha will be developed. The site is located in the north western segment of the R27 and R315 (Darling Yzerfontein Road) intersection.

3. Locality Plan:

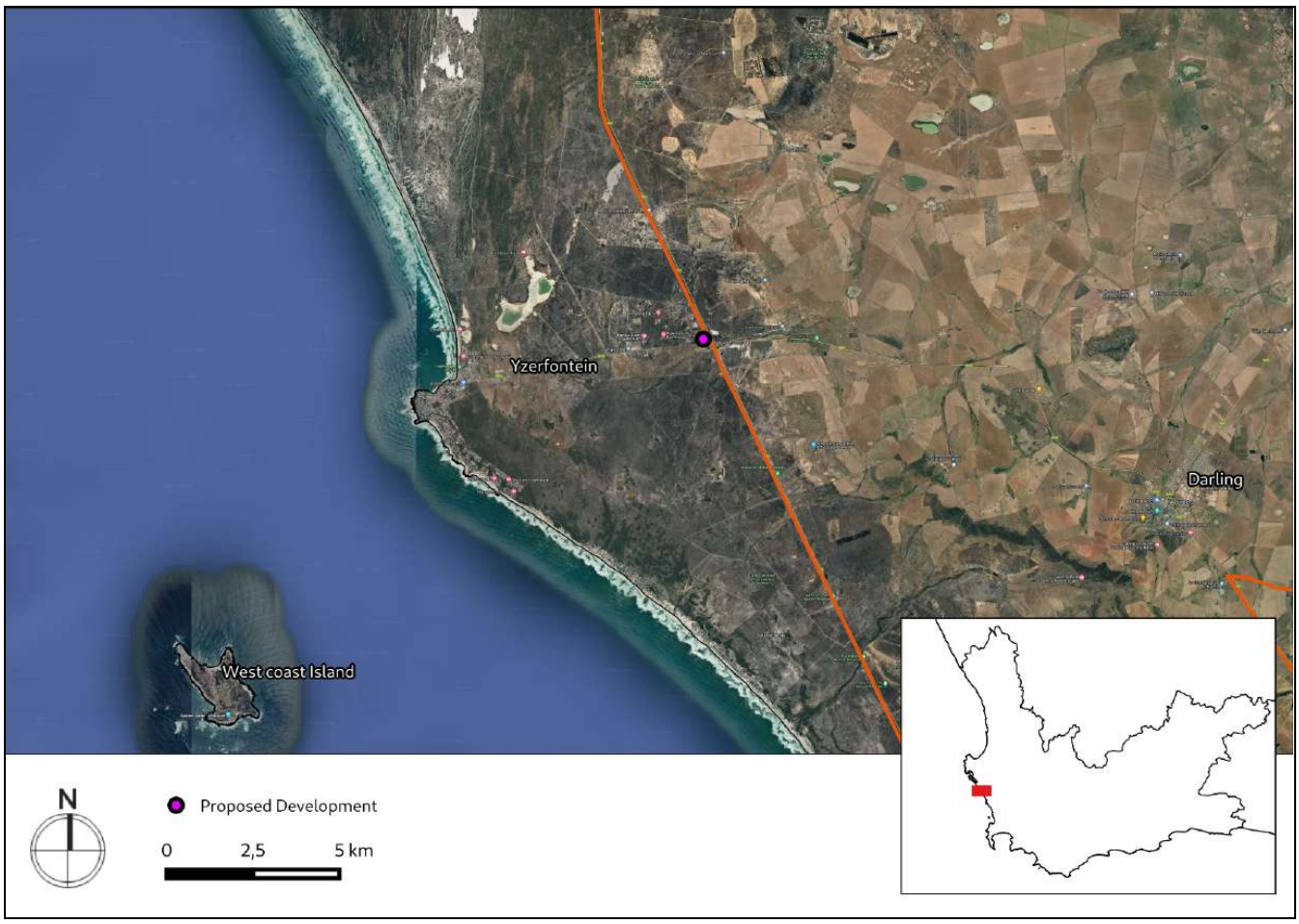

Figure A: Location of the proposed development area

4. Description of Proposed Development:

The owners, JetVest 1157 (Pty) Ltd, intent to establish a service station which include a fuel facility, convenience store and retail outlets (shops) and tourism facilities with a total development footprint of ± 9.8ha.

5. Anticipated Impacts on Heritage Resources:

The survey proceeded with no major constraints and limitations, and the project area was comprehensively surveyed for heritage resources. No archaeological resources or palaeontological resources of significance were identified within the area proposed for development. The overall sensitivity of the development area for impacts to significant archaeology and palaeontology is therefore low.

As noted in the VIA, "The proposed development will have a moderate-high impact on the landscape causing noticeable change to the visual environment. The development has a moderate-low visual exposure; moderate-high visual absorption capacity; medium compatibility; and high local visibility only. The development's visual impact has local extent, long-term duration, medium intensity, definitely probability and medium significance on the landscape. Recommendations are made around the need for a landscape plan, the use of locally indigenous species where possible but not excluding exotic trees, colouration based on the site's natural colouring, subtle fence colouring, and landscape maintenance around commercial and natural planting schemes."

6. Recommendations:

There is no objection to the proposed development from a heritage perspective on condition that:

- The recommendations in the VIA are implemented with particular reference to
    - The requirement for a detailed SDP which includes landscaping detail
    - The development of a Landscape Plan for the site
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. Heritage Western Cape (HWC) must be contacted immediately in order to determine an appropriate way forward.

Details of Specialist who prepared the HIA

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management, heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is a member of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 250 Screening and Heritage Impact Assessments throughout South Africa.

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CONTENTS

1. INTRODUCTION

1.1 Background Information on Project

The owners, JetVest 1157 (Pty) Ltd, intend to establish a service station which includes a fuel facility, convenience store and retail outlets (shops) and tourism facilities with a total development footprint of ± 9.8ha.

The development proposal entails the rezoning of Portion 7 of Farm no 554, Malmesbury RD from Agricultural Zone 1 to Transport and Business Zone:

- i. Rezone a portion ±4.3ha of Portion 7 of Farm 554, Malmesbury Division from Agricultural Zone 3 to Business Zone 3 in terms of Section 25 (2) (a) of the Swartland Municipality Land Use Planning By-Law. To operate a service station including a washing bay as primary rights ±2.1ha, and
- ii. Obtain Consent Use, of ±2.2ha on business zone 3 in terms of Section 25 (2) (o) of the Swartland Municipality Land Use Planning By-Law in order to operate a shop and business premises.
- iii. Obtain Consent Use, of ±0.6ha on Agriculture Zone 3 in terms of Section 25 (2) (o) of the Swartland Municipality Land Use Planning By-Law in order to operate a tourist facility
- iv. Rezone a portion of ±3.6ha from Agriculture Zone 1 or 3 to Transport Zone 2 to accommodate streets and parking.
- v. The remaining ±1.9ha will keep its Agricultural Zone 3 zoning.

The proposed rezoned facilities will offer business and tourism opportunities and enhance the established tourist activities that occur in the surrounding environment. The proposed rezoning is aligned with the Swartland SDF and Integrated Zoning Scheme regulations.

1.2 Description of Property and Affected Environment

Portion 7 of Farm 554, Malmesbury Division and the development site being part of it, is zoned Agricultural Zone and is currently vacant and covered with natural veld. This vacant property does not project any specific character as stand-alone property and could either contribute to the backdrop of natural veld or to the development node at the R27 and R315 crossing.

The current zoning of Portion 7 of Farm no 554 is Agricultural Zone 1 and the land cover being natural veldt. There are no buildings on the property. The land use to the east of the area and the R27 changes gradually to wheat farming. To the north of the property the area consists of several smallholdings (with Agriculture I zoning) whilst to the south and west there are mostly farms. All these agricultural properties are covered with natural veldt due to the poor soil quality (i.e., the carrying capacity is 1 large stock unit per 21ha). To the west of the property is regional and local infrastructure which includes the WACs cable (Western Africa Cable System -international

communication infrastructure) landed from the sea on shore, the landfill site of the municipality and a data centre (also international communication infrastructure). This entire infrastructure is fenced off or surrounded by walls.

The property itself is presently overgrown with alien vegetation (black wattle) although there is evidence of alien vegetation clearing on the property.

View over site from the R315

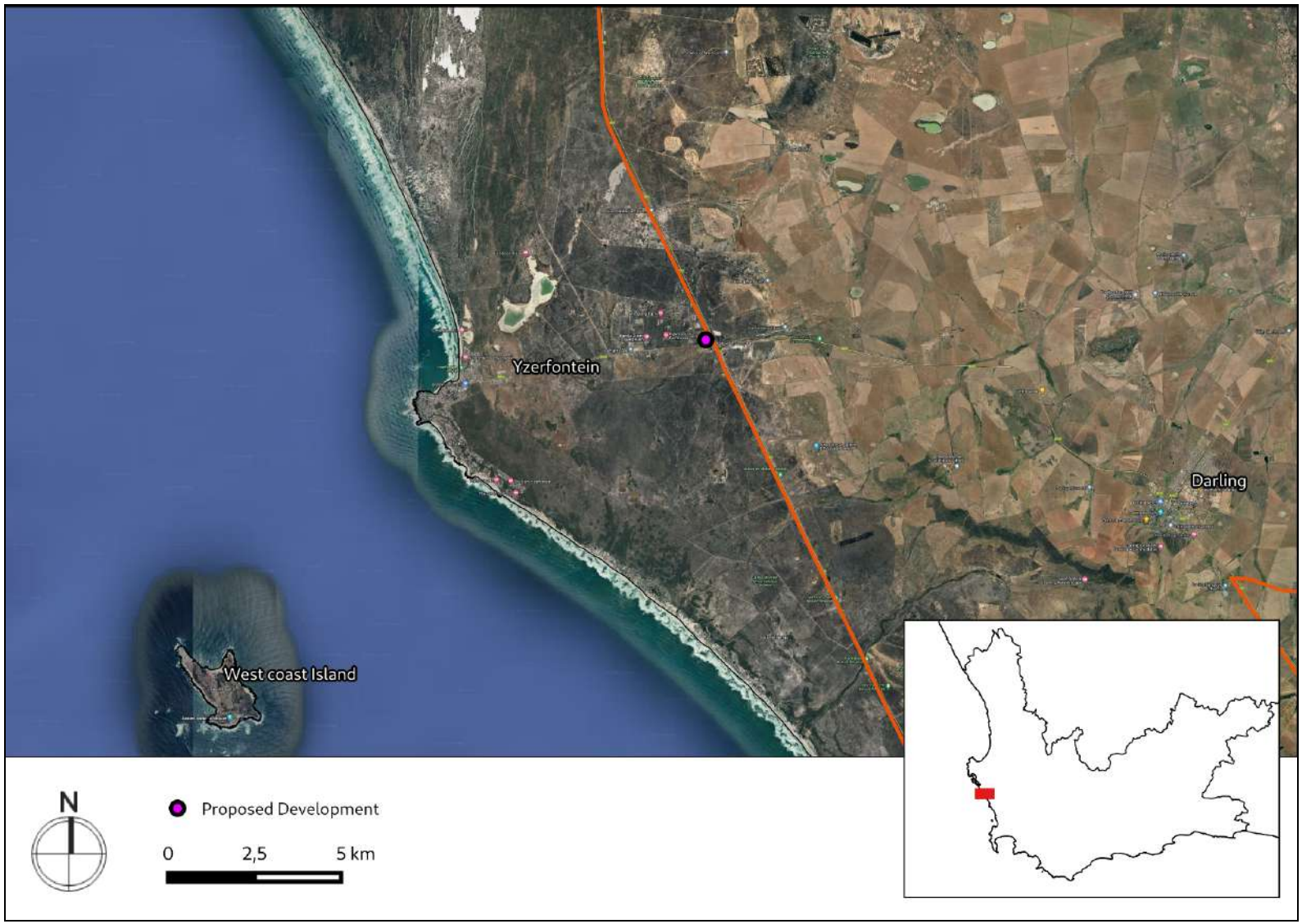

Figure 1.1: The proposed development area

Figure 1.2: The proposed development area

Figure 1.3: The proposed development area

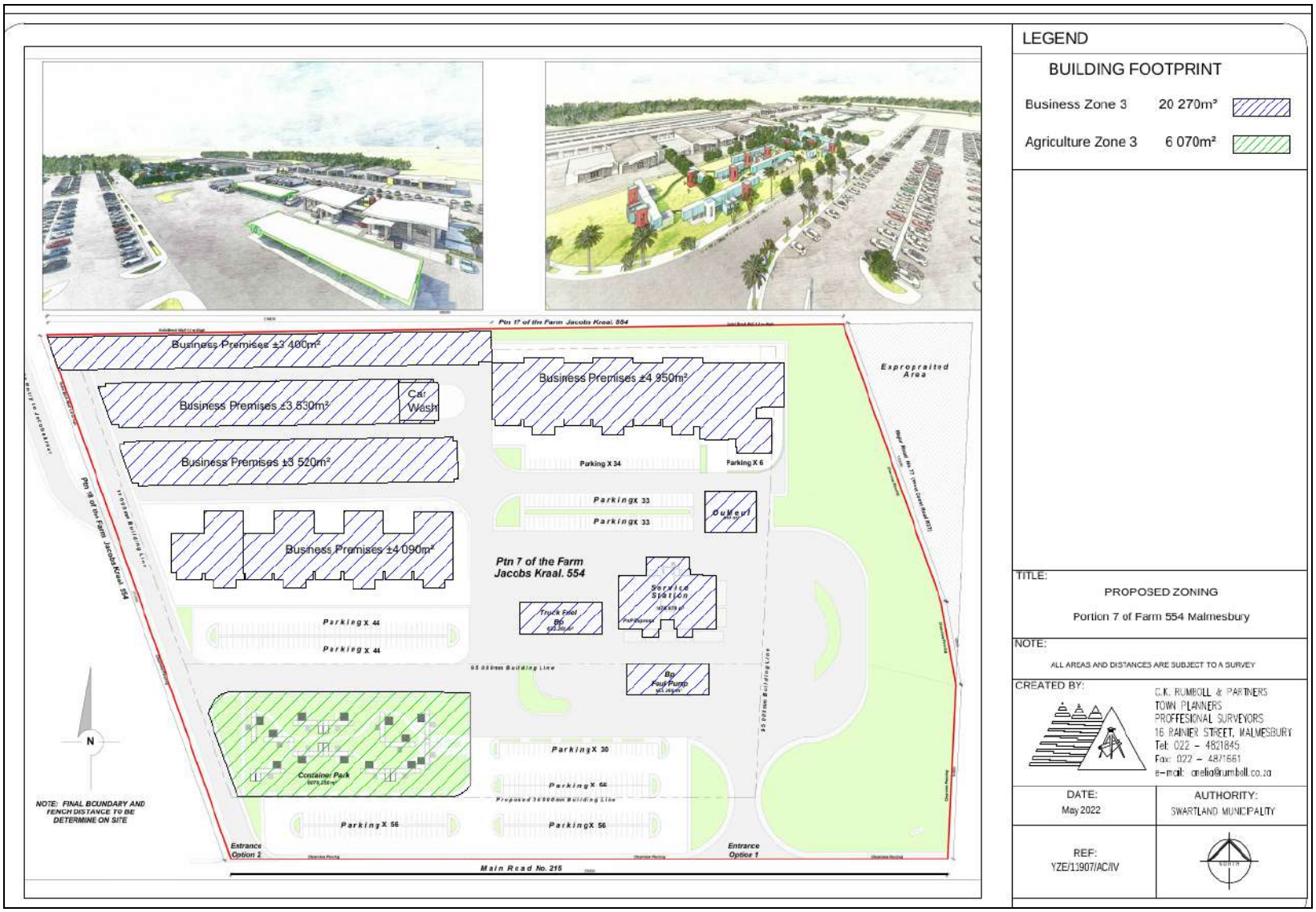

Figure 1.4: The proposed development layout

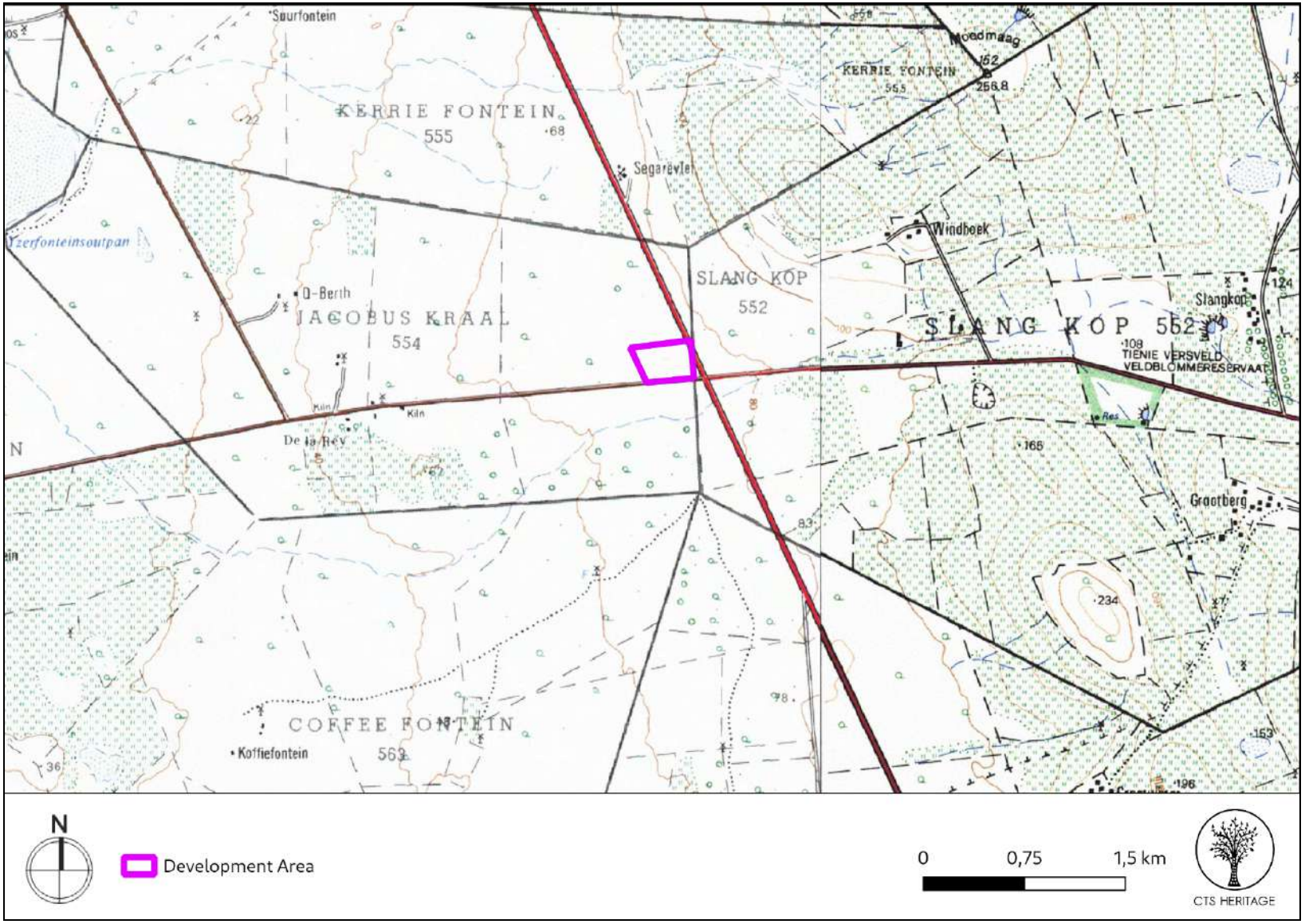

Figure 1.5: The proposed development area on an extract of the 1:50 000 Topo Map

2. METHODOLOGY

2.1 Purpose of HIA

The purpose of this Heritage Impact Assessment (HIA) is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

2.2 Summary of steps followed

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- An archaeologist conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologists conducted their site visit on 27 January 2023
- A palaeontologist conducted desktop assessment of palaeontological resources likely to be disturbed by the proposed development.
- The identified resources were assessed to evaluate their heritage significance and impacts to these resources were assessed.
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

2.3 Assumptions and uncertainties

- The *significance* of the sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants are notified for an investigation and evaluation of the find(s) to take place.

However, despite this, sufficient time and expertise was allocated to provide an accurate assessment of the heritage sensitivity of the area.

2.4 Constraints & Limitations

No constraints or limitations were experienced other than the dense vegetation present on site. The area was surveyed as best as possible at the time and as the vegetation growth allowed. The survey tracks followed internal roads and animal tracks. In addition, we inspected areas with noticeable vegetation changes.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

Yzerfontein town was established in the 1930's with the subdivision of the larger "Yzerfontein" farm into smaller plots. Prior to disturbance of the area for development, a rich mosaic of indigenous coastal fynbos covered the land. This vegetation is still present in the various greenbelt zones between the houses and also covers most of the areas being set aside as conservation areas by the Swartland Municipality. According to Orton (2007), the relatively high density of the vegetation cover suggests that it has varied considerably in the past with open areas presumably having been present to allow occupation by prehistoric populations. According to Deacon (2006) [SAHRIS NID 8318], in recent years there has been considerable growth of the coastal town of Yzerfontein with a corresponding loss of archaeological sites. These include Holocene shell middens and older Pleistocene occurrences. A major excavation was undertaken at a partially destroyed but still significant Middle Stone Age site near the harbour (Halkett et al. 2003; Klein et al. 2004). The site is in an eroded cliff of calcrete at the coast and yielded a number of interesting insights into Middle Stone Age lifeways. Additional excavations have been completed at a site called Bakoond in Yzerfontein for which interpretive signage has been erected.

According to Orton (2007), "The local shoreline is composed of a combination of rocky outcrops and sandy beaches with the latter actively degrading as a result of the high energy coastline. This has caused embayments to form wherever shorter stretches of sandy shore are present. Each rocky outcrop protects the land immediately behind it resulting in the formation of small peninsulas and headlands of which the Bakoond site is the most prominent… The Yzerfontein rocky shores occupy some 4.5 km of coastline and both north and south of this area long sandy beaches stretch uninterrupted for some 17 km to the south and 25 km to the north. This has no doubt resulted in the Yzerfontein area having been a focus of occupation and food procurement during the Later Stone Age, and most especially the last 3000 years." The areas proposed for conservation are therefore very sensitive in terms of archaeological heritage such as shell middens including Later Stone Age stone tools, pottery, ostrich egg shell beads etc. Often, there may be very little evidence of rich archaeological deposits at the ground surface. All the known and recorded archaeological sites from Yzerfontein fall within the areas proposed for conservation. The conservation of these sites is supported.

The geology of this coastline consists predominantly of the Langebaan and Witzand Formations. The calcareous aeolianite of the Langebaan Formation overlays the Varswater Formation which is the same formation that contains the significant deposits of the West Coast Fossil Park. The Langebaan Formation has high sensitivity for impacts to palaeontology according to the SAHRIS Fossil Heritage Layers Browser and is dated to the Late Pliocene to Late Quaternary (<~3 Ma.). The Witzand Formation essentially comprises whitish, unconsolidated, coastal calcareous dunes of Holocene age and is of moderate sensitivity for impacts to palaeontological heritage.

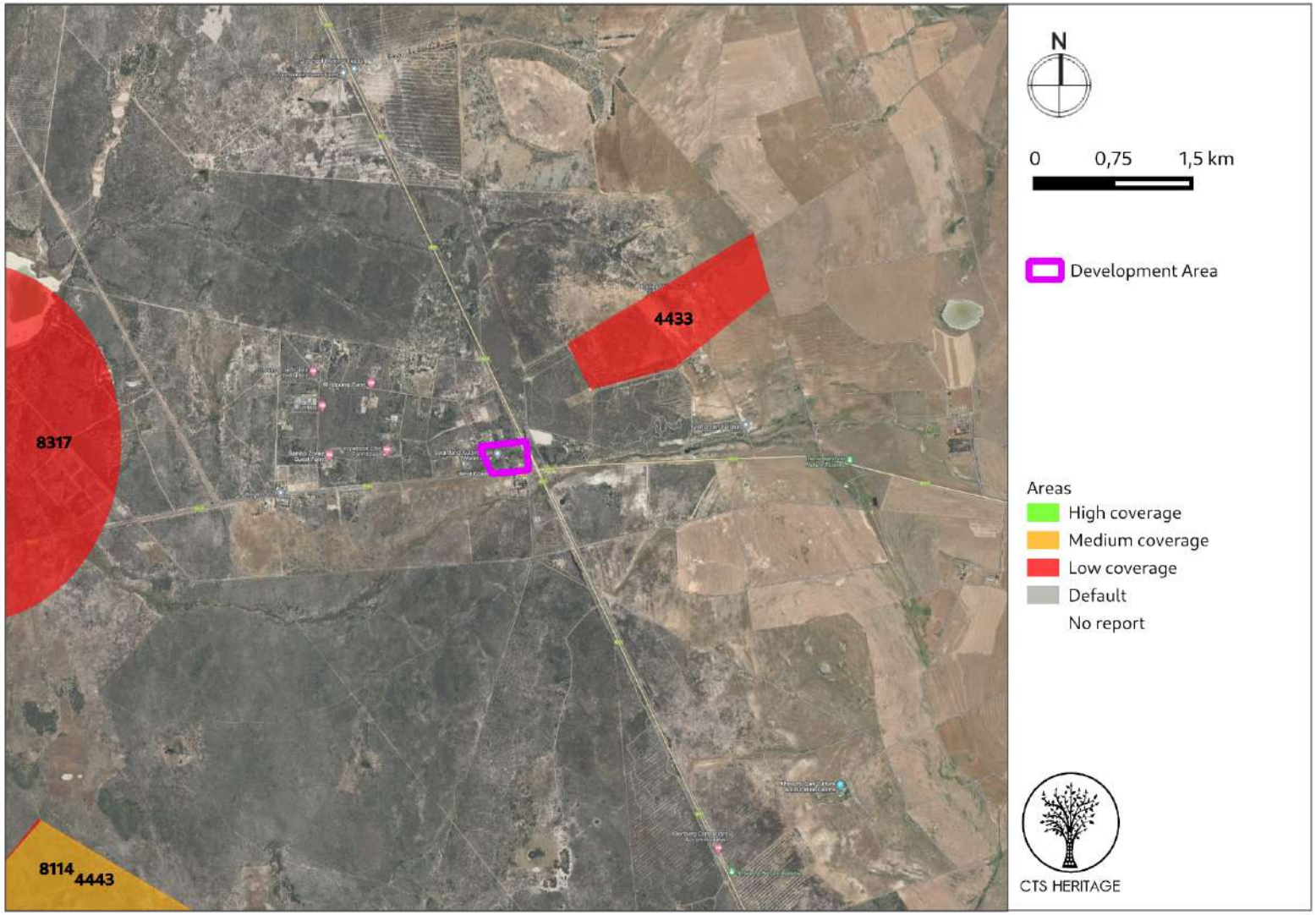

Figure 2: Spatialisation of heritage assessments conducted in proximity to the proposed development

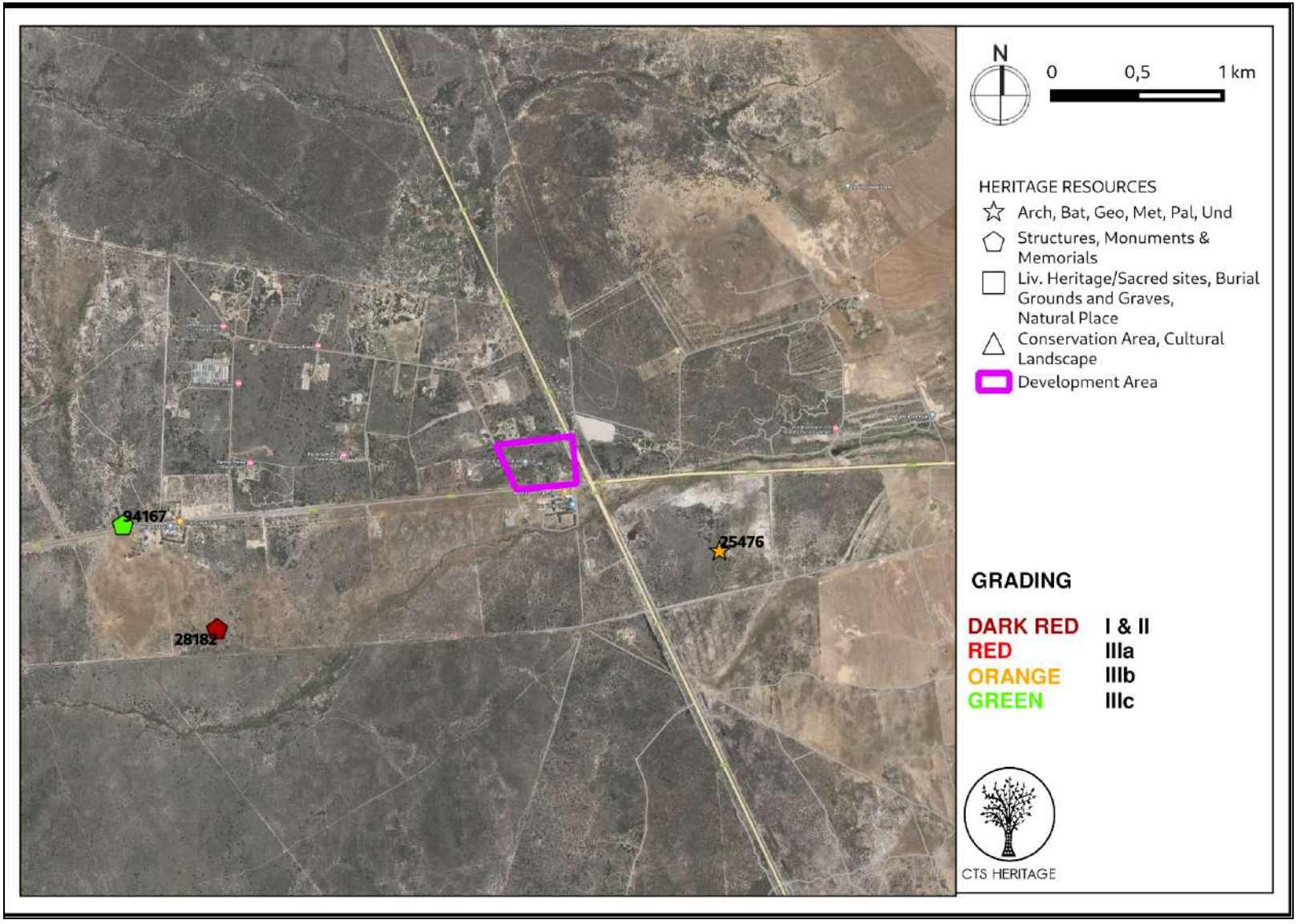

Figure 3: Spatialisation of known heritage resources in proximity to the development area

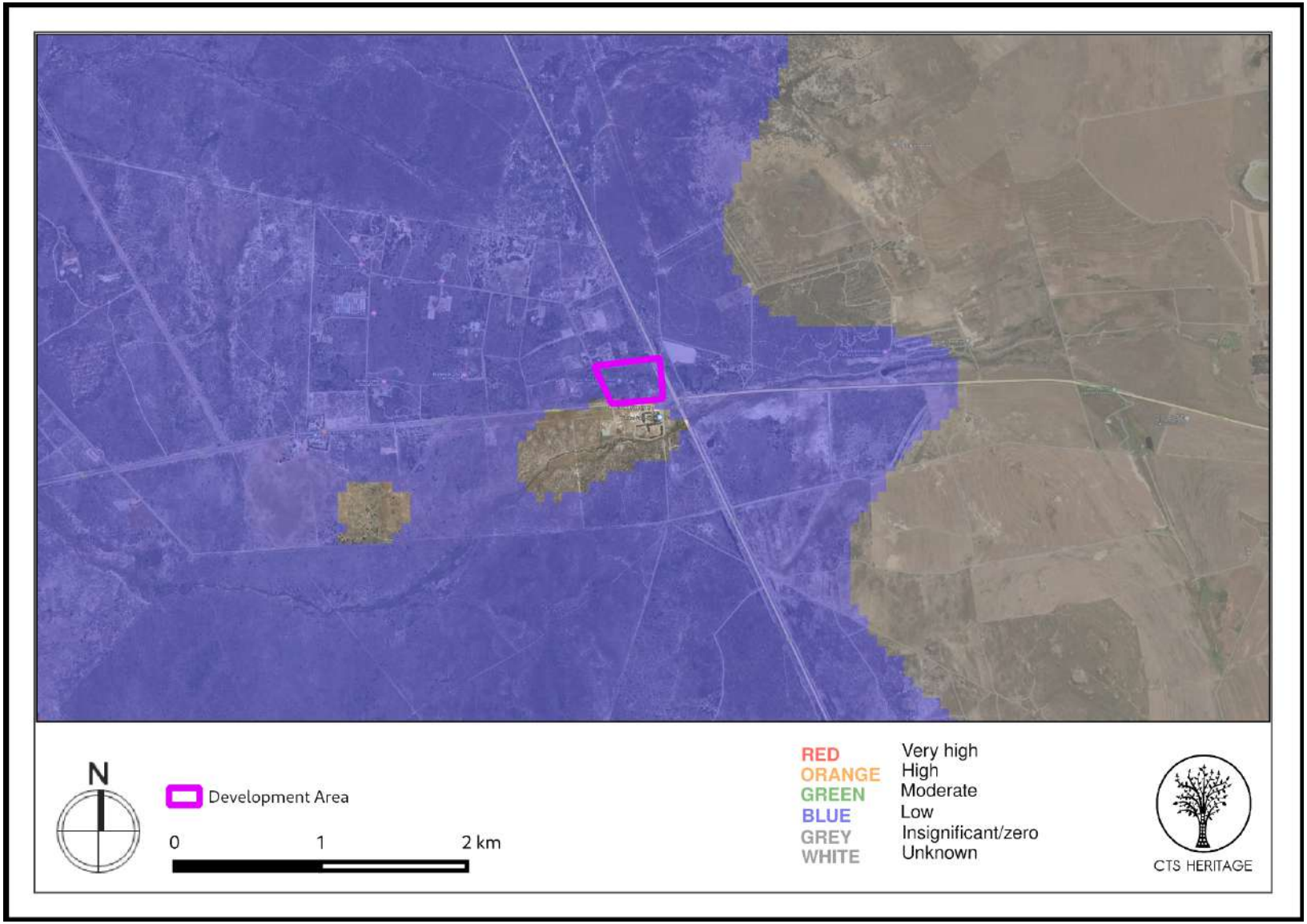

Figure 4: Palaeontological sensitivity of the proposed development area

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

No resources of archaeological significance were observed during the field assessment. Where alien vegetation had been cleared, the Witzand Formation was evident on the ground surface including nodules of calcrete and ferricrete and some shell material.

No fossils were observed on the ground surface of the property.

Figure 5: Track paths of site visit

4.2 Heritage Resources identified

No resources of archaeological significance were observed during the field assessment.

Figure 6.1 and 6.2: Cleared vegetation at site entrance

Figure 6.3 and 6.4: Evidence of shell, calcrete and ferricrete where vegetation has been cleared and dense vegetation elsewhere

Figure 6.5 and 6.6: Evidence of shell, calcrete and ferricrete where vegetation has been cleared and dense vegetation elsewhere

Figure 6.7 and 6.8: Evidence of shell, calcrete and ferricrete where vegetation has been cleared

Figure 6.9 and 6.10: Evidence of vegetation clearing and calcrete chunks that have been piled up at the entrance to the site

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

The site and its immediate surroundings have low heritage significance. No impact to significant heritage resources is anticipated from this proposed development.

According to the PIA completed for this project, "the proposed development involves trenches for conventional building foundations (~0.6 m depth) and services infrastructure (up to ~1.5 m depth) and will primarily affect the Q1 coversands. The excavations for the installation of the fuel tanks are expected to be about 4 m deep. It has not been specified how waste water and sewerage is to be disposed of, but septic tanks and/or a sewerage pump station also involve deeper excavations. It is possible that the older Q2 coversands and associated palaeosurfaces will be intersected in the deeper excavations.

Fossil bones are the main concern and are sparse in the Springfontyn Fm. Q1 and Q2 coversands and soils. Fossil shells and bones in the subsurface of the Q1 coversands are often in an archaeological context. Fossil bones in a primary context are occasionally discovered and are typically exposed during construction of coastal developments where the finds are large bones that get readily noticed, such as bigger antelopes and buffalo, rhino, hippo, bush pigs and elephants. The fossil bones are often on a palaeosurface underlying the loose coversands such as the compact top of the older Q2 coversands.

It is noted that the proximity of a drainage line and water source to the south of Portion 7 could increase the probability of fossil bones occurring nearby. Nevertheless, with the exception of such local "hotspots", due to the overall scarcity of fossil bones in the coversands and underlying buried soils, the palaeontological sensitivity of the Springfontyn Fm. Q2 and Q1 coversands is overall LOW.

The possible presence of fossils in the subsurface does not have an a priori influence on the decision to proceed with the proposed construction activities on Portion 7 of Jacobus Kraal 554. However, mitigation measures are essential." The potential impact has a moderate influence during the Construction Phase, consisting of implemented mitigation measures including the adoption of the attached HWC Chance Fossil Finds Procedure.

According to the NID submission completed for this project, "The Swartland Spatial Development Framework, 2015, proposed that the area between the R27 and West Coast be declared as a national park, similar to the West Coast National Park. This proposal does not have any statutory status, according to the South African National Biodiversity Institute. A development node at the R27 and R315 crossing is also proposed.

Besides the lime Kilns in the extended surroundings, there are no heritage resources involved on and in the immediate surroundings of the site. Lime kilns were built to burn mussel shells to form a binding material to be used as cement. Salt was added to the lime, which was widely used to whitewash the outside of buildings. Animal fat was added to help the binding properties of the lime and to waterproof the surface. The two lime kilns on the R315 en route to Yzerfontein, were still in use as late as 1976.

The visual quality of the streetscape along the Main Road No.215 (R315) running East West and along Major Road No. 77/1 (West coast road R27) running north south is overwhelmingly shaped by fynbos (Hopefield Sand fynbos) and consists of stretches of uninterrupted natural veld with vistas across the veld onto the coast. A rural urban transition zone exists at the R27 and R315 intersection as the natural veld gets interrupted with small holdings on both sides of the road and the West Coast padstal. Further along the R315 travelling west, authority and communication infrastructure are dispersed along the road up to the point where Yzerfontein starts.

The urbanisation of the intersection will be formalised as an upgrade of the intersection and R27 at the intersection is planned."

The VIA notes that:

- The site lies at the intersection between the busy R27 Coastal Road and the R315 Darling-Yzerfontein Road in the northwest quadrant
- The general environment is flat with fynbos and strandveld vegetation towards the coast
- The R27 is a very busy north-south transport corridor with the Darling-Yzerfontein road well-frequented by locals and tourists
- The property is a greenfields site in an area that is changing with various subdivisions already made in this location
- The site is flat and sandy with typical fynbos vegetation largely masked by alien Rooikrans
- The site is most visible from the R315 along which it will be developed and has been recently fenced with Clear-vu fencing

According to the VIA completed for this project by Eitzen (2023), "The proposed development will have a moderate-high impact on the landscape causing noticeable change to the visual environment. The development has a moderate-low visual exposure; moderate-high visual absorption capacity; medium compatibility; and high local visibility only. The development's visual impact has local extent, long-term duration, medium intensity, definitely probability and medium significance on the landscape. Recommendations are made around the need for a landscape plan, the use of locally indigenous species where possible but not excluding exotic trees,

colouration based on the site's natural colouring, subtle fence colouring, and landscape maintenance around commercial and natural planting schemes."

5.2 Sustainable Social and Economic Benefit

The proposed rezoning supports the following Swartland SDF proposals.

- Prioritise tourism development in Yzerfontein and support the natural beauty of the coastal town. Projects should promote existing tourism attractions and should link to related tourism activities.
- Develop and maintain coastal recreation development including tourism i.e. provide tourism orientated municipal infrastructure, marketing infrastructure and BBBEE tourism projects.

Yzerfontein is viewed as an area with economic potential, in particular within the fields of tourism and recreation. The node at the intersection is viewed as a related growth point. Several developments in recent years supported the growth of the tourism industry i.e., a farm stall and nursery, and several rural lifestyle developments in the smallholding area. These developments enhance the unlocking of Yzerfontein's economic potential.

5.3 Proposed development alternatives

No alternative layouts have been assessed as part of this project, however the entire assessment area was surveyed for impacts to heritage resources. The proposed development is unlikely to negatively impact on significant heritage resources and as such, no alternatives are proposed from a heritage perspective.

6. RESULTS OF PUBLIC CONSULTATION

As this application is made in terms of NEMA, the public consultation on the HIA will take place with the broader public consultation process required for the Environmental Impact Assessment process and will be managed by the lead environmental consultants on the project.

In addition, the report will be shared with the local authority and the Friends of Blaauwberg Conservation Area (FoBCA) Conservation Body for comment for a period of 30 days. The results of this consultation are included in Appendix 3.

7. CONCLUSION

The survey proceeded with no major constraints and limitations, and the project area was comprehensively surveyed for heritage resources. No archaeological resources or palaeontological resources of significance were identified within the area proposed for development. The overall sensitivity of the development area for impacts to significant archaeology and palaeontology is therefore low.

As noted in the VIA, "The proposed development will have a moderate-high impact on the landscape causing noticeable change to the visual environment. The development has a moderate-low visual exposure; moderate-high visual absorption capacity; medium compatibility; and high local visibility only. The development's visual impact has local extent, long-term duration, medium intensity, definitely probability and medium significance on the landscape. Recommendations are made around the need for a landscape plan, the use of locally indigenous species where possible but not excluding exotic trees, colouration based on the site's natural colouring, subtle fence colouring, and landscape maintenance around commercial and natural planting schemes."

8. RECOMMENDATIONS

There is no objection to the proposed development from a heritage perspective on condition that:

- The recommendations in the VIA are implemented with particular reference to
    - The requirement for a detailed SDP which includes landscaping detail
    - The development of a Landscape Plan for the site
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. Heritage Western Cape (HWC) must be contacted immediately in order to determine an appropriate way forward.

9. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
4412	AIA Phase 1	Jonathan Kaplan	01/01/1999	Archaeological Study Erf 1626 (Bakoond), Ysterfontein
4432	AIA Phase 1	Jonathan Kaplan	01/07/2007	Phase 1 Archaeological Impact Assessment: Proposed Development Viladalmeida Yzerfontein Portion of Portion 27 Farm Yzerfontein No. 560 Malmesbury
4441	AIA Phase 1	Jonathan Kaplan	01/06/1996	Archaeological Impact Assessment: 16 Mile Beach Nature Resort, Ysterfontein
4443	AIA Phase 1	Jonathan Kaplan	01/06/2005	Phase 1 Archaeological Impact Assessment Proposed Development of a Private Nature Reserve on Tygerfontein Farm No.564 Yzerfontein Swartland Municipality
7710	AIA Phase 1	Jonathan Kaplan	01/07/2008	Phase 1 Archaeological Impact Assessment: Proposed Development Portion 27 of Farm No. 560 Yzerfontein
8114	AIA Phase 1	Graham Avery, WJJ van Rijssen, ML Wilson	01/01/1990	Archaeological and Palaeontological Survey on Tygerfontein 564, Malmesbury Division
8317	AIA Phase 1	Graham Avery	01/05/1994	Archaeological Survey at Ysterfontein: Coast to Ysterfonteinsoutpan (3318 AC)
8318	AIA Phase 1	Hilary Deacon	29/11/2006	Yzerfontein Retirement Village and Old Age Home Proposed Development in the Magisterial District of Malmesbury, Western Cape Province: Phase 1 Archaeological and Heritage Impact Assessment Report
8319	AIA Phase 1	Jonathan Kaplan	01/10/2008	Phase 1 Archaeological Impact Assessment: Proposed Development Portion of Portion 4 of Farm No. 560 Yzerfontein

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APPENDICES

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APPENDIX 1: Palaeontological Assessment (2023)

HWC22101412NK1018

PALAEONTOLOGICAL IMPACT ASSESSMENT

(DESKTOP STUDY)

PROPOSED SERVICE STATION AND BUSINESS PREMISES ON JACOBUS KRAAL 554 / 7

Yzerfontein, Swartland Municipality, West Coast Magisterial District, Western Cape

By

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Client

JetVest 1157 (Pty) Ltd.

20 February 2023

EXECUTIVE SUMMARY

1. Site Name

Proposed JestVest Service Station and Business Premises on Jacobus Kraal 554 / 7.

2. Location

Portion 7 of the farm Jacobus Kraal 554 (~10.37 ha) is located at the turn off to Yzerfontein from the R27 West Coast Road (Figure 1) and is in the NW quadrant of the intersection of the R27 and the R315 (aka Main Road 215).

3. Locality Plan

See Figure 1.

4. Proposed Development

The proposed development (Figure 2) includes the fuel and service station precinct and a number of business premises for restaurants, shops and services. An area is provided for a market with stalls in containers and seating area under cover. Areas are allocated to parking.

5. Palaeontological Resources Identified

The proposed development area is situated on the Q1 surficial coversand unit (Figure 3). Beneath the surface Q1 coversands it is likely that the older Q2 coversands with soil development are present.

6. Anticipated Impacts

The proposed development involves trenches for conventional building foundations (~0.6 m depth) and services infrastructure (up to ~1.5 m depth) and will primarily affect the Q1 coversands. The excavations for the installation of the fuel tanks are expected to be about 4 m deep. It has not been specified how waste water and sewerage is to be disposed of, but septic tanks and/or a sewerage pump station also involve deeper excavations. It is possible that the older Q2 coversands and associated palaeosurfaces will be intersected in the deeper excavations.

Fossil bones are the main concern and are sparse in the Springfontyn Fm. Q1 and Q2 coversands and soils. Fossil shells and bones in the subsurface of the Q1 coversands are often in an archaeological context. Fossil bones in a primary context are occasionally discovered and are typically exposed during construction of coastal developments where the finds are large bones that get readily noticed, such as bigger antelopes and buffalo, rhino, hippo, bush pigs and elephants. The fossil bones are often on a palaeosurface underlying the loose coversands such as the compact top of the older Q2 coversands.

It is noted that the proximity of a drainage line and water source to the south of Portion 7 could increase the probability of fossil bones occurring nearby. Nevertheless, with the exception of such local “hotspots”, due to the overall scarcity of fossil bones in the coversands and underlying buried soils, the palaeontological sensitivity of the Springfontyn Fm. Q2 and Q1 coversands is overall LOW.

7. Recommendations

The possible presence of fossils in the subsurface does not have an *a priori* influence on the decision to proceed with the proposed construction activities on Portion 7 of Jacobus Kraal 554. However, mitigation measures are essential. The potential impact has a moderate influence during the Construction Phase, consisting of implemented mitigation measures recommended below.

The rescue of fossils during earth works critically depends on spotting this material as it is uncovered during digging *i.e.* by monitoring excavation activity. As it is not feasible for a specialist monitor to be continuously present, the earthworks personnel must be involved in mitigation by watching for fossils. It is recommended that a requirement to be alert for possible fossils and archaeological material be

included in the EMP for the Construction Phase, with a Fossil Finds Procedure in place. The Fossil Finds Procedure included as Appendix 3 provides guidelines to be followed in the event of fossil finds.

The Project Manager, foremen and workers involved in excavating the deposits must be informed of the need to watch for fossils. Workers seeing potential objects are to cease work at that spot and to report to the Project Manager and/or the Environmental Control Officer (ECO). The ECO will inform the developer and contact the palaeontologist contracted to be on standby in the case of fossil finds. The latter will liaise with HWC on the nature of the find and consequent actions (permitting and collection of find).

If a significant occurrence of fossil bones is discovered a professional palaeontologist must be appointed to collect them and to record their contexts. Said palaeontologist must also undertake the recording of the stratigraphic context and sedimentary geometry of the exposure and the compilation of the report to Heritage Western Cape and the IZIKO S.A. Museum. The rescue of discovered palaeontological remains by a contracted specialist shall be at the Developer's expense. Due to the poorly consolidated nature of the expected deposits the collection of any fossil bones can be quickly accomplished.

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CONTENTS

SPECIALIST DETAILS, EXPERTISE AND DECLARATION

CURRICULUM VITAE

John Pether, M.Sc., Pr. Sci. Nat. (Earth Sci.)

Independent Consultant/Researcher recognized as an authority with 37 years' experience in the field of coastal-plain and continental-shelf palaeoenvironments, fossils and stratigraphy, mainly involving the West Coast/Shelf of southern Africa. Has been previously employed in academia (South African Museum) and industry (Trans Hex, De Beers Marine). At present an important involvement is in Palaeontological Impact Assessments (PIAs) and mitigation projects in terms of the National Heritage Resources Act 25 (1999) (~350 PIA reports to date) and is an accredited member of the Association of Professional Heritage Practitioners (APHP). Continues to be involved as consultant to offshore and onshore marine diamond exploration ventures. Expertise includes:

- Coastal plain and shelf stratigraphy (interpretation of open-pit exposures, on/offshore cores and exploration drilling).
- Sedimentology and palaeoenvironmental interpretation of shallow marine, aeolian and other terrestrial surficial deposits.
- Marine macrofossil taxonomy (molluscs, barnacles, brachiopods) and biostratigraphy.
- Marine macrofossil taphonomy.
- Sedimentological and palaeontological field techniques in open-cast mines (including finding and excavation of vertebrate fossils (bones).

Membership of Professional Bodies

- South African Council of Natural Scientific Professions. Earth Science. Reg. No. 400094/95.
- Geological Society of South Africa.
- Palaeontological Society of Southern Africa.
- Southern African Society for Quaternary Research.
- Association of Professional Heritage Practitioners (APHP), Western Cape. Accredited Member No. 48.

Past Clients Palaeontological Assessments

AECOM SA (Pty) Ltd.	Guillaume Nel Environmental Management Consultants.
Agency for Cultural Resource Management (ACRM).	Klomp Group.
AMATHEMBA Environmental.	Megan Anderson, Landscape Architect.
Anél Blignaut Environmental Consultants.	Ninham Shand (Pty) Ltd.
Arcus Gibb (Pty) Ltd.	PD Naidoo & Associates (Pty) Ltd.
ASHA Consulting (Pty) Ltd.	Perception Environmental Planning.
Aurecon SA (Pty) Ltd.	PHS Consulting.
BKS (Pty) Ltd. Engineering and Management.	Resource Management Services.
Bridgette O'Donoghue Heritage Consultant.	Robin Ellis, Heritage Impact Assessor.
Cape Archaeology, Dr Mary Patrick.	Savannah Environmental (Pty) Ltd.
Cape EAPrac (Cape Environmental Assessment Practitioners).	Sharples Environmental Services cc
CCA Environmental (Pty) Ltd.	Site Plan Consulting (Pty) Ltd.
Centre for Heritage & Archaeological Resource Management (CHARM).	SRK Consulting (South Africa) (Pty) Ltd.
Chand Environmental Consultants.	Strategic Environmental Focus (Pty) Ltd.
CK Rumboll & Partners.	UCT Archaeology Contracts Office (ACO).
CNdV Africa	UCT Environmental Evaluation Unit
CSIR - Environmental Management Services.	Urban Dynamics.
Digby Wells & Associates (Pty) Ltd.	Van Zyl Environmental Consultants
Enviro Logic	Western Cape Environmental Consultants (Pty) Ltd, t/a ENVIRO DINAMIK.
Environmental Resources Management SA (ERM).	Wethu Investment Group Ltd.
Greenmined Environmental	Withers Environmental Consultants.

Stratigraphic consulting including palaeontology

Afri-Can Marine Minerals Corp	Council for Geoscience
De Beers Marine (SA) Pty Ltd.	De Beers Namaqualand Mines.
Geological Survey Namibia	IZIKO South African Museum.
Namakwa Sands (Pty) Ltd	NAMDEB

DECLARATION OF INDEPENDENCE

PALAEONTOLOGICAL IMPACT ASSESSMENT (DESKTOP STUDY).

PROPOSED SERVICE STATION AND BUSINESS PREMISES ON JACOBUS KRAAL 554 / 7.

Yzerfontein, Swartland Municipality, West Coast Magisterial District, Western Cape.

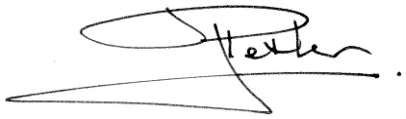
Terms of Reference

This assessment forms part of the Heritage Assessment and it assesses the overall palaeontological (fossil) sensitivities of formations underlying the Project Area in terms of the proposed development.

Declaration

I …**John Pether**……, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in the compilation of the above report;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have any vested interest in the proposed activity proceeding;
- have disclosed to the EAP any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management act;
- have provided the EAP with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.



Signature of the specialist.

Date: 20 February 2023

ABBREVIATIONS

asl.	above (mean) sea level.
bsl.	below (mean) sea level.
CD-NGI	Chief Directorate – National Geo-spatial Information.
Fm.	Formation.
HWC	Heritage Western Cape.
ka	Thousand years ago.
LIG	Last Interglacial.
Ma	Million years ago.
OSL	Optically stimulated luminescence.
PIA	Palaeontological Impact Assessment.
SAHRA	South African Heritage Resources Agency.
SRTM	Shuttle Radar Topography Mission – NASA.

GLOSSARY

~ (tilde): Used herein as “approximately” or “about”.

Aeolian: Pertaining to the wind. Refers to erosion, transport and deposition of sedimentary particles by wind. A rock formed by the solidification of aeolian sediments is an aeolianite.

Alluvium: Sediments deposited by a river or other running water (alluvial).

Archaeology: Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Bedrock: Hard rock formations underlying much younger sedimentary deposits.

Calcareous: sediment, sedimentary rock, or soil type which is formed from or contains a high proportion of calcium carbonate in the form of calcite or aragonite.

Calcrete: An indurated deposit (duricrust) mainly consisting of Ca and Mg carbonates. The term includes both pedogenic types formed in the near-surface soil context and non-pedogenic or groundwater calcretes related to water tables at depth.

Clast: Fragments of pre-existing rocks, *e.g*. sand grains, pebbles, boulders, produced by weathering and erosion. Clastic – composed of clasts.

Colluvium: Hillwash deposits formed by gravity transport downhill. Includes soil creep, sheetwash, small-scale rainfall rivulets and gullying, slumping and sliding processes that move and deposit material towards the foot of the slopes.

Conglomerate: A cemented gravel deposit.

Coversands: Aeolian blanket deposits of sandsheets and smaller dunes.

Fluvial deposits: Sedimentary deposits consisting of material transported by, suspended in and laid down by a river or stream.

Fossil: The remains of parts of animals and plants found in sedimentary deposits. Most commonly hard parts such as bones, teeth and shells which in lithified sedimentary rocks are usually altered by petrification (mineralization). Also impressions and mineral films in fine-grained sediments that

preserve indications of soft parts. Fossils plants include coals, petrified wood and leaf impressions, as well as microscopic pollen and spores. Marine sediments contain a host of microfossils that reflect the plankton of the past and provide records of ocean changes. Nowadays also includes molecular fossils such as DNA and biogeochemicals such as oils and waxes.

Heritage: That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

OSL: Optically stimulated luminescence. One of the radiation exposure dating methods based on the measurement of trapped electronic charges that accumulate in crystalline materials as a result of low-level natural radioactivity from U, Th and K. In OSL dating of aeolian quartz and feldspar sand grains, the trapped charges are zeroed by exposure to daylight at the time of deposition. Once buried, the charges accumulate and the total radiation exposure (total dose) received by the sample is estimated by laboratory measurements. The level of radioactivity (annual doses) to which the sample grains have been exposed is measured in the field or from the separated minerals containing radioactive elements in the sample. Ages are obtained as the ratio of total dose to annual dose, where the annual dose is assumed to have been similar in the past.

Palaeontology: The study of any fossilised remains or fossil traces of animals or plants which lived in the geological past and any site which contains such fossilised remains or traces.

Palaeosol: An ancient, buried soil formed on a palaeosurface. The soil composition may reflect a climate significantly different from the climate now prevalent in the area where the soil is found. Burial reflects the subsequent environmental change.

Palaeosurface: An ancient land surface, usually buried and marked by a palaeosol or pedocrete, but may be exhumed by erosion (*e.g*. wind erosion/deflation) or by bulk earth works.

Pedogenesis/pedogenic: The process of turning sediment into soil by chemical weathering and the activity of organisms (plants growing in it, burrowing animals such as worms, the addition of humus *etc.*).

Pedocrete: A duricrust formed by pedogenic processes.

Rhizolith: Fossil root. Most commonly formed by pedogenic carbonate deposition around the root and developed in palaeosols.

Stone Age: The earliest technological period in human culture when tools were made of stone, wood, bone or horn.

Stratotype locality: The place where deposits regarded as defining the characteristics of a particular geological formation occur.

Tectonic: Relating to the structure of the earth's crust and the large-scale processes which take place within it (faulting and earthquakes, crustal uplift or subsidence.

Trace fossil: A structure or impression in sediments that preserves the behaviour of an organism, such as burrows, borings and nests, feeding traces (sediment processing), farming structures for bacteria and fungi, locomotion burrows and trackways and traces of predation on hard parts (tooth marks on bones, borings into shells by predatory gastropods and octopuses).

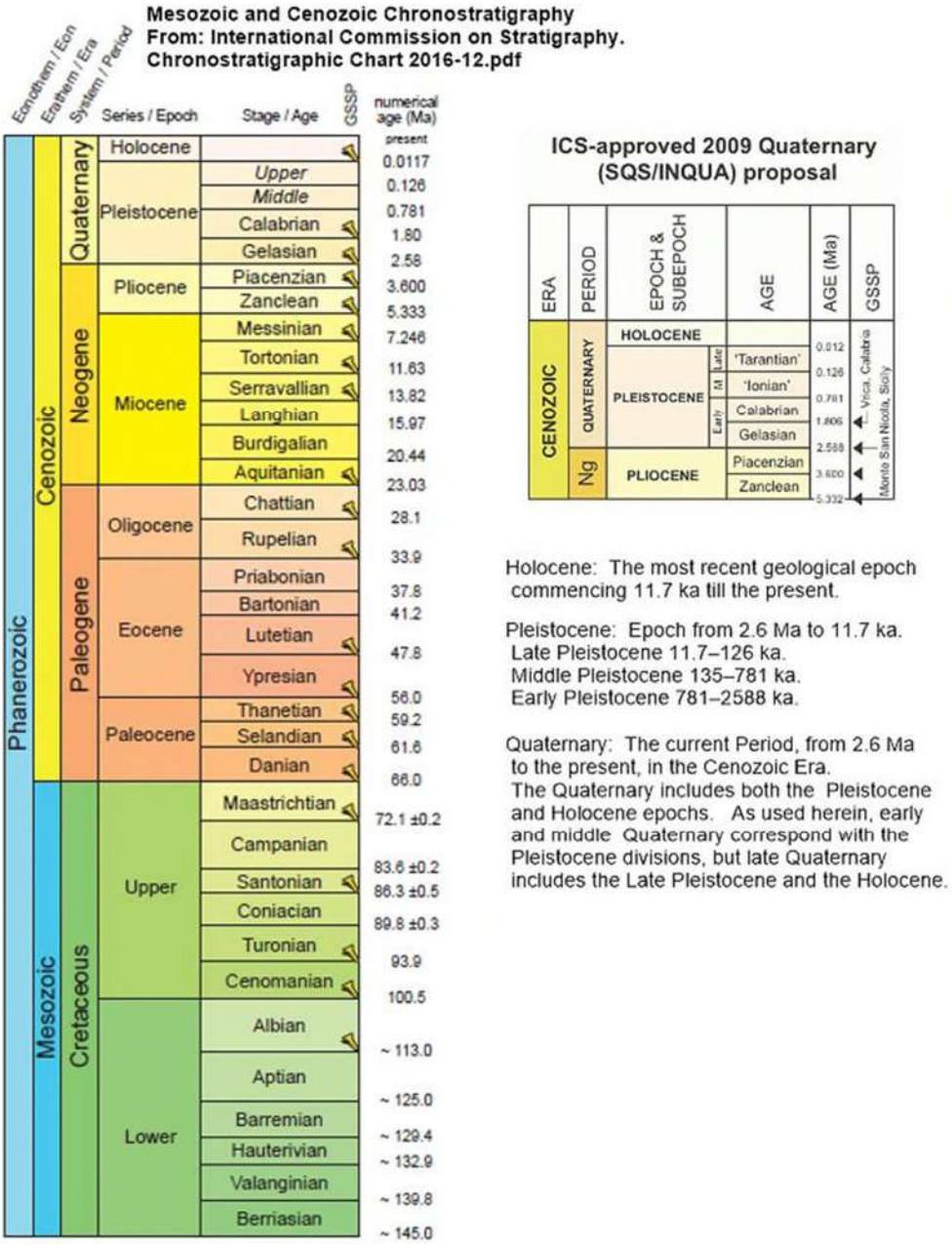
GEOLOGICAL TIME SCALE TERMS

For more detail see www.stratigraphy.org.

ka: Thousand years or kilo-annum (10^3 years). Implicitly means “ka ago” *i.e*. duration from the present, but “ago” is omitted. The “Present” refers to 1950 AD. Not used for durations not extending from the Present. For a duration only “kyr” is used.

Ma: Millions years, mega-annum (10^6 years). Implicitly means “Ma ago” *i.e.* duration from the present, but “ago” is omitted. The “Present” refers to 1950 AD. Not used for durations not extending from the Present. For a duration only “Myr” is used.

Late Pliocene Warm Period: An interval of warm climate and high sea level around ~3 Ma. This interval was previously referred to as the Mid Pliocene Warm Period (MPWP) when the boundary between the Pliocene and Quaternary was set at ~1.8 Ma at the beginning of the Calabrian (see figure below). Now that the Pliocene/Quaternary boundary is set further back in time by international agreement to the beginning of the Gelasian at ~2.6 Ma, the MPWP at ~3 Ma is no longer “mid”, but is in the late Pliocene. However, for continuity it is still often referred to as the MPWP. Lately it has also been referred to as the Mid Piacenzian Warm Period, thus preserving the abbreviation and also being chronologically correct.



COMPLIANCE WITH APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R326 (7 April 2017)	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page v.
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page vi.
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.
(cA) an indication of the quality and age of base data used for the specialist report;	Section 4.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 8.
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 4.
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying alternatives;	Sections 6 & 7..
g) an identification of any areas to be avoided, including buffers;	N/A
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figures 3 & 4.
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 4.2.
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Sections 7-9.
k) any mitigation measures for inclusion in the EMPr;	Section 9.
l) any conditions for inclusion in the environmental authorisation;	Section 9.
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 9.
n) a reasoned opinion- i. whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity and activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Sections 7 - 9.
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not Applicable
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not Applicable
q) any other information requested by the competent authority.	Not Applicable
2. Where a government notice gazetted by the Minister provides for any protocol of minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply	Site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed. See Appendix 2.

1 INTRODUCTION

JetVest 1157 (Pty) Ltd. proposes to develop Portion 7 of the farm Jacobus Kraal 554 with the construction of a vehicle service station and business premises. A Notification of Intent to Develop (NID) was submitted to Heritage Western Cape (HWC) and a Palaeontological Impact Assessment (PIA) was requested.

This PIA is to inform about the palaeontological sensitivities of the Project Area and the probability of fossils being uncovered in the subsurface and being disturbed or destroyed during the construction of the proposed development.

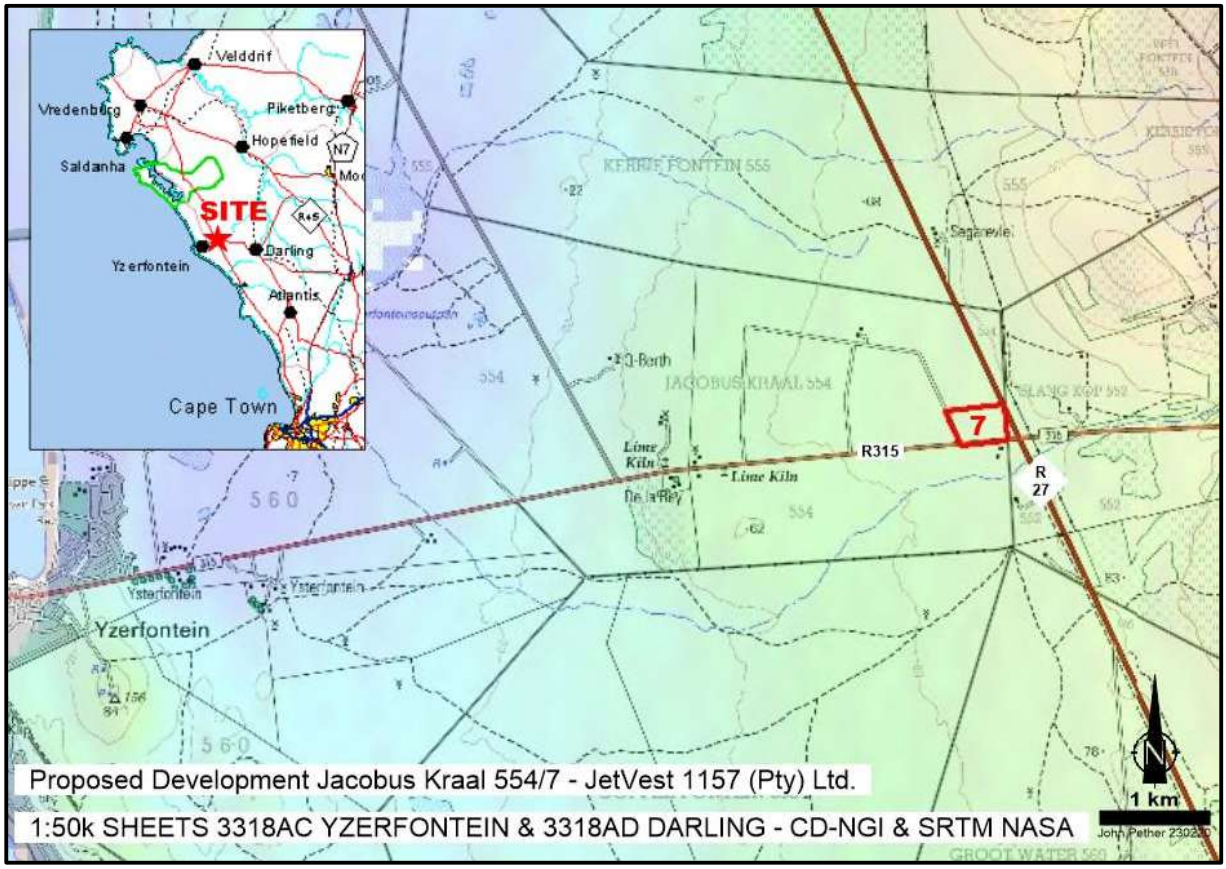


Figure 1. Location of the proposed development on Jacobus Kraal 554, Portion 7.

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 LOCATION

Portion 7 of the farm Jacobus Kraal 554 (~10.37 ha) is located at the turn off to Yzerfontein from the R27 West Coast Road (Figure 1) and is in the NW quadrant of the intersection of the R27 and the R315 (aka Main Road 215).

2.2 PROPOSED DEVELOPMENT

The proposed development (Figure 2) includes the fuel and service station precinct and a number of business premises for restaurants, shops and services. An area is provided for a market with stalls in containers and seating area under cover. Areas are allocated to parking.

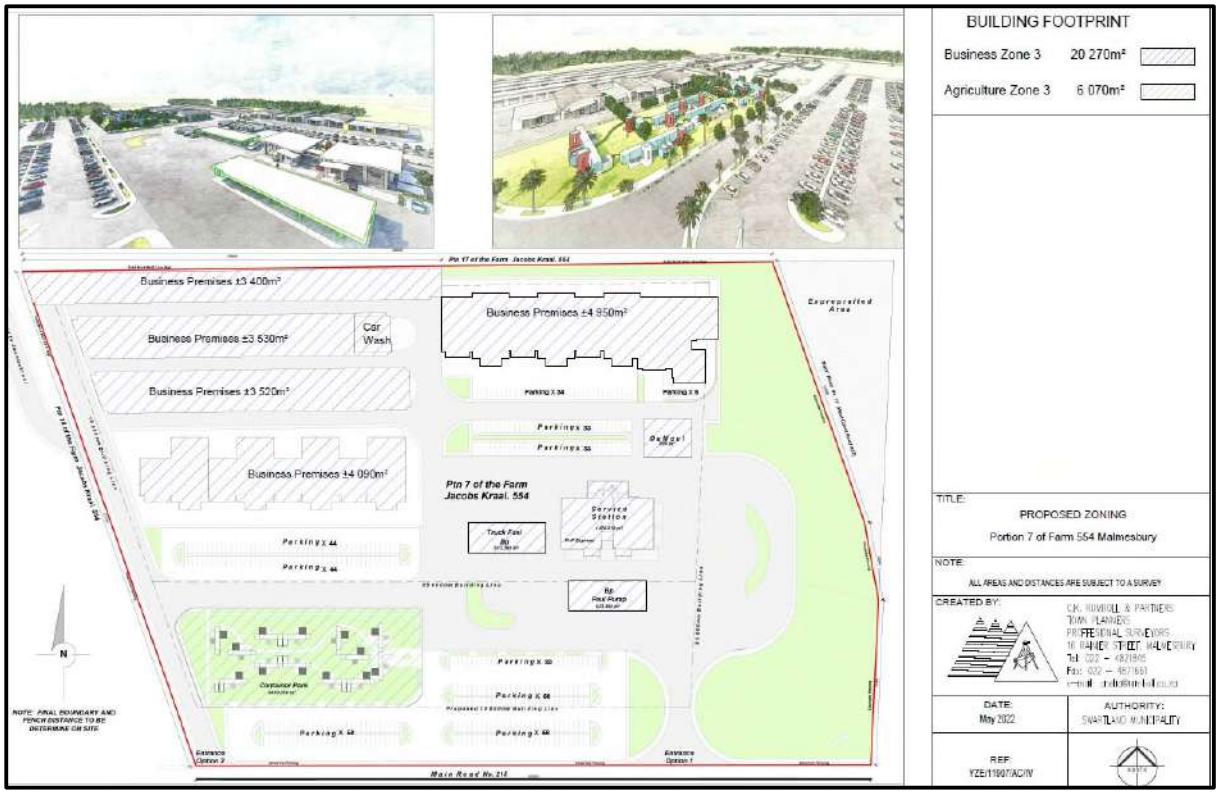


Figure 2. The proposed Site Develop Plan for Portion 7 of Jacobus Kraal 554.

3 APPLICABLE LEGISLATION

The National Heritage Resources Act (NHRA No. 25 of 1999) protects archaeological and palaeontological sites and materials, as well as graves/cemeteries, battlefield sites and buildings, structures and features over 60 years old. According to the Act (Sect. 35), it is an offence to destroy, damage, excavate, alter of remove from its original place, or collect, any archaeological, palaeontological and historical material or object, without a permit issued by the South African Heritage Resources Agency (SAHRA) or applicable Provincial Heritage Resources Agency, *viz*. Heritage Western Cape (HWC).

Notification of SAHRA or the applicable Provincial Heritage Resources Agency is required for proposed developments exceeding certain dimensions (Sect. 38). If the areal scale of subsurface disturbance and exposure exceeds 300 m in linear length or 5000 m^2, the development must be assessed for heritage impacts (HIA) that may include an assessment of palaeontological heritage (PIA).

4 METHODOLOGY

4.1 THE LITERATURE

As a desktop study, this report relies on the author's familiarity with the scientific literature pertaining to the geology and palaeontology of the coastal plains, together with own observations. A considerable volume of scientific literature (several hundred published articles) has issued from the fossil finds made in the Southwestern Cape, most famously from finds in the old Langebaanweg phosphate mine that is now the West Coast Fossil Park. The important information for this report is in the articles dealing with the broader stratigraphy, palaeoenvironments, fossils and ages of the formations. These are, *inter alia*, Visser & Schoch (1972, 1973), Tankard (1974, 1975a,b, 1976), Dingle *et al.* (1979), Rogers (1980, 1982, 1983), Hendey (1981a,b,), Dingle *et al.* (1983), Hendey (1983a,b,c), Hendey & Dingle (1990),

Pether *et al*. (2000), Roberts & Brink (2002), Roberts *et al*. (2006), Roberts *et al*. (2011) and Roberts & Siegfried (2014).

In this report the regional geological context is first summarised and subsequently the local geology and palaeontological sensitivities of the Project Area are described and the impact of the subsurface disturbance entailed by the development is assessed.

Some differences in the interpretation of the coastal-plain stratigraphy of the southwestern Cape (the **SANDVELD GROUP**) exist between researchers, part of which is merely historical as ongoing research and fossil finds have provided more insights, and part of which reflects different approaches in stratigraphic interpretation. However, the endeavour to understand the deposits depends critically on fossil finds to refine their ages and the associated past environments.

4.2 ASSUMPTIONS AND LIMITATIONS

The assumption is that the fossil potential of a formation in the Project Area will be typical of that found in the region and more specifically, similar to that already observed in the surrounds of the Project Area. In many cases the information on fossil content is limited to the basics, such as in the case of geological mapping when the fossils are not the immediate focus.

Scientifically important fossil shell and bone material is expected to be sparsely scattered in these coastal-plain deposits, but unless large and obvious, is not generally seen, under-estimating the fossil prevalence. Much depends on careful scrutiny of exposures and on spotting fossils as they are uncovered during digging *i.e.* by monitoring excavations. A limitation on predictive capacity exists in that it is not possible to predict the buried fossil content of an area or formation other than in general terms.

5 REGIONAL GEOLOGICAL SETTING

The **bedrock** of the wider area consists of the basement rocks of the **Malmesbury Group** shales and limestones whose origin dates from over ~600 Ma (Ma: million years ago) as the deposits in an ancient ocean basin which have been metamorphosed when the basin was compressed by crustal tectonic forces and intruded by the **Cape Granites** about 550 Ma. The erosion-resistant crystalline “Cape Granites” are now exposed as the Darling hills just inland of the R27. while the softer Malmesbury Group shales have mostly been eroded away to low elevations and are usually buried beneath the much younger coastal-plain formations. These bedrock formations are not of palaeontological interest.

5.1 THE SANDVELD GROUP

The eroded bedrock of the coastal plain is buried beneath the sediments of the **SANDVELD GROUP** (Hendey & Dingle, 1990). These sediments are of later Cenozoic age, deposited during the Neogene and Quaternary periods, *i.e*. mainly during the last 23 million years. A tabulated summary of the formations comprising the Sandveld Group (**Table 1**) is based primarily on the chronological history of the major times of high sea level during periods of global warming as evidenced in oceanic palaeoclimatic records and the corresponding fossiliferous marine deposits preserved on the coastal plain farther north along Namaqualand where they are extensively exposed in diamond mine open-cast pits. The dated marine formations interfinger with the terrestrial aeolian formations, bracketing the ages of the aeolian formations. The terrestrial formations of the Sandveld Group, such as the Langebaan and Springfontyn formations, are very broadly defined at present and incorporate deposits of different ages, but by analogy with the coastal-plain record of Namaqualand, must also be similarly bracketed by sea-level history. The repetition of the formation names in Table 1 reflects their composite nature comprising members of various ages.

Table 1. The Sandveld Group – an expanded stratigraphic scheme.

FORMATION	AGE AND DESCRIPTION	SIGNIFICANCE/SENSITIVITY	
WITZAND	Holocene and recently active dune fields and cordons <~12 ka.	Mainly archaeological sites.	Quaternary
VELDDRIF 3	Holocene High 7-3 ka.	Shell fossils common, local significance.	
Springfontyn Q1	Late Quaternary coversands and dunes.	Poorly fossiliferous, local significance.	
LANGEBAAN	Late Quaternary calc. aeolianites <~125 ka.	Fossil bones mod. common, local to medium significance.	
VELDDRIF 2	Last Interglacial raised beach & estuarine 6-8m.	Shell fossils common, local significance. Fossil bones very sparse, high significance.	
Springfontyn Q2	Later mid-Quaternary heuweltjiesveld soils & underlying sands & palaeosols.	Poorly fossiliferous, medium significance.	
LANGEBAAN	Mid Quaternary calc. aeolianites.	Fossil bones mod. common, local to high significance.	
VELDDRIF 1	Mid-Quaternary raised beach & estuarine deposits, ~0.4 Ma. Sea-levels below ~8-12 m asl.	Extents & fossil content poorly known, high significance.	
Marine erosion surfaces to ~15 m asl. (Velddrif 1), to ~6-8 m asl (Velddrif 2) and ~3 m asl. (Velddrif 3)			
SPRINGFONTYN	Latest Pliocene to mid-Quaternary <~3 Ma. Mainly quartzose dune and sandsheet deposits, inter-bedded palaeosols. Marsh beds, alluvium & colluvium locally.	Fossil bones very sparse, high significance. Basal Baards Quarry type fluvial deposits locally. Elandsfontein & Duynefontyn Fossil Beds.– v high significance.	
LANGEBAAN	Latest Pliocene to early Quaternary calcareous aeolianites <~3 Ma.	Fossil bones mod. common, local to high significance.	Pliocene
UYEKRAAL (2)	Late Pliocene transgression to ~35 m asl., ~3 Ma. Subsequent marine regression deposits.	Shell fossils common, local significance. Fossil bones very sparse, high significance.	
Marine erosion surface to ~35 m asl.			
Springfontyn Fm.	Pliocene leached and altered sands.	Largely unfossiliferous, possible peats/lignite.	
LANGEBAAN	Earlier Pliocene calcareous aeolianites <~3 Ma.	Fossil bones mod. common, local to high significance.	
VARSWATER upper Regression facies	Later early Pliocene regressive marine deposits of wider area. 5-4 Ma.	Fossil bone rare, high significance. Poorly known, fossil shells of high significance.	
VARSWATER lower Transgression facies in major embayments	Early Pliocene transgressive marine deposits in embayments (upper ?KGM, Langeberg Quartzose Sand and Muishond Fontein Pelletal Phosphorite members. Sea-level max ~50-60 m asl.	Fossil bone common locally, high significance. Shells very sparse, high significance.	
Marine erosion surface to ~60 m asl.			
Springfontyn Fm.	Miocene leached and altered sands.	Largely unfossiliferous, possible peats/lignite.	Miocene
PROSPECT HILL	Miocene calcareous aeolianite 12-9 Ma? (this age controversial, could be Pliocene)	Fossils very sparse – high significance.	
SALDANHA	Mid-Miocene marine deposits (predicted presence), 17-14 Ma. Sea-level max. ~100 m asl. May Include the lower Konings Vlei Gravel Member (KGM).	Very few fossils recovered, high significance. if found.	
Marine erosion surface to ~100 m asl.			
LANGEENHEID CLAYEY SAND (LCSM) (1)	Mid Miocene early-transgression estuarine deposits (prev. LCS Member in lower Varswater Fm.). 18-17 Ma.	Plant microfossils – high significance.	
ELANDSFONTYN	Oligocene-early Miocene fluvial muds, peats, sands and gravels, ~26-18 Ma.	Plant fossils – high significance.	
PRE-SANDVELD GROUP BEDROCK – Malmesbury Group shales and Cape Granites.			

(1) Previously a member of the Varswater Fm.
(2) Previously subsumed in the Varswater Fm.

5.1.1 Early Miocene Tropical Forests

The buried valleys eroded in the Malmesbury shales are filled with the **Elandsfontyn Formation**, the oldest formation of the Sandveld Group, consisting of sandy fluvial and muddy marsh deposits laid down by meandering rivers under humid, tropical to subtropical climatic conditions (Rogers, 1980, 1982). The formation has abundant plant fossils in places, including lignified logs and plant material. Fossil pollen is indicative of forest vegetation with palms and is considered to be early to middle Miocene in age (Coetzee, 1978; Rogers, 1982; Hendey, 1981b, Roberts *et al*., 2017). This was an interval 23-16 Ma of slow global warming and episodically rising sea level which culminated in the Mid-Miocene Climatic Optimum ~16 Ma. A drill core into the Elandsfontyn palaeochannel deposits beneath Saldanha Bay, kindly provided by Transnet, has been the subject of multi-disciplinary study by an international scientific team (Roberts *et al*., 2017), providing much new information about the Elandsfontyn Formation, when yellowwood forest covered the granite hills and mangroves lined the shoreline. The Elandsfontyn Fm. is not expected to be present beneath the Project Area.

5.1.2 Mio-Pliocene Marine Formations

The older marine formations are generally not exposed, being buried beneath several metres of ancient sandy dune rock (aeolianite) such as the Langebaan Formation, but are revealed in the deep excavations of mine and quarry pits.

The oldest marine deposits of the southwestern coastal plain, the **Saldanha Formation,** were laid down during and just after the Mid-Miocene Climatic Optimum ~16-14 Ma. The Saldanha Fm. deposits are substantially eroded away, but residual marine gravels and sands above ~50 m asl. belong to this formation, while patches of it are likely preserved in places beneath younger, Pliocene marine deposits.

Subsequent Pliocene palaeoshoreline deposits (5-3 Ma) are found below ~50 m asl. (Pether *et al*., 2000). In the southwestern Cape, these marine deposits are collectively known as the **Varswater Formation**. The stratotype locality is at the **West Coast Fossil Park** where the extensive fossil bone assemblage recovered from the phosphate quarry indicates the early Pliocene age (Hendey, 1981a). These fossils were deposited in an estuarine setting during the transgression to ~50 m asl., about 5 Ma during the global warming of the Early Pliocene Warm Period. In the wider area, when sea level later receded from ~50 m asl., fossiliferous shallow-marine deposits were left mantling the emerged coastal plain.

Sea level rose again during the warming of the Late Pliocene Warm Period (~3.0 Ma), to a level now ~30 m asl. In the Saldanha embayment west of the West Coast Fossil Park, the flat plain extending towards the coast is underlain by these deposits, called the "**Uyekraal Formation**", after Rogers (in Rogers *et al*., 1990). These late Pliocene marine beds are the youngest marine deposits which make up a large volume and underlie the outer part of the coastal plain.

5.1.3 The Quaternary Raised Beaches

The Pliocene Epoch came to an end ~2.6 Ma with global cooling and the growth of the polar ice sheets and the "Ice Ages" of the Quaternary Period set in. Sea level fluctuated at positions well below present for most of the Quaternary, at times as much as 80 to 130 m below present sea level at times of Ice Age glacial maxima. The generally colder conditions were interrupted by brief intervals of global warming (interglacials) when sea level was several metres above present level. The higher sea level intervals resulted in the deposition of the Quaternary "raised beaches" found at low elevations (<15 m asl.) around the coast. These raised beaches typically occur as shelly gravels and sands on wave-cut terraces fringing the modern coast and collectively comprise the **Velddrif Formation**.

5.1.4 The Aeolian Formations

The aforementioned marine formations are generally not exposed at the surface and do not feature on geological maps as they are covered by extensive dune plumes and coversand sheets (Figure 3) which were blown inland from the successions of ancient shorelines by mainly southerly winds. Near the coast the ages of the marine formations underlying and interbedded with the aeolianite formations provide the prime age control for the aeolianite formations, while inland the main aeolian formations are separated by well-developed fossil soil pedocretes which, if exposures exist, can be traced inland from the coast. Sea-level fluctuations were the major influence on the large-scale architecture of the aeolian formations.

Two main variants of aeolianites recognized in the Sandveld Group:

- **Calcareous aeolianites** which are comprised of sand with a high calcareous content in the form of tiny shell fragments and which includes the semi-lithified and calcreted, older aeolianites of different ages such as the Miocene **Prospect Hill Formation** and the Pliocene and Quaternary **Langebaan Formation**. These calcareous aeolianites formations are evident in the coastal landscape as the ridges, low hills and mounds which have a surface calcrete crust or carapace capping the softer dune rock below. The modern dunes at the coast, called the **Witzand Formation**, generally also have significant shell fragment content.
- **Quartzose aeolianites** which are thicknesses of mainly aeolian sands dominated by quartz sand with limited calcareous content and which are assigned to the **Springfontyn Formation**. The Springfontyn Fm. as applied herein accommodates the quartzose windblown sand sheets and dunes that have covered parts of the coastal landscape during the Quaternary Period. Much older quartzose aeolianites have also been assigned to the Springfontyn Fm., but these are treated separately in Table 1 as later Miocene and Pliocene to early Quaternary formations.

The older calcareous dunes recognized comprise the **Prospect Hill Formation** which is the high calcareous aeolianite ridge backing the coastal plain between Saldanha Bay to Paternoster. It includes fossil eggshell fragments of the extinct ostrich *Diamantornis wardi* and extinct forms of land snails (Roberts & Brink, 2002). Based on dated occurrences of fossil ostrich eggshell in the Namib, East Africa and Arabia, an age of 12-9 Ma is indicated for the Prospect Hill Formation (Stidham, 2008).

Surface outcrops of the younger, calcified aeolianites of **Langebaan Formation** occupy large areas of the landscape (Figure 3). At this stage, the Langebaan Formation includes various aeolianites of different ages and is an “amalgam” of the dune plumes that formed on the coastal plain, at differing places and times, mainly during the last ~4 Ma (Pliocene to the late Quaternary). This is reflected in the different ages indicated from fossils found at various places:

- a latest Pliocene or younger age (Diazville lower quarry, Roberts & Brink, 2002).
- early Quaternary (Skurwerug, Hendey & Cooke, 1985).
- middle and late Quaternary ages (Kraal Bay Member) are indicated by relationships to Last Interglacial (~125 ka) and earlier shoreline deposits and by dating of aeolianites by Optical Stimulated Luminescence methods (OSL) (Roberts *et al*., 2009).

Older Quartzose aeolianites of considerable thicknesses comprise the coastal plain deposits inland from the coast which are of broadly similar age as the calcareous Mio-Pliocene aeolianites, but not necessarily contemporaneous. These deposits include “glass sands” which are evidently older aeolianites which have been leached by percolating groundwater and which are probably of **later Miocene age**, as well as aeolianites which have a reworked marine phosphatic sand content, likely of **Pliocene to early Quaternary ages**. These older “Springfontyn” sands are extensively altered by groundwater, with iron-oxide staining and formation of ferruginous and phosphatic concretions, nodules and rinds.

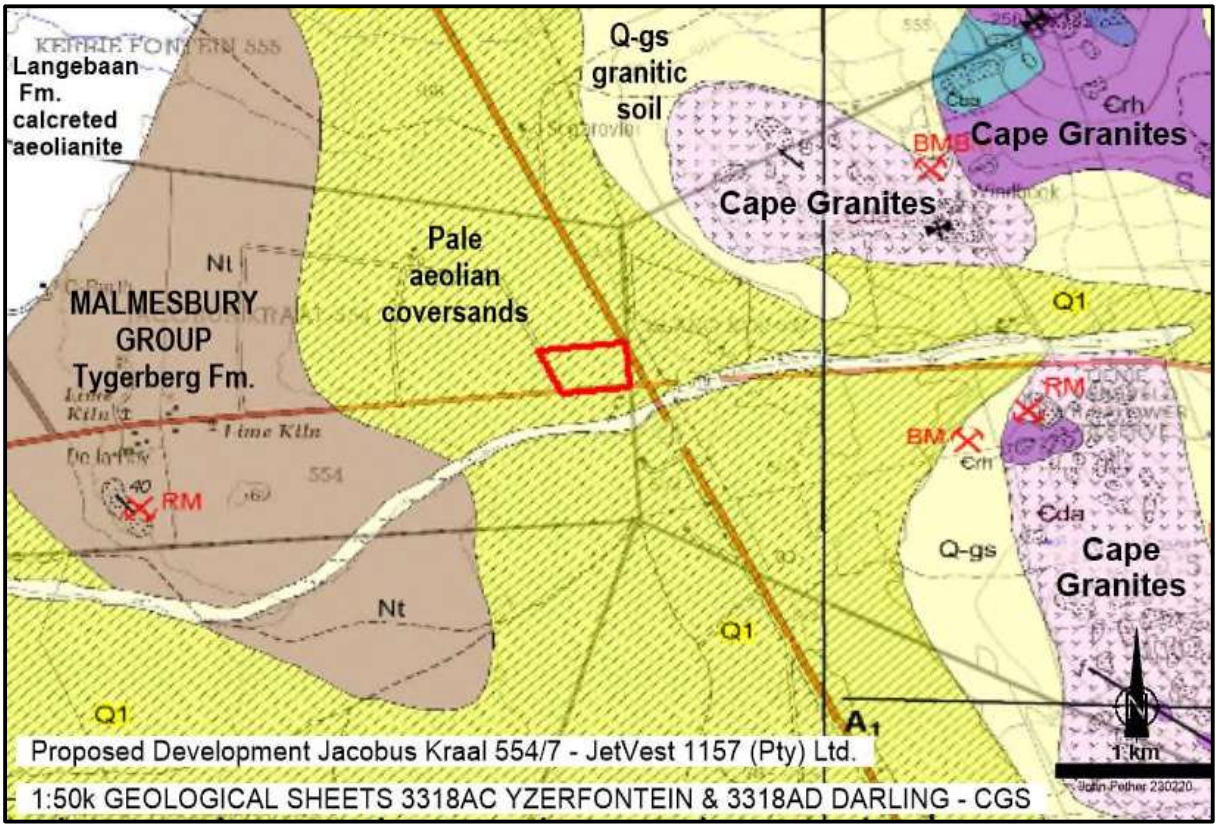


Figure 3. Surface geology and context of the proposed development.

The **younger Quaternary Springfontyn Formation** is manifest in the landscape in the form of two surficial units of coversands which are widely distributed, with different degrees of soil development. Visser & Schoch (1972, 1973) distinguished the older surface cover of dot-patterned hillocky veld (heuweltjiesveld) as **surface unit Q2** and the overlying pale white to slightly reddened sandsheets and low dunes as **surface unit Q1**.

The **Q2** heuweltjiesveld soil is just the surface of a formation of coversands and dunes of mid-Quaternary age, ~800-150 ka. The deposits beneath the Q2 surface are thicker at the locations of old dune plumes and generally thicken into lower areas in the landscape. In addition to mainly windblown sandsheets, the deposits also comprise the local colluvial/sheetwash deposits, local alluvial stream and flood deposits, and vlei or pan deposits where the water table was near the surface. Pedogenic features such as palaeosols, minor calcretes and ferruginous concretions are also present.

The latest addition to the Springfontyn Formation, the **pale Q1 coversands** (Figure 3), have clearly accumulated episodically, as is evident in sand swathes with differing vegetation patterns seen in aerial images. In places these sands are undergoing semi-active transport and locally have been remobilized into active sandsheets and dunes. The ages obtained from OSL-dating suggest episodic deposition during the last 100 kyr during the late Quaternary.

The latest addition of dunes to the coastal plain is the **Witzand Formation** (Rogers, 1980), comprising partly calcareous sands blown from the beach in the last several thousand years of the Holocene and accumulated in the form of a narrow dune cordon or “sand wall” parallel to the coast, where the dunes cover the Velddrif Fm. deposits, or as dune plumes transgressing several kilometres inland.

6 LOCAL GEOLOGICAL SETTING

The proposed development area is situated on the Q1 surficial coversand unit (Figure 3). To the east is the granite bedrock of the Darling hills, while to the west is thinly-covered shale bedrock of the

Malmesbury Group. Farther west is the accumulation of calcareous, calcreted aeolianites of the Langebaan Fm.

Borehole G30877 was drilled adjacent to the R27/R315 intersection on Jacobus Kraal at a surface elevation of 74.5 m asl. and intersected 25.7 m of sediments down to bedrock at 48.8 m asl. (Rogers, 1980). The borehole log is not readily available and therefore the thicknesses and elevations of the formations encountered in the borehole are not known. However, beneath the surface Q1 coversands it is likely that the older Q2 coversands with soil development are present. Further down may be leached and altered aeolian sands of Pliocene to early Quaternary age, underlain by residual marine deposits.

7 ANTICIPATED IMPACTS

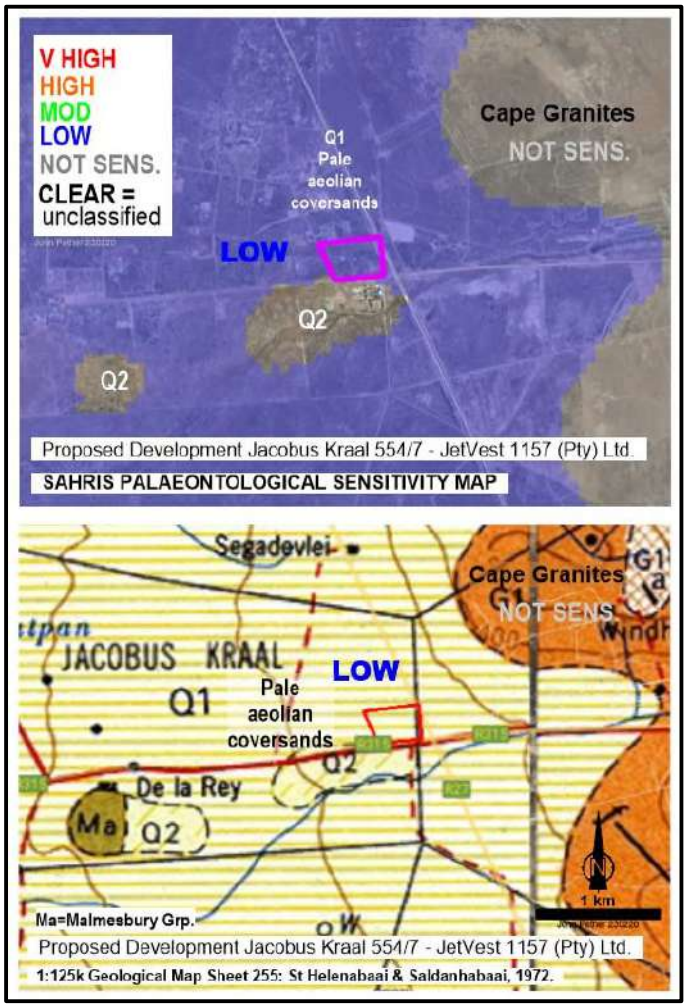


Figure 4. Top – Palaeontological Sensitivity of surface formations. Bot. – The corresponding geological map.

The intensity or magnitude of impact relates to the palaeontological sensitivities of the affected formations (Appendix 2) and the volume of disturbance by excavation. Portion 7 of Jacobus Kraal 554 is on the late Quaternary Q1 pale aeolian coversands which are generally of LOW sensitivity (Figure 4).

The proposed development involves trenches for conventional building foundations (~0.6 m depth) and services infrastructure (up to ~1.5 m depth) and will primarily affect the Q1 coversands. The excavations for the installation of the fuel tanks are expected to be about 4 m deep. It has not been specified how waste water and sewerage is to be disposed of, but septic tanks and/or a sewerage pump

station also involve deeper excavations. It is possible that the older Q2 coversands and associated palaeosurfaces will be intersected in the deeper excavations. The older geological map (Figure 4, Bot.) shows outcrops of Q2 deposits to the immediate south of Portion 7, but colour aerial images do not support this, showing only Q1 pale sands and not the brown-hued Q2 soil.

Fossil bones are the main concern and are sparse in the Springfontyn Fm. Q1 and Q2 coversands and soils. Fossil shells and bones in the subsurface of the Q1 coversands are often in an archaeological context. Fossil bones in a primary context are occasionally discovered and are typically exposed during construction of coastal developments where the finds are large bones that get readily noticed, such as bigger antelopes and buffalo, rhino, hippo, bush pigs and elephants. The fossil bones are often on a palaeosurface underlying the loose coversands such as the compact top of the older Q2 coversands.

Sites of international renown are on Duynefontyn 34 just north of Koeberg and on Elandsfontyn 349 (historic Hopefield Site) where richly fossiliferous beds in the older sands of the Springfontyn Formation are associated with the margins of local vleis. Notably, prior to the wind erosion of coversands at these sites there would have been no indication of the fossil wealth just below, which at Elandsfontyn included the cranium of the pre-modern human *Homo heidelbergensis*, a find of international scientific importance. It is quite possible that comparable highly fossiliferous palaeosurfaces associated with past local water sources remain buried and undiscovered within or beneath the Springfontyn Fm. coversands. It is noted that the proximity of a drainage line and water source to the south of Portion 7 could increase the probability of fossil bones occurring nearby. Nevertheless, with the exception of such local “hotspots”, due to the overall scarcity of fossil bones in the coversands and underlying buried soils, the palaeontological sensitivity of the Springfontyn Fm. Q2 and Q1 coversands is overall LOW.

8 ASSESSMENT OF IMPACTS

8.1 NATURE OF THE IMPACT OF BULK EARTH WORKS ON FOSSILS

Fossils are rare objects, often preserved due to unusual circumstances. This is particularly applicable to vertebrate fossils (fossil bones), which tend to be sporadically preserved and have high value with respect to palaeoecological and biostratigraphic (dating) information. Such fossils are non-renewable resources. Provided that no subsurface disturbance occurs, the fossils remain sequestered there.

Overall the palaeontological sensitivity of coastal deposits is HIGH (Almond & Pether, 2009) due to previous fossil finds of high scientific importance. When excavations are made they furnish the “windows” into the coastal plain depository that would not otherwise exist and thereby provide access to the hidden fossils. The impact is positive for palaeontology, if efforts are made to watch out for and rescue the fossils. The very scarcity of fossils makes for the added importance of looking out for them. Fossils and significant observations will be lost in the absence of management actions to mitigate such loss. There remains a medium to high risk of valuable fossils being lost despite management actions to mitigate such loss. Machinery involved in excavations may damage or destroy fossils, or they may be hidden in “spoil” of excavated material. This loss of the opportunity to recover them and their contexts when exposed at a site is irreversible.

8.1.1 Extents

The physical extent of impacts on potential palaeontological resources relates directly to the extents of subsurface disturbance involved in the Construction Phase, *i.e*. LOCAL.

However, unlike an impact that has a defined spatial extent (*e.g.* loss of a portion of a habitat), the cultural, heritage and scientific impacts are of regional to national extent, as is implicit in the National Heritage Resources Act No. 25 (1999) and, if scientifically important specimens or assemblages are uncovered, are of INTERNATIONAL interest. This is evident in the amount of foreign-funded palaeontological research that takes place in South Africa by scientists of other nationalities.

8.1.2 Duration

The impact of both the finding or the loss of fossils is permanent. The found fossils must be preserved "for posterity"; the lost, overlooked or destroyed fossils are lost to posterity. The duration of impact is therefore PERMANENT with or without mitigation.

8.1.3 Intensity/Magnitude

The intensity or magnitude of impact relates to the palaeontological sensitivities of the affected formations and the degree or volume of disturbance.

As noted, with the exception of local "hotspots" near water sources, due to the overall scarcity of fossil bones in the coversands and underlying buried soils, the palaeontological sensitivity of the Springfontyn Fm. Q2 and Q1 coversands is overall LOW. The scale and number of deeper construction excavations is minor compared to quarrying operations.

8.1.4 Probability of occurrence

Although fossil bones are overall sparse in the Springfontyn Fm. coversands and underlying buried soils there is some possibility that fossil bones could be discovered, most likely in association with archaeological material, but it is IMPROBABLE.

8.1.5 Consequence of impact or risk

Permanent loss of material palaeontological heritage (fossil specimens) and the scientific discovery and knowledge implicit in their origin and context.

8.1.6 Irreplaceable loss of resources

Without mitigation and rescue of unearthed fossils there will be a COMPLETE LOSS OF RESOURCES within the footprints of the earthworks.

8.1.7 Reversibility

Palaeontological resources are unique and their loss is IRREVERSIBLE.

8.1.8 Indirect impacts

The material fossil evidence of "deep time" is embedded in the creation of the sacred landscape and contributes to the "sense of place" cultural aesthetic of the region. The loss of fossils and concomitant interpreted knowledge impoverishes the tangible testimony of the prehistoric landscape and ecological context of ancient humans.

8.1.9 Cumulative impacts

The cumulative impact of coastal developments is the inevitable and permanent loss of fossils and the associated scientific implications. As mentioned, the impact of both the finding and the loss of fossils is permanent. Diligent and successful mitigation contributes to a positive cumulative impact as the rescued fossils are preserved and accumulated for scientific study. Even though just a very minor portion of the bone fossils exposed in coastal excavations has been seen and saved, the rescued fossils have proved to be of fundamental scientific value.

8.1.10 Degree to which impact can be avoided

There is a risk of valuable fossils being lost despite management actions to mitigate such loss. The avoidance of impact is LOW.

8.1.11 Degree to which impact can be managed

Experience of coastal developments and mining has shown that the impact is difficult to manage and will require significant mitigation co-operation and effort on the part of excavation contractors and supervisors. Seldom are fossil bone finds reported from contexts where they are expected to occur. The conclusion is that the monitoring of digging is generally inadequate for the capture of small-scale fossil bone occurrences as the fossils are only briefly exposed, while large bones or bone clusters are seen. The success of management is thus LOW to MODERATE.

8.1.12 Degree to which an impact can be mitigated

Given unavoidable loss of fossils the impact can only be partly mitigated, *i.e*. MODERATE.

8.1.13 Residual impacts

Negative residual impact arises from the unavoidable loss of fossils of unknown significance in spite of mitigation efforts. Positive residual impact arises from the successful rescue of fossil material for posterity, resulting in material for future research, employment opportunities for budding, young researchers and enhanced insights into the prehistory of the SW Cape.

8.2 SUMMARY IMPACT TABLES

8.2.1 Springfontyn Formation Q1 & Q2 Coversands

Loss of fossil bones and archaeological material from excavations in the Springfontyn Formation coversands.							
	Extent	**Duration**	**Intensity**	**Status**	**Probability**	**Significance**	**Confidence**
Without mitigation	Local 1	Permanent 5	Low 4	Negative	Improbable 2	LOW 20	M
Essential mitigation measures • Construction personnel to be alert for rare fossil bones and follow “Fossil Finds Procedure”. • Cease excavation at location of discovery of fossil bones and protect fossils from further damage. • Contact appointed palaeontologist providing information and images. • Palaeontologist will assess information and establish suitable response, such as the importance of the find and measures for preservation, collection and record keeping. • Exposed fossiliferous sections recorded and sampled by appointed palaeontologist.							
With mitigation	Local 1	Permanent 5	Low 4	Positive	Improbable 2	LOW 20	M

8.3 SIGNIFICANCE

Without mitigation the significance of the impact of the earthworks on the fossil bone content of the Springfontyn Fm. coversands is LOW NEGATIVE and with mitigation is LOW POSITIVE.

9 RECOMMENDATIONS

9.1 MONITORING

The rescue of fossils during earthworks critically depends on spotting this material as it is uncovered during digging *i.e*. by monitoring excavation activity. As it is not feasible for a specialist to be continuously present the construction personnel must be involved in mitigation by watching for fossils. It is recommended that a requirement to be alert for possible fossils be included in the EMP for the Construction Phase of the proposed development, with a Fossil Finds Procedure in place. The Fossil Finds Procedure included as Appendix 3 provides guidelines to be followed in the event of fossil finds.

The Project Manager, foremen and workers involved in excavating the deposits must be informed of the need to watch for fossils. Workers seeing potential objects are to cease work at that spot and to report to the Project Manager and/or the Environmental Control Officer (ECO). The ECO will inform the developer and contact the palaeontologist contracted to be on standby in the case of fossil finds. The latter will liaise with HWC on the nature of the find and consequent actions (permitting and collection of find).

If a significant occurrence of fossil bones is discovered a professional palaeontologist must be appointed to collect them and to record their contexts. Said palaeontologist must also undertake the recording of the stratigraphic context and sedimentary geometry of the exposure and the compilation of the report to Heritage Western Cape and the IZIKO S.A. Museum.

9.2 MITIGATION SUMMARY FOR THE CONSTRUCTION PHASE EMP

The following measures apply to all earthworks affecting the formations discussed above.

OBJECTIVE: To see and rescue fossil material that may be exposed in the excavations made for construction of the Service Station and Business Premises.		
Project components	Excavations for fuel tanks, foundations and water, power and waste infrastructure.	
Potential impact	Loss of fossils by their being unnoticed and/ or destroyed.	
Activity/ risk source	All bulk earthworks.	
Mitigation: target/ objective	To facilitate the likelihood of noticing fossils and ensure appropriate actions in terms of the relevant legislation.	
MITIGATION: ACTION/ CONTROL	**RESPONSIBILITY**	**TIMEFRAME**
Inform staff of the need to watch for potential fossil occurrences.	The Client, the EIA practitioner, the ECO & contractors.	Construction.
Inform staff of the Fossil Finds Procedures to be followed in the event of fossil occurrences.	ECO/specialist.	Construction.
Monitor for presence of fossils.	Contracted personnel and ECO.	Construction.
Liaise on nature of potential finds and appropriate responses.	ECO and specialist, HWC.	Construction.
Obtain permit from HWC for fossil finds collection.	Specialist.	Construction.
Excavate main finds, inspect pits & record and sample excavations.	Specialist.	Construction.
Performance Indicator	Reporting of and liaison about possible fossil finds. Fossils noticed and rescued. Scientific record of fossil contexts and temporary exposures in earthworks.	

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11 APPENDIX 1. METHODOLOGY FOR ASSESSING THE SIGNIFICANCE OF IMPACTS

EFFECT	**Extents/Spatial Scale**		**E**
	Localized	At localized scale and a few hectares in extent.	1
	Study area	The proposed site and its immediate environs.	2
	Regional	District and Provincial level.	3
	National	Country.	4
	International	Internationally.	5
	Duration/Temporal Scale		**D**
	Very short	Less than 1 year.	1
	Short term	Between 2 to 5 years.	2
	Medium term	Between 5 and 15 years.	3
	Long term	Exceeding 15 years and from a human perspective almost permanent.	4
	Permanent	Resulting in a permanent and lasting change.	5
	Magnitude/Intensity (Palaeontological Sensitivity)		**M**
	No potential	Formations entirely lacking fossils such as igneous rocks.	0
	Marginal	Limited probability for producing fossils from certain contexts at localized outcrops.	2
	Low	Depositional environment where fossils are unlikely to be preserved, or are judged unlikely to produce unique fossil remains.	4
	Medium	Strong potential to yield fossil remains based on stratigraphy and/or geomorphologic setting.	6
	High	Formations known to contain palaeontological resources that include rare, well-preserved fossil materials.	8
	Very high	Formations/sites known or likely to include vertebrate fossils pertinent to human ancestry and palaeoenvironments and which are of international significance.	10
	Probability/Likelihood		**P**
	Very improbable	Probably will not happen.	1
	Improbable	Some possibility, but low likelihood.	2
	Probable	Distinct possibility of these impacts occurring.	3
	Highly probable	The impact is most likely to occur.	4
	Definite	The impact will definitely occur regardless of prevention measures.	5

SIGNIFICANCE = (E+D+M)P		
< 30	LOW	The impact would not have a direct influence on the decision to develop in the area
30-60	MEDIUM	The impact could influence the decision to develop in the area unless it is effectively mitigated
>60	HIGH	The impact must have an influence on the decision process to develop in the area

12 APPENDIX 2. PALAEONTOLOGICAL SENSITIVITY RATING

Palaeontological Sensitivity refers to the likelihood of finding significant fossils within a geologic unit.

VERY HIGH: Formations/sites known or likely to include vertebrate fossils pertinent to human ancestry and palaeoenvironments and which are of international significance.

HIGH: Assigned to geological formations known to contain palaeontological resources that include rare, well-preserved fossil materials important to on-going palaeoclimatic, palaeobiological and/or evolutionary studies. Fossils of land-dwelling vertebrates are typically considered significant. Such formations have the potential to produce, or have produced, vertebrate remains that are the particular research focus of palaeontologists and can represent important educational resources as well.

MODERATE: Formations known to contain palaeontological localities and that have yielded fossils that are common elsewhere, and/or that are stratigraphically long-ranging, would be assigned a moderate rating. This evaluation can also be applied to strata that have an unproven, but strong potential to yield fossil remains based on its stratigraphy and/or geomorphologic setting.

LOW: Formations that are relatively recent or that represent a high-energy subaerial depositional environment where fossils are unlikely to be preserved, or are judged unlikely to produce unique fossil remains. A low abundance of invertebrate fossil remains can occur, but the palaeontological sensitivity would remain low due to their being relatively common and their lack of potential to serve as significant scientific resources. However, when fossils are found in these formations, they are often very significant additions to our geologic understanding of the area. Other examples include decalcified marine deposits that preserve casts of shells and marine trace fossils, and fossil soils with terrestrial trace fossils and plant remains (burrows and root fossils)

MARGINAL: Formations that are composed either of volcaniclastic or metasedimentary rocks, but that nevertheless have a limited probability for producing fossils from certain contexts at localized outcrops. Volcaniclastic rock can contain organisms that were fossilized by being covered by ash, dust, mud, or other debris from volcanoes. Sedimentary rocks that have been metamorphosed by the heat and pressure of deep burial are called metasedimentary. If the meta sedimentary rocks had fossils within them, they may have survived the metamorphism and still be identifiable. However, since the probability of this occurring is limited, these formations are considered marginally sensitive. Sediments that have been altered by advanced weathering involving decalcification are also marginally sensitive.

NO POTENTIAL: Assigned to geologic formations that are composed entirely of volcanic or plutonic igneous rock, such as basalt or granite, and therefore do not have any potential for producing fossil remains. These formations have no palaeontological resource potential.

Adapted from Society of Vertebrate Paleontology. 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources - Standard Guidelines. News Bulletin, Vol. 163, p. 22-27.

13 APPENDIX 3. FOSSIL FINDS PROCEDURE

13.1 MONITORING

A constant monitoring presence over the period during which excavations for developments are made, by either an archaeologist or palaeontologist, is generally not practical.

The field supervisor/foreman and workers involved in digging excavations must be encouraged and informed of the need to watch for potential fossil and buried archaeological material. Workers seeing potential objects are to report to the field supervisor who, in turn, will report to the ECO. The ECO will inform the archaeologist and/or palaeontologist contracted to be on standby in the case of fossil finds.

To this end, responsible persons must be designated. This will include hierarchically:

» The field supervisor/foreman, who is going to be most often in the field.

» The Environmental Control Officer (ECO) for the project.

» The Project Manager/Site Agent.

13.2 RESPONSE BY PERSONNEL IN THE EVENT OF FOSSIL FINDS

In the process of digging the excavations fossils may be spotted in the excavation sides or bottom, or as they appear in excavated material during loading.

» Stop work at fossil find. The site foreman and ECO must be informed.

» Protect the find site from further disturbance and safeguard all fossil material in danger of being lost such as in the excavator bucket and scattered in the spoil heap.

» The ECO or site agent must immediately inform the standby palaeontologist and/or Heritage Western Cape (HWC) and provide via email the information about the find, as detailed below:

    * Date
    * Position of the excavation (GPS) and depth.
    * A description of the nature of the find.
    * Digital images of the excavation showing vertical sections (sides) and the position of the find showing its depth/location in the excavation.
    * A reference scale must be included in the images (tape measure, ranging rod, or object of recorded dimensions).
    * Close-up, detailed images of the find (with scale included).

Heritage Western Cape and/or the standby palaeontologist will assess the information and a suitable response will be established which will be reported to the developer and the ECO, such as whether rescue excavation or rescue collection by a palaeontologist is necessary or not.

The response time/scheduling of the rescue fieldwork is to be decided in consultation with developer/owner and the ECO. It will probably be feasible to “leapfrog” the find and continue excavation farther along, so that the work schedule and machine time is minimally disrupted. The strategy is to rescue the material as quickly as possible. Due to the poorly consolidated nature of the expected deposits the collection of any fossil bones can be quickly accomplished.

Fossil material may also be spotted amongst disturbed material during its further handling, *e.g*. loading and discharging sand into stockpiles, such as fossil bones embedded in the chunks of compact sands, or revealed in crumbing lumps of sandy soil. The fossil material must be rescued immediately and the

heap in the vicinity of the find should be searched for material still hidden. Bone-bearing chunks and loose fossil bones must be moved to an appropriate storage spot for safekeeping and treated as an isolated bone find with respect to the location/source and images of the find. The ECO or site agent must inform the standby archaeologist or palaeontologist, providing images of the finds.

13.3 APPLICATION FOR A PERMIT TO COLLECT FOSSILS

A permit from HWC and a Work Plan is required to excavate fossils. The applicant should be the qualified specialist responsible for assessment, collection and reporting (palaeontologist). Should fossils be found that require rapid collecting, application for a palaeontological permit must be made to HWC immediately.

In addition to the information and images of the find, the application requires details of the registered owners of the sites, their permission and a site-plan map. All fossils must be deposited at a HWC-approved institution. The rescue of discovered palaeontological remains by a contracted specialist shall be at the Developer's expense.

---oooOOOooo---

13.4 HERITAGE WESTERN CAPE RECORDING FORM

FOSSIL DISCOVERIES: HWC PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	Lat:	Long:
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	Digital image of vertical section (side)	
	Fossil from different angles	
	Wider context of the find	
Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil	Name: Contact:	
Recorder	Name: Contact:	
Photographer	Name: Contact:	

CTS HERITAGE

APPENDIX 2: Visual Impact Assessment (2023)

YZERFONTEIN DEVELOPMENT

VISUAL IMPACT ASSESSMENT

PORTION 7 OF FARM 554, YZERFONTEIN

FEBRUARY 2023 ☙ PHOTOGRAPH 1: VIEW TOWARDS THE SITE (RIGHT) FROM THE R315 APPROACHING THE R27 INTERSECTION

researched and produced by
New World Associates LA © for **CK Rumboll & Vennote**

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Landscape Architecture | Landscape Management
Landscape Planning | Heritage Planning | Visual Planning
This report should be printed double-sided if at all.
Viewing of images is best done on screen.

Reflection

- "The term **'visual and aesthetic'** is intended to cover the broad range of visual, scenic, cultural, and spiritual aspects of the landscape. However, for the purpose of brevity, the term **'visual'** is used in the text' (p 1). **Thus it includes aspects of "the area's sense of place, ... natural and cultural landscapes, ... the identification of all scenic resources, protected areas and sites of special interest, together with their relative importance in the region, ... the need to include both *quantitative* criteria, such as 'visibility', and *qualitative* criteria, such as landscape or townscape 'character'** (pp 1-2)."

  This report (p 20) from the *PGWC Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (November 2005)*

- **"Visual impact. The value of the environment is often under-estimated from a visual perspective.** It is the visual quality of the environment that, to a large degree, generates the attraction for the tourism industry and draws people to certain areas as desired locations for living a lifestyle outside of the large cities and densely developed urban areas. **The visual resources of rural areas, such as scenic landscapes and the cultural streetscapes and farmsteads,** and environments such as the Garden Route [Swartland], constitute major tourist attractions. ...

  Each area has its own unique visual character and atmosphere, which plays an important role in the quality of any tourist experience. The diversity of the landscapes makes it essential to consider all development **and more particularly the expansion of urban areas, an issue that requires special consideration.** The intention is to manage urban development in such a way that no development would detract from the visual quality of the environment **and that all development conform to a characteristic style and urban form that suits the character of the area."**

  This report (p 22) from the *PGWC Urban Edge Guideline (December 2005)*

ᘓ Beauty is in the eye of the beholder.

What the eye doesn't see, the heart doesn't grieve over.

English Proverbs

ᘓ Do not seek revenge or bear a grudge against one of your people,

but love your neighbour as yourself. I am the LORD.

Mosaic Law, Leviticus 19.18, The Holy Bible (NIV)

NWA

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1 Executive Summary

1.1 Summary

The proposed development of a Transport and Business Zone will see a garage and business premises with a container park developed on site. The site is largely natural and flat, although there are alien Rooikrans invading it. It has already been fenced with a black Clearvu fence. The site has high local visibility from the R27 and the R315 with its biggest impact probably on the West Coast Farm Stall. The visual and aesthetic sensitivity of the area is moderate while the anticipated impact on the landscape is also moderate. Recommendations are made to minimise visual and aesthetic impacts with particular reference to a landscape plan, the planting of car park shade trees, a locally indigenous planting scheme that allows traditional exotic tree species, and landscape maintenance for a mixed commercial and natural scheme.

1.2 Project Description (see page 12)

1. The proposed development entails rezoning Portion 7 of Farm 554, Malmesbury from Agricultural Zone 1 to Transport and Business Zone.
2. 4.3 hectares will be rezoned to Business Zone 3 allowing for the operation of a service station with washing bay on 2.1 hectares.
3. Consent Use for 2.2 hectares on Business Zone 3 to operate a shop and business premises. Consent Use of 0.6 hectares on Agricultural Zone 3 to operate a tourist facility.
4. Rezone a portion of 3.6 hectares from Agricultural Zone 1 or 3 to Transport Zone 2 to accommodate streets and parking, with the remaining 1.9 hectares kept as Agricultural Zone 3.
5. These proposals are in line with the existing tourism activities in the area. Some tree planting is illustrated in axonometric views.

1.3 Legal and Administrative Requirements (see page 19)

1. Provision is made for scenic, visual and aesthetic protection in the NHRA (1999), WC Provincial Urban Edge Guideline (2005), WC Provincial SDF (2014) and the Swartland SDF (2017-2022) inter alia.
2. The Provincial Government of the Western Cape *Guideline for Visual and Aesthetic Specialists in EIA processes* defines the scope and preparation of VIAs.
3. VIA is integral to assessing environmental and heritage impact in scenic heritage areas like the coastal zone and historic towns.
4. The SDF reports cover the transport and tourism needs at this interchange as it lies at a strategic tourism intersection on the R27, which is designated as a local corridor.
5. The large open space on the east of the site would also fall in the proposed biodiversity corridor.

1.4 Visual Environment Description (see page 29)

1. The site lies at the intersection of busy R27 Coastal Road and the R315 Darling–Yzerfontein Road in the northwest quadrant.
2. The general environment is flat with fynbos and strandveld vegetation towards the coast.
3. The R27 is a very busy north–south transport corridor and the Darling–Yzerfontein road well frequented by both locals and tourists.
4. The property is a Greenfield site in an area that is changing with various subdivisions already made in this location.
5. The site is flat and sandy with typical fynbos vegetation largely masked by alien Rooikrans.
6. The site is most visible from the R315 along which it will be developed and has been recently fenced with Clearvu fencing.

1.5 Visual Impact Assessment (see page 47)

1. VISUAL IMPACT: The proposed development will have a moderate-high impact on the landscape causing noticeable change to the visual environment.
2. VISIBILITY: The development has moderate-low visual exposure; moderate-high visual absorption capacity; medium compatibility; and high local visibility only.
3. NATURE OF IMPACT: The development's visual impact has local extent, long-term duration, medium intensity, definite probability, and medium significance on the landscape.
4. Recommendations are made around the need for a landscape plan, the use of locally indigenous species where possible but not excluding exotic trees, colouration based on the

site's natural colouring, subtle fence colouring, and landscape maintenance around commercial and natural planting schemes.

1.6 Visual Management and Monitoring Plan (see page 62)

1. Sound Visual Management is the ultimate aim of the VIA process. The Mitigation Recommendations developed in the report need to be implemented.
2. This process of implementation will occur throughout the lifetime of the project, hence, the need for a Monitoring Plan. Institutions, individuals and organisations referred in the Monitoring Plan must develop a means of achieving the monitoring otherwise this report serves no purpose.
3. Once the VIA Report has been approved, the Developers must seek the implementation of the recommendations as soon as possible.

NWA

2 Project Description

2.1 Summary

The proposed development entails rezoning Portion 7 of Farm 554, Malmesbury from Agricultural Zone 1 to Transport and Business Zone. 4.3 hectares will be rezoned to Business Zone 3 allowing for the operation of a service station with washing bay on 2.1 hectares. Consent Use for 2.2 hectares on Business Zone 3 to operate a shop and business premises. Consent Use of 0.6 hectares on Agricultural Zone 3 to operate a tourist facility. Rezone a portion of 3.6 hectares from Agricultural Zone 1 or 3 to Transport Zone 2 to accommodate streets and parking, with the remaining 1.9 hectares kept as Agricultural Zone 3. These proposals are in line with the existing tourism activities in the area. Some tree planting is illustrated in axonometric views.

2.2 Introduction

Combined with Section 3, this chapter presents the relevant project information required to develop a Visual Impact Assessment (VIA) of the development for Environmental Impact Assessment (EIA) and Heritage Impact Assessment (HIA) purposes. This chapter reviews the relevant basic aspects of the proposed development and includes plans and diagrams as appropriate to this end.

2.2.1 Background

New World Associates was commissioned by the developers through CK Rumboll & Vennote to prepare the VIA for this project. The Environmental Application is also being managed by CK Rumboll & Vennote. Developments of this scale and nature in scenic and historic environments, within or without the Urban Edge, require Visual Assessments in accordance with the PGWC *Guideline for Specialist Visual Studies* (pp 11-12).

2.2.2 Accreditation

Bruce Eitzen ML BSc PrLArch PHP MEMBER ILASA APHP conducted this assessment. He is a registered Landscape Architect and Environmental Planner with the South African Council of

Landscape Architecture Professionals (SACLAP), and Specialist Practitioner in Visual and Landscape Heritage. He has thirty years experience across the board of Landscape Architecture and Environmental Planning and has practised in South Africa, Central Africa and East Africa. He holds a BSc (Botany) from the University of Cape Town and a Masters in Landscape Architecture from the University of Pretoria.

His public service includes serving for three years on the Association of Heritage Assessment Practitioners Executive Committee chairing Professional Practice. He also served on the National Executive Committee of the Institute for Landscape Architects in South Africa and was the Chair of ILASA Cape for four years. He also chaired the Local Organising Committee (LOC) of the International Federation of Landscape Architects (IFLA) World Congress 2012 that was held in Cape Town. He is the founder of Landscape Heritage SA, a new heritage organisation focussing on Southern African Landscape Heritage.

2.2.3 Statement of Independence

New World Associates is an independent consulting firm practising in the abovementioned fields. None of its members have any financial interest in the proposed development nor are involved in any other projects being undertaken by the developer.

2.2.4 Reporting Requirements

This report is generally based on South African environmental management procedures and, more specifically, on the provincial guideline endorsed by the Provincial Government of the Western Cape (PGWC) on 3 November 2005: *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes* (November 2005, PGWC).

2.2.5 Assumptions and Limitations

This assessment has been conducted based on the information presented in the report as received from the development team at the time of the report's preparation. While the information provided is limited to these plans, a comprehensive site inspection and impact analysis allowed mitigation recommendations to be made. We assume that the information provided was accurate and complete, and there are no gaps in our knowledge of the project proposal for this level of assessment.

2.3 Project Proposal

2.3.1 Location

The development occurs on Portion 7 of Farm 554 Yzerfontein (see Figure 2-1). The site is located at the turnoff to Yzerfontein R315 and the R27.

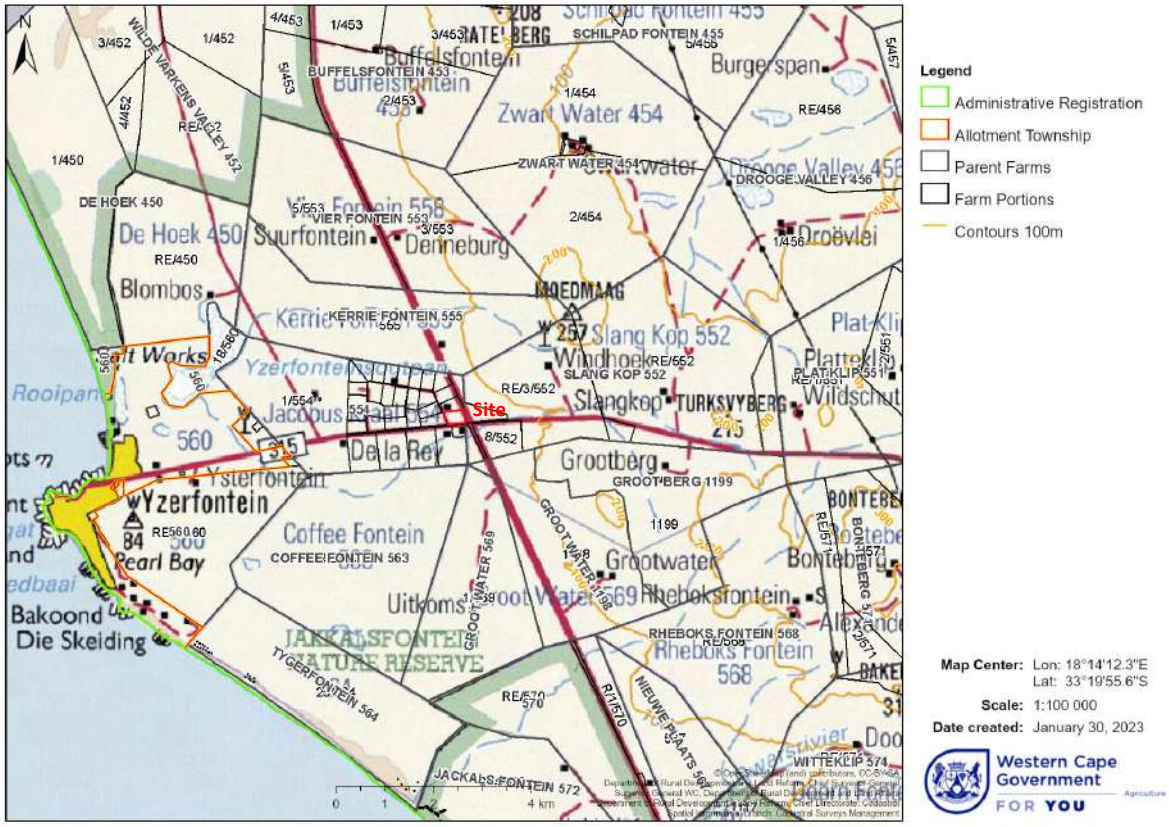
2.3.2 Planning Application

An application for the development of the site is being prepared by CK Rumboll & Partners.

Land Use Aspects and Surrounding Land Use

The following description is taken from the NID (April 2022, page 19) prepared by CK Rumboll & Partners:

> The current zoning of Portion 7 of Farm no 554 is Agricultural Zone 1 and the land cover being natural veldt. There are no buildings on the property. The land use to the east of the area and the R27 changes gradually to wheat farming.
>
> To the north of the property the area consists of several smallholdings (with Agriculture I zoning) whilst to the south and west there are mostly farms. All these agricultural properties are covered with natural veldt due to the poor soil quality (i.e., the carrying capacity is 1 large stock unit per 21ha). To the west of the property is regional and local infrastructure which includes the WACs cable (Western Africa Cable System -international communication infrastructure) landed from the sea on shore, the landfill site of the municipality and a data centre (also international communication infrastructure). This entire infrastructure is fenced off or surrounded by walls.



Source: Cape Farm Mapper | New World Associates.

Figure 2-1: Location of the Proposed Development.

2.3.3 Development Proposal

The following description is taken from the NID (April 2022, page 20) prepared by CK Rumboll & Partners:

> The development proposal entails the rezoning of Portion 7of Farm no 554, Malmesbury RD from Agricultural Zone 1 to Transport and Business Zone:
>
> 1. **Rezone** a portion ±4.3ha of Portion 7 of Farm 554, Malmesbury Division from **Agricultural Zone 3 to Business Zone 3** in terms of *Section 25 (2) (a) of the Swartland Municipality Land Use Planning By-Law*. To operate a **service station including a washing bay as primary rights** ±2.1ha, and
> 2. Obtain **Consent Use**, of ±2.2ha on **business zone 3** in terms of Section *25 (2) (o) of the Swartland Municipality Land Use Planning By-Law* in order to operate a **shop and business premises**.
> 3. Obtain **Consent Use**, of ±0.6ha on **Agriculture Zone** 3 in terms of Section *25 (2) (o) of the Swartland Municipality Land Use Planning By-Law* in order to operate a **tourist facility**
> 4. **Rezone** a portion of ±3.6ha from Agriculture Zone 1 or 3 to Transport Zone 2 to accommodate streets and parking.
> 5. The remaining ±1.9ha will keep its Agricultural Zone 3 zoning.
>
> The proposed rezoned facilities will offer business and tourism opportunities and enhance the established tourist activities that occur in the surrounding environment. The proposed rezoning is aligned with the Swartland SDF and Integrated Zoning Scheme regulations.

2.3.4 Site Development Plan (see Appendix A)

The Site Development Plan (see Figure 2-2) shows a layout of with a corner Service Station and Truck Fuel point, with parking and 5 long blocks noted as Business Premises, all zoned Business Zone 3, with a Container Park (Agriculture Zone 3) along the Main Road R215.

Axonometric views show a colourful Container Park scheme and some tree planting.

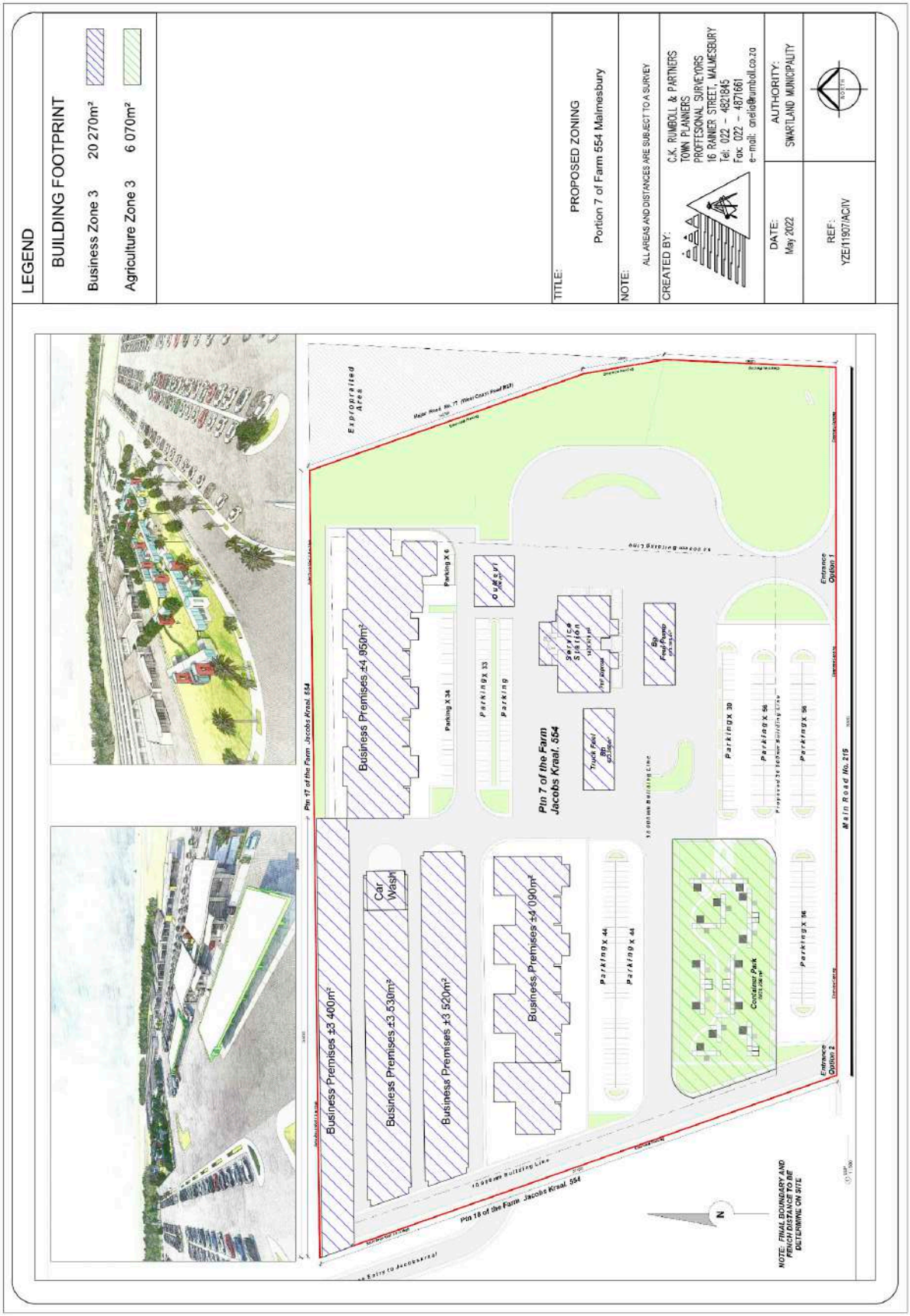
See Appendix A on page 69 for full size plans.

2.3.5 Landscape and Environment

The site has a large open space buffer along the coastal road R27 with bushy vegetation illustrated, possibly aliens? Tree planting of evergreen trees and palms are indicated too but minimal shade trees in the car park areas.

2.4 Alternatives

At this stage there are no alternatives under consideration, although it bears repeating that the plan and perspectives are unofficial.



Source: CK Rumboll & Partners.

Figure 2-2: Site Development Plan: Proposed Zoning (May 2022).

NWA

3 Legal and Administrative Requirements

3.1 Summary

Provision is made for scenic, visual and aesthetic protection in the NHRA (1999), WC Provincial Urban Edge Guideline (2005), WC Provincial SDF (2014) and the Swartland SDF (2017-2022) inter alia. The Provincial Government of the Western Cape *Guideline for Visual and Aesthetic Specialists in EIA processes* defines the scope and preparation of VIAs. VIA is integral to assessing environmental and heritage impact in scenic heritage areas like the coastal zone and historic towns. The SDF reports cover the transport and tourism needs at this interchange as it lies at a strategic tourism intersection on the R27, which is designated as a local corridor. The large open space on the east of the site would also fall in the proposed biodiversity corridor.

3.2 Introduction

This chapter provides the important and necessary policy, legal and administrative background for the visual impact study. A general overview of the relevant documents with specific reference to those applicable to visual planning is included. Particular mention is made of local planning guidelines that have the most direct bearing on the project such as the Spatial Development Framework (SDF) for the given area.

3.2.1 Background

The policy, legal and administrative framework for conservation, EIA and development in South Africa has long roots. Visual Impact Assessment (VIA) is mentioned in the national requirements for EIA under the National Environmental Management Act (NEMA) and the Environmental Conservation Act. Furthermore, the provincial government now endorsed its own guidelines for various EIA processes including VIA (PGWC, November 2005). Specific requirements for VIA may also included in local Spatial Development Frameworks (SDF) and Integrated development Plans (IDP).

3.4 Legal Framework

This review of current documentation is made with specific reference to requirements for VIA in the Law and by National Guidelines.

3.4.1 National Environmental Management Act No. 107 of 1998 (NEMA)

This Act is "To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; and to provide for matters connected therewith."

Chapter 5: Integrated Environmental Management has among its general objectives: **(b) "identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2" (p 34).**

3.4.2 South African National Heritage Resources Act, 1999 (NHRA)

NHRA regulations cover the protection of **historic sites, objects, buildings and landscapes.** It covers (ii) "archaeological items," namely, "material remains resulting from human activity… older than 100 years;" rock art, wrecks and "features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found (2 Definitions). **The Definitions also include the term "(vi) 'cultural significance' [which] means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance."**

The NHRA makes provision for two forms of protection, formal and informal, and sets up a three tier system of formal protection as:

1. Grade 1 or National Heritage Sites managed by SAHRA.
2. Grade 2 or Provincial Heritage Sites managed by HWC.
3. Grade 3 or Local Heritage Sites managed by the Local Authority.

3.4.4 PGWC Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (Edition 1, June 2005)

This long since endorsed guideline (November 2005) is the most relevant document that now guides VIA in the Western Cape.[1] It is a highly useful document and has been used to guide this report. While lacking a definition of VIA, it states in the Introduction: "This visual guideline

[1] Oberholzer, B (2005) by CSIR Environmentek. *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes: Edition 1.* CSIR Report No. ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

document is therefore an attempt to develop a 'best practice' approach for visual specialists, EIA practitioners and authorities involved in the EIA process.

The term **'visual and aesthetic'** is intended to cover the broad range of visual, scenic, cultural, and spiritual aspects of the landscape; however, for the purpose of brevity, the term **'visual'** is used in the text' (p 1).

Thus it includes aspects of "the area's sense of place, ... natural and cultural landscapes, ... the identification of all scenic resources, protected areas and sites of special interest, together with their relative importance in the region, ... the need to include both *quantitative* criteria, such as 'visibility', and *qualitative* criteria, such as landscape or townscape 'character' (pp 1-2).

3.4.5 PGWC Guideline for Involving Heritage Specialists in EIA Processes (Edition 1, June 2005)

Continuing on from the NHRA (1999), this now legally adopted Provincial Guideline further records (p 3): "Types of heritage resources as defined in the relevant legislation may include the following:

- Places, buildings, structures and equipment of cultural significance
- Places to which oral traditions are attached or are associated with living heritage
- Historical settlements or townscapes
- Landscape and natural features of cultural significance
- Geological sites of scientific or cultural importance
- Archaeological and palaeontological sites
- Graves and burial grounds
- Sites related to the history of slavery (NHRA)."

These are the so-called "tangibles" of the heritage concept (p 5). Thus the "cultural landscape" is seen as having a range from Archaeology to Palaeontology to Historical Architecture to Social History to Public Memory and Natural Landscape (p 6). Two categories of heritage significance/sensitivity are used: **Category 1:** Formally protected heritage sites and **Category 2:** Landscapes of recognised or potential significance or sensitivity (not yet formally protected) (p 18).

This extensive list of sites include Grade I-III, National and Provincial Heritage Sites and Protected Areas, as well as Provisionally Protected Sites, Urban Conservation Areas, Nature Reserves, proclaimed Scenic Routes, etc as well as World Heritage Sites e.g. Robben Island and Cradle of Humankind (Sterkfontein). A very large list of landscapes is also included starting with **Scenic/Historical Routes or Landscapes, Pristine Natural Areas e.g. Cedarberg and many**

other types of landscapes including Historic Farm *Werf*s e.g. *Boschendal, Morgenster, Alphen,* and historical farmlands e.g. Winelands, Swartland, Karoolands, and many more.

This long list has been ordered into twelve types of Heritage Context in Table 1 (pp 21-27), namely:

1. Palaeontological Landscape
2. Archaeological Landscape
3. Historical Built Urban Landscape
4. Historical Farmland
5. Historical Rural Town
6. Pristine/Natural Landscape
7. Relic Landscape
8. Burial Ground and Grave Site
9. Associated Landscape
10. Historical Farm Werf
11. Historical Institutional Landscape
12. Scenic/Visual Amenity Landscape.

Many of these could be grouped under the broad term Regional Cultural Landscapes (p 31). Thus various types of landscape form a vital part or domain of Heritage Resources. As a visual resource, landscape is very much seen and perceived in every human sense.

3.5 Administrative Framework

3.5.1 Western Cape Provincial Urban Edge Guideline (DEA&DP December 2005)

This document notes the following on visual impact that has special reference to this and all similar types of development, bold added (p 30):

> **"Visual impact. The value of the environment is often under-estimated from a visual perspective. It is the visual quality of the environment that, to a large degree, generates the attraction for the tourism industry and draws people to certain areas as desired locations for living a lifestyle outside of the large cities and densely developed urban areas. The visual resources of rural areas, such as scenic landscapes and the cultural streetscapes and farmsteads, and environments such as the Garden Route, constitute major tourist attractions.** Visual qualities of the environment also forms the backdrop to most other tourist activities, such as 4 x 4 routes, hiking trails, camping and recreational activities and even sporting facilities that sustain local economic activity. The growth of golf resorts in the Garden Route serve as examples of the attraction of the environment and more particularly the visual environment for interest in sporting facilities. Added thereto, the experience of reserves and resorts in the Cedarberg and Karoo are as much in the visual quality of the environment as it is in the attraction of the facilities.
>
> **Each area has its own unique visual character and atmosphere,** which plays an important role in the quality of any tourist experience. The diversity of the landscapes makes it essential to consider all development **and more particularly the expansion of urban areas, an issue that requires special consideration.** The intention is to manage urban development in such a way that no development would detract from the visual quality of the environment **and that all development conforms to a characteristic style and urban form that suits the character of the area."**

This implies that edge development should not only be limited to certain areas through inclusion or exclusion, **but that edge development should also be subject to urban design guidelines, architectural consideration and general aesthetic treatment.** The visual quality of the environment is not limited to the natural environment. **The built environment has as much of an effect on the aesthetic appeal of an area as has the natural environment."**

3.5.2 West Coast District Municipal SDF (2020)

The following is derived from the *West Coast District Municipal SDF (2020)*, particularly the area around Yzerfontein, which is not highlighted in the report. The site lies in the orange **R27 Local Corridor** in Figure 3-5 and in the extract Figure 3-1 in a **Proposed East–West Biodiversity Corridor**.

Source: West Coast District Municipal SDF (2020).

Figure 3-1: West Coast District Municipal SDF: Yzerfontein – Darling Extract.

3.5.3 Swartland SDF (2017–2022)

The R315/R27 is discussed in the following section:

Rural Areas of Ward 5: Objective 1

Particular aspects noted include the following:

- **Commercial: Agriculture:** Develop an intensive rural use corridor along R315 from the R315/ R27 intersection and the town of Yzerfontein. Support the development of small holdings and small scale agri-processing along this corridor.
- **Commercial: Tourism:** Promote festivals building agricultural brand i.e. Music Festival Rocking the Daisies, Crayfish Bonanza, Tuna and Snoek Fishing Competition.
- **Commercial: Agriculture:** Support the development of a rural corridor along the R315 between the intersection with the R27 and Yzerfontein.
- **Commercial: Tourism:** Allow for smallholdings and agri/ conservation/ tourism related uses around Yzerfontein.

	Agriculture	Tourism
Commercial	Develop an intensive rural use corridor along R315 from the R315/ R27 intersection and the town of Yzerfontein. Support the development of small holdings and small scale agri-processing along this corridor.	Promote festivals building agricultural brand i.e. Music Festival Rocking the Daisies, Crayfish Bonanza, Tuna and Snoek Fishing Competition
	Strengthen agricultural activities in eastern part of Ward 5, a limited intensive agricultural production area to include vineyards, dairies, poultry rearing and piggeries. Support and allow for intensive agriculture, agricultural related industries, agriculturally related commercial opportunities and exhibition centres	Promote West Coast Conservation corridor as tourist destination.
Residential	Provide affordable housing, but not limited to, in Yzerfontein.	Support development of resorts (within the West Coast Conservation Corridor)
	Support the development of a rural corridor along the R315 between the intersection with the R27 and Yzerfontein.	Allow for smallholdings and agri/ conservation/ tourism related uses around Yzerfontein.

Source: Swartland SDF (2017–2022): 2019 Rev. Page 182ff.

Figure 3-2: Swartland SDF: Objective 1: Grow economic prosperity and facilitate economic sector growth [Economic Environment].

Rural Areas of Ward 5: Objective 2

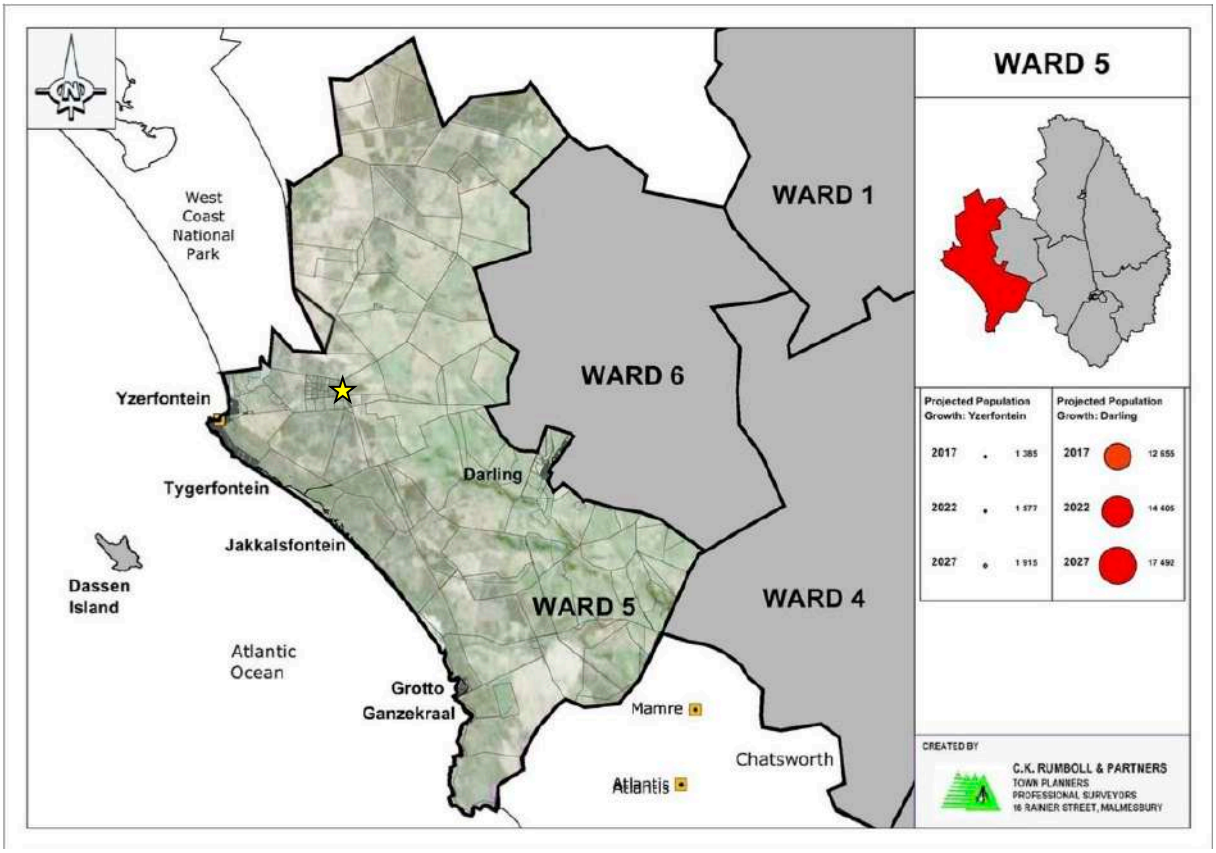
R27	Link to Cape Town in the south with increased accessibility & reduced travel time Link to the north with the Saldanha IDZ Optimise links to markets (Cape Town & Windhoek) Promote node development at intersection with R315. Link to West Coast National Park and Blaauwberg Nature Reserve
R315	Link between West Coast (R27) and Malmesbury via Darling is also part of the main tourism route in the Swartland between the Riebeek Valley and the West Coast (Yzerfontein), improve mobility. Continue maintenance of road network Develop transport nodes along R315 and N7, ensure Darling, Mamre and Atlantis benefit. R307 link from Darling to Mamre and gravel road to Moorreesburg.
Transport Node	Safeguard the intersection between the R27 and the R315 by making it more visible. A tourism node could provide visible supporting services.
Pedestrian/ Cycle route	Develop cycle route from Yzerfontein along the R315 to Darling, with a proposed bridge or underpass crossing of the R27. This will reinforce the tourism route of the R315 and act as a spatial gateway to the R315 route.

Source: Swartland SDF (2017–2022): 2019 Rev. Page 182ff.

Figure 3-3: Swartland SDF: Objective 2: Proximate convenient and equal access [Economic Environment].

- **R27:** Promote node development at intersection with R315.
- **R315:** Link between West Coast (R27) and Malmesbury via Darling is also part of the main tourism route in the Swartland between the Riebeek Valley and the West Coast (Yzerfontein), improve mobility.
- **R315:** Develop transport nodes along R315 and N7, ensure Darling, Mamre and Atlantis benefit.

- **Transport Node:** Safeguard the intersection between the R27 and the R315 by making it more visible. A tourism node could provide visible supporting services.
- **Pedestrian/Cycle Route:** Develop cycle route from Yzerfontein along the R315 to Darling, with a proposed bridge or underpass crossing of the R27. This will reinforce the tourism route of the R315 and act as a spatial gateway to the R315 route.



Source: Swartland SDF (2017–2022).

Figure 3-4: Swartland SDF: Ward 5.

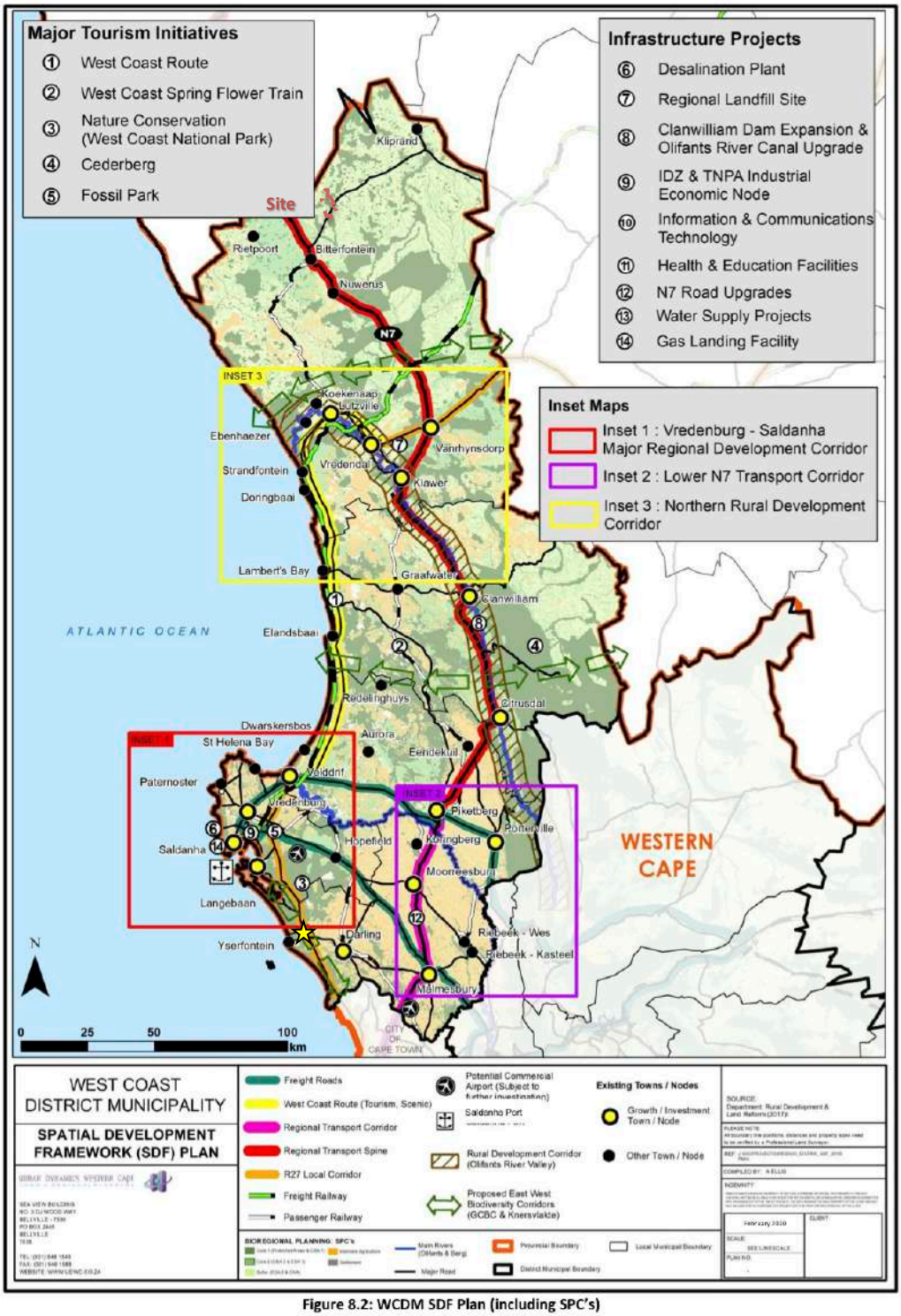


Figure 8.2: WCDM SDF Plan (including SPC's)

Source: West Coast District Municipal SDF (2020).

Figure 3-5: West Coast District Municipal SDF.

3.6 Strategic Issues

3.6.1 Strategic Assessment

One of the difficulties of assessing visual impact at present is the lack of strategic Provincial or Municipal EIA, VIA or HIA studies which provide guidance on how the individual project fits into the overall context of development in any region. While an individual project seems to have an acceptable level of mitigatable impact, when viewed collectively, their sum total can well exceed the sum of the parts. That is, the impact of a single scheme such as this development may seem to be minimal when considered in isolation; however, when seen collectively with other developments also proposed in the area or region but as unknown to the assessor, or as not considered over the long term, the overall impact can become unsustainable. These are cumulative impacts.

There are no strategic visual studies done of the area that we are aware of. Therefore, it is not possible to consider strategic issues in detail at the project level as the information is generally not available and it is outside the scope of project assessments to do so.

3.7 Conclusion

The site lies at a strategic tourism intersection on the R27, which is designated as a local corridor. It is also a significant tourism connection, so balancing the various needs of transport and tourism needs to be achieved in the landscape. The large open space on the east of the site would also fall in the proposed biodiversity corridor.

NWA

4 Visual Environment Description

4.1 Summary

The site lies at the intersection of busy R27 Coastal Road and the R315 Darling–Yzerfontein Road in the northwest quadrant. The general environment is flat with fynbos and strandveld vegetation towards the coast. The R27 is a very busy north–south transport corridor and the Darling–Yzerfontein road well frequented by both locals and tourists. The property is a Greenfield site in an area that is changing with various subdivisions already made in this location. The site is flat and sandy with typical fynbos vegetation largely masked by alien Rooikrans. The site is most visible from the R315 along which it will be developed and has been recently fenced with Clearvu fencing.

4.2 Introduction

Combined with Section 2, this chapter presents the relevant visual data required to develop a Visual Impact Assessment. This is a strongly visual chapter well illustrated with site and regional photographs. Visual impact is all about what can we see and how this affects us. This chapter shows us what we can see.

4.2.1 Background

The description of the environment is undertaken with a view to presenting basic data for the VIA. A full presentation is made of the visual information collected and analysed as required for a Level 3 VIA.

4.2.2 Key Issues

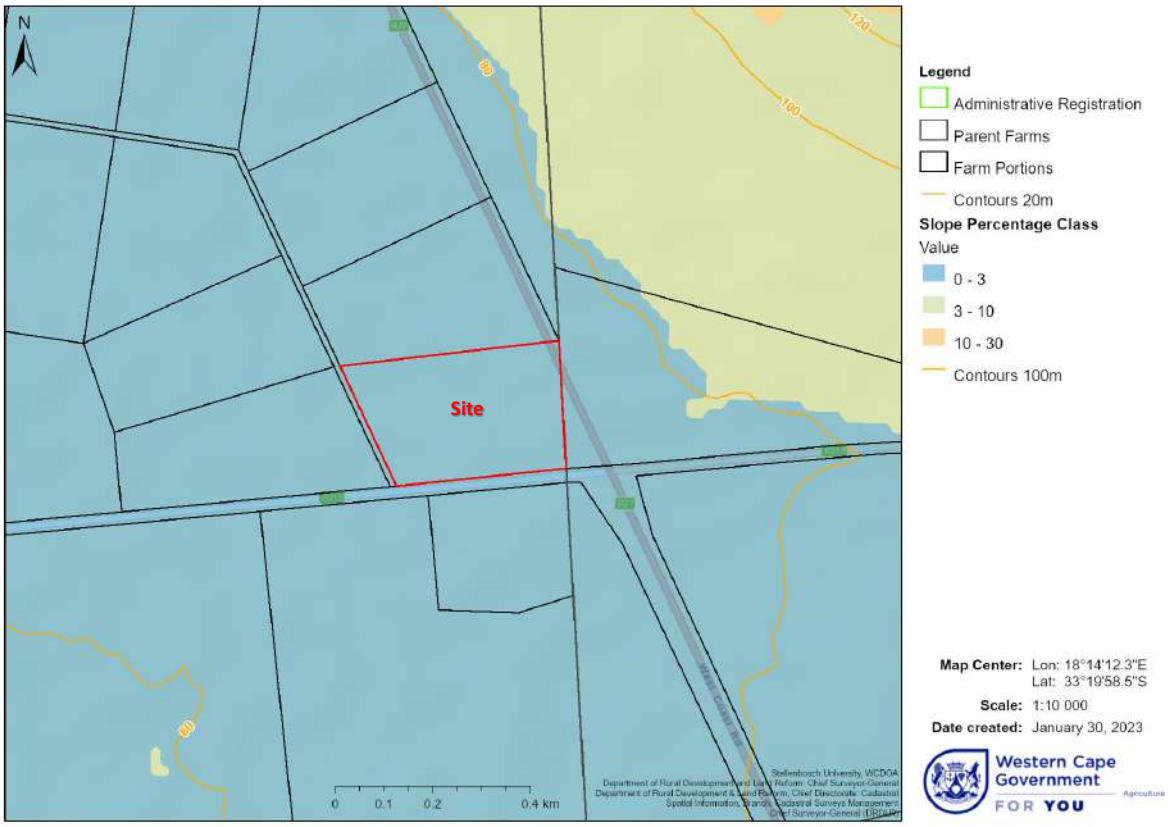
1. The site lies on the corner of the coastal road R27 and the road to Yzerfontein R315 in the northwest corner.
2. The site is undeveloped but has recently been fenced all round with Clearvu fencing but is heavily infested with alien Rooikrans.
3. The property is opposite the popular and well established West Coast Farm Stall, a restaurant and shop frequented by local travellers and tourists.

4. The route along the R315 into Yzerfontein already has various residential type developments along it while there is little else on the R27 at this point.

4.3 Natural Environment

4.3.1 Landform

The topography of the general area is mostly **relatively flat at <3%** with some **gently sloping 3-10%** to the west over the R27 (see Figure 4-1). There are no area with **hilly slopes >10%** in the immediate vicinity.



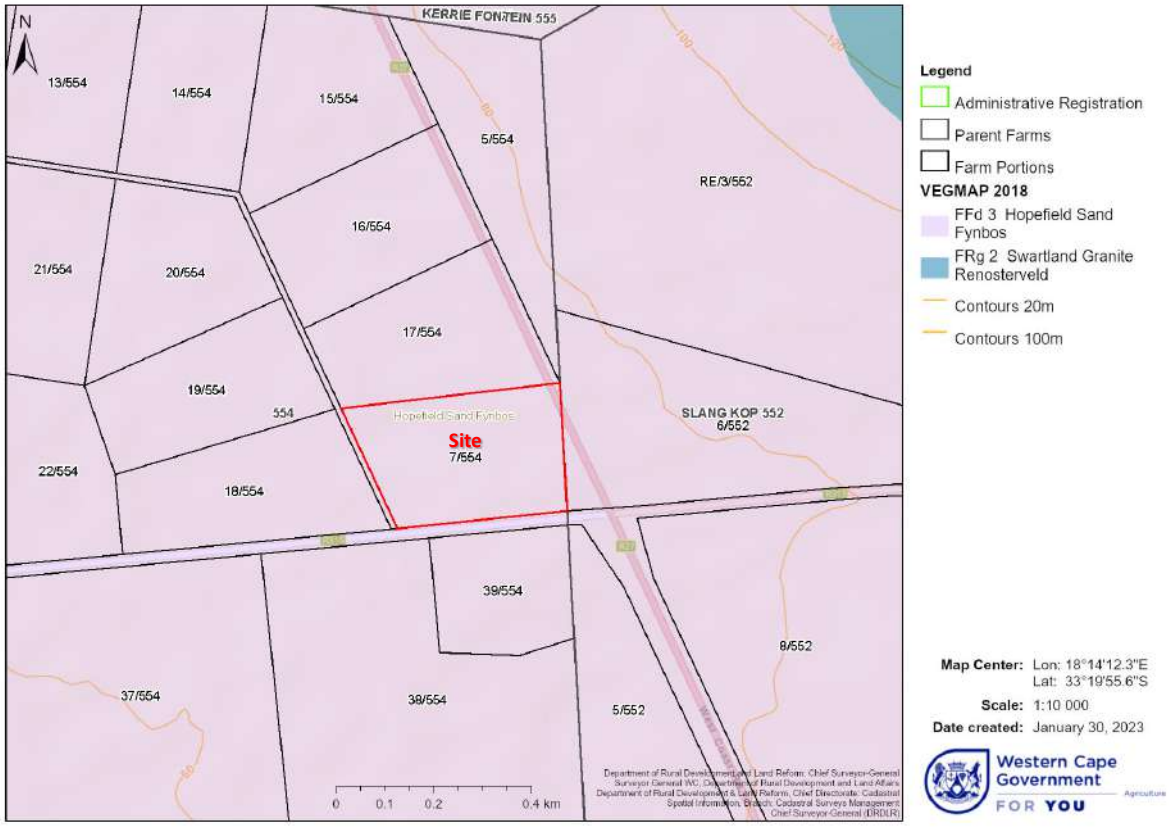
Source: Cape Farm Mapper | New World Associates.

Figure 4-1: Slope Classes Map of the Area.

4.3.2 Vegetation

The area is mostly **Hopefield Sand Fynbos** originally with some **Swartland Granite Renosterveld** on the small hill to the east (see Figure 4-2). The site itself appears to be largely natural with some disturbance and quite a lot of alien Rooikrans invasion on it.

The conservation status of the natural vegetation is provided below in order to inform the site's landscape value with respect to the significance of the vegetation. Sometimes a site is covered with exotic aliens and these too have a significant impact on the visual and aesthetic value of a site. It also informs the landscaping and planting mitigation recommendations.



Source: VegMap 2018 on Cape Farm Mapper (CFM/SANBI, 2006–) | New World Associates.

Figure 4-2: Vegetation Map of the Area.

Conservation and Management[2]

All of the Site area's vegetation type would have been **Hopefield Sand Fynbos,**[3] which is ranked as **(Least Concern)/Endangered.**[4]

- **Swartland Granite Renosterveld** is ranked as **Endangered.**

4.4 Cultural Environment

4.4.1 History[5]

Yzerfontein is a popular holiday resort, especially for surfers and anglers. The resort was established in 1936 by the Katz family, who purchased the farm Yzerfontein (Iron Fountain), dividing it into residential stands. There is a spring and a saltpan on an ironstone formation about 3km inland for which the farm was originally named.

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[2] South African National Biodiversity Institute (2006–). *The Vegetation Map of South Africa, Lesotho and Swaziland*, Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors), online http://bgis.sanbi.org/SpatialDataset/Detail/18, Version 2012.

[3] **Endangered.** Target 30%. Very small portion statutorily conserved in the West Coast National Park, with an additional 2% protected in Hopefield and Jakkalsfontein Nature Reserves. Already 40% transformed for cultivation (especially cash crops) and grazing land. Increased occurrence of aliens such as *Acacia saligna*, *A. cyclops* as well as various species of *Pinus* and *Eucalyptus* is of concern. Erosion very low. Local farmers claim that water extraction is drying out rivers, marshes and wetlands.

[4] The ranking available online is contradictory with Cape Farm Mapper stating **Least Concerned** and the BGIS site stating **Endangered**.

[5] Extracted from Erasmus (2004) *On Route in South Africa*, pages 48–49.

Whales are known to seek the protection of the bay for calving and mating. Dassen Island which lies about 10km southwest of Yzerfontein is the largest of 34 submarine mountains along the West Coast, named for the dassies found there by Sir Edward Michelburne in 1605. Jan van Riebeeck also noted many seals there in 1654.

Dutch fishing at Saldanha Bay began in 1658 when "four 'free burghers' … were granted permission to settle and fish for a living in the Saldanha Bay area" (ibid). Prior to that, indigenous hunter-gatherers known as strandlopers gathered coastal resources along the coastline of the region.

Nearby Darling is an even older settlement renowned as a "flower town" and established in 1853 (ibid, page 50).

4.4.2 Heritage

There are two beehive-shaped lime kilns built in the 1940s on the road into Yzerfontein, used to make building lime from seashells, as practised by Jan van Riebeeck centuries before. These kilns were declared National Monuments in the 1980s and, presumable, downgraded to Provincial Heritage Sites under the National Heritage Resources Act (NHRA). There are also the remains of an unsuccessful fish-canning factory from World War II, the jetty now popular with anglers (ibid page 49).

Source: Cape Farm Mapper | New World Associates.

Figure 4-3: Satellite Image of the site and surrounds.

4.4.3 Land Use

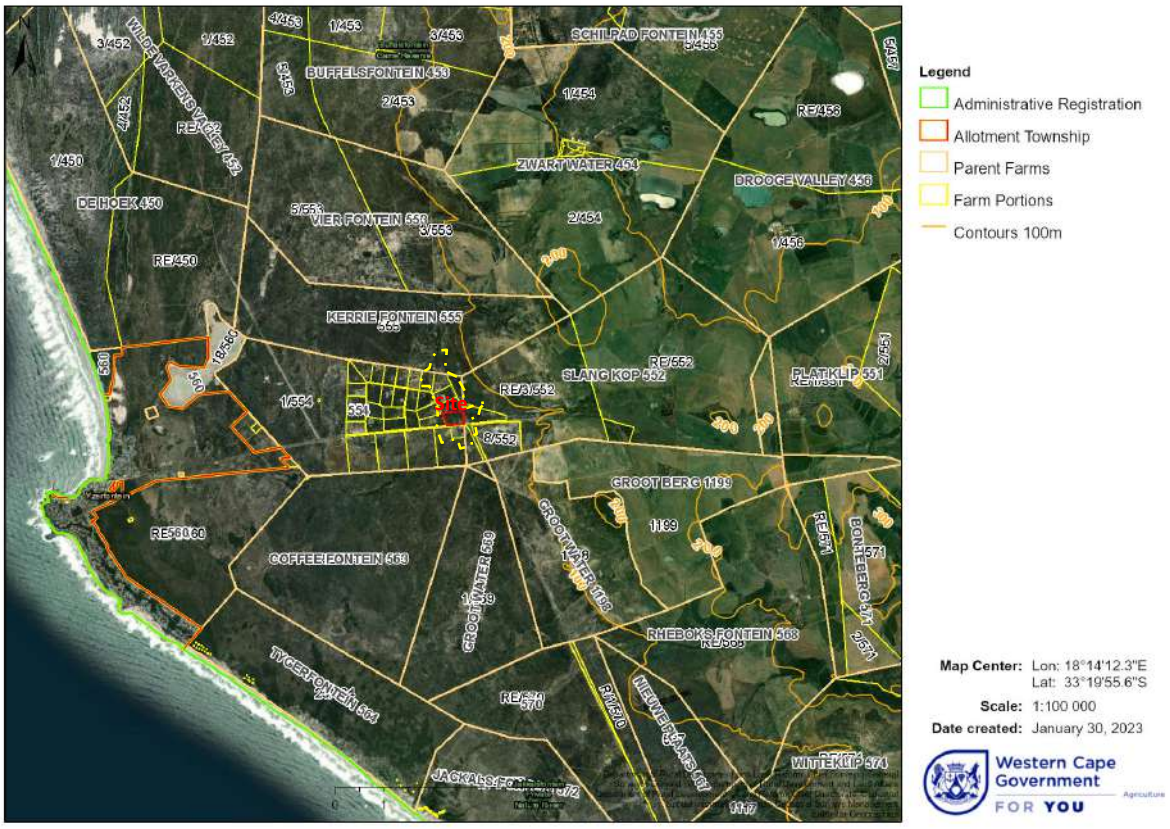
As noted earlier (see Figure 3-5), there is little specific planning information for the site but it is currently zone Agricultural Zone 1.

4.4.4 Urban Edge

The site occurs well outside the Urban Edge of Paternoster in an area along the R27, opposite/north of the popular West Coast Farm Stall.

4.4.5 Aesthetics

The area's aesthetic is mixed rural with some tourist developments, the busy R27 and numerous alien Acacias, providing a rather scrappy image (see Figure 4-3). To the east are the fertile rolling hills of the Swartland, and to the west is the coastal zone that is largely natural at this point, excepting the town of Yzerfontein itself (see Figure 4-4).



Source: Cape Farm Mapper | New World Associates.

Figure 4-4: Satellite Image of the wider area.

4.5 Visual Environment

4.5.1 Visual

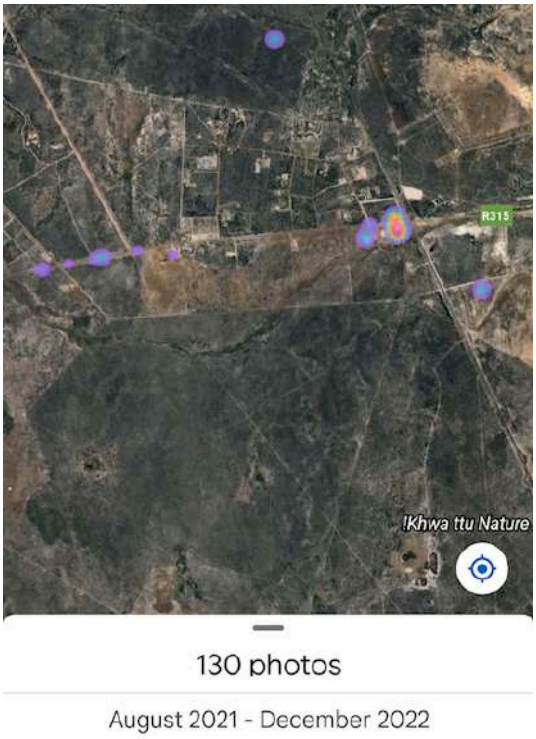
The site has been the subject of a photographic survey that looks at the site itself, the local area and views from local roads (Figure 4-5). The bulk of the visual description is to be found in the photographs that are self explanatory and accompanied by descriptions.

Unfortunately, all the photograph locations on local roads were not captured, presumably due to poor GPS coverage. Many more photographic points were taken than are indicated by the rainbow spots, with photographs being taken in all travelling directions on both the R27 and the R315.

According to the PGWC Guidelines "the term 'visual and aesthetic' is intended to cover the broad range of visual, scenic, cultural and spiritual aspects of the landscape; however, for the purpose of brevity, the term 'visual' is used in the text" (p 1). Thus it is within the technical gambit of VIA to comment on all the varied aspects that make up the visual environment which is the aim of this study.

The photographic survey is presented as if one were to visit the site for the first time, covering views from the approach road, scenic routes, local roads, views of and from the site then views from the neighbourhood.

The following photographs were taken on 31 December 2022 during summer.



Source: Google Photos | NWA.

Figure 4-5: Site and photographic locations on satellite image. Unfortunately, the photograph locations on local roads were not captured, presumably due to poor GPS coverage. Many more photographic points were taken than are indicated by the rainbow spots.

4.5.2 Views from the Road

Source: All photographs in this report by Bruce Eitzen © 2023

Photograph 4-1: Showing the main gate to the site opposite the West Coast Farm Stall.

The site is easily seen from the road, both the R27 and the R315, differing directions affording different views. At present, the site is inaccessible having recently been fenced. However, there are also a lot of aliens in places obscuring views into the site.

Views Series Northbound on the Coastal Road R27

The following views were taken from the R27 northbound as travelling from Cape Town, then southbound. The landscape is quite flat in this area with a lot of alien vegetation obscuring ground level views. The site occurs to the left after the R315 turnoff.

Photograph 4-2: View series northbound on the R27 approaching the R315 intersection.

Photograph 4-3: View series northbound on the R27 approaching the R315 intersection.

Photograph 4-4: View series northbound on the R27 approaching the R315 intersection.

Photograph 4-5: View series northbound on the R27 approaching the R315 intersection.

Photograph 4-6: View series northbound on the R27 approaching the R315 intersection.

Photograph 4-7: View series northbound on the R27 approaching the R315 intersection.

Photograph 4-8: View series northbound on the R27 at the R315 intersection.

Photograph 4-9: View series northbound on the R27 passing the site at left.

Photograph 4-10: View series northbound on the R27 passing the site at left.

Photograph 4-11: View to the right at the intersection opposite/east of the site.

The main focus of attention in approaching the site is the West Coast Farm Stall at left with its large trees and signage. The small Darling wind turbines to the right are also something of a local landmark. This is a very busy intersection with high speed travel along the busy R27 much of the time. Aliens tend to dominate the view of what should be the lovely local fynbos and strandveld.

Views Series Southbound on the Coastal Road R27

The following views were taken from the R27 southbound as travelling to Cape Town. The landscape is quite flat in this area with a lot of alien vegetation obscuring ground level views. The site occurs to the right just before the R315 turnoff.

Photograph 4-12: View series southbound on the R27 approaching the R315 intersection.

Photograph 4-13: View series southbound on the R27 approaching the R315 intersection.

Photograph 4-14: View series southbound on the R27 approaching the R315 intersection.

Photograph 4-15: View series southbound on the R27 approaching the R315 intersection.

Photograph 4-16: View series southbound on the R27 approaching the R315 intersection.

Photograph 4-17: View series southbound on the R27 approaching the R315 intersection.

Photograph 4-18: View series southbound on the R27 approaching the R315 intersection.

Views Series Eastbound on the Yzerfontein–Darling Road R315

The following views were taken from the R315 eastbound as travelling to Yzerfontein.

Photograph 4-19: View series eastbound on the R315 approaching the R27 intersection.

Photograph 4-20: View series eastbound on the R315 approaching the R27 intersection.

Photograph 4-21: View series eastbound on the R315 approaching the R27 intersection.

Photograph 4-22: View series eastbound on the R315 approaching the R27 intersection.

Photograph 4-23: View series eastbound on the R315 approaching the R27 intersection.

Photograph 4-24: View series eastbound on the R315 approaching the R27 intersection.

Photograph 4-25: View series eastbound on the R315 at the R27 intersection.

Photograph 4-26: View series eastbound on the R315 past the R27 intersection.

Photograph 4-27: View series eastbound on the R315 past the R27 intersection.

Views Series Westbound on the Darling–Yzerfontein Road R315

The following views were taken from the R315 westbound as travelling to Yzerfontein.

Photograph 4-28: View series westbound on the R315.

Photograph 4-29: View series westbound on the R315.

Photograph 4-30: View series westbound on the R315.

Photograph 4-31: View series westbound on the R315.

When travelling from this side towards Yzerfontein, the site features prominently on the right. You travel a long way past it as you turn into the R315 with the site on your right, otherwise on your left in the opposite direction.

Photograph 4-32: View series westbound on the R315.

Photograph 4-33: View series westbound on the R315.

Photograph 4-34: View series westbound on the R315.

Photograph 4-35: View series westbound on the R315.

Photograph 4-36: View series westbound on the R315.

Photograph 4-37: View series westbound on the R315.

4.5.3 Views from Neighbouring Areas

Views from West Coast Farm Stall

The following views were taken around the West Coast Farm Stall, which is over the road to the south of the site.

Photograph 4-38: Panorama of the site from the West Coast Farm Stall.

Photograph 4-39: Panorama of the West Coast Farm Stall from the site.

The site most impacted by the development will be the West Coast Farm Stall as it is currently located in a mostly rural area with some housing on the R315.

4.5.4 Views from Heritage Sites

The site is not visible from the nearby limekilns that we could determine.

4.5.5 Views on the Site

The following views are taken of and around the site, which is quite open to the road except for the invasive Rooikrans that will be removed in due course.

Photograph 4-40: Panorama westwards of the site showing its invasive Rooikrans.

Photograph 4-41: Panorama eastwards of the site showing its invasive Rooikrans.

Photograph 4-42: Wider panorama eastwards of the site showing its invasive Rooikrans.

Photograph 4-43: Another view of the site eastwards showing its invasive Rooikrans.

Photograph 4-44: Panorama from the site towards the West Coast Farm Stall.

At present, the site is undeveloped but has the strongest connection to the R315 and the West Coast Farm Stall over the road.

4.5.6 Conclusion

This is basically a Greenfield site in an area that is changing with various subdivisions already made in this location. The site is flat and sandy with typical fynbos vegetation largely masked by alien Rooikrans. The site is most visible from the R315 along which it will be developed and has been recently fenced with Clearvu fencing.

NWA

5 Visual Impact Assessment

5.1 Summary

VISUAL IMPACT: The proposed development will have a moderate-high impact on the landscape causing noticeable change to the visual environment. VISIBILITY: The development has moderate-low visual exposure; moderate-high visual absorption capacity; medium compatibility; and high local visibility only. NATURE OF IMPACT: The development's visual impact has local extent, long-term duration, medium intensity, definite probability, and medium significance on the landscape. Recommendations are made around the need for a landscape plan, the use of locally indigenous species where possible but not excluding exotic trees, colouration based on the site's natural colouring, subtle fence colouring, and landscape maintenance around commercial and natural planting schemes.

5.2 Introduction

This chapter uses the information collected in the previous chapters in an analysis that identifies and then describes the preliminary visual and aesthetic impacts of the project on the environment presented in tabular form due to the extent of the project.

DEFINITION: "Visual impact is defined as a change in the appearance of the landscape as a result of development which can be positive (improvement) or negative (detraction)" (IEA and the Landscape Institute, 1995).

5.2.1 Key Issues

1. The site falls outside the Urban Edge in a prominent location at the intersection of the R27 and the R315.
2. The site and general area is flat with low to moderate vegetation cover including aliens.
3. The site is a Greenfield site that does not appear to have been used or developed in recent years.
4. The site is highly visible from both the R27 and the R315 and is well chosen for the purpose at this busy intersection and developing node.

5. The property most impacted by the development will be the West Coast Farm Stall.

5.3 Methodology

A table is being used to scope the issues relating to visual and aesthetic impact of the wind turbines on the landscape.

5.3.1 The Visual Assessment

The visual environment can be structured into the following components:

1. **Natural Environment:** comprising the *Geomorphology* (geology, soil, land form), *Climate* (atmosphere and water), and *Nature* (vegetation and wildlife).
2. **Cultural Environment:** comprising *Land Use* (urban, rural, agricultural, recreational, etc), the *Structures* (architecture, engineering, lighting, services), and *History* (ancient, colonial, modern, contemporary).
3. **Visual Environment:** comprising *Views* (aesthetics, visibility), *Routes* (scenic, transport), and *Landscapes* (town, country, cultural, natural, mountainous, coastal, etc).

5.3.2 Triggers for Visual Assessment

These have been extracted from the PGWC (November 2005) list of triggers (p 9) with potential aspects relevant to this project noted in **bold:**

The nature of the receiving environment:

1. Areas with protection status, such as national parks or nature reserves;
2. Areas with proclaimed heritage sites or scenic routes;
3. Areas with intact wilderness qualities, or pristine ecosystems;
4. Areas with intact or outstanding rural or townscape qualities;
5. Areas with a recognized special character or sense of place;
6. **Areas lying outside a defined urban edge line;**
7. Areas with sites of cultural or religious significance;
8. **Areas of important tourism or recreation value;**
9. **Areas with important vistas or scenic corridors;**
10. Areas with visually prominent ridgelines or skylines.

The nature of the project:

1. High intensity type projects including large-scale infrastructure;
2. **A change in land use from the prevailing use;**
3. A use that is in conflict with an adopted plan or vision for the area;
4. **A significant change to the fabric and character of the area;**
5. **A significant change to the townscape or streetscape;**
6. **Possible visual intrusion in the landscape;**
7. Obstruction of views of others in the area.

As can be seen, the various sites could be described as falling within at least 3 of the 10 listed receiving environments (30%), and 4 out of 7 project types (57%) that may cause visual impact giving a combined total of 43.5%; the receiving environment has *moderate–low* sensitivity while the project character has *high* impact. **Thus the factors triggering potential impact suggest that impact will be moderate-high.** Regarding "the nature of the receiving environment," categories apply to both the site and the area generally.

5.3.3 Key Issues Requiring Specialist Input

The following table helps identify the likely level of impact:

TYPE OF ENVIRONMENT: High to Low Sensitivity	TYPE OF DEVELOPMENT: Low to High Intensity				
	Category 1 development	**Category 2 development**	**Category 3 development**	**Category 4 development**	**Category 5 development**
Protected/wild areas of international, national, or regional significance	Moderate visual impact expected	**High visual impact expected**	**High visual impact expected**	**Very high visual impact expected**	**Very high visual impact expected**
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	**High visual impact expected**	**High visual impact expected**	**Very high visual impact expected**
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	**High visual impact expected**	**High visual impact expected**
Areas or routes of low scenic, cultural, historical significance / disturbed	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	**High visual impact expected**
Disturbed or degraded sites / run-down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

Figure 5-1: Table of Visual Impacts ex DEA&DP Guidelines.

Furthermore, the PGWC "Categorisation of issues to be addressed by the visual assessment" (Table 1, p 6) identifies the project as **Category 4 development:** small-scale commercial facilities / office parks, one-stop petrol stations.

Terms are defined as follows (p 7):[6] *Low density development* – generally single or double-storey domestic structures, usually with more than 50% of the area retained as natural (undisturbed) open space.[7] In the list of "Type of environment" this would be defined as **"areas or routes of *medium* scenic, cultural, historical significance."** This would result in a theoretical possible outcome: ***high* visual impact** expected. When considering the following descriptions, we find that the visual impact is at least described as **Moderate–High**:

"High visual impact expected:

1. Potential intrusion on protected landscapes or scenic resources;
2. **Noticeable change in visual character of the area;**
3. Establishes a new precedent for development in the area.

"Moderate visual impact expected:

1. **Potentially some affect on protected landscapes or scenic resources;**
2. Some change in the visual character of the area;
3. **Introduces new development or adds to existing development in the area.**

"Minimal visual impact expected:

1. Potentially low level of intrusion on landscapes or scenic resources;
2. Limited change in the visual character of the area;
3. Low-key development, similar in nature to existing development."

"Little or no visual impact expected:

1. Potentially little influence on scenic resources or visual character of the area;
2. Generally compatible with existing development in the area;
3. Possible scope for enhancement of the area."

---

[6] **Category 1 development:** e.g. nature reserves, nature-related recreation, camping, picnicking, trails and minimal visitor facilities.
Category 2 development: e.g. low-key recreation / resort / residential type development, small-scale agriculture / nurseries, narrow roads and small-scale infrastructure.
Category 3 development: e.g. low density resort / residential type development, golf or polo estates, low to medium-scale infrastructure.
Category 4 development: e.g. medium density residential development, sports facilities, small-scale commercial facilities / office parks, one-stop petrol stations, light industry, medium-scale infrastructure.
Category 5 development e.g. high density township / residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, power lines, freeways, toll roads, large-scale infrastructure generally. Large-scale development of agricultural land and commercial tree plantations. Quarrying and mining activities with related processing plants.

[7] *Low-key development* – generally small-scale, single-storey domestic structures, usually with more than 75% of the area retained as natural (undisturbed) open space.
Low density development – generally single or double-storey domestic structures, usually with more than 50% of the area retained as natural (undisturbed) open space.
Medium density development – generally 1 to 3-storey structures, including cluster development, usually with more than 25% of the area retained as green open space.
High density development – generally multi-storey structures, or low-rise high density residential development.

The following terms are used in the above assessments (p 8):

1. *Fundamental change* – dominates the view frame and experience of the receptor;
2. ***Noticeable change* – clearly visible within the view frame and experience of the receptor;**
3. *Some change* – recognisable feature within the view frame and experience of the receptor;
4. *Limited change* – not particularly noticeable within the view frame and experience of the receptor;
5. *Generally compatible* – Practically not visible, or blends in with the surroundings."

SUMMARY ASSESSMENT—VISUAL IMPACT: The proposed development will have a moderate-high impact on the landscape causing noticeable change to the visual environment.

This assessment of the impact is confirmed by the following descriptions of the categories of issues:

5.3.4 Level of Assessment

PGWC (November 2005) defines the selection of the appropriate approach to VIA for a moderate visual impact expected as a **Level 3** Visual Assessment (p 13). This is defined as follows:

Approach Type A Assessment*: which are relatively large in extent, and involve natural or rural landscapes.*

Visual impact assessment report by visual specialist qualified in landscape architecture or environmental planning; preferably affiliated to SACLAP.

Method:

1. Identification of issues raised in scoping phase, and site visit;
2. Description of the receiving environment and the proposed project;
3. Establishment of view catchment area, view corridors, viewpoints and receptors;
4. Indication of potential visual impacts using established criteria;
5. Inclusion of potential lighting impacts at night;
6. Description of alternatives, mitigation measures and monitoring programmes;
7. Review by independent, experienced visual specialist (if required);

A Level 4 VIA for High Impact requires "Complete 3D modelling and simulations, with and without mitigation" in addition to the above.[8]

[8] This is not always possible depending on the planning information available or necessary where development types are known.

5.4 Visual Analysis

5.4.1 Visual Mapping

This has been mapped in Figure 5-2 and shows the site's visibility as defined by its Viewshed, Zones of Visual Influence and Viewpoint Analysis. Visual Absorption Capacity (or Visual Sensitivity) is not mapped but discussed below. The mapping technique is a traditional, *reflective* mapping or viewshed mapping, which shows where, and to what extent, the site is visible from its surroundings. *Projective* mapping, that is, from viewpoints within the site (inside out) is not required but site views can be seen in the photographs.

5.4.2 Key to the Visual Analysis Map

The Visual Catchment is shown as thick brown lines and approximately follows the ridgelines of the mountains and hills (see Figure 5-2). Areas *theoretically* visible to the site (Zone of Visual Influence or ZVI) are indicated in **yellow** overlain on a radiating circle centred on the site graded from **solid blue** on the site being most visible to no shading beyond 5km visibility. Combined with the yellow ZVI this produces a **green** to **yellow** colour where the site is visible. Areas with no yellow colouring are those where the site is not visible (the view shadow).

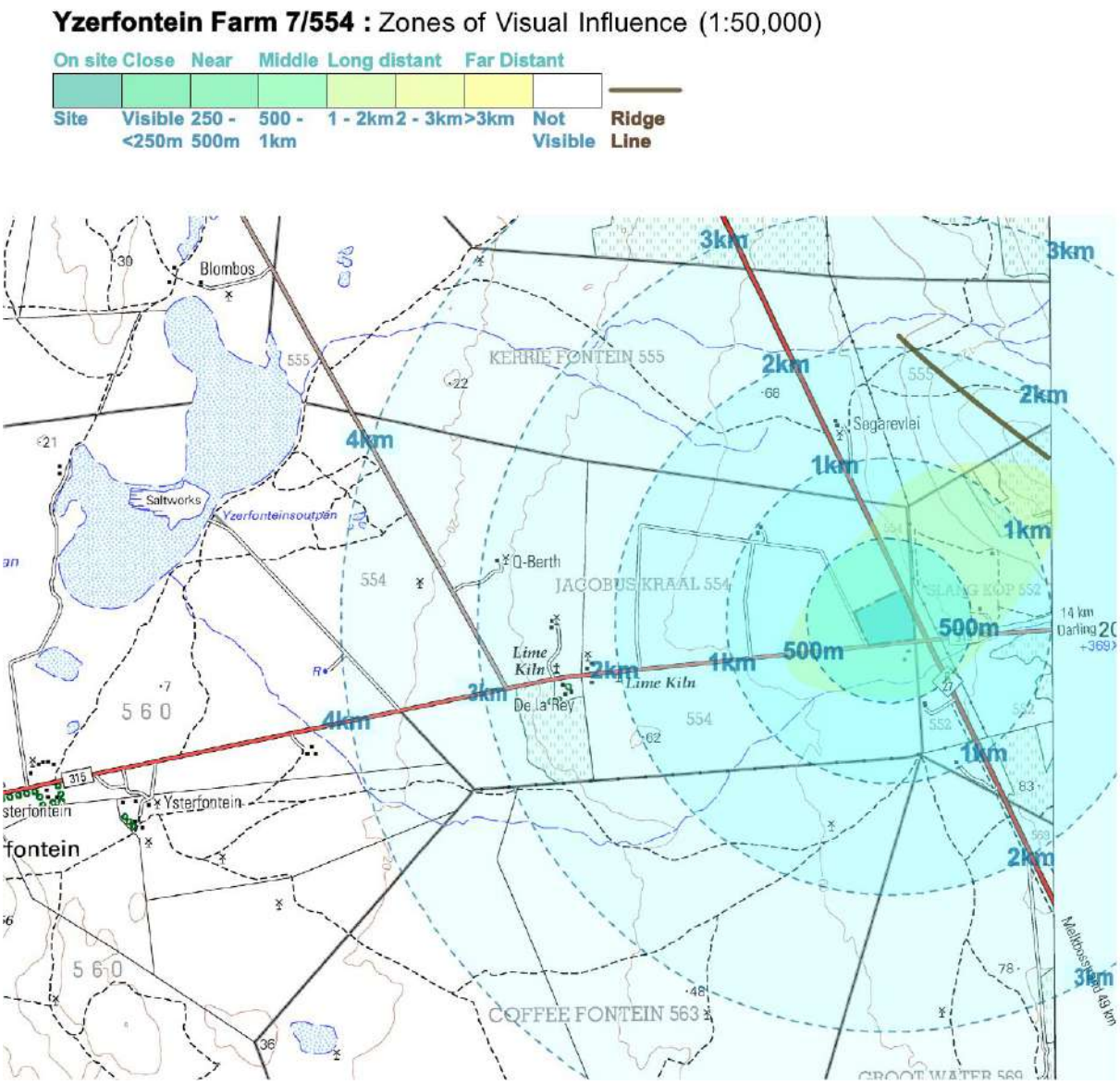
It should be noted that the term *theoretically* is significant as it is neither possible nor necessary to physically check all these locations. However, strategic views have been checked according to site inspection and analysis. Some views that would theoretically be possible are not possible due to ground level screening and the hilly terrain. Urban and suburban buildings and orientation are also important factors in visibility. Radiating circles of concentric rings encompass the site at 1km intervals but including a 250m and 500m circle.

5.4.3 Viewshed

The **viewshed** is indicated by the edge of the yellow zones on the map and either is terminated by **ridgelines** shown in brown or diminishes with distance (see Figure 5-2). The viewshed of the site is contained mostly by local structures and vegetation rather than topography.

5.4.4 Zone of Visual Influence

The **Zone of Visual Influence (ZVI)** is shown in various shades of **green** and has a relatively small ZVI relative to the site (see Figure 5-2). The only significant and observable ridgelines in this largely flat landscape are to the west on the edge of the Darling Hills. Due to the flatness of the area combined with the bushy local vegetation, site visibility is mostly within the 500m range with possible oversight from the hills to the east.



Source: New World Associates.

Figure 5-2: Zone of Visual Influence.
Portion of a 1:50,000 map of Yzerfontein (3318AC_1999_ED4_GEO Yzerfontein) showing the approximate Zone of Visual Influence (ZVI).

5.4.5 Visual Absorption Capacity

The Visual Absorption Capacity (VAC) of the landscape is typically defined by landform, land use and vegetation. In this case, landuse applies primarily while local vegetation such as tree planting is also a factor.

VAC of the Land Form

Landform is not a significant factor in constraining the ZVI of the site, except in the east.

VAC of the Land Use

Land Use VAC is always a factor in built-up areas with ground level structures usually blocking off views near buildings and walls. Thus views the site from the south are easily blocked by the West Coast Farm Stall.

VAC of the Vegetation

The site has high vegetation VAC due to the bushy vegetation on site and in the area, as well as tree planting.

5.4.6 Visual Sensitivity

The area has moderate sensitivity due to its strategic location on a key intersection. While the local area is not highly scenic, it is part of the wider West Coast tourist environment that is more closely related to the coastal zone. This allows more development to be accommodated, even in this rural area, as it is 8km to the seaside town of Yzerfontein.

5.4.7 VIA Criteria and Assessment

The PGWC Guideline (June 2005, pp 18-19) defines Visual Impact Assessment Criteria as outlined following. We have included our assessment of the visual impact here along with the assessment criteria for ease of relating to the complex of terminology:

Specific Criteria for VIAs[9]—Visibility

The following analysis presents the specific criteria findings in bold for the project.

Visual exposure of the area: the geographic area from which the project will be visible, or view catchment area.

1. *High visual exposure* – covers a large area (e.g. several square kilometres).
2. ***Moderate visual exposure* – covers an intermediate area (e.g. several hectares).**
3. ***Low visual exposure* – covers a small area around the project site.**

Visual absorption capacity (VAC): the potential of the landscape to conceal the proposed project, i.e.

1. ***High VAC* – e.g. effective screening by topography and vegetation;**
2. ***Moderate VAC* – e.g. partial screening by topography (and vegetation);**
3. *Low VAC* – e.g. little screening by topography (or vegetation).

Landscape integrity: the compatibility or congruence of the project with the qualities of the existing landscape or townscape, or the 'sense of place.'

1. *Low compatibility* – visually intrudes, or is discordant with the surroundings;
2. ***Medium compatibility* – partially fits into the surroundings, but clearly noticeable;**
3. *High compatibility* – blends in well with the surroundings.

[9] *Note 1:* These, as well as any additional criteria, need to be customised for different project assessments. *Note 2:* Various components of the project, such as the structures, lighting or power lines, may have to be rated separately, as one component may have fewer visual impacts than another. This could have implications when formulating alternatives and mitigations.

Visibility of the project: based on distance from the project to selected viewpoints i.e.:

1. ***Highly visible* – dominant or clearly noticeable (e.g. 0 to 1km);**
2. *Moderately visible* – recognisable to the viewer (e.g. 1 to 2km);
3. *Marginally visible* – not particularly noticeable to the viewer (e.g. 2km+).

SUMMARY ASSESSMENT—VISIBILITY: The development has moderate-low visual exposure; moderate-high visual absorption capacity; medium compatibility; and high local visibility only.

The PGWC Guideline further notes: "To aid decision-making, the assessment and reporting of possible impacts requires consistency in the interpretation of impact assessment criteria. Various criteria are defined in the EIA Regulations, such as 'nature', 'extent', 'duration', etc. The interpretation of these criteria for visual assessments is given in Box 11" repeated below:

Criteria Used for the Assessment of Visual Impacts—Visual Impact Assessment

The following analysis presents the specific criteria findings in bold for the project.

Nature of the impact: an appraisal of the visual effect the activity would have on the receiving environment. This description should include visual and scenic resources that are affected, and the manner in which they are affected, (both positive and negative effects).

Extent: the spatial or geographic area of influence of the visual impact, i.e.:

1. *site-related:* extending only as far as the activity;
2. ***local:* limited to the immediate surroundings;**
3. *district:* affecting a smaller urban/rural area;
4. *regional:* affecting a larger metropolitan or regional area;
5. *national:* affecting large parts of the country;
6. *international:* affecting areas across international boundaries.

Duration: the predicted life-span of the visual impact:

1. *short term,* (e.g. duration of the construction phase);
2. *medium term,* (e.g. duration for screening vegetation to mature);
3. ***long term,* (e.g. lifespan of the project);**
4. *permanent,* where time will not mitigate the visual impact.

Intensity: the magnitude of the impact on views, scenic or cultural resources.

1. *low,* where visual and scenic resources are not affected;
2. ***medium,* where visual and scenic resources are affected to a limited extent;**
3. *high,* where scenic and cultural resources are significantly affected.

Probability: the degree of possibility of the visual impact occurring:

1. *improbable*, where the possibility of the impact occurring is very low;
2. *probable*, where there is a distinct possibility that the impact will occur;
3. *highly probable*, where it is most likely that the impact will occur; or
4. ***definite*, where the impact will occur regardless of any prevention measures.**

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

1. *low*, where it will not have an influence on the decision;
2. ***medium*, where it should have an influence on the decision unless it is mitigated; or**
3. *high*, where it would influence the decision regardless of any possible mitigation.

SUMMARY ASSESSMENT—NATURE OF IMPACT: The development's visual impact has local extent, long-term duration, medium intensity, definite probability, and medium significance on the landscape.

	Site
VISUAL IMPACT	
Impact	Med-High
Change	Med-High
VISIBILITY	
Visual Exposure	Med-Low
Visual Absorption Capacity	Med-Low
Compatibility	Medium
Visibility	High
NATURE OF IMPACT	
Extent	Local
Duration	Long Term
Intensity	Medium
Probability	Definite
Significance	Medium

Figure 5-3: Table of Site Assessment.

Plomp Methodology

Visual impact assessment using the Plomp (2004) methodology (see Appendix A for key):

Activity	Impact	Phase	Probability		Duration		Scale		Magnitude / Severity		Significance[10]		
			Score	Magni-tude	Score	Magni-tude	Score	Magni-tude	Score	Magni-tude	Score	WOM	WM
Visual Significance Score Calculation = Probability x (Duration + Scale + Magnitude) = 5 x (4 + 1 + 6) = 5 x 11 = 55													
Construction activities, operational infrastructure and lighting, decommis-sioning of infrastructure	Visual impact of develop-ment on surrounding landscape	Construc-tion, opera-tions and closure	5	Definite	4	Long-term	1	Local	6	Medium	55	Moder-ate	Mod-erate–Low

Figure 5-4: Plomp Methodology Assessment.

5.4.8 Distribution of Impacts

"Beneficiaries and losers"[11] (PGWC, p 21) of the project's visual impacts are mainly local as the development will only have high visual impact to the local environment.

The people most affected by the development will be the immediate neighbours at New Orleans.

5.4.9 Photomontages

Photomontages have not been prepared and are not considered necessary for this project as the impact is overall moderate and will be mitigated by the recommendations.

5.5 Analysis of Alternatives

At this time there are no significant alternatives to consider.

5.6 Planning Phase Impacts

This is potentially the most significant phase of a Project as it is here that crucial planning and design decisions are taken. **Critical Mitigation Recommendations are noted in bold.**

5.6.1 Planning and Design

While there is a conflict between the need to densify urban areas within the urban edge at the same time as maintaining rural character along the urban edge, there is a similar conflict in rural areas in the need to locate industrial type activities that are often unsightly. This has to be managed and mitigated.

As the WC Provincial Urban Edge Guideline has referred to the need **"to manage urban development in such a way that no development would detract from the visual quality of**

[10] **Significance:** Score calculation = Probability x (Duration + Scale + Magnitude); WOM Without Mitigation; WM With Mitigation.

[11] Possible better designations are "winners and losers" or "beneficiaries and adversaries" as, so often objectors become opponents in environmental and visual impact.

the environment and that all development conform to a characteristic style and urban form that suits the character of the area," further stating that **"this implies that edge development should not only be limited to certain areas through inclusion or exclusion, but that edge development should also be subject to urban design guidelines, architectural consideration and general aesthetic treatment" for both natural and built environment** (see section 3.5.1).

Furthermore, the WC Provincial SDF noted *inter alia* the following:

- It also proposes "to ensure effective management of all municipal functions and facets to ensure equitable and affordable services and amenities and a safe **and aesthetically pleasing urban environment…."**.
- **Cultural resources acknowledged and protected as the fundamental link with the historical past and a basis for planning and shaping of future urban and rural environments.**
- **A safe, healthy and aesthetically pleasing urban environment, with the architectural and spatial character depicting the historical and cultural background of the habitat community.**

Many of these components such as the mountains, farms and historical structures are irreplaceable national assets and accentuate the region's unique character. For this reason, policy guidelines and actions must be formulated to emphasize, protect and promote these components. **The character, the detail of the towns and any planned changes should thus be carefully considered."**

It is the guidelines resulting from the visual-aesthetic-landscape analysis that will achieve the balance as best as possible along with their implementation.

Site Development Plan Assessment

The SDP shows some intention to landscape the site but it is only partially conceived. Tree and shrub planting is essential in screening developments and in creating a sense of place and pleasant environment, especially in rural settings. The large area on the corner that is undeveloped and left natural is also significant in screening the site and retaining the natural rural character.

Mitigation Recommendations

1. **Site Development Plan:** The "SDP" is indicative only and actually labelled as Proposed Zoning. A detailed SDP should be prepared showing the site fully with landscaping. Overdeveloped sites with inadequate allowance for tree planting around buildings are excessively hot and have a negative impact on the climatic environment. The edge along the R315 Yzerfontein Road is important and needs to be sensitively developed without long

lines of uninterrupted parking and allowance for landscaping and tree planting. The highway landscape zone is also important to buffering the scheme from the R277.

2. **Landscape Plan:** A Landscape Plan should be prepared for the scheme showing how the open spaces will be landscaped. The site needs to have a comprehensive design of shade trees in all areas, particularly the car parks and boundary zone against the R315 and R27.
3. **Tree Planting:** Traditional exotic tree species are often best suited to the harsh conditions of the SW Cape so are also recommended, along with trees indigenous to the forests of the SW Cape where appropriate.
4. **Planting:** Landscape planting should be done with locally indigenous species where possible, otherwise trees and plants occurring in the fynbos region more generally. Careful conservation of the natural vegetation and the removal of aliens is necessary.
5. **Fencing:** It is unfortunate that the site was already fenced with black fencing as this should preferably be done using soft colouration that blends in with the natural colour scheme. No garish greens and blacks are generally advised, particularly vivid greens, reds, blues and browns that are so unsightly.
6. **Colouration:** The colouration of the scheme should try as far as possible to blend in with the natural colouring in the area without using striking contrasting colours such as intense bright colours.
   6.1. No garish greens and blacks are generally advised, particularly vivid greens, reds, blues and browns that are so unsightly in items like water tanks, signage, furniture, etc.
   6.2. Ideal landscape colours in rural areas, and even urban areas, are the dullest khaki browns, khaki greens, and khaki grey-greens.
   6.3. As the landscape of the Swartland is mostly dull grey throughout the year, this is the colour range recommended for all materials on site including bricks if they are to be used.
7. **Maintenance:** Planting maintenance of the proposed landscaping needs to be included in the development budget and a plan for the ongoing maintenance of the scheme landscaping should be prepared and budgeted for. Maintenance must be geared to maintaining and restoring the natural vegetation and using natural planting patterns and maintenance going forward and more regular commercial landscaping in the developed areas.

5.7 Construction Phase Impacts

Construction Phase visual impacts are no more than normal for an urban site although they will be extensive.

5.7.1 Construction

Construction inevitably gives rise to noise, disruption and dust, amongst others. These are well covered by Municipal Bylaws. Site destruction and damage is also coincident with quarrying especially to water, soil and vegetation. Changes to the water table by excavations can also have a heavy impact on the trees with deaths occurring a few years later.

Mitigation Recommendation: Construction

1. **Damage Control:** All parties must make every effort to control the destruction of soils and vegetation on site, especially any remnants of natural vegetation. These must not be damaged under any circumstances.
2. **Pollution:** Chemical damage by cement mixing directly on the ground and by diesel, etc spills must also be prevented at all costs, as should vandalism of the plants and accidental damage to limbs by workers and machinery. Fires must be prevented also at all costs in all areas. Penalties and incentives should be implemented as can fencing off areas.
3. **Monitoring:** Monitoring of the landscape, soils and vegetation during construction is very important and must be attended to regularly. Damage to some is all too inevitable and often irreversible. Adequate indigenous (preferably endemic) vegetation must be planted.

5.8 Operation Phase Impacts

Lighting, landscape maintenance and conservation management are discussed.

5.8.1 Lighting

The Architectural and Landscape Guidelines need to consider lighting in their specific guidelines. Security lighting, while necessary, can be handled with care.

Mitigation Recommendation: Lighting

1. **Lighting:** Lighting should be minimised and carefully controlled as part of the project's management plan. The use of green energy fittings and concepts should be encouraged and lighting developed with sensitivity to the rural landscape.

5.8.1 Conservation Management and Landscape Maintenance

Waterwise landscaping should be used wherever possible and green star building practices.

Mitigation Recommendation: Conservation Management and Landscape Maintenance

1. **Landscape Maintenance:** must be carried out at all times in line with these recommendations to help keep the scheme green and encouraging local biodiversity.

5.9 Decommissioning Phase Impacts

On-going landscape maintenance and conservation management remains necessary.

5.9.1 Refurbishment and Resale

This is a continuing aspect of the property ownership cycle.

Mitigation Recommendation: Refurbishment and Resale

1. **Refurbishment and Resale:** The previous recommendations regarding Planning, Construction and Operation all apply to this process. The entire site can be dismantled and rehabilitated if no longer needed and restored to an appropriate land use.

This concludes the analysis of impacts and detailed recommendations for their mitigation. The chapter, Visual Management and Monitoring Plan follows. It gives recommendations for the management and monitoring of the environment and the given VIA recommendations.

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6 Visual Management and Monitoring Plan

Sound Visual Management is the ultimate aim of the VIA process. The Mitigation Recommendations developed in the report need to be implemented. This process of implementation will occur throughout the lifetime of the project, hence, the need for a Monitoring Plan. Institutions, individuals and organisations referred in the Monitoring Plan must develop a means of achieving the monitoring otherwise this report serves no purpose. Once the VIA Report has been approved, the Developers must seek the implementation of the recommendations as soon as possible.

6.1 Introduction

This chapter uses the information developed in the previous section. It sets out a basic plan for the implementation of both site management and the VIA recommendations.

6.1.1 Background

Site management in this case refers to that aspect of project management needed to control visual impact. The tools for visual management developed in the VIA Report are the *Mitigation Recommendations.* Their implementation also needs to be managed as part of the on-going site and impact management. A particular aspect of site management is monitoring. Monitoring is the routine inspection, recording and reporting of visual issues pertaining to visual impact aimed at mitigating impact by timely correction of problems as they arise.

6.1.2 Key Issues

1. Monitoring is typically routine inspection with physical analysis and recommendation, or routine reporting by various combinations of parties as outlined. The on-going monitoring of various aspects of the project are critical to its success. Long term management of visual issues is a more challenging issue that comes down to what individuals do over time as allowed to by their local authority.

2. With the identification of monitoring method, analysis and reporting, is the identification of the responsible party as indicated in Figure 6-1: Visual Monitoring Plan. This figure is crucial in the successful implementation of the Mitigation Recommendations and consequently, a visually-friendly (or visually responsible) project. The key parties referred to in the Monitoring Plan are largely the Developers/Owners, the Designers, and the Planning Authorities.
3. **Once the VIA Report has been approved, the Developer/s must seek the implementation of the recommendations as soon as possible. The Developer/s and Designers need to take this document and embody it in their day-to-day operations and long-term plans. Mitigation Recommendations are all written specifically around the subject of project and site management for impact mitigation; it is their incorporation into overall project management policy and practice that is required.**

6.2 Visual Management

6.2.1 Project and Site Management

The management of the project and site with particular reference to visual concerns is the subject of the Mitigation Recommendations and, indeed, the whole VIA study. As the Mitigation Recommendations are all written specifically around the subject of project and site management for impact mitigation; it is their incorporation into overall project management policy and practice that is required. The information contained in the VIA Report effectively provides the necessary information for the project management to implement their project in a visually responsible manner.

6.2.2 Implementing the VIA Recommendations

The Mitigation Recommendations have been written as broad guidelines to identify principles for minimising visual impact. The recommendations are by no means specifications. **There is a tendency in the construction industry to damage and repair later, which, while possible in construction, is not always possible in the environment. A need for care towards the environment should be developed by the Contractors.** The Development Team needs to take this document and embody it in their planning and design, day-to-day operations and long-term plans.

6.3 Environmental Monitoring

6.3.1 Monitoring Methodology

The framework for administering the implementation of mitigation guidelines is presented in the monitoring plan on the following page (see Figure 6-1: Visual Monitoring Plan). The table comprises the list of project activities numbered in the same sequence as those in the Miti-

gation Plan. For each project activity, recommendations are made from the following standardised monitoring activities:

6.3.2 Monitoring

The following types and timing of monitoring are suggested:

1. **Inspection:** site inspection (random, at completion), routine inspection (possibly annually), clean-up inspection (after completion of clean up of the accident incident).
2. **Monitoring:** observation (and photography).
3. **Review:** review of reports, plans and design.

6.3.3 Monitoring Plan

The Monitoring Plan has been tabulated for easy reference in the figure below.

Item	Project Component and Activity	Monitoring	Investigation	Reporting	Responsible Party
5.6	**PLANNING PHASE**				
5.6.0	VIA Report	Review	Physical and Recommendation	Recommendation	Planning Authorities
5.6.1	Planning and Design	Review	Physical and Recommendation	Recommendation	Authorities, Developers and Designers
5.7	**CONSTRUCTION PHASE**				
5.7.1	Construction	Site and Routine Inspection	Physical and Recommendation	Recommendation	ALL
5.8	**OPERATION PHASE**				
5.8.1	Lighting	Routine Inspection	Physical and Recommendation	Routine, *Ad hoc* Meeting	Owners, Authorities
5.8.2	Conservation Management and Landscape Maintenance	Routine Inspection	Physical and Recommendation	Routine, *Ad hoc* Meeting	Owners, Authorities
5.9	**DECOMMISSIONING**				
5.9.1	Refurbishment	Site Inspection	Physical and Recommendation	Routine, *Ad hoc*	Owner, Authorities

Figure 6-1: Visual Monitoring Plan.

6.3.4 Analysis

The following types of analyses are recommended:

1. **Physical:** on site and by photography.
2. **Recommendation:** check against VIA recommendation.

6.3.5 Reporting

The following methods of recording and reporting are recommended:

1. **Recommendation:** report or design recommendation.
2. **Routine:** log (daily, monthly, activity), report (quarterly), certificate, minutes.
3. ***Ad hoc:*** report (incident, closing).
4. **Meetings:** routine meeting (weekly), follow-up (incident), pro-active meeting (*ad hoc*).

6.3.6 Responsible Party

The following principal responsible parties have been identified as key during the monitoring process:

1. The Planning Authorities
2. The Developers and Owners
3. The Designers: Architects and Landscape Architects
4. The Contractors.

The above monitoring plan identifies who is conducting the prescribed monitoring activities. In cases where certification for compliance or approval are indicated the responsible certifying or approving authority is noted. Many building activities are strictly controlled by local by-laws.

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Appendices

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Appendix A Plomp Assessment Methodology

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to alternatives under study for meeting a project need.

Probability	**This describes the likelihood of the impact actually occurring.**
Improbable	The possibility of the impact occurring is very low, due to the circumstances, design or experience.
Probable	There is a probability that the impact will occur to the extent that provision must be made therefore.
Highly Probable	It is most likely that the impact will occur at some stage of the development.
Definite	The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory actions or contingency plans to contain the effect.
Duration	**The lifetime of the impact.**
Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.
Medium term	The impact will last up to the end of the phases, where after it will be negated.
Long term	The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
Permanent	Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.
Scale	**The physical and spatial size of the impact.**
Local	The impacted area extends only as far as the activity, e.g. footprint.
Site	The impact could affect the whole, or a measurable portion of the above-mentioned properties.
Regional	The impact could affect the area including the neighbouring residential areas.
Magnitude/ Severity	Does the impact destroy the environment, or alter its function.
Low	The impact alters the affected environment in such a way that natural processes are not affected.
Medium	The affected environment is altered, but functions and processes continue in a modified way.
High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Significance	**This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.**
Negligible	The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
Low	The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
Moderate	The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
High	The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

Figure A-1: Impact Significance Criteria.

The significance of the aspects/impacts of the process was rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process.[12] These matrices use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significances of the impacts were determined through a synthesis of the criteria below in Figure A-1 above.

The following weights were assigned to each attribute:

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

Figure A-2: Attribute Weighting.

The significance of each activity is rated without mitigation measures and with mitigation measures for both construction and operational phases of the development.

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[12] Plomp, H. (2004). *A Process for Assessing and Evaluating Environmental Management Risk and Significance in a Gold Mining Company*. Conference Papers – Annual National Conference of the International Association for Impact Assessment: South African Affiliate.

Appendix B Project Plans

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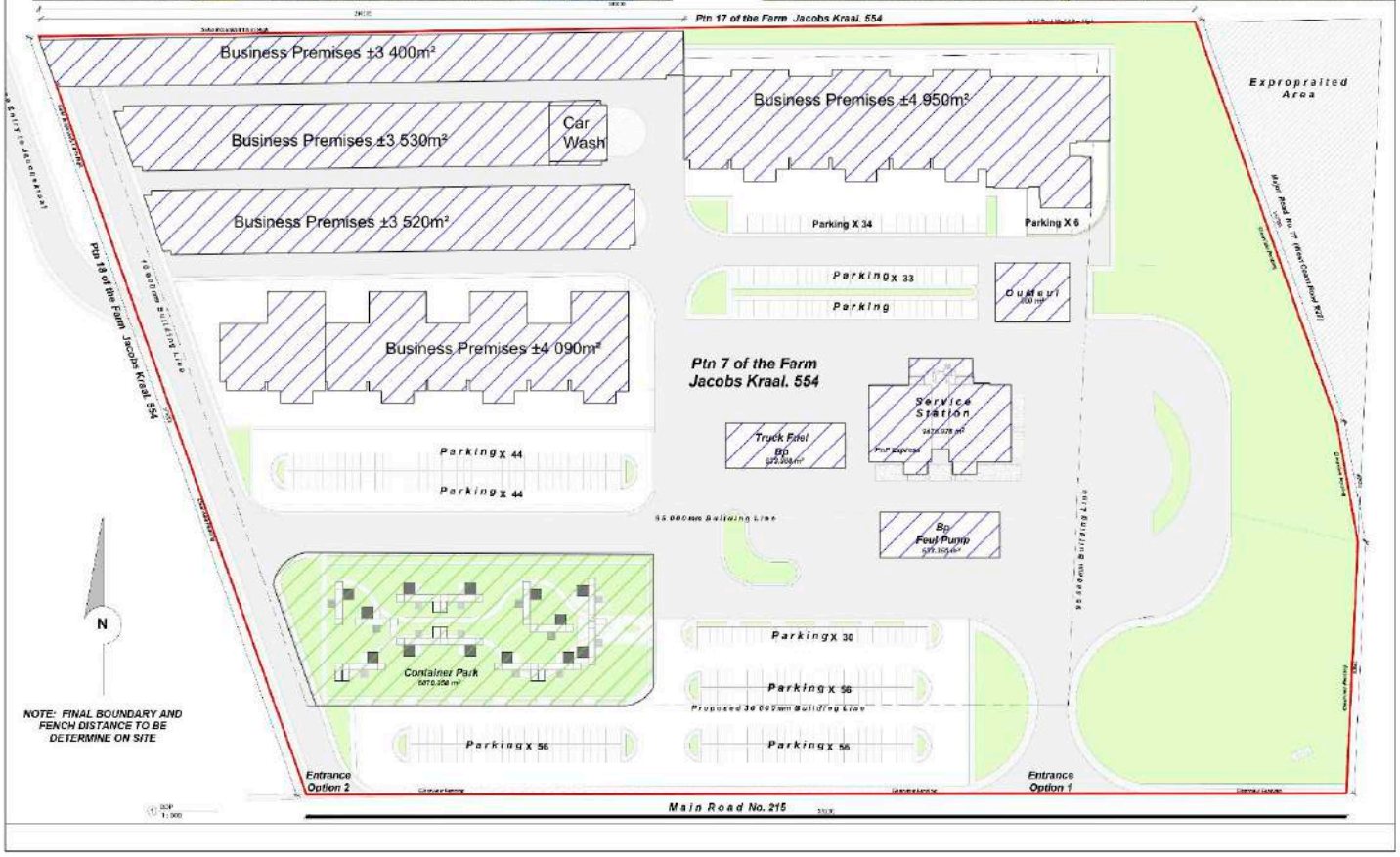

LEGEND

BUILDING FOOTPRINT

Business Zone 3	20 270m²	
Agriculture Zone 3	6 070m²	

TITLE:

PROPOSED ZONING

Portion 7 of Farm 554 Malmesbury

NOTE:

ALL AREAS AND DISTANCES ARE SUBJECT TO A SURVEY

CREATED BY:

C.K. RUMBOLL & PARTNERS
TOWN PLANNERS
PROFFESIONAL SURVEYORS
16 RAINIER STREET, MALMESBURY
Tel: 022 – 4821845
Fax: 022 – 4871661
e-mail: anelie@rumboll.co.za

DATE:	AUTHORITY:
May 2022	SWARTLAND MUNICIPALITY

REF:
YZE/11907/AC/IV

CTS HERITAGE

APPENDIX 3: Results of PPP