

HERITAGE IMPACT ASSESSMENT

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

WOODLANDS WASTEWATER TREATMENT WORKS (WWTW) AND SEWER RETICULATION UPGRADE FOR THE KOUKAMMA MUNICIPALITY

Prepared by CTS Heritage



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For

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EXECUTIVE SUMMARY

1. Site Name:

Woodlands WWTW

2. Location:

The site is located on Farm Palmiet River 585, Remainder of Erf 1, Woodlands. Woodlands is a small residential suburb approximately 10 km southwest of the town of Kareedouw in Koukamma Municipality, Sarah Baartman District Municipality, Eastern Cape province. It lies approximately 1 km south of the N2 and 6 km west of the R402.

3. Locality Plan:

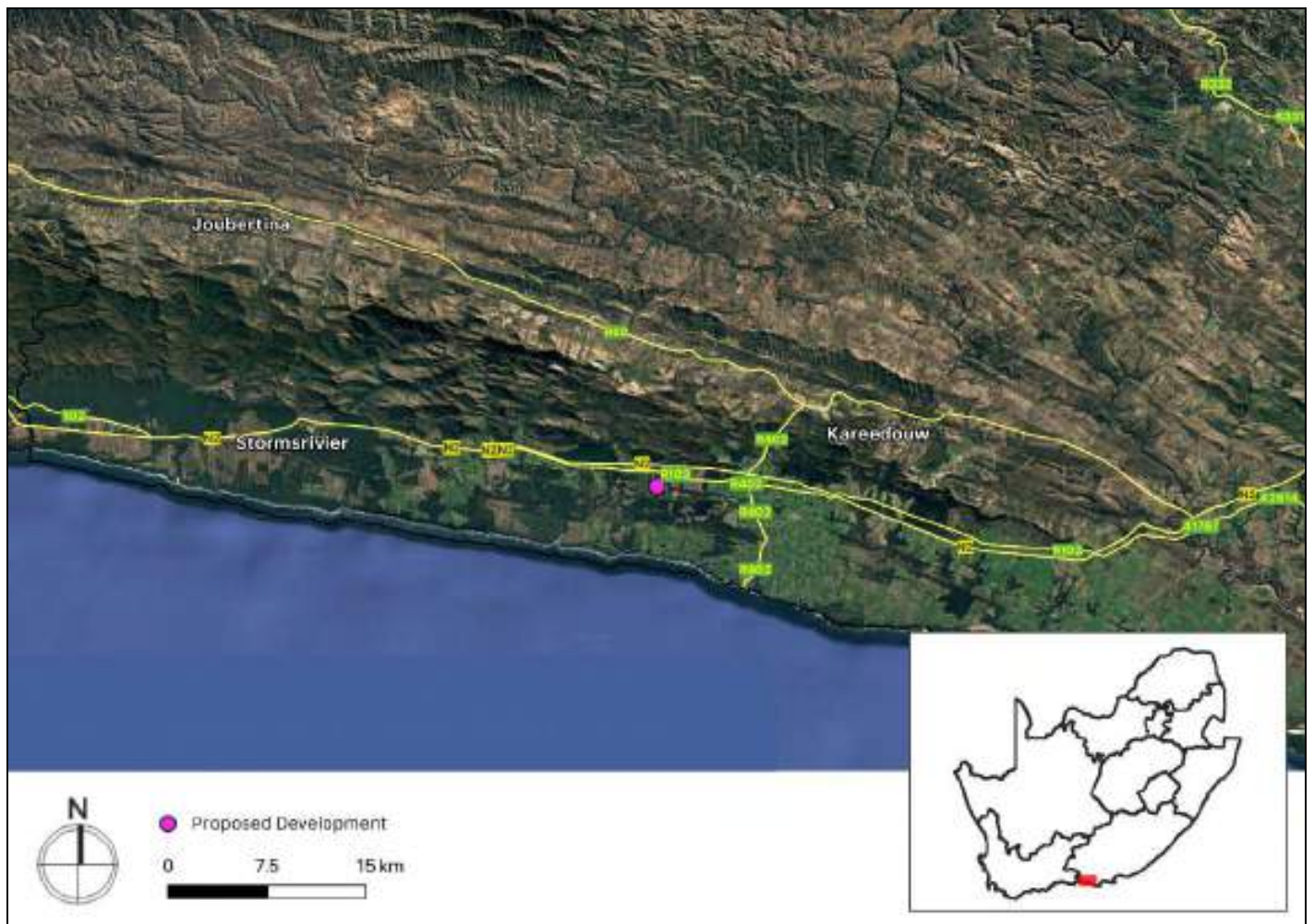


Figure A: Satellite image (2025) indicating the location of the proposed development area

4. Description of Proposed Development:

Bluepebble Sustainable Solutions has been appointed by SMEC South Africa (Pty) Ltd to undertake a Basic



Assessment process to ensure compliance with regulations contained in the National Environmental Management Act (NEMA Act No. 107 of 1998) and the Environmental Impact Assessment Regulations (2014), as amended, for the Woodlands Wastewater Treatment Works (WWTW) and sewer reticulation upgrade for the Koukamma Municipality.

The Woodlands sanitation services consist of digester tanks and a 110mm diameter small bore gravity sewer reticulation system. Effluent from digesters is regularly removed by means of vacuum tankers, transported, and disposed of at the Wastewater Treatment Works (WWTW) at Woodlands Settlement. The WWTW is located 0.5km south of the southwestern boundary of the Woodlands Settlement. Effluent then undergoes an activated sludge treatment process followed by a clarification process where the solids and liquid are separated before the final effluent is discharged into a surface water course. Sludge settlement is conveyed to a pit close to the treatment works where it is then disposed of. As soon as the hole is 80% full it is then backfilled, and a new hole is formed. The WWTW is capable of handling flows up to 400KI/d of solids free sewage. The hydraulic and treatment capacity of the existing treatment plant will be further studied during the concept and design phases. The proposed activities for the upgrade of bulk sewers, replacing of small-bore sanitation system at Woodlands is as follows:

- Replace Internal Sewer Reticulation of the woodlands area.
- Design new sewer infrastructure for the proposed development.
- Realign and replace the Bulk Sewer Main.
- Refurbish the existing Waste Water Treatment works.

5. Anticipated Impacts on Heritage Resources:

The assessment of the Woodlands area proceeded with certain constraints, notably reduced surface visibility due to dense vegetation cover. Nevertheless, the area was comprehensively surveyed for heritage resources. As with previous surveys across the broader Kareedouw area, this assessment recorded a low density and occurrence of archaeological and palaeontological material, with no significant heritage resources identified within the development footprint. The sewer reticulation network will be upgraded along existing road systems and buried, meaning no notable impact to the character of the area is expected.

Both archaeological and palaeontological resources in the study area are assessed as having low sensitivities. The calculated impact of the proposed development on these resources is correspondingly low, and with mitigation, overall impacts to heritage are considered minimal and unlikely.

6. Recommendations:

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



- Should any buried archaeological resources, human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. Eastern Cape Provincial Heritage Resources Authority (ECPHRA) must be contacted immediately in order to determine an appropriate way forward.
- Chance Fossil Finds Protocol (CFFP): A Chance Fossil Finds Protocol (Appendix 4) must be incorporated into the Environmental Management Programme (EMPr) to guide on-site personnel during all ground-disturbing activities.

With the implementation of these measures, the proposed Woodlands WWTW and sewer upgrade can proceed with negligible risk to archaeological and palaeontological heritage.



Details of Specialist who prepared the HIA

Prepared by Gemma Poretti, an archaeologist with an MPhil in Archaeology from the University of Cape Town where she specialised in using stable carbon isotopes in charcoal to understand rainfall seasonality during the late Pleistocene. Since then, she has begun gaining experience in cultural resource management in South Africa, and joined the CTS Heritage team in 2025. She is a member of the Association of Southern African Professional Archaeologists (ASAPA) and serves on the council of The South African Archaeological Society (ArchSoc) as communications manager. Gemma has also been an active member of the Eastern Cederberg Rock Art Group (eCRAG) since 2024, taking part in regular surveys across the Western Cape to help document and conserve rock art sites.

Report reviewed by Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments and heads up the heritage division of the organisation. She 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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1. INTRODUCTION

1.1 Background Information on Project

This report is drafted to assess the likelihood of impact to significant heritage resources for the proposed upgrading of the Wastewater Treatments Works (WWTW) at Woodlands, Koukamma Municipality, Eastern Cape Province. Bluepebble Sustainable Solutions has been appointed by SMEC South Africa (Pty) Ltd to undertake a Basic Assessment process to ensure compliance with regulations contained in the National Environmental Management Act (NEMA Act No. 107 of 1998) and the Environmental Impact Assessment Regulations (2014), as amended, for the Woodlands Wastewater Treatment Works (WWTW) and sewer reticulation upgrade for the Koukamma Municipality.

The Woodlands sanitation services consist of digester tanks and a 110 mm diameter small bore gravity sewer reticulation system. Effluent from digesters is regularly removed by means of vacuum tankers, transported, and disposed of at the Wastewater Treatment Works (WWTW) at Woodlands Settlement. The WWTW is located 0.5 km south of the southwestern boundary of the Woodlands Settlement. Effluent then undergoes an activated sludge treatment process followed by a clarification process where the solids and liquid are separated before the final effluent is discharged into a surface water course. Sludge settlement is conveyed to a pit close to the treatment works where it is then disposed of. As soon as the hole is 80 % full it is then backfilled, and a new hole is formed. The WWTW is capable of handling flows up to 400 Kl/d of solids free sewage. The hydraulic and treatment capacity of the existing treatment plant will be further studied during the concept and design phases.

The proposed activities for the upgrade of bulk sewers, replacing of small-bore sanitation system at Woodlands is as follows:

- Replace Internal Sewer Reticulation of the woodlands area.
- Design new sewer infrastructure for the proposed development.
- Realign and replace the Bulk Sewer Main.
- Refurbish the existing Waste Water Treatment works.

1.2 Description of Property and Affected Environment

The proposed development area is situated about 10 km southwest of Kareedouw in the Sarah Baartman District Municipality of the Eastern Cape. It lies on Farm Palmiet River 585 in the Woodlands (Oubosstrand) area, a small rural settlement positioned immediately west of the R102 regional road, which runs parallel to the N2 highway further north. The project footprint covers the Woodlands residential settlement and surrounding undeveloped land, extending southward toward the Kommetjie Forest. At the southern end of the footprint is the Woodlands WWTW, linked to the settlement by a bulk pipeline that follows the local access roads.

The surrounding land use is mixed, with small-scale agriculture and forestry plantations interspersed with residential plots and undeveloped forested areas. Much of the terrain is heavily vegetated with dense thicket and



forest, although portions of the northern and eastern sectors have been cleared or cultivated. The northern part of the site includes formal and informal housing, while the southern extent contains the WWTW facility and an informal refuse disposal area used for community waste collection. Dense bush, alien vegetation and litter are present along the proposed pipeline route north of the WWTW, which is adjacent to the town's dumping site.

Topographically, the area is a gently undulating lowland ranging between 220 and 240 masl. The Palmiet River and its drainage depressions cross the site, creating seasonally waterlogged zones in the southern and western sectors. To the east, the river drops into a gorge before joining the Kliprivier. The wider setting includes forestry plantations of pine and eucalyptus, large dairy farms, and natural thicket vegetation. The Tsitsikamma Nature Reserve and mountain range lie north of the N2, while the coastline is about 5 km south of Woodlands.

The village itself consists mainly of low-income housing built in the 1990s and early 2000s, with a cluster of older buildings on the eastern side dating to the early to mid-20th century. A large graveyard has developed north of one of the churches, unfenced and open to the surrounding landscape.

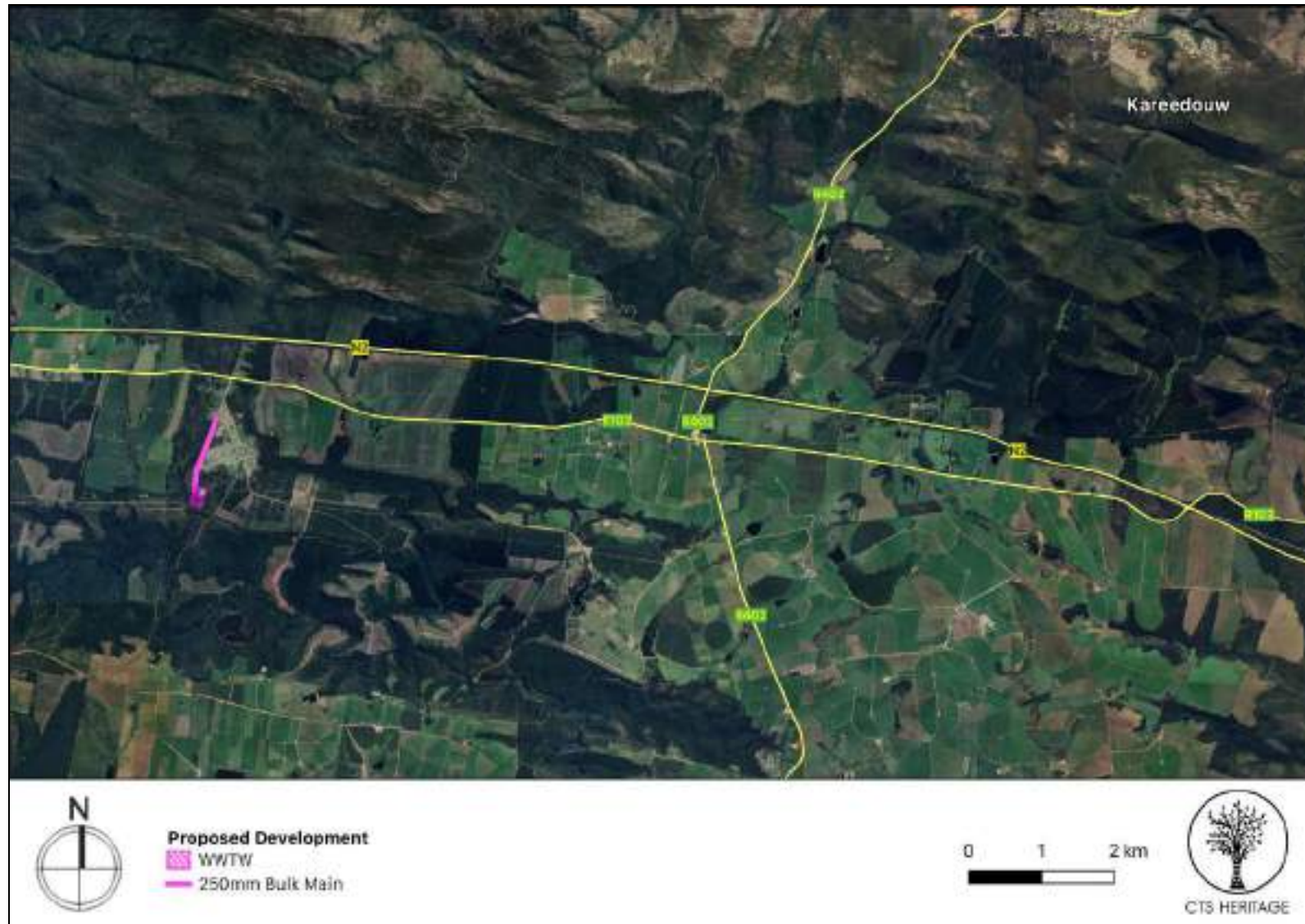


Figure 1.1 Satellite image (2025) indicating the location of the proposed development area in relation to the town of Kareedouw, Eastern Cape

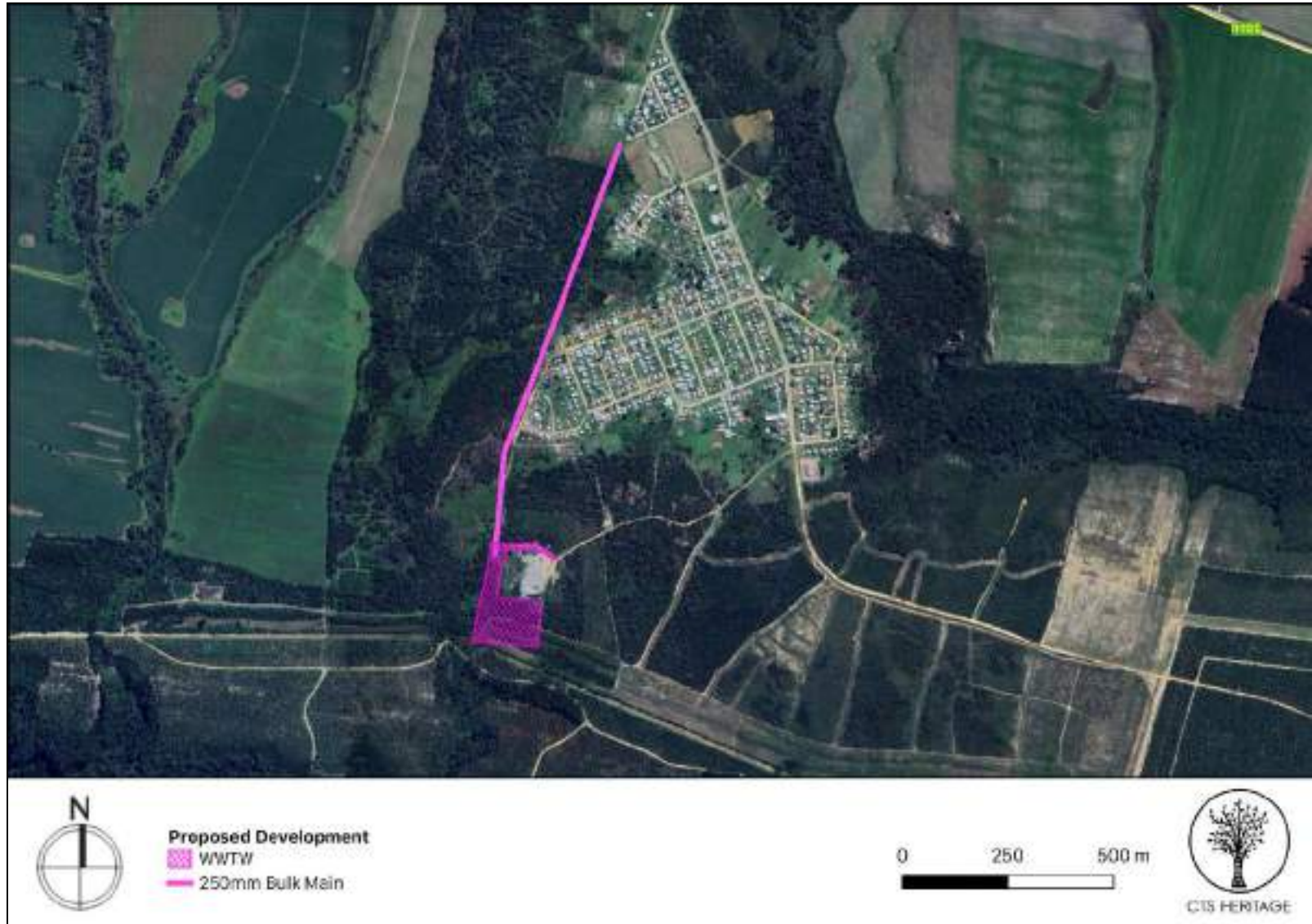


Figure 1.2 Satellite image (2025) showing a closer view of the proposed development area

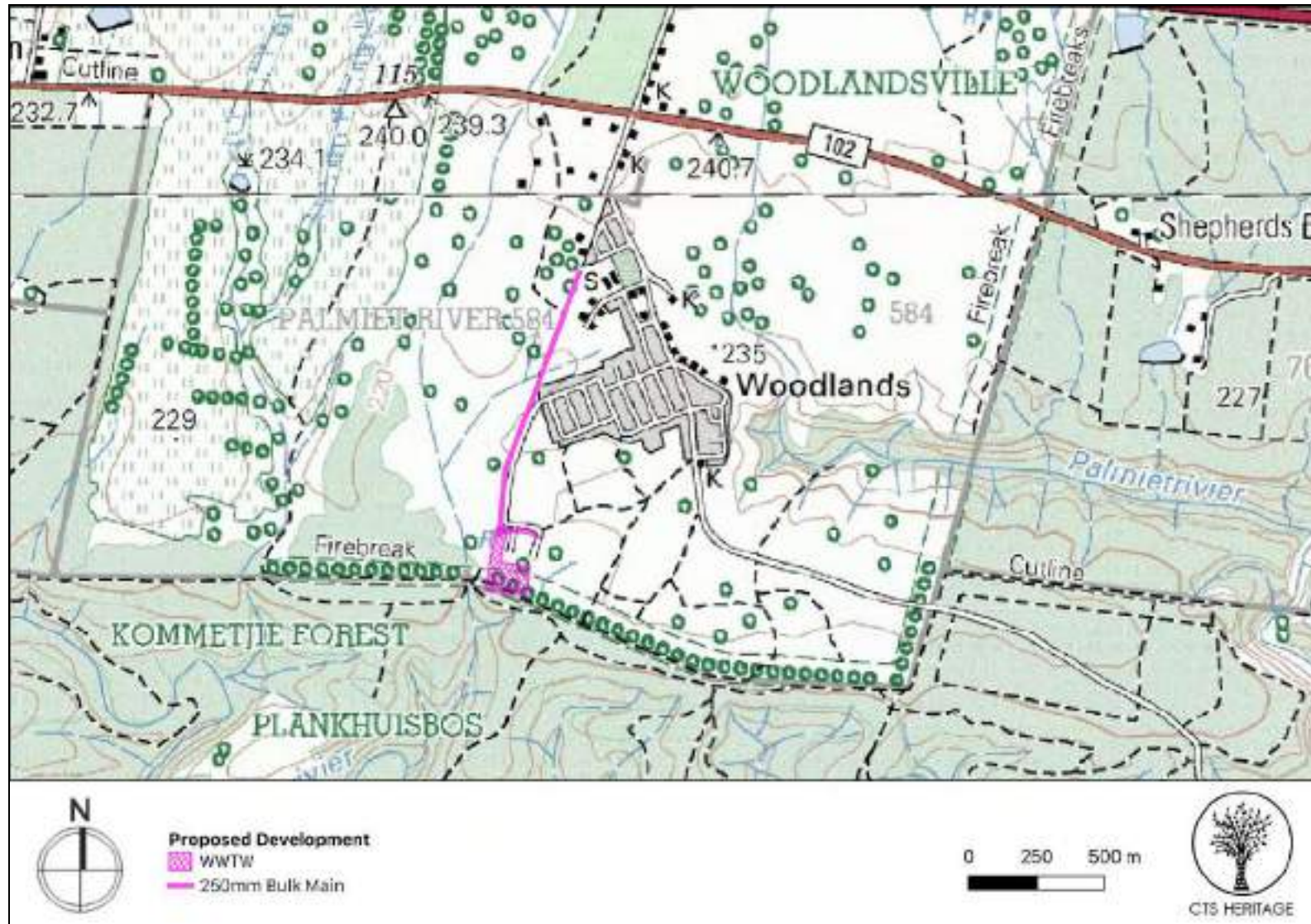


Figure 1.3 The proposed development area reflected on the recent edition of the 1:50 000 Topo Map



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 19 November 2025
- A palaeontologist conducted a field assessment of palaeontological resources likely to be disturbed by the proposed development on 2 November 2025
- 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

The areas surrounding the village are covered in dense vegetation and large amounts of rubbish. As a result, archaeological and palaeontological visibility is low overall, and most of the terrain is part of forestry plantations that have been in operation for much of the 20th century. None of the proposed pipelines and upgrades will take place on undisturbed ground.



2.5 Impact Assessment Methodology

Direct, indirect and cumulative impacts of the issues identified through the Basic Assessment process were assessed in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high).
- The duration, wherein it will be indicated whether:
 - The lifetime of the impact will be of a very short duration (0 – 1 years) – assigned a score of 1.
 - The lifetime of the impact will be of a short duration (2 – 5 years) – assigned a score of 2.
 - Medium-term (5 – 15 years) – assigned a score of 3.
 - Long term (> 15 years) – assigned a score of 4.
 - Permanent – assigned a score of 5.
- The consequences (magnitude), quantified on a scale from 0 – 10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1 – 5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high.
- The status, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

$$S = (E + D + M) \times P$$

S = Significance weighting

E = Extent



D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the acceptability of the development footprint, or the decision process to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the acceptability of the development footprint, or the decision process to develop in the area unless it is effectively mitigated),
- > 60-90 points: High (i.e. where the impact must have an influence on the acceptability of the development footprint, or the decision process to develop in the area).
- > 90 points: Very High (i.e. where the impact must have an influence on the acceptability of the development footprint, or the decision process to develop in the area, and may constitute a fatal flaw where motivated by a specialist consultant)



3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment: Background

The proposed development area is situated approximately 10 km southwest of Kareedouw, the nearest major town, within the Sarah Baartman District Municipality of the Eastern Cape Province, South Africa. Kareedouw got its name from the Khoe phrase “path by the Karee trees.” It was established in 1906 when the Dutch Reformed Church decided to build a church there, which is still in use. South Africa’s late former Prime Minister, John Vorster is buried next to the Dutch Reformed Church in Kareedouw. It has a long history of wood cutting and has a statue in the town to commemorate the town’s woodcutters. The town still has a large wood and lumber industry, with a creosote plant. It is also known as the gateway to the Langkloof as well as the Southern Entrance to the Baviaanskloof. In 2020 it won the Kwela Town of the Year title. The R62 is one of the more well-known routes in South Africa, boasting natural splendour and many hiking trails.

3.2 Built Environment & Cultural Landscapes

The broader area, as part of the renowned Garden Route, is known for its scenic value, especially along the R62. The location of this development between two nature reserves speaks further to the scenic and wilderness value of this broader context. Wahl and Van Schalkwyk (2013) note that the R62 and the Langkloof Scenic Routes have high local and regional significance for their aesthetic and economic (tourism) values. Based on the location of the proposed WWTW adjacent to the existing waste disposal site, and its distance from any major access routes, it is unlikely that the proposed development of the WWTW will negatively impact on the cultural landscape value of the area. The proposed sewer reticulation network is to be located within the existing road network for the existing Woodlands residential development. As this network will be buried, it is unlikely that this infrastructure will negatively impact on the cultural landscape.

3.3 Archaeology

Nilssen (2018) [SAHRIS ID 513392] in a nearby AIA as part of the Impofu WEF located 30km east of the proposed development area, wrote, *“The most sensitive portion of the Impofu Wind Farms site, from an archaeological and heritage standpoint, is the coastal strip where archaeological resources are abundant up to a distance of about 5 km from the shoreline. This stretch is described as a pre-colonial cultural landscape and is highly valued by scientists and the Gamtkwa Khoisan Council. Due to the scarcity of rock shelters and caves in the study area, archaeological sites are rare further inland and are expected to cluster on higher lying areas overlooking the relatively flat to undulating surroundings. Many finds reported inland of the pre-colonial cultural landscape consist of isolated Stone Age specimens or very low density scatters of Stone Age artefacts that occur in disturbed contexts and devoid of any faunal remains or other cultural materials. For the most part, such heritage resources are rated to be of low significance.”* This proposed development area is located further inland which means that it



is located outside of this sensitive coastal band. According to Van Schalkwyk (2013), *“Little is known about the Stone Age in the region, especially with regard to the Middle Stone Age and even more so about the Early Stone Age.”* However, he goes on to note that rock art and shelters occupied during the Later Stone Age are known from the broader region. Rock art sites and associated archaeological deposit may be located within the kloofs and valleys located within the mountains located north of the area under assessment here.

Few heritage impact assessments have been completed in proximity to the area proposed for development, resulting in some Heritage resources being identified within the broader area, most of which are palaeontological in nature (Figure 3). In their Archaeological Assessment as part of a larger project for a 132 kv line running from Melkhout through Humansdorp and Dieprivier to Kareedouw, Wahl and Van Schalkwyk (2013, SAHRIS ID 120032, and Van Schalkwyk & Wahl, 2012, SAHRIS ID 131946) found very few archaeological artefacts or remains. They also included no mitigation recommendations pertaining to archaeology. They do list some finds from other prior assessments completed by Binneman in the vicinity [SAHRIS IDS 6890 and 162676]. The archaeological sensitivity of the broader area can be summarised as follows, *“ESA stone artefacts are common throughout the region and a large site is present on the hill slopes close to the confluence of the Krom and Diep Rivers, about 3.5 km south-east of Dieprivier Substation (Binneman 2010; 2012). Binneman also identified MSA /ESA artefacts about 2.3 km south-east of Dieprivier Substation (Binneman 2010), a single ESA handaxe 2.7 km north-west of proposed Tower 46 (Binneman 2011) and a scatter of ESA artefacts about 8 km south-west of Dieprivier Substation (Binneman 2012).”* In Binneman’s report (2011, SAHRIS ID 6890, the large orange polygon in Figure 2), he wrote, *“The proposed Happy Valley Wind Energy Facility is approximately 20 kilometres from the coast and falls outside the coastal sensitive zone. The site is covered by dense grass and fynbos vegetation, which made archaeological observation very difficult. Only one large Earlier Stone Age handaxe was observed eroding from the exposed gravel in a track leading to the top of the ridge.”*

The area proposed for development in this application has not previously been assessed for impacts to archaeological heritage however, due to the location of the proposed WWTW adjacent to the existing waste disposal site, as well as the limited nature and scale of the proposed WWTW, it is unlikely that this proposed development will negatively impact on significant archaeological heritage. The proposed sewer reticulation network is to be located within the existing road network for the existing Woodlands residential development. As such, the establishment of this water infrastructure will be located in areas that have been extensively previously disturbed and as such, it is unlikely that this proposed development will negatively impact on significant archaeological heritage.

3.4 Palaeontology

According to the SAHRIS Palaeosensitivity map, the area proposed for development is underlain by sediments of varying levels, from low to very high palaeontological sensitivity. According to the extract from the Council of



GeoScience map for Port Elizabeth (3324), the area proposed for the WEF is underlain by sediments of the Peninsula Formation (Op), the Cederberg Formation (Oc), the Goudini Formation (Sg) and the Skurweberg Formation (Ss).

Almond (2013, SAHRIS ID 131953) in a PIA that intersects with the proposed development (Figure 2. Previous Heritage Impact Assessments), wrote *“Body fossils (shells, teeth, bones etc) are so far unknown from the Peninsula Formation but a modest range of shallow marine to nearshore fluvial and / or estuarine trace fossils have been recognised, mainly from the Western Cape outcrop area (e.g. Rust 1967, Potgieter & Oelofsen 1983, Broquet 1990, 1992, Almond 1998a,b, Braddy & Almond 1999, Thamm & Johnson 2006). These traces include trilobite resting and feeding burrows (Cruziana, Rusophycus), arthropod trackways (e.g. Diplichnites, Palmichnium) that are variously attributed to eurypterids, crustaceans or trilobites, palmate, annulated feeding burrows (Arthropycus), dense assemblages (“pipe rock”) of vertical dwelling burrows of unknown suspension feeders (Skolithos, Trichichnus), vertical columns or cones of densely reworked sediment (Metaichna / possible Heimdallia), and several types of horizontal burrows (Palaeophycus, possible Aulichnites)...An important, albeit low diversity, assemblage of Peninsula Formation trace fossils was recently recorded from heterolithic beds exposed in the Rosenhof Quarry site within the broader Tsitsikamma Community Wind Energy Facility study region to the southwest of Humansdorp by Almond (2012). Traces here include vertical Skolithos burrows, Rusophycus and Cruziana arthropod scratch burrows that were probably generated by trilobites, possible bivalve burrows (Lockeia) and teichichnoid spreiten burrows, as well as abundant flower-shaped “gyrophyllitid” burrows that had previously been reported from beach boulders at Cape Saint Francis.”* In the Palaeotechnical report on formations in the Eastern Cape (2009, SAHRIS ID 108744), the Peninsula Formation has low palaeontological sensitivity.

On the Cederberg Formation, Almond (2013) writes, *“An exceptionally important and interesting biota of soft-bodied (i.e. unmineralised) and shelly invertebrates, primitive jawless vertebrates and microfossils has been recorded since the middle 1970s from finely laminated, black mudrocks of the Soom Member, forming the lower, mudrock dominated portion of the Cederberg Formation. This is one of only two so-called soft-body Lagerstaette of Late Ordovician age recorded worldwide (the other example was recently discovered in Canada; Young et al., 2007). The “Soom Shale” is between 10-15m thick, and fossils occur sporadically throughout the succession, from 1m above the base upwards. This biota has been extensively reviewed by Aldridge et al. (1994, 2001) and Selden and Nudds (2004) while much new information remains to be published (See review in Almond 2008 and refs. therein). The macrofossils include a range of macroalgae, shelly invertebrates (e.g. inarticulate brachiopods, conical-shelled nautiloids and other molluscs, crustaceans, unmineralised trilobites and eurypterids or “water scorpions”) and several groups of primitive jawless fish (e.g. anaspids, conodonts). Important microfossil groups include chitinozoans, spore tetrads of land plants and marine acritarchs. A further interesting category of fossils recorded from the Soom Member of Kromrivier are bromalites. These are the various fossilised products of*



ancient animal guts such as droppings (coprolites), regurgitates and stomach contents that sometimes contain the comminuted remains of recognisable prey animals such as conodonts or brachiopods (Aldridge et al., 2006). The majority of Soom fossils have been collected from a handful of localities, most of which lie on the Clanwilliam sheet within the central to northern Cedarberg (Gray et al. 1986, Cocks & Fortey 1986, Theron et al. 1990, Aldridge et al. 1995). New fossiliferous localities have recently been identified in the Clanwilliam area, while well preserved trilobite trace fossils (*Rusophycus*) have been collected from thin tempestite sandstones towards the base of the Soom Member in the Hex River Mountains by Almond (unpublished obs., 2011). In the Palaeotechnical report (2009) the Cedarberg Formation recommendation is “field scoping study recommended before excavation takes place” followed by “This unit often obscured by Cape age deformation and poor exposure of mudrocks in mountainous terrain. Its development in the Eastern Cape is not well understood.” It is determined to have high sensitivity for impacts to palaeontology.

Almond (2013) summarises the next two formations in the Table Mountain group as “*The fossil record of the Goudini and Skurweberg Formations, dominated by braided fluvial sandstones, is very sparse indeed. This reflects major global regression (low sea levels) during the Silurian Period, peaking during the latter part of the period (Cooper 1986). Sporadic, low diversity ichnoassemblages from thin, marine-influenced stratigraphic intervals have been recorded from all three Nardouw formations in the Western Cape by Rust (1967a, 1981) and Marchant (1974). There are also scattered, often vague reports of trace fossils in geological sheet explanations and SACS reports (e.g. Malan et al. 1989, De Beer et al. 2002). Most involve “pipe rock” (*Skolithos* ichnofacies) or various forms of horizontal epichnial burrows, including possible members of the *Scolicia* group which may be attributable to gastropods. Also recorded are typical Early Silurian palmate forms of the annulated burrow *Arthropycus*, poorly preserved “bilobites” (bilobed arthropod scratch burrows), gently curved epichnial furrows and possible arthropod tracks (Almond 2008). It is possible that more diverse ichnoassemblages (and even microfossils from subordinate mudrock facies where these have not been deeply weathered or tectonised) may eventually be recorded from the more marine-influenced outcrops of the Eastern Cape Fold Belt.*” In the Palaeotechnical report (2009, SAHRIS ID 108744), both the Goudini and Skurweberg formations have low palaeontological sensitivity.

On the Table Mountain Group formations in the area, surveyed by Almond (2013), he wrote, “*During the present one-day field study almost all the Table Mountain Group exposures showed high levels of tectonic deformation (e.g. steep bedding, quartz veins, pervasive cleavage within mudrock intervals) as well as deep chemical weathering. These two factors, which are both more extremely developed within the potentially more fossiliferous mudrock-rich intervals of the Table Mountain Group (e.g. Cedarberg, Goudini and Baviaanskloof Formation), have seriously compromised fossil preservation here. No fossil remains were observed within the Table Mountain Group sediments in the study area and the various formations concerned are considered to have a low palaeontological sensitivity in this region.*”



Based on Almond et al. (2009) and Almond (2013), a field survey is usually recommended for geology that has high and very high palaeontological sensitivity, but due to tectonic deformations, the fossil finds may be limited. In the HIA by Van Schalkwyk and Wahl (2012, SAHRIS ID 131946), the palaeontological sensitivity of the area is summarised it as *“underlain by potentially fossiliferous bedrocks of Palaeozoic, Mesozoic and Caenozoic age that crop out within the Cape Fold Belt, Southern coastal plain and Gamtoos River Valley of the Eastern Cape. The Dieprivier-Kareedouw sector runs along the grain of the Cape Fold Belt and is partially underlain by Early Devonian sediments of the Baviaanskloof and Gydo Formations that may contain early land plants and marine invertebrates respectively. However, given the tight folding here, it is quite likely that most of the original fossil content of these rocks has been destroyed by tectonism.”*

The area proposed for development in this application has not been previously assessed for impacts to palaeontological heritage however, due to the limited nature and scale of the proposed WWTW, it is unlikely that this proposed development will negatively impact on significant archaeological heritage. The proposed sewer reticulation network is to be located within the existing road network for the existing Woodlands residential development.



Figure 2 Satellite image (2025) indicating the proposed location of development in relation to heritage studies previously conducted, with SAHRIS NIDs indicated



Figure 3 Heritage Resources previously identified near the study area, with SAHRIS Site IDs indicated

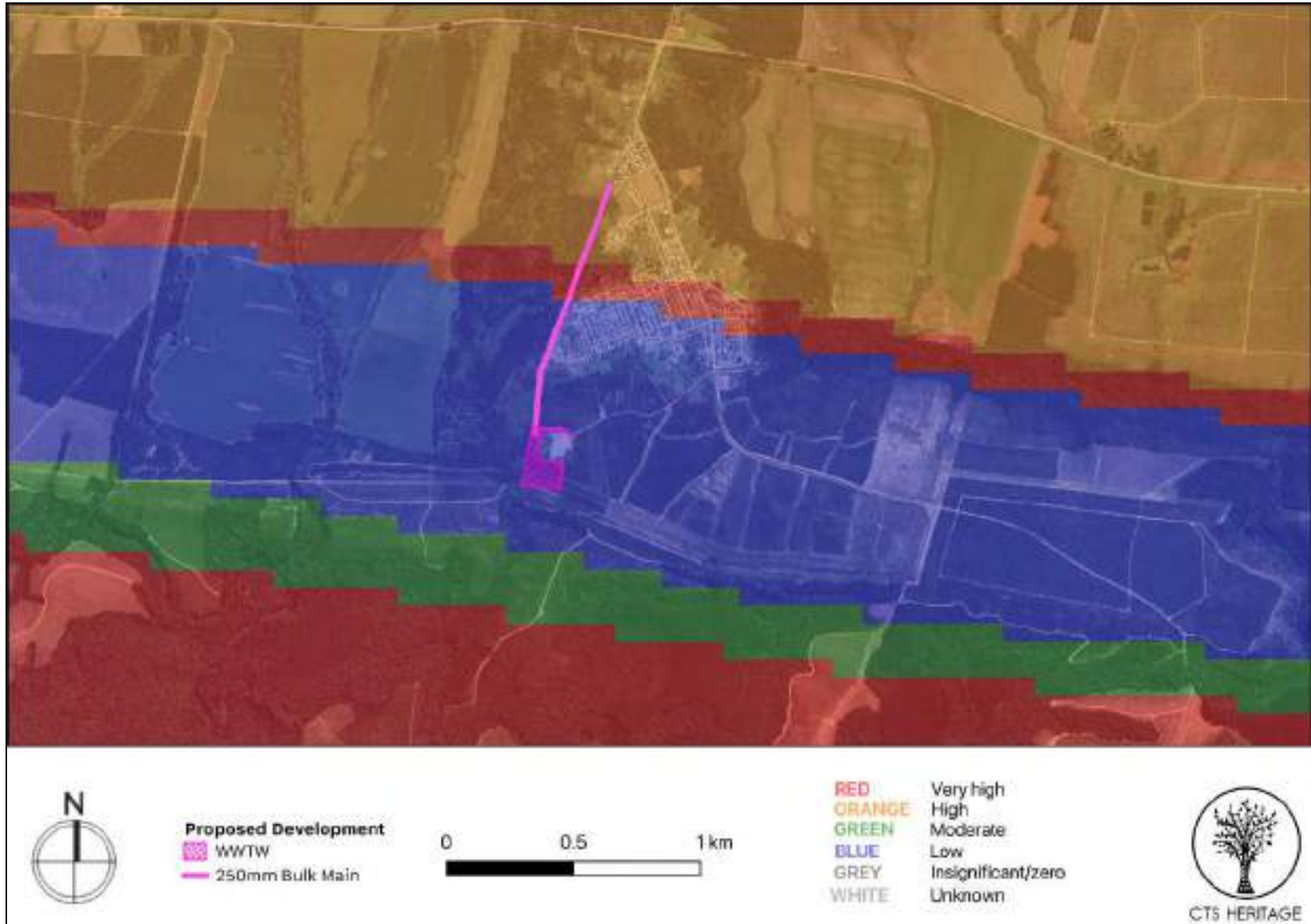


Figure 4.1 Map indicating the variable palaeontological sensitivity of the development area, from Low to High and Very High, from the SAHRIS PalaeoMap

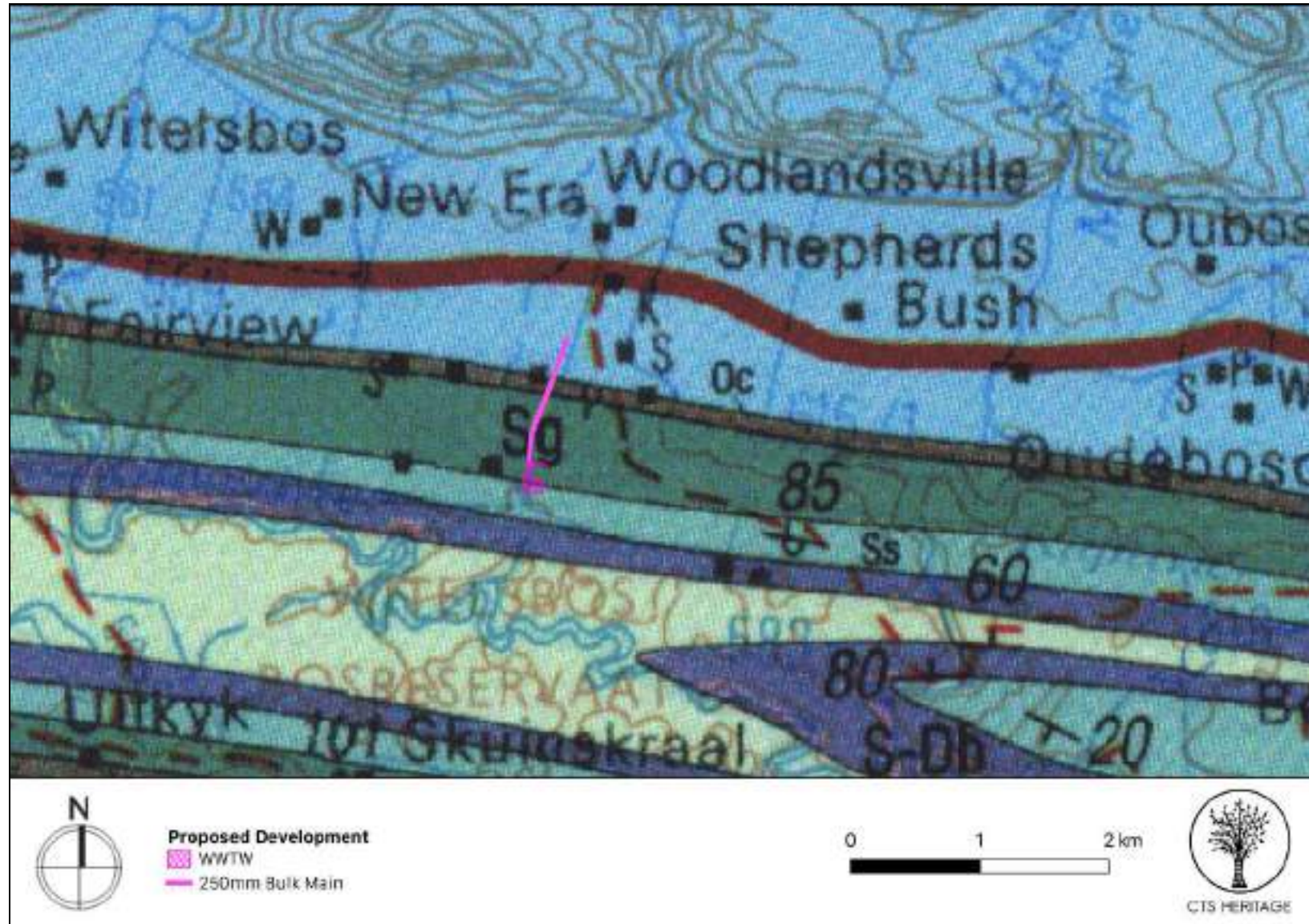


Figure 4.2 Extract from the CGS 3324 Port Elizabeth Map indicating that the development area is underlain by sediments of the Table Mountain Group Op: Peninsula Formation, Sg: Goudini Formation, Ss: Skurweberg Formation



4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of Findings of Specialist Reports

4.1.1 Archaeology (Appendix 1)

The field assessment recorded a municipal graveyard north of the school and church, which remains unfenced but is actively used and was graded IIIA for its social and spiritual value. Two 20th-century homesteads of local architectural and historic significance were identified and graded IIIB, though both lie more than 350 m from the pipeline route and are unlikely to be impacted. A ruin within the WWTW area was also noted but assessed as Not Conservation Worthy, given it is in disrepair and its surroundings have been extensively altered.

No archaeological material, such as stone artefacts or ceramics, was observed, and previous studies similarly indicate low archaeological sensitivity in the area. With the pipeline following existing roads and being buried, and all identified heritage resources lying outside the development footprint, the overall impact on archaeological heritage is considered low.

4.1.2 Palaeontology (Appendix 2)

The development footprint is underlain by sedimentary units of the Table Mountain Group (Cape Supergroup), namely the Peninsula, Cederberg, Goudini, and Skurweberg formations. These units, of Ordovician to Silurian age, are regionally known to preserve sparse trace-fossil assemblages — such as *Skolithos* and *Cruziana* burrows — but are generally unfossiliferous in the Eastern Cape due to extensive tectonic deformation and deep weathering.

The field assessment confirmed that the development footprint has been extensively disturbed, particularly in the eastern and central sections, where infrastructure and previous land use have altered the surface. The western portion is covered by dense forest vegetation, which restricted visibility and prevented direct observation of the underlying geology. Areas to the north and northwest are occupied by residential developments and small-scale agricultural plots, further limiting exposure. No in situ bedrock outcrops or fossil material were identified during the survey, and no fossiliferous horizons were detected.

Overall, the site is heavily modified and obscured by vegetation, settlement, and waste disposal activities. Given the lack of exposures and the absence of fossil finds during the survey, the potential for encountering significant palaeontological material during construction is regarded as low. Any fossil occurrences, if present, are expected to be isolated and of limited scientific importance, and the impact on palaeontological heritage resources from excavation and trenching is therefore considered minimal.

4.2 Heritage Resources Identified

During the archaeological field assessment, four heritage observations were made in proximity to the development area, three to the east of the pipeline route, and one within the bounds of the existing WWTW. None of these observations were archaeological in nature (e.g., stone artefacts, pottery and ceramics, precolonial stonewalling or structures etc.). Other nearby heritage assessments have similarly found a low density and occurrence of archaeological material, concluding that the area likely has low archaeological sensitivity (Nilssen 2018, SAHRIS NID 513392; Wahl and Van Schalkwyk 2013, SAHRIS ID 120032; Van Schalkwyk & Wahl 2012, SAHRIS ID 131946). No fossil material was identified during the palaeontological survey.

Table 1 below shows the observations made during the field assessments. For full descriptions and images, see Appendix 1.

Table 1: Archaeological observations noted during the field assessment

POINT ID	Description	Density	Type	Period	Co-ordinates		Grading	Mitigation
001	Ruined 20th-century buildings near WWTW	n/a	Ruin	Modern	-34.01109	24.159615	NCW	n/a
002	Early 20th-century homesteads and vernacular buildings	n/a	Structure	Historical	-34.00526	24.166239	IIIC	50m Buffer
003	20th-century ruins and church building	n/a	Structure, Ruin	Historical, Modern	-34.00349	24.166255	IIIC	50m Buffer
004	Woodlands graveyard, unfenced, surrounded by trees	n/a	Graves/Burial Grounds	Modern	-34.00222	24.166182	IIIA	100m Buffer

4.3 Mapping and Spatialisation of Heritage Resources

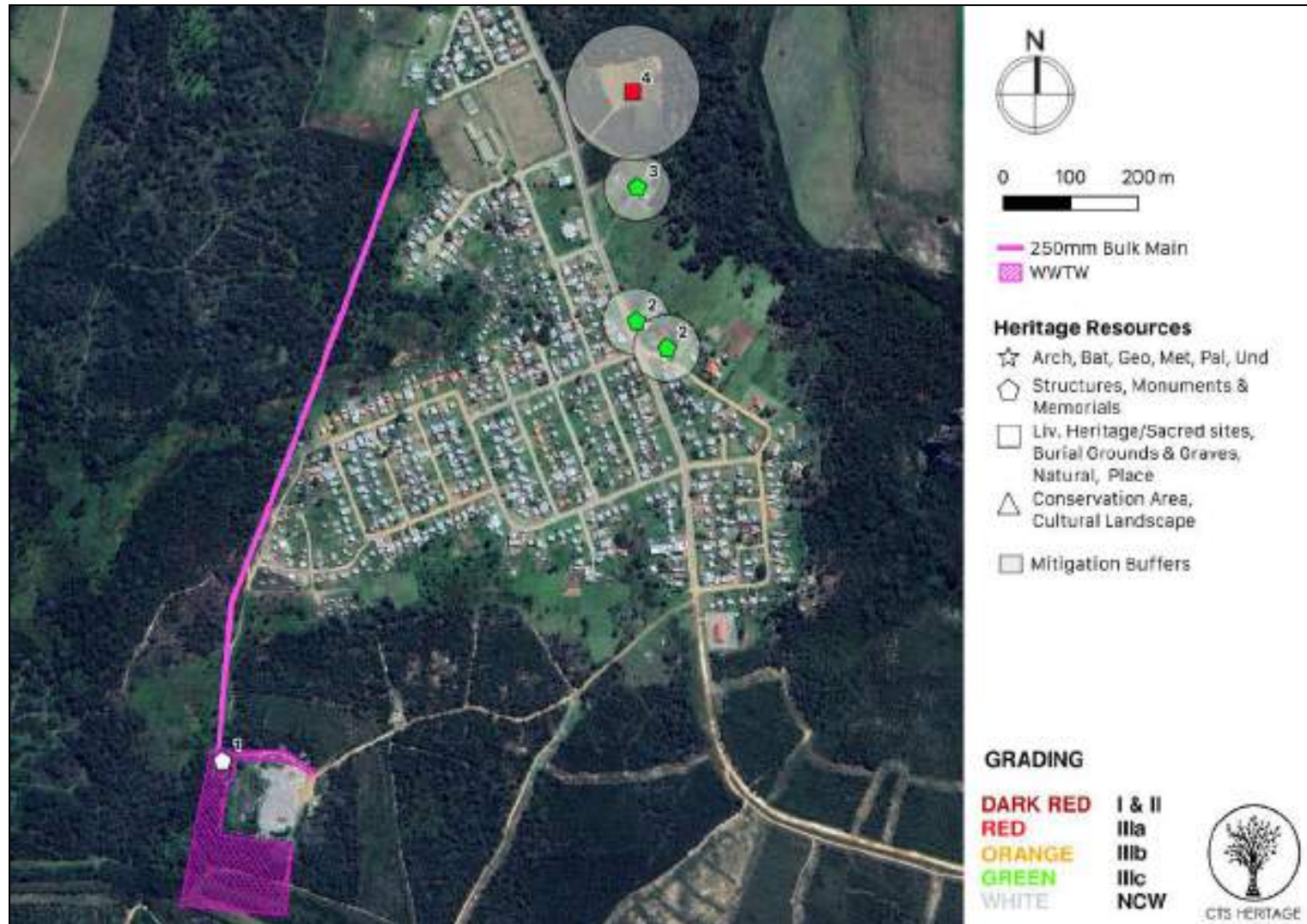


Figure 5.1 All the archaeological sites and observations noted in proximity to the development area. Mitigation buffers are mapped for reference, but no impact on these sites is anticipated given their distance from the pipeline route.



5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of Impact to Heritage Resources

5.1.1 Cultural Landscape and VIA

According to the client, a visual study was not deemed necessary as the scope of work is confined to an already developed footprint adjacent to the landfill. Nevertheless, potential impacts to the cultural landscape and visual quality must be addressed.

Sense of place refers to a user's unique experience of an environment, shaped by cognitive perception. Visual character – defined by factors such as topography, development, vegetation and cultural or historical features – plays a significant role. An impact on sense of place occurs when the visual landscape is altered to the extent that the environment is experienced less positively. At Woodlands, the broader environment is predominantly residential and agricultural in character, and a prominent landfill that already represents a visual disturbance.

The anticipated visual impact of the proposed WWTW on regional visual quality (beyond 6 km) and sense of place is difficult to quantify but generally expected to be of low significance. The provision of basic services and associated infrastructure adds another layer to the cultural landscape, but this is acceptable in residential areas. As the proposed development area is dominated by residential settlement and most infrastructure will consist of buried pipelines, the likely impact to the cultural landscape is minimal.

5.1.2 Archaeology

During the field assessment, four heritage observations were noted in proximity to the development area, three to the east of the proposed pipeline route, and one within the bounds of the WWTW site (Figure 5.1). None of these observations were archaeological in nature (e.g., stone artefacts, pottery and ceramics, precolonial stonewalling or structures, etc.). Other nearby heritage assessments have similarly found a low density and occurrence of archaeological material, concluding that the area likely has low archaeological sensitivity (Nilssen 2018, SAHRIS NID 513392; Wahl and Van Schalkwyk 2013, SAHRIS ID 120032; Van Schalkwyk & Wahl 2012, SAHRIS ID 131946).

Two 20th-century homesteads were identified during the assessment. These structures were assessed as culturally significant, with appreciable architectural and historic value in the local context, and were therefore graded IIIB. The surrounding area is already built up, with roads and services nearby, and the homesteads are located more than 350 m from the proposed pipeline route. Given this context and the relatively limited nature of the development, sensitivity in the vicinity is low and impact is unlikely. A 50 m buffer has been mapped around these structures in Figure 5.1 for reference purposes.

An unfenced graveyard was observed during the field assessment, and this site is still actively used and visited by residents of the Woodlands area. It was therefore assessed to have high levels of local social and spiritual



heritage significance and graded IIIA. The graveyard lies approximately 300 m from the proposed pipeline route, a distance that exceeds the recommended 100 m buffer for graves and burials.

Within the WWTW area, a ruin of a 20th-century building was identified just 5 m from the proposed pipeline route. However, the ruin is in disrepair and has no discernible cultural value, and the immediate surroundings have been drastically altered. It was therefore assessed as Not Conservation Worthy (NCW). The recording of this structure as part of the assessment is considered sufficient, and no further mitigation measures are recommended. While there remains the possibility that there is buried material associated with this ruin, it is unlikely that this buried material will have any significant archaeological or scientific cultural value. There is no objection to the demolition of this ruin for the construction of the proposed WWTW.

Overall, the limited number of heritage resources identified during the assessment are not anticipated to be impacted by the proposed development, and the significance of impact to surrounding resources is considered **Low**, even without mitigation (Table 2.1). With mitigation, including the reporting of any buried archaeological material to ECPHRA, impact remains **Low** (Table 2.1).



Table 2.1 Impacts of the proposed development to archaeological resources

NATURE: The construction phase of the project will require excavation, which may impact on archaeological heritage resources if present.				
		Without Mitigation		With Mitigation
MAGNITUDE	L (2)	No archaeological heritage resources of significance were identified within the development footprint, though some occur in the broader area	L (1)	No archaeological heritage resources of significance were identified within the development footprint, though some occur in the broader area
DURATION	H (5)	Where an impact to an archaeological resource occurs, the impact will be permanent.	H (5)	Where an impact to a resource occurs, the impact will be permanent.
EXTENT	L (1)	Impacts confined to the development footprint	L (1)	Impacts confined to the development footprint
PROBABILITY	L (1)	It is unlikely that significant heritage resources will be impacted	L (1)	It is unlikely that significant heritage resources will be impacted
SIGNIFICANCE	L	$(1+5+2) \times 1 = 8$	L	$(1+5+1) \times 1 = 7$
STATUS		Negative		Neutral
REVERSIBILITY	L	Any impacts to heritage resources that do occur are irreversible	L	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE LOSS OF RESOURCES?	L	Unlikely	L	Unlikely
CAN IMPACTS BE MITIGATED		Yes		Yes
MITIGATION: - Should any buried archaeological resources, human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. Eastern Cape Provincial Heritage Resources Authority (ECPHRA) must be contacted immediately in order to determine an appropriate way forward.				
RESIDUAL RISK: Should any significant resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of cultural resources of potential scientific value.				



5.1.3 Palaeontology

The construction and upgrading of the Woodlands WWTW and associated sewer reticulation network will involve vegetation clearance, excavation, trenching, and grading. These activities will disturb surface and shallow subsurface deposits and may affect any fossil material preserved within the underlying strata.

The development area is underlain by the Peninsula, Cederberg, Goudini, and Skurweberg formations of the Table Mountain Group. Each of these formations has been assigned a Low palaeontological sensitivity. Fossil material known from these units elsewhere consists almost exclusively of sparse trace fossils, such as Skolithos and Cruziana burrows, with body fossils being rare or absent.

No fossil material was identified during the field assessment. The site is extensively disturbed in areas associated with existing infrastructure and residential development, while dense vegetation limits visibility in the remaining portions of the footprint. No in situ bedrock exposures were observed, and no fossiliferous horizons were detected.

The potential for encountering significant fossil material during construction is regarded as low. Fossil occurrences, if present, are expected to be isolated and of limited scientific importance. The overall impact on palaeontological resources from the proposed development is considered **Low**, even without mitigation, and remains **Low** with mitigation (Table 2.2).

Table 2.2: Impacts of the proposed development of the proposed development to palaeontological resources

NATURE: The construction phase of the project will require excavation, which may impact on palaeontological heritage resources if present.				
		Without Mitigation		With Mitigation
MAGNITUDE	L (2)	The area proposed for development is underlain by sediments of low palaeontological sensitivity	L (1)	The area proposed for development is underlain by sediments of low palaeontological sensitivity
DURATION	H (5)	Where an impact to resources occurs, the impact will be permanent.	H (5)	Where an impact to resources occurs, the impact will be permanent.
EXTENT	L (1)	Since fossil material known from these units consists almost exclusively of sparse trace fossils, the spatial scale will be localised within the site boundary	L (1)	Since fossil material known from these units consists almost exclusively of sparse trace fossils, the spatial scale will be localised within the site boundary
PROBABILITY	L (1)	The potential impact to fossil heritage resources is low	L (1)	The potential impact to fossil heritage resources is extremely low
SIGNIFICANCE	L	$(1+5+2) \times 1 = 8$	L	$(1+5+1) \times 1 = 7$
STATUS		Negative		Positive
REVERSIBILITY	L	Any impacts to heritage resources that do occur are irreversible	L	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE LOSS OF RESOURCES?	L	Unlikely	L	Unlikely
CAN IMPACTS BE MITIGATED		Yes		Yes
MITIGATION: - Chance Fossil Finds Protocol (CFFP): A Chance Fossil Finds Protocol must be incorporated into the Environmental Management Programme (EMPr) to guide on-site personnel during all ground-disturbing activities.				
RESIDUAL RISK: Should any significant resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources.				



5.2 Sustainable Social and Economic Benefit

Social and economic benefits expected from the Woodlands WWTW and sewer reticulation upgrades are detailed in the project's *Water Use License and Application Summary Report (2025)*:¹

"The Integrated Development Plan (IDP) of Koukamma Local Municipality (2025/2026) ... provides key objectives across various sectors, aiming to enhance service delivery, governance, environmental stability etc. One of these objectives relate to the provision of Basic Services as follows:

- *Deliver essential services such as water, sanitation, electricity, and waste management*
- *Ensure access to piped water, sanitation, and refuse removal.*

Some of the key objectives of the district is related to ensure services to communities in a sustainable manner and promote a safe and healthy environment. These goals are the blueprint to achieve a better and more sustainable future for all. These challenges are related to poverty, climate, environmental degradation and prosperity for example...

The approval of the application will result in significant social benefits, which is in line with the SDF of Koukamma Local Municipality (2022). This is reflected by creating better living conditions for individuals in the catchment area, by allowing more houses to be built, while ensuring adequate sanitary circumstances are maintained with the increase in capacity of the wastewater treatment site. The upgrade is essential if the receiving environment is to be protected from discharges of poorly treated or untreated effluent into watercourses.

Various job opportunities will be created by the upgrade of the WWTW in the form of contracting staff in the form of labourers, technical, engineering, operating and maintenance staff."

Based on the outcomes of this heritage assessment, the anticipated socio-economic benefits to be derived from the project outweigh any anticipated negative impacts to heritage resources.

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 layout provided for the Woodlands WWTW is unlikely to negatively impact on significant heritage resources and as such, no alternatives are proposed from a heritage perspective.

¹ Jordaan, S. 2025. Appendix G7 - Proposed Upgrade to the Woodlands Wastewater Treatment Works and Associated Sewerage Infrastructure: Water Use License Application Summary Report. Prepared for Koukamma Municipality by Confluent Environmental.
<https://bluepebble.co.za/blog/upgrading-waste-water-treatment-works-woodlands-koukamma-local-municipality#:~:text=Anonymous%20/%2027.03.2025-,Upgrading%20of%20Waste%20Water%20Treatment%20Works%20at%20Woodlands%2C%20Koukamma%20Local,a%20new%20hole%20is%20formed.>



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

7. CONCLUSION

The assessment of the Woodlands area proceeded with certain constraints, notably reduced surface visibility due to dense vegetation cover. Nevertheless, the area was comprehensively surveyed for heritage resources. As with previous surveys across the broader Kareedouw area, this assessment recorded a low density and occurrence of archaeological and palaeontological material, with no significant heritage resources identified within the development footprint. The sewer reticulation network will be upgraded along existing road systems and buried, meaning no notable impact to the character of the area is expected.

Both archaeological and palaeontological resources in the study area are assessed as having low sensitivities. The calculated impact of the proposed development on these resources is correspondingly low, and with mitigation, overall impacts to heritage are considered minimal and unlikely.

8. RECOMMENDATIONS

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

- Should any buried archaeological resources, human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. Eastern Cape Provincial Heritage Resources Authority (ECPHRA) must be contacted immediately in order to determine an appropriate way forward.
- Chance Fossil Finds Protocol (CFFP): A Chance Fossil Finds Protocol (Appendix 4) must be incorporated into the Environmental Management Programme (EMPr) to guide on-site personnel during all ground-disturbing activities.

With the implementation of these measures, the proposed Woodlands WWTW and sewer upgrade can proceed with negligible risk to archaeological and palaeontological heritage.

9. REFERENCES

Heritage Impact Assessments				
NID	Report Type	Author/s	Date	Title
4255	HIA Letter of Exemption	Johan Binneman	01/06/2006	Letter Of Recommendation (With Conditions) For The Exemption Of A Full Phase 1 Archaeological Heritage Impact Assessment For The Subdivision And Rezoning Of Portion 28 Of The Farm "Melkhoutekraal" No. 254 In Kareedouw (Koukama Municipality), From Agriculture
6890	AIA Phase 1	Johan Binneman	04/06/2011	A Phase 1 Archaeological Impact Assessment For The Proposed Happy Valley Wind Energy Facility Near Humansdorp, Kouga Local Municipality, District Of Humansdorp, Eastern Cape Province
6891	AIA Desktop	Johan Binneman	01/06/2009	An Archaeological Desktop Study For The Proposed Happy Valley Wind Energy Facility. Kou-Kamma Municipality, Humansdorp District, Eastern Cape Province
7124	AIA Phase 1	Karen Van Ryneveld	20/09/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa
7594	AIA Phase 1	Johan Binneman	01/08/2011	Phase 1 Archaeological Impact Assessment For The Proposed Oyster Bay Wind Energy Facility, Kouga Local Municipality, Humansdorp, Eastern Cape Province
7595	AIA Desktop	Johan Binneman	01/11/2010	An Archaeological Desktop Study For The Proposed Oyster Bay Wind Energy Facility, Local Kuga Municipality, Humansdorp District, Eastern Cape Province
8101	AIA Desktop	Johan Binneman	07/03/2011	An Archaeological Desktop Study For He Construction Of The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province
8102	AIA Phase 1	Johan Binneman	01/08/2011	A Phase 1 Archaeological Impact Assessment For The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.
8445	HIA Phase 1	Karen Van Ryneveld	31/12/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa 1
8446	HIA Phase 1	Karen Van Ryneveld	31/12/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa
8914	PIA Phase 1	Robert Gess	30/03/2011	Palaeontological Heritage Component Of Fibreco Telecommunications, Basic Assessment For The Proposed Fibre Optic Data Cable Project: Route 5: Pe To Durban
8929	PIA Phase 1	Billy De Klerk	04/01/2011	Palaeontological Heritage Impact Assessment Of The Proposed Happy Valley Wind Energy Facility On A Site East Of Humansdorp, Eastern Cape
8955	PIA Phase 1	Billy De Klerk	17/12/2010	Palaeontological Heritage Impact Assessment Of The Proposed Wind Farms In The Coastal Region Of The Kouga Local Municipality Near The Villages Of Oyster Bay And St Francis Bay.
8988	PIA Phase 1	John E Almond	20/09/2011	Proposed Oyster Bay Wind Energy Facility Near Humansdorp. Kouga Local Municipality, Eastern Cape
9033	PIA Phase 1	John E Almond	02/08/2011	Proposed Tsitsikamma Community Wind Energy Facility Near Humansdorp, Kouga Local Municipality, Eastern Cape Province

26808	AIA Phase 2	Karen Van Ryneveld	03/06/2012	Phase 1 Archaeological Assessment Micro-Siting & Phase 2 Archaeological Test Pitting Turbine Line 33-36, Red Cap Kouga Wind Farm, Central Cluster, Oyster Bay, Eastern Cape, South Africa
44916	AIA Phase 1	Karen Van Ryneveld	25/06/2012	Mining Right Application: Farms Klein Rivier (713-32) And Buffelsbosch (742-14), Humansdorp District, Eastern Cape, South Africa
44918	PIA Desktop	John Pether	05/06/2012	Mining Right Application On Farms Klein Rivier 713 Ptn 32 And Buffelsbosch 742 Ptn 14 District Of Humansdorp, Eastern Cape Province
120032	AIA Phase 1	Elizabeth Wahl, Len van Schalkwyk	08/05/2013	Phase 1 Archaeological Impact Assessment Report: Proposed 132kV Power Line and Substation Infrastructure, Melkhout-Dieprivier, Kouga Local Municipality, Cacadu District, Eastern Cape Province, South Africa
108744	Palaeotechnical Report	John E Almond, Billy De Klerk, Robert Gess	01/05/2009	Palaeontological heritage of the Eastern Cape
125085	AIA Phase 1	Karen Van Ryneveld	15/07/2013	Tsitsikamma Wind Farm - Borrow Pits Project, Humansdorp Registration Division, Eastern Cape
125089	PIA Phase 1	Karen Van Ryneveld	17/07/2013	Palaeontological Heritage Study For Proposed Establishment Of Borrow Pits (For Road And Concrete Construction Materials) To Primarily Serve The Tsitsikamma Community Wind Farm Project
131946	AIA Desktop	Len van Schalkwyk, Elizabeth Wahl	30/05/2012	Phase 1 Heritage Impact Assessment Report: 132kV Power Line and Substation Infrastructure, Dieprivier-Kareedouw, Kouga Local Municipality, Cacadu District Municipality, Eastern Cape Province, South Africa
131953	PIA Phase 1	John E Almond	01/05/2013	Palaeontological specialist assessment: combined field-based and desktop study PROPOSED KAREEDOUW-DIEPRIVIER 132 kV TRANSMISSION LINE PROJECT, HUMANSDORP MAGISTERIAL DISTRICT, EASTERN CAPE.
162676	HIA Phase 1	Johan Binneman	31/10/2012	A Phase 1 Archaeological Impact Assessment For The Proposed 132kv Power Line Linking The Tsitsikamma Community Wind Energy Facility To The Proposed Extension Of The Dieprivier Substation, Kouga Local Municipality, Humansdorp District, Eastern Cape Province
177466	AIA Phase 2	Karen Van Ryneveld	01/10/2014	Phase 2a Archaeological Monitoring (Final Report) - The Kouga Wind Farm (Red Cap Kouga Wind Farm, Central Cluster), Oyster Bay, Eastern Cape, South Africa
179415	Palaeontological Specialist Reports	John E Almond	31/08/2012	Palaeontological Specialist Study: Combined Desktop & Field-Based Assessment For The Proposed Tsitsikamma Community Wind Energy Facility Near Humansdorp, Kouga Local Municipality, Eastern Cape Province
179470	Archaeological Specialist Reports	Johan Binneman	28/09/2012	Archaeological Walk Through Survey Of The Final Turbine Footprint For The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality
269397	AIA Phase 1	Celeste Booth	02/03/2015	Fibreco Repeater Sites Routes 3 And 4_heritage_2015 Aia Report
384447	Heritage Statement	Stefan de Kock	09/01/2017	Proposed Establishment Of A New Dam On A Portion Of The Farm Rietfontein 594/1, Sarah Baartman District And Nelson Mandela Bay Municipality
513392	AIA Phase 1	Peter Nilssen	02/07/2018	Phase 1a Archaeological Impact Assessment, Scoping Phase, Proposed Impofu West Wind Farm, Kouga Local Municipality, Sarah Baartman District Municipality, Eastern Cape Province



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APPENDICES



APPENDIX 1: Archaeological Assessment (2025)

ARCHAEOLOGICAL SPECIALIST STUDY

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

WOODLANDS WASTEWATER TREATMENT WORKS (WWTW) AND SEWER RETICULATION UPGRADE FOR THE KOUKAMMA MUNICIPALITY

Prepared by



CTS HERITAGE

Nic Wiltshire
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In Association with

Blue Pebble

December 2025



EXECUTIVE SUMMARY

This report is drafted on behalf of Bluepebble Sustainable Solutions, who have been appointed by SMEC South Africa (Pty) Ltd to undertake a Basic Assessment process for the Woodlands Wastewater Treatment Works (WWTW) and sewer reticulation upgrade for the Koukamma Municipality. The project entails replacing the small-bore sanitation system, realigning and upgrading bulk sewers, and refurbishing the existing wastewater treatment works to improve service capacity. All works will be situated within existing infrastructure corridors.

The archaeological assessment proceeded with some constraints and limitations, yet the project area was comprehensively assessed for heritage resources. No archaeological material of significance was identified, and the majority of the heritage observations relate instead to 20th-century structures and places of local historic and social value, as well as an unfenced graveyard still in use by the Woodlands community.

None of the graded heritage resources identified fall within the layout for the proposed pipeline or associated WWTW infrastructure, and as such, no direct impact to significant heritage resources is anticipated. The sewer reticulation network will be upgraded along existing road systems and will be buried, meaning that no notable impact to the character of the area is expected.

Due to the limited nature and scale of the proposed development, as well as the disturbed nature of the development area, there is no objection to the proposed development of the WWTW and its associated pipeline from an archaeological perspective.

Recommendations

There is no objection to the proposed development from an archaeological perspective on condition that:

- Should any buried archaeological resources, human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. Eastern Cape Provincial Heritage Resources Authority (ECPHRA) must be contacted immediately in order to determine an appropriate way forward.



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1. INTRODUCTION

1.1 Background Information on Project

This report is drafted for the proposed upgrades to the Wastewater Treatment Works (WWTW) and sewer reticulation system in Woodlands, near Kareedouw in the Eastern Cape.

1.2 Description of Property and Affected Environment

The proposed wastewater treatment works and pipeline reticulation upgrade for the small village of Woodlands in the Eastern Cape will impact existing infrastructure as well as the installation of new pipelines and services to erven that are currently not serviced by the municipal system. Woodlands lies along the R102 main road which runs parallel to (and to the south of) the N2 highway between Clarkson and Thornham. The Palmiet River drops into a gorge to the east of Woodlands before joining the Kliprivier further east.

Most of the immediate surrounding area around Woodlands consists of forestry land with large plantations of pine and eucalyptus trees. There are also several large dairy farms in the vicinity. The Tsitsikamma Nature Reserve and the Tsitsikamma mountain range lie to the north beyond the other side of the N2 highway and the coastline is about 5km south of the urban edge of Woodlands.

The bulk of the village consists of low income housing built in the 1990s and early 2000s with a cluster of older buildings on the eastern side that date to the early to mid-20th century. A fairly large graveyard has grown to the north of one of the churches and the area around the graveyard is unfenced and open. Dense bush, alien vegetation and large amounts of litter were seen along the proposed pipeline route running north of the existing WWTW as the WWTW is also adjacent to the town's rubbish dumping site.

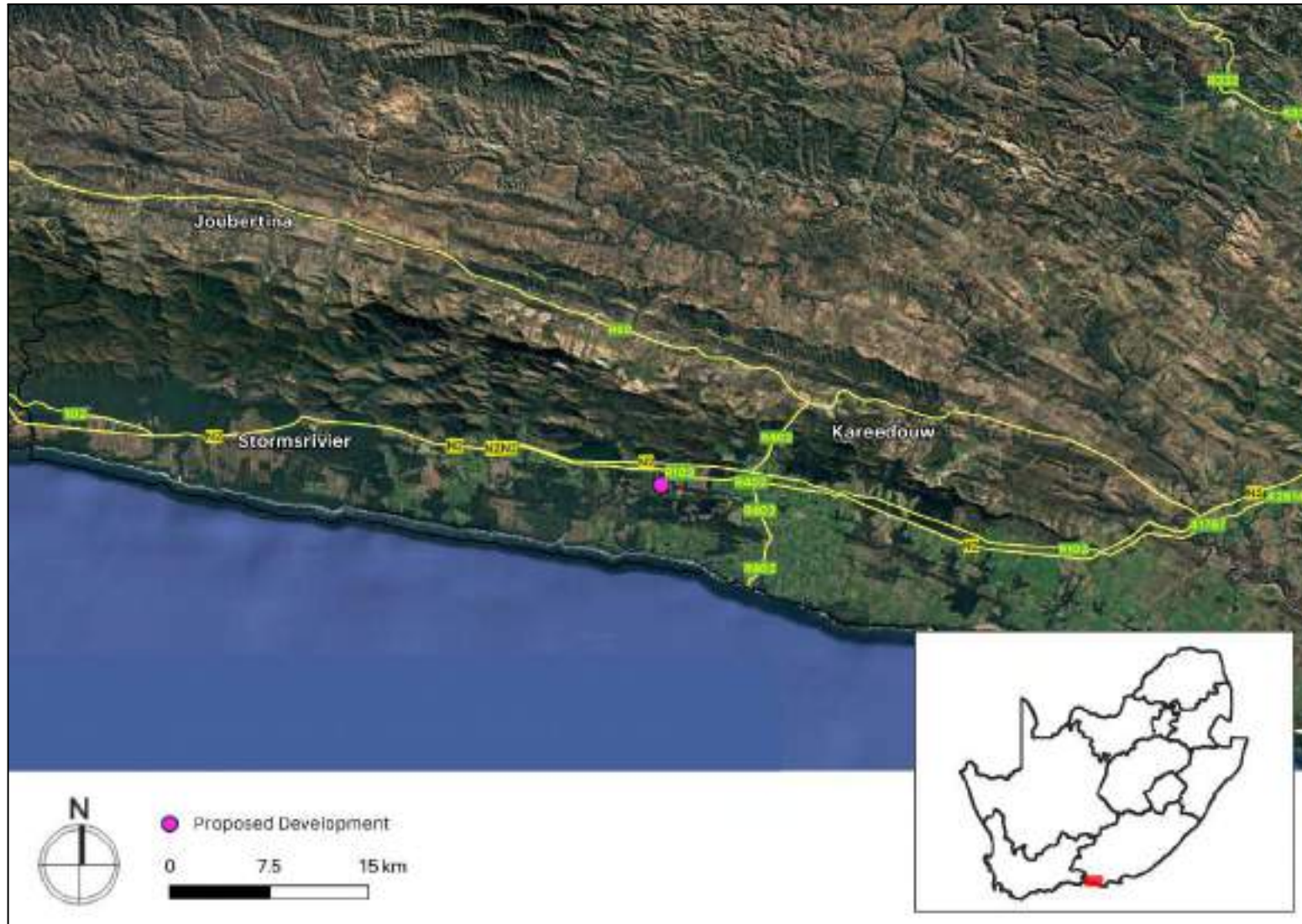


Figure 1.1 Satellite image (2025) indicating the location of the proposed development area

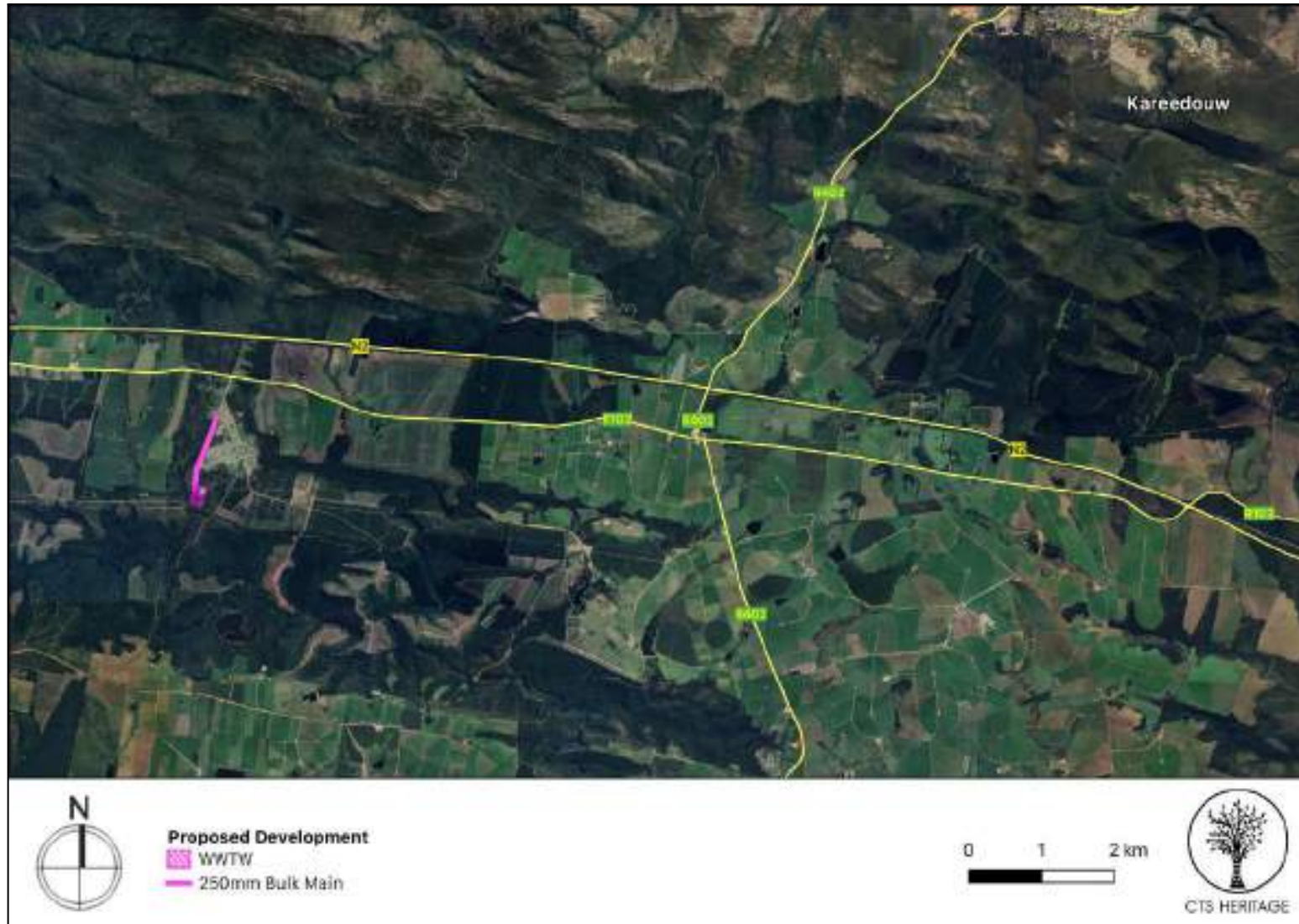


Figure 1.2 Satellite image (2025) indicating the location of the proposed development area in relation to the town of Kareedouw, Eastern Cape



Figure 1.3 Satellite image (2025) showing a closer view of the proposed development area

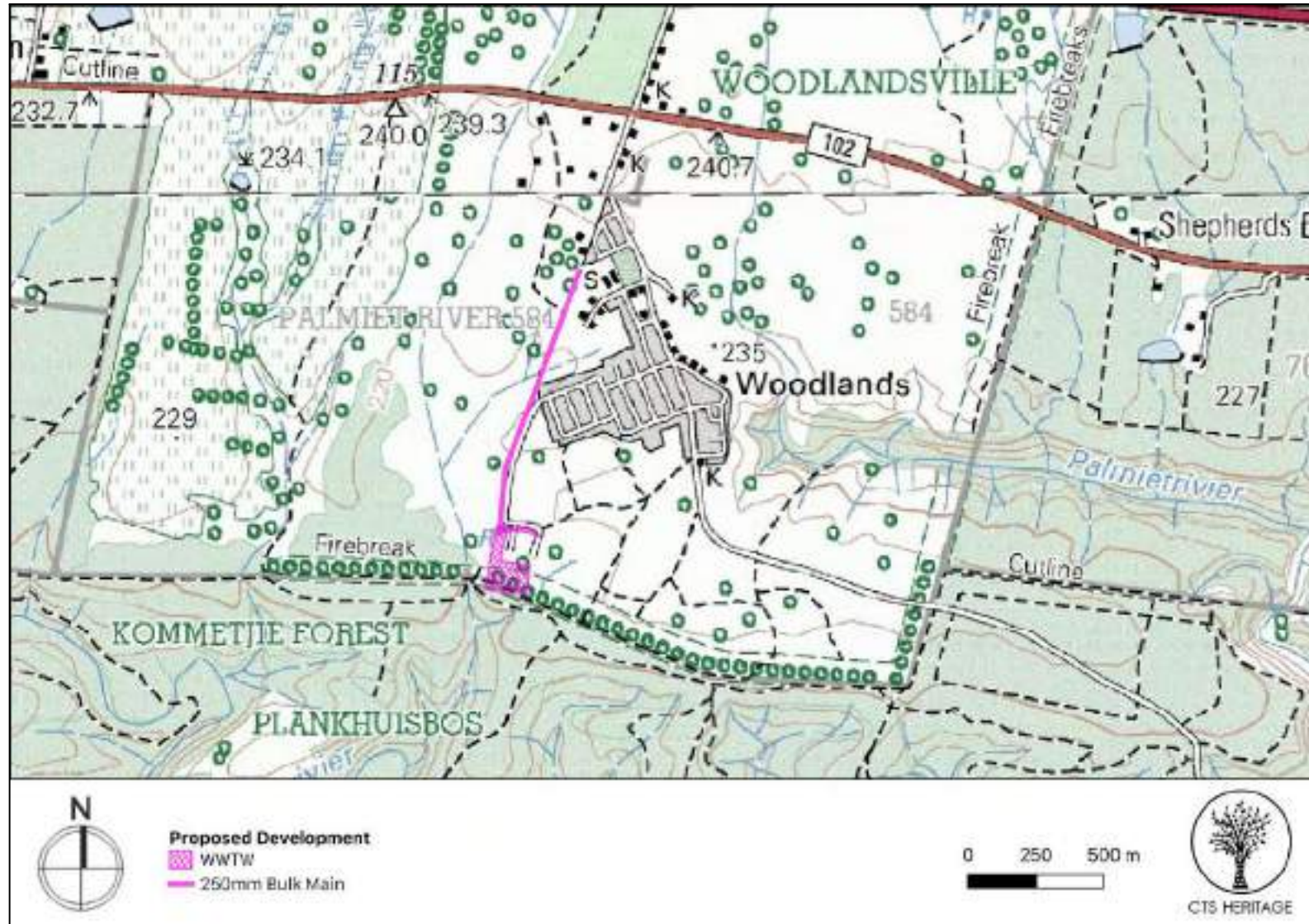


Figure 1.4 The proposed development area reflected on the recent edition of the 1:50 000 Topo Map



2. METHODOLOGY

2.1 Purpose of Archaeological Study

The purpose of this archaeological study is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999) in terms of impacts to archaeological resources.

2.2 Summary of Steps Followed

- An archaeologist, Mr N. Wiltshire, conducted a survey of the site and its environs on 19 November 2025 to determine what archaeological resources are likely to be impacted by the proposed development.
- The area proposed for development was assessed on foot, photographs of the context and finds were taken, and tracks were recorded using a GPS.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

2.3 Constraints & Limitations

The areas surrounding the village are covered in thick vegetation and large amounts of rubbish – the archaeological visibility is very low and most of the terrain is part of forestry plantations that have been in operation for much of the 20th century. None of the proposed pipelines and upgrades will take place on undisturbed ground.



Figure 2 Satellite image (2025) indicating the proposed location of development in relation to heritage studies previously conducted, with SAHRIS NIDs indicated

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Background

The proposed development area is situated approximately 10 km southwest of Kareedouw, the nearest major town, within the Sarah Baartman District Municipality of the Eastern Cape Province, South Africa. Kareedouw got its name from the Khoe phrase “path by the Karee trees.” It was established in 1906 when the Dutch Reformed Church decided to build a church there, which is still in use. South Africa’s late former Prime Minister, John Vorster is buried next to the Dutch Reformed Church in Kareedouw. It has a long history of wood cutting and has a statue in the town to commemorate the town’s woodcutters. The town still has a large wood and lumber industry, with a creosote plant. It is also known as the gateway to the Langkloof as well as the Southern Entrance to the Baviaanskloof. In 2020 it won the Kwela Town of the Year title. The R62 is one of the more well-known routes in South Africa, boasting natural splendour and many hiking trails.

3.2 Archaeology

Nilssen (2018) [SAHRIS ID 513392] in a nearby AIA as part of the Impofu WEF located 30km east of the proposed development area, wrote, *“The most sensitive portion of the Impofu Wind Farms site, from an archaeological and heritage standpoint, is the coastal strip where archaeological resources are abundant up to a distance of about 5 km from the shoreline. This stretch is described as a pre-colonial cultural landscape and is highly valued by scientists and the Gamtkwa Khoisan Council. Due to the scarcity of rock shelters and caves in the study area, archaeological sites are rare further inland and are expected to cluster on higher lying areas overlooking the relatively flat to undulating surroundings. Many finds reported inland of the pre-colonial cultural landscape consist of isolated Stone Age specimens or very low density scatters of Stone Age artefacts that occur in disturbed contexts and devoid of any faunal remains or other cultural materials. For the most part, such heritage resources are rated to be of low significance.”* This proposed development area is located further inland which means that it is located outside of this sensitive coastal band. According to Van Schalkwyk (2013), *“Little is known about the Stone Age in the region, especially with regard to the Middle Stone Age and even more so about the Early Stone Age.”* However, he goes on to note that rock art and shelters occupied during the Later Stone Age are known from the broader region. Rock art sites and associated archaeological deposit may be located within the kloofs and valleys located within the mountains located north of the area under assessment here.

Few heritage impact assessments have been completed in proximity to the area proposed for development, resulting in some Heritage resources being identified within the broader area, most of which are palaeontological in nature (Figure 3). In their Archaeological Assessment as part of a larger project for a 132 kv line running from Melkhout through Humansdorp and Dieprivier to Kareedouw, Wahl and Van Schalkwyk (2013, SAHRIS ID 120032, and Van Schalkwyk & Wahl, 2012, SAHRIS ID 131946) found very few archaeological artefacts or remains. They also included no mitigation recommendations pertaining to archaeology. They do list some finds from other prior assessments completed by Binneman in the vicinity [SAHRIS IDS 6890 and 162676]. The archaeological sensitivity of the broader area can be summarised as follows, *“ESA stone artefacts are common throughout the region and a large site is present on the hill slopes close to the confluence of the Krom and Diep Rivers, about 3.5 km south-east of Dieprivier Substation (Binneman 2010; 2012). Binneman also identified MSA /ESA artefacts about 2.3 km south-east of Dieprivier Substation*



(Binneman 2010), a single ESA handaxe 2.7 km north-west of proposed Tower 46 (Binneman 2011) and a scatter of ESA artefacts about 8 km south-west of Dieprivier Substation (Binneman 2012)." In Binneman's report (2011, SAHRIS ID 6890, the large orange polygon in Figure 2), he wrote, *"The proposed Happy Valley Wind Energy Facility is approximately 20 kilometres from the coast and falls outside the coastal sensitive zone. The site is covered by dense grass and fynbos vegetation, which made archaeological observation very difficult. Only one large Earlier Stone Age handaxe was observed eroding from the exposed gravel in a track leading to the top of the ridge."*

The area proposed for development in this application has not been previously been assessed for impacts to archaeological heritage however, due to the location of the proposed WWTW adjacent to the existing waste disposal site, as well as the limited nature and scale of the proposed WWTW, it is unlikely that this proposed development will negatively impact on significant archaeological heritage. The proposed sewer reticulation network is to be located within the existing road network for the existing Woodlands residential development. As such, the establishment of this water infrastructure will be located in areas that have been extensively previously disturbed.

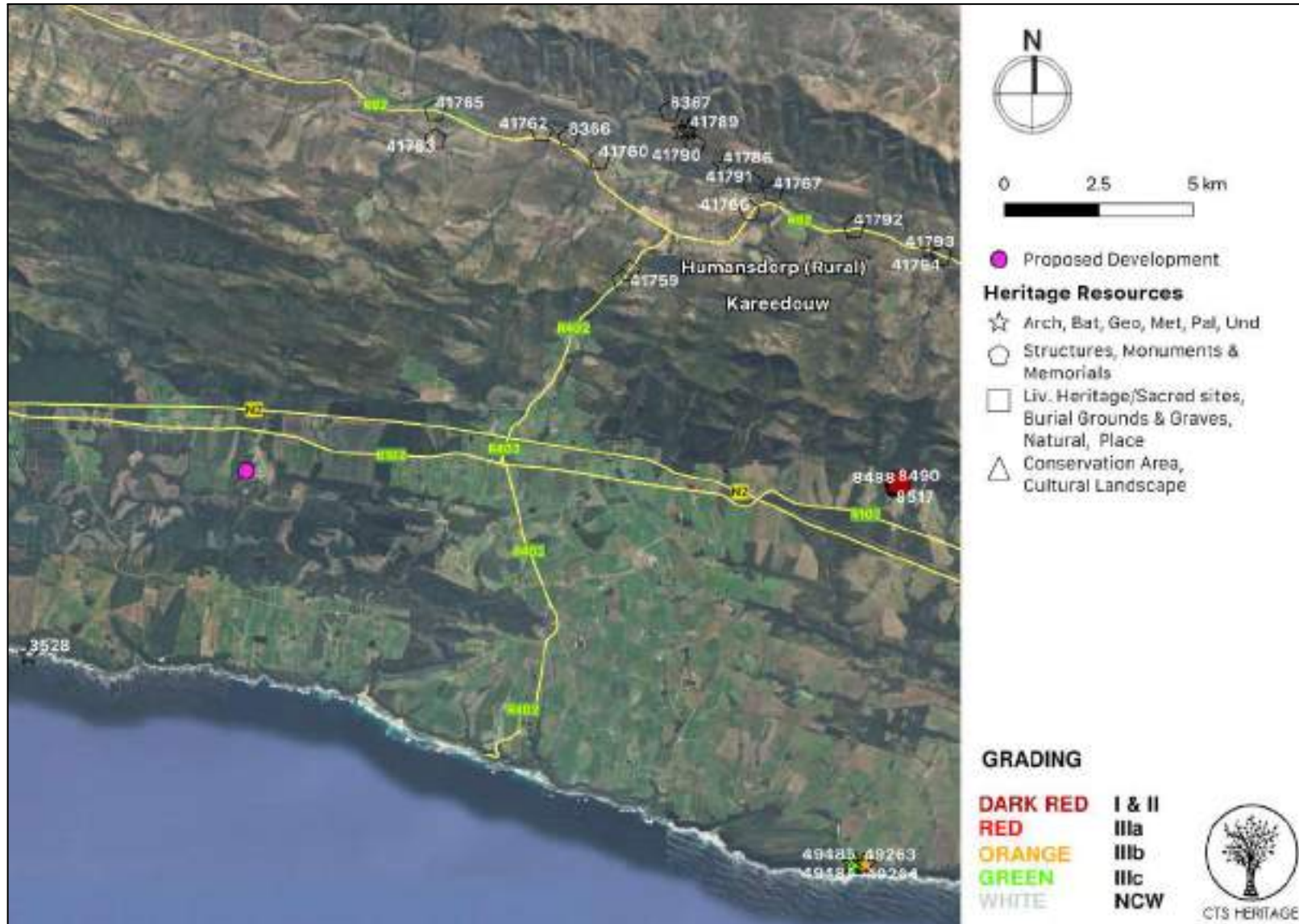


Figure 3 Heritage Resources previously identified near the study area, with SAHRIS Site IDs indicated

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

The municipal graveyard was recorded north of the school and church premises east of the town and the area remains unfenced. The cluster of older vernacular buildings along the eastern side of Woodlands were also recorded and have some low local contextual significance. No graves were seen along the pipeline routes or in the small garden allotments used by the community to grow vegetables and keep stock for their own use.



Figure 4.1 View along the R102 main road as one enters the Woodlands area.



Figure 4.2 View of the informal homes in the northwest end of Woodlands.



Figure 4.3 View looking south from the northern end of Woodlands.



Figure 4.4 View looking west along the pipeline routes with stands of plantations surrounding Woodlands.



Figure 4.5 View of the Tsitsikamma Mountains north of Woodlands.



Figure 4.6 View of a small garden and informal dwelling on the outskirts of Woodlands.



Figure 4.7 View of the plantations abutting Woodlands.



Figure 4.8 View from the main road running through Woodlands.



Figure 4.9 View of various formal homes along the tarred roads in Woodlands.



Figure 4.10 View heading towards the existing WWTW and municipal waste dump.



Figure 4.11 View looking north over more garden allotments and the mountains to the north.



Figure 4.12 View looking north over more garden allotments and the mountains to the north.



Figure 4.13 View of the waste dump next to the WWTW.



Figure 4.14 View of the waste dump next to the WWTW.



Figure 4.15 View of rubbish dumped along the jeep tracks around the WWTW.



Figure 4.16 View along the pipeline route north of the existing WWTW.

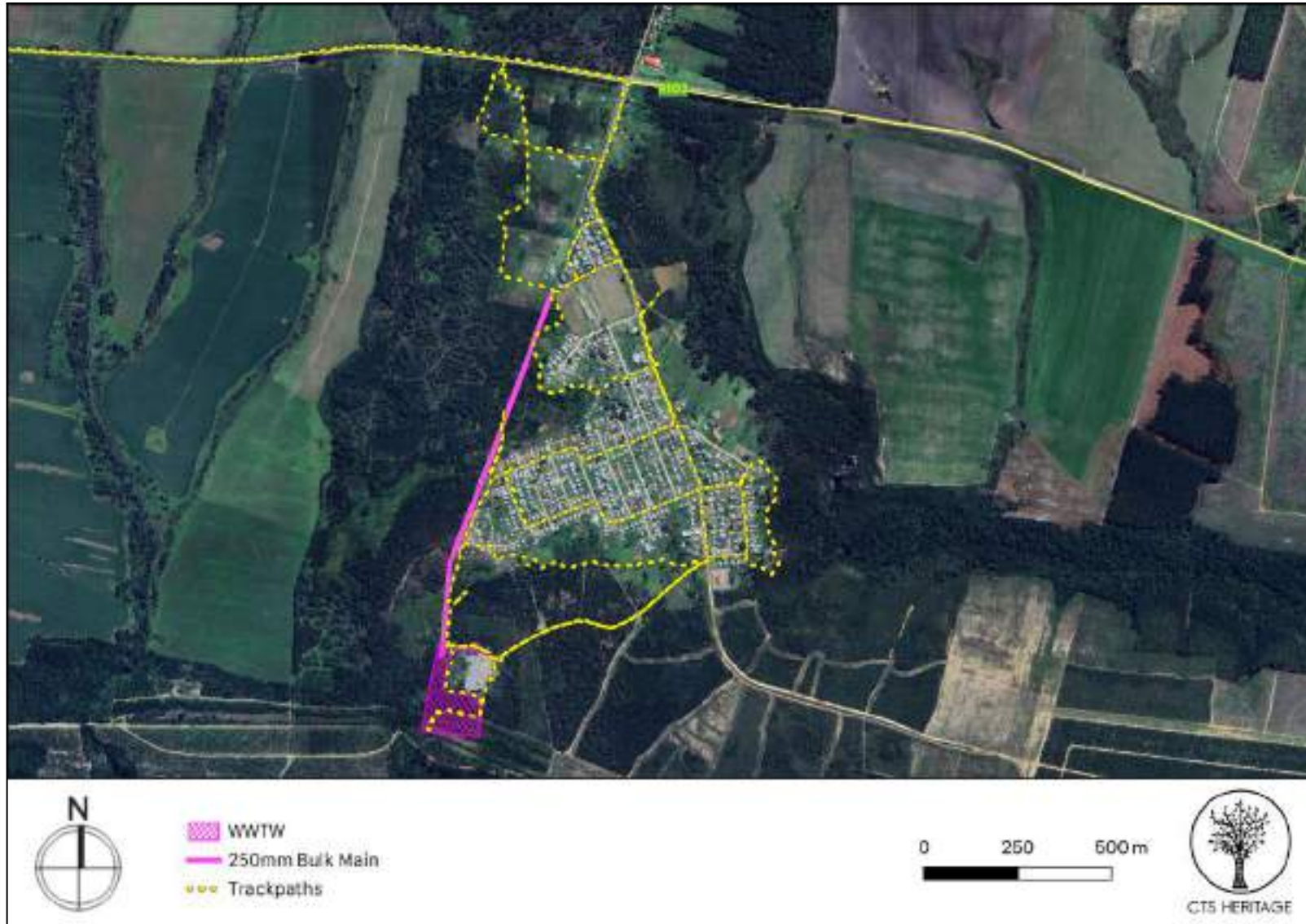


Figure 5 Track paths of the archaeological field assessment conducted on 19 November 2025

4.2 Archaeological Resources Identified

Table 1: Observations noted during the field assessment

POINT ID	Description	Density	Type	Period	Co-ordinates		Grading	Mitigation
001	Ruined 20th-century buildings near WWTW	n/a	Ruin	Modern	-34.01109	24.159615	NCW	n/a
002	Early 20th-century homesteads and vernacular buildings	n/a	Structure	Historical	-34.00526	24.166239	IIIC	No impact is anticipated
002	Early 20th-century homesteads and vernacular buildings	n/a	Structure	Historical	-34.00562	24.166729	IIIC	No impact is anticipated
003	20th-century ruins and church building	n/a	Structure, Ruin	Historical, Modern	-34.00349	24.166255	IIIC	No impact is anticipated
004	Woodlands graveyard, unfenced, surrounded by trees	n/a	Graves/Burial Grounds	Modern	-34.00222	24.166182	IIIA	No impact is anticipated

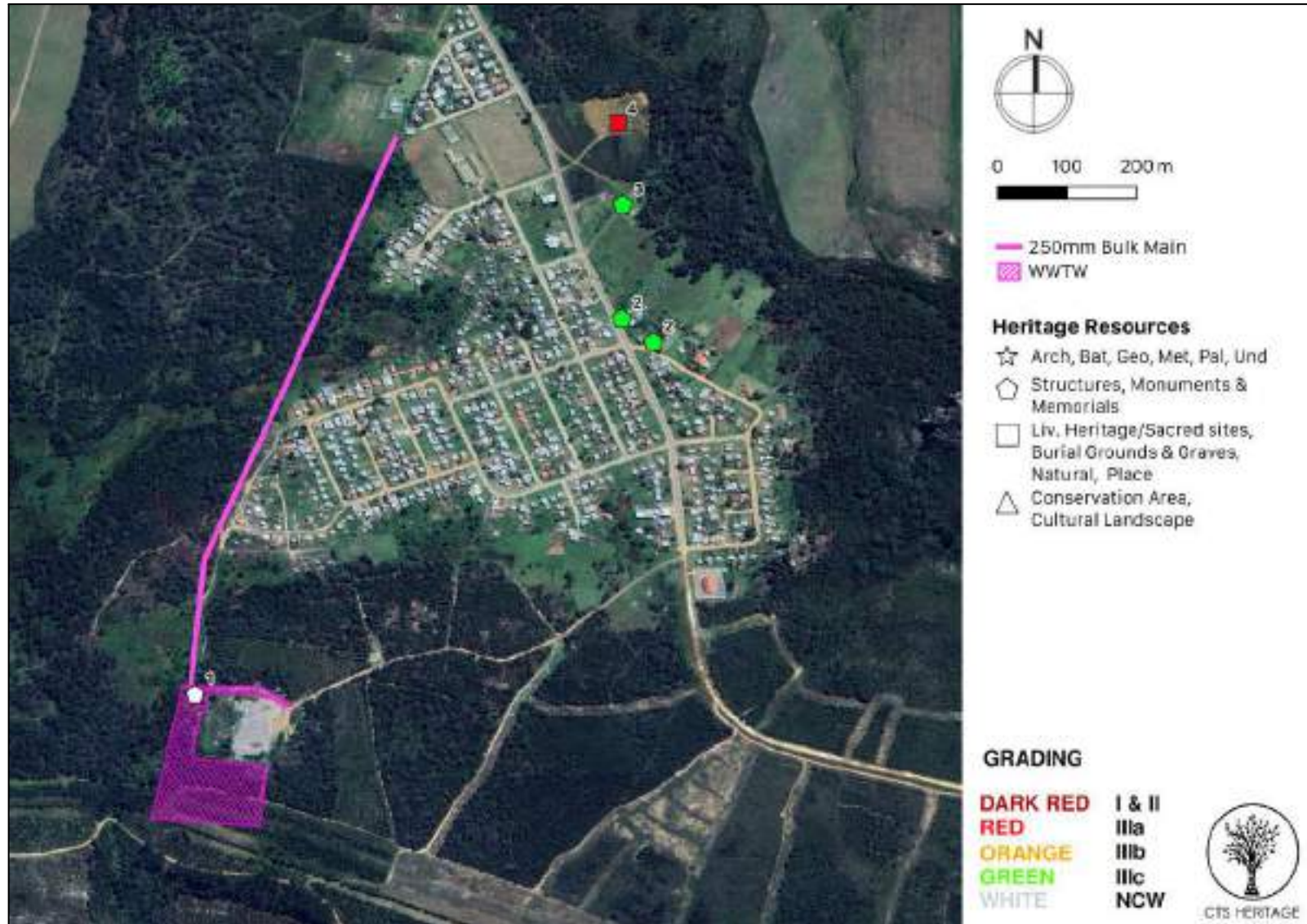


Figure 6 Map of all sites and observations noted within the development area and surrounds

4.3 Selected Photographic Record

(a full photographic record is available upon request)



Figure 7.1: Observation 001

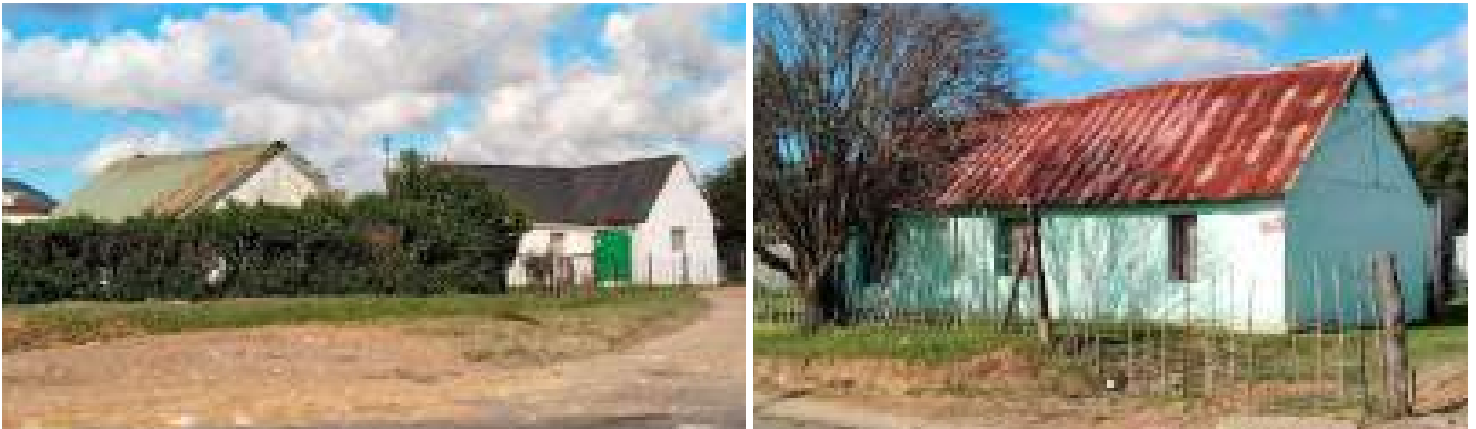


Figure 7.2: Observation 002



Figure 7.3: Observation 003



Figure 7.4: Observation 004

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of Impact to Archaeological Resources

During the field assessment, four heritage observations were noted in proximity to the development area, three to the east of the proposed pipeline route, and one within the bounds of the WWTW site (Figure 6). None of these observations were archaeological in nature (e.g., stone artefacts, pottery and ceramics, precolonial stonewalling or structures, etc.). Other nearby heritage assessments have similarly found a low density and occurrence of archaeological material, concluding that the area likely has low archaeological sensitivity (Nilssen 2018, SAHRIS NID 513392; Wahl and Van Schalkwyk 2013, SAHRIS ID 120032; Van Schalkwyk & Wahl 2012, SAHRIS ID 131946).

Two 20th-century homesteads were identified during the assessment (Figures 7.2 and 7.3). These structures were assessed as culturally significant, with appreciable architectural and historic value in the local context, and were therefore graded IIIB. The surrounding area is already built up, with roads and services nearby, and the homesteads are located more than 350 m from the proposed pipeline route. Given this context and the relatively limited nature of the development, sensitivity in the vicinity is low and impact is unlikely. As these structures are located more than 200 m from the proposed development (Figure 8), no impact to these structures is anticipated. A 50 m buffer has been mapped around these structures in Figure 8 below for reference purposes.

An unfenced graveyard was observed during the field assessment (Figure 7.4). Graveyards are considered loci of social and spiritual value, and this site is still actively used and visited by residents of the Woodlands area. It was therefore assessed to have high levels of local social and spiritual heritage significance and graded IIIA. The graveyard lies approximately 300 m from the proposed pipeline route, a distance that exceeds the recommended 100 m buffer for graves and burials. Provided that the recommended buffer is maintained throughout all phases of development, the likelihood of impact is anticipated to remain low.

Within the WWTW area, a ruin of a 20th-century building was identified just 5 m from the proposed pipeline route (Figures 6 and 7.1). However, the ruin is in disrepair and has no discernible cultural value. Its immediate surroundings have been drastically altered. This ruin has been determined to be Not Conservation Worthy (NCW). The recording of this structure as part of the assessment is considered sufficient, and no further mitigation measures are recommended. While there remains the possibility that there is buried material associated with this ruin, it is unlikely that this buried material will have any significant archaeological or scientific cultural value. There is no objection to the demolition of this ruin for the construction of the proposed WWTW.

Overall, the limited number of heritage resources identified during the assessment are not anticipated to be impacted by the proposed development. The sewer reticulation network will follow existing road systems and be buried, meaning no significant impact to the character of the area or to significant archaeological heritage is expected.

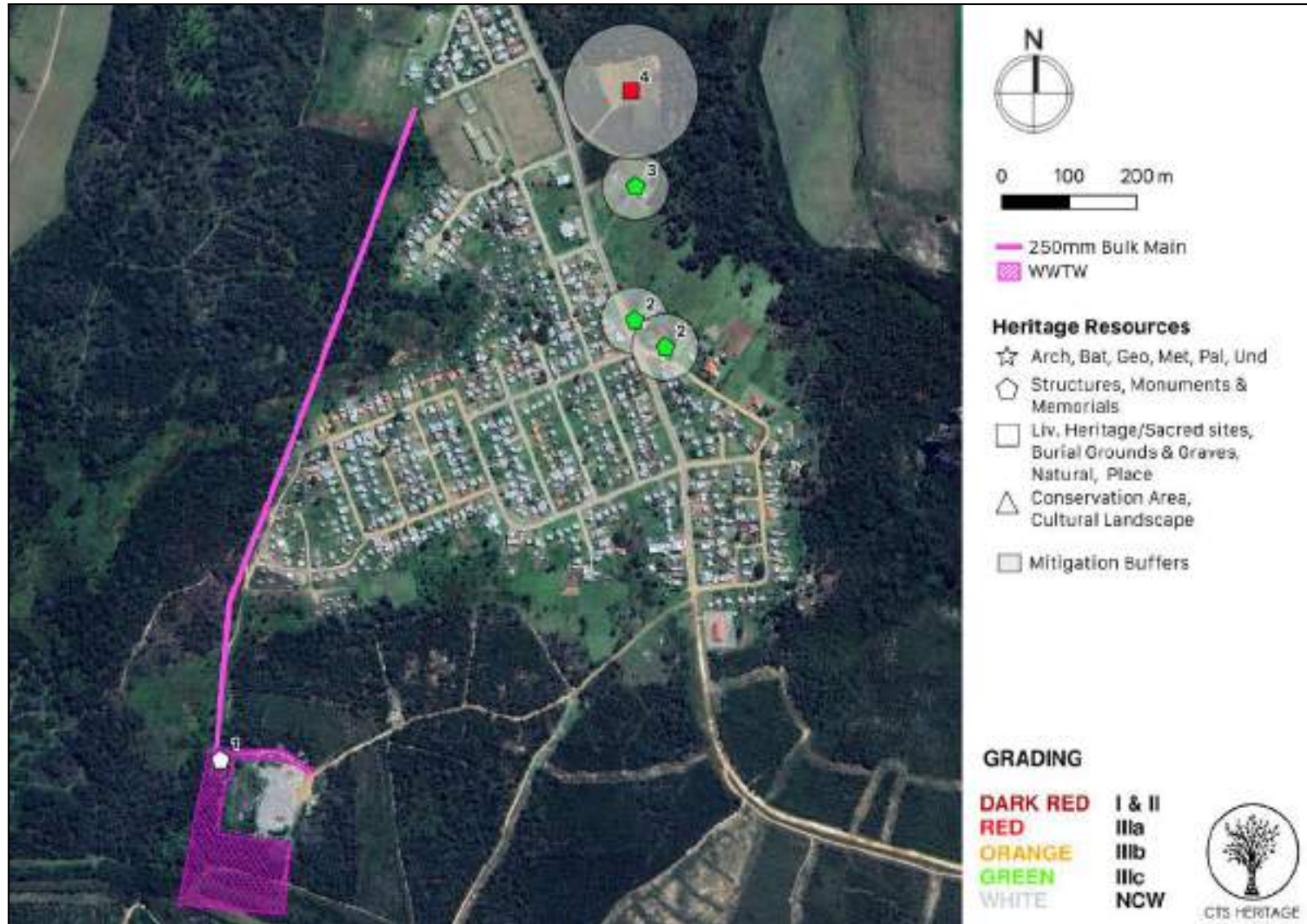


Figure 8 Map of all sites and observations noted within the development area and surrounds, as well as mitigation buffers for reference. No impact to these sites is anticipated.

6. CONCLUSION AND RECOMMENDATIONS

The archaeological assessment proceeded with some constraints and limitations, yet the project area was comprehensively assessed for heritage resources. No archaeological material of significance was identified, and the majority of the heritage observations relate instead to 20th-century structures and places of local historic and social value, as well as an unfenced graveyard still in use by the Woodlands community.

None of the graded heritage resources identified fall within the layout for the proposed pipeline or associated WWTW infrastructure, and as such, no direct impact to significant heritage resources is anticipated. The sewer reticulation network will be upgraded along existing road systems and will be buried, meaning that no notable impact to the character of the area is expected.

Due to the limited nature and scale of the proposed development, as well as the disturbed nature of the development area, there is no objection to the proposed development of the WWTW and its associated pipeline from an archaeological perspective.

Recommendations

There is no objection to the proposed development from an archaeological perspective on condition that:

- Should any buried archaeological resources, human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. Eastern Cape Provincial Heritage Resources Authority (ECPHRA) must be contacted immediately in order to determine an appropriate way forward.

7. REFERENCES

Heritage Impact Assessments				
NID	Report Type	Author/s	Date	Title
4255	HIA Letter of Exemption	Johan Binneman	01/06/2006	Letter Of Recommendation (With Conditions) For The Exemption Of A Full Phase 1 Archaeological Heritage Impact Assessment For The Subdivision And Rezoning Of Portion 28 Of The Farm "Melkhoutekraal" No. 254 In Kareedouw (Koukama Municipality), From Agriculture
6890	AIA Phase 1	Johan Binneman	04/06/2011	A Phase 1 Archaeological Impact Assessment For The Proposed Happy Valley Wind Energy Facility Near Humansdorp, Kouga Local Municipality, District Of Humansdorp, Eastern Cape Province
6891	AIA Desktop	Johan Binneman	01/06/2009	An Archaeological Desktop Study For The Proposed Happy Valley Wind Energy Facility. Kou-Kamma Municipality, Humansdorp District, Eastern Cape Province
7124	AIA Phase 1	Karen Van Ryneveld	20/09/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa
7594	AIA Phase 1	Johan Binneman	01/08/2011	Phase 1 Archaeological Impact Assessment For The Proposed Oyster Bay Wind Energy Facility, Kouga Local Municipality, Humansdorp, Eastern Cape Province
7595	AIA Desktop	Johan Binneman	01/11/2010	An Archaeological Desktop Study For The Proposed Oyster Bay Wind Energy Facility, Local Kuga Municipality, Humansdorp District, Eastern Cape Province
8101	AIA Desktop	Johan Binneman	07/03/2011	An Archaeological Desktop Study For He Construction Of The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province
8102	AIA Phase 1	Johan Binneman	01/08/2011	A Phase 1 Archaeological Impact Assessment For The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.
8445	HIA Phase 1	Karen Van Ryneveld	31/12/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa 1
8446	HIA Phase 1	Karen Van Ryneveld	31/12/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa
8914	PIA Phase 1	Robert Gess	30/03/2011	Palaeontological Heritage Component Of Fibreco Telecommunications, Basic Assessment For The Proposed Fibre Optic Data Cable Project: Route 5: Pe To Durban
8929	PIA Phase 1	Billy De Klerk	04/01/2011	Palaeontological Heritage Impact Assessment Of The Proposed Happy Valley Wind Energy Facility On A Site East Of Humansdorp, Eastern Cape
8955	PIA Phase 1	Billy De Klerk	17/12/2010	Palaeontological Heritage Impact Assessment Of The Proposed Wind Farms In The Coastal Region Of The Kouga Local Municipality Near The Villages Of Oyster Bay And St Francis Bay.
8988	PIA Phase 1	John E Almond	20/09/2011	Proposed Oyster Bay Wind Energy Facility Near Humansdorp. Kouga Local Municipality, Eastern Cape
9033	PIA Phase 1	John E Almond	02/08/2011	Proposed Tsitsikamma Community Wind Energy Facility Near Humansdorp, Kouga Local Municipality, Eastern Cape Province
26808	AIA Phase 2	Karen Van Ryneveld	03/06/2012	Phase 1 Archaeological Assessment Micro-Siting & Phase 2 Archaeological Test Pitting Turbine Line 33-36, Red Cap Kouga Wind Farm, Central Cluster, Oyster Bay, Eastern Cape, South Africa
44916	AIA Phase 1	Karen Van Ryneveld	25/06/2012	Mining Right Application: Farms Klein Rivier (713-32) And Buffelsbosch (742-14),

				Humansdorp District, Eastern Cape, South Africa
44918	PIA Desktop	John Pether	05/06/2012	Mining Right Application On Farms Klein Rivier 713 Ptn 32 And Buffelsbosch 742 Ptn 14 District Of Humansdorp, Eastern Cape Province
120032	AIA Phase 1	Elizabeth Wahl, Len van Schalkwyk	08/05/2013	Phase 1 Archaeological Impact Assessment Report: Proposed 132kV Power Line and Substation Infrastructure, Melkhout-Dieprivier, Kouga Local Municipality, Cacadu District, Eastern Cape Province, South Africa
108744	Palaeotechnical Report	John E Almond, Billy De Klerk, Robert Gess	01/05/2009	Palaeontological heritage of the Eastern Cape
125085	AIA Phase 1	Karen Van Ryneveld	15/07/2013	Tsitsikamma Wind Farm - Borrow Pits Project, Humansdorp Registration Division, Eastern Cape
125089	PIA Phase 1	Karen Van Ryneveld	17/07/2013	Palaeontological Heritage Study For Proposed Establishment Of Borrow Pits (For Road And Concrete Construction Materials) To Primarily Serve The Tsitsikamma Community Wind Farm Project
131946	AIA Desktop	Len van Schalkwyk, Elizabeth Wahl	30/05/2012	Phase 1 Heritage Impact Assessment Report: 132kV Power Line and Substation Infrastructure, Dieprivier-Kareedouw, Kouga Local Municipality, Cacadu District Municipality, Eastern Cape Province, South Africa
131953	PIA Phase 1	John E Almond	01/05/2013	Palaeontological specialist assessment: combined field-based and desktop study PROPOSED KAREEDOUW-DIEPRIVIER 132 kV TRANSMISSION LINE PROJECT, HUMANSDORP MAGISTERIAL DISTRICT, EASTERN CAPE.
162676	HIA Phase 1	Johan Binneman	31/10/2012	A Phase 1 Archaeological Impact Assessment For The Proposed 132kv Power Line Linking The Tsitsikamma Community Wind Energy Facility To The Proposed Extension Of The Dieprivier Substation, Kouga Local Municipality, Humansdorp District, Eastern Cape Province
177466	AIA Phase 2	Karen Van Ryneveld	01/10/2014	Phase 2a Archaeological Monitoring (Final Report) - The Kouga Wind Farm (Red Cap Kouga Wind Farm, Central Cluster), Oyster Bay, Eastern Cape, South Africa
179415	Palaeontological Specialist Reports	John E Almond	31/08/2012	Palaeontological Specialist Study: Combined Desktop & Field-Based Assessment For The Proposed Tsitsikamma Community Wind Energy Facility Near Humansdorp, Kouga Local Municipality, Eastern Cape Province
179470	Archaeological Specialist Reports	Johan Binneman	28/09/2012	Archaeological Walk Through Survey Of The Final Turbine Footprint For The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality
269397	AIA Phase 1	Celeste Booth	02/03/2015	Fibreco Repeater Sites Routes 3 And 4_heritage_2015 Aia Report
384447	Heritage Statement	Stefan de Kock	09/01/2017	Proposed Establishment Of A New Dam On A Portion Of The Farm Rietfontein 594/1, Sarah Baartman District And Nelson Mandela Bay Municipality
513392	AIA Phase 1	Peter Nilssen	02/07/2018	Phase 1a Archaeological Impact Assessment, Scoping Phase, Proposed Impofu West Wind Farm, Kouga Local Municipality, Sarah Baartman District Municipality, Eastern Cape Province



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APPENDIX 2: Palaeontological Assessment (2025)

PALAEONTOLOGICAL SPECIALIST STUDY

WOODLANDS WASTEWATER TREATMENT WORKS (WWTW) AND SEWER RETICULATION UPGRADE FOR THE KOUKAMMA MUNICIPALITY

Prepared by



CTS HERITAGE

And
Ryan Nel

In Association with

Blue Pebble

November 2025



CTS HERITAGE

EXECUTIVE SUMMARY

This Palaeontological Impact Assessment (PIA) evaluates the potential impact of the proposed Woodlands Wastewater Treatment Works (WWTW) and associated sewer reticulation upgrade for the Koukamma Municipality, located approximately 10 km southwest of Kareedouw in the Sarah Baartman District Municipality, Eastern Cape Province. The project footprint encompasses the existing Woodlands residential settlement and extends southward toward the Kommetjie Forest, with the WWTW situated at the southern end of the development area. The proposed activities include the refurbishment of the existing treatment facility, replacement and realignment of bulk sewer mains, and installation of new sewer reticulation infrastructure within existing disturbed corridors.

The development area is underlain by sedimentary rocks of the Table Mountain Group (Cape Supergroup), including the Peninsula, Cederberg, Goudini, and Skurweberg formations, dating from the Ordovician to Silurian periods. These formations primarily comprise quartzitic sandstones, siltstones, and shales that record shallow marine to fluvial depositional environments. Regionally, they are known to contain sparse marine trace fossils—such as *Skolithos* and *Cruziana* burrows—but are generally unfossiliferous in the Eastern Cape due to structural deformation, metamorphism, and deep weathering. The palaeontological sensitivity of these units is therefore classified as Low, in accordance with the SAHRIS Palaeosensitivity Map and previous specialist assessments.

The assessment revealed that the project area has been extensively modified by previous development and infrastructure installation, with dense forest and thicket vegetation further limiting surface exposure. No in situ geological outcrops or fossil material were identified during the survey, and no fossiliferous horizons were observed within the development footprint. Given these findings, the likelihood of encountering scientifically significant fossil material during construction is considered low. Excavation, trenching, and site grading—will disturb shallow subsurface deposits; however, due to the low fossil potential of the underlying formations and prior disturbance, the overall impact on palaeontological heritage is assessed as Low. The palaeontological resources, if present, are expected to be isolated and of limited scientific importance.

To ensure that potential fossil discoveries are appropriately managed, the following mitigation measure is recommended:

- **Chance Fossil Finds Protocol (CFFP): A CFFP should be incorporated into the Environmental Management Programme (EMPr).**

With the implementation of this measure, the proposed Woodlands WWTW and sewer reticulation upgrade can proceed with negligible risk to palaeontological heritage



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1. INTRODUCTION

1.1 Background Information on Project

Bluepebble Sustainable Solutions has been appointed by SMEC South Africa (Pty) Ltd to undertake a Basic Assessment process to ensure compliance with regulations contained in the National Environmental Management Act (NEMA Act No. 107 of 1998) and the Environmental Impact Assessment Regulations (2014), as amended, for the Woodlands Wastewater Treatment Works (WWTW) and sewer reticulation upgrade for the Koukamma Municipality.

The Woodlands sanitation services consist of digester tanks and a 110 mm diameter small bore gravity sewer reticulation system. Effluent from digesters is regularly removed by means of vacuum tankers, transported, and disposed of at the Wastewater Treatment Works (WWTW) at Woodlands Settlement. The WWTW is located 0.5 km south of the southwestern boundary of the Woodlands Settlement. Effluent then undergoes an activated sludge treatment process followed by a clarification process where the solids and liquid are separated before the final effluent is discharged into a surface water course. Sludge settlement is conveyed to a pit close to the treatment works where it is then disposed of. As soon as the hole is 80 % full it is then backfilled, and a new hole is formed. The WWTW is capable of handling flows up to 400 Kl/d of solids free sewage. The hydraulic and treatment capacity of the existing treatment plant will be further studied during the concept and design phases.

The proposed activities for the upgrade of bulk sewers, replacing of small-bore sanitation system at Woodlands is as follows:

- Replace Internal Sewer Reticulation of the woodlands area.
- Design new sewer infrastructure for the proposed development.
- Realign and replace the Bulk Sewer Main.
- Refurbish the existing Waste Water Treatment works.



1.2 Description of Property and Affected Environment

The proposed development area is situated approximately 10 km southwest of Kareedouw, the nearest major town, within the Sarah Baartman District Municipality of the Eastern Cape Province, South Africa. The site is located on Portion 584 of Palmietrivier, in the Woodlands (Oubosstrand) area — a small rural community positioned immediately west of the R102, a secondary regional road that runs parallel to and connects with the N2 National Route further north.

The project footprint encompasses the Woodlands residential settlement and surrounding undeveloped and vegetated land, extending southward toward the Kommetjie Forest. The Woodlands WWTW is positioned at the southern end of the development footprint, connected to the main settlement by a 250 mm bulk main pipeline that follows the local access road network.

Land use in the surrounding region is mixed, with small-scale agriculture and forestry plantations interspersed with residential plots and undeveloped forested areas. Much of the terrain is heavily vegetated with dense thicket and forest, while portions of the northern and eastern sectors have been cleared or cultivated. The northern part of the site includes existing and informal residential developments, whereas the southern extent includes the WWTW facility and an informal refuse disposal area used for community waste collection.

Topographically, the area lies within a gently undulating lowland setting, ranging from approximately 220 m to 240 masl at its highest point. The Palmiet River and its associated wet drainage depressions traverse the area, forming low-lying, seasonally waterlogged zones, particularly in the southern and western sectors. Although not perennial, these watercourses create wetland-like conditions during rainfall periods.

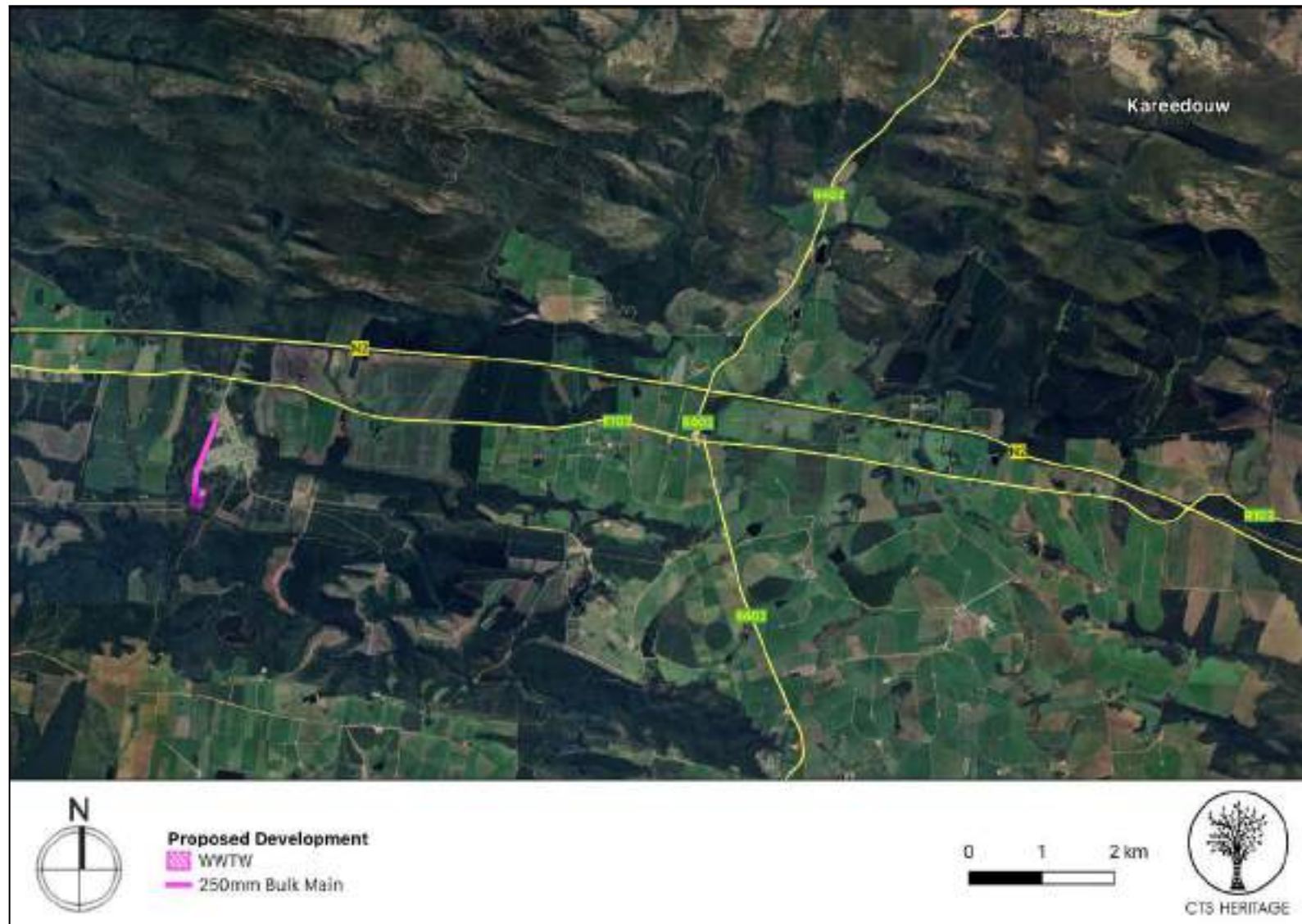


Figure 1.1 Satellite image (2025) indicating the location of the proposed development area in relation to the town of Kareedouw, Eastern Cape

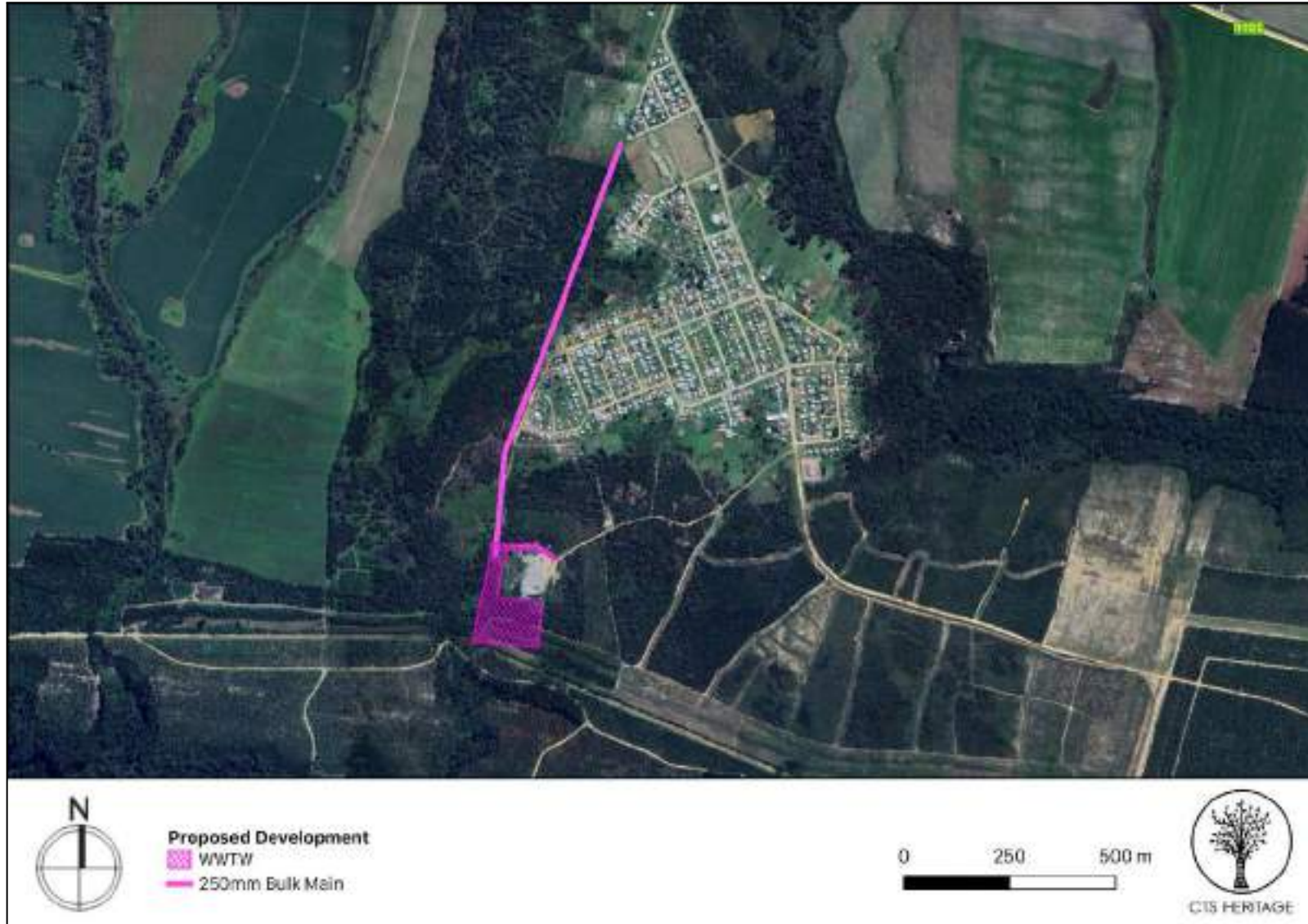


Figure 1.2 Satellite image (2025) showing a closer view of the proposed development area

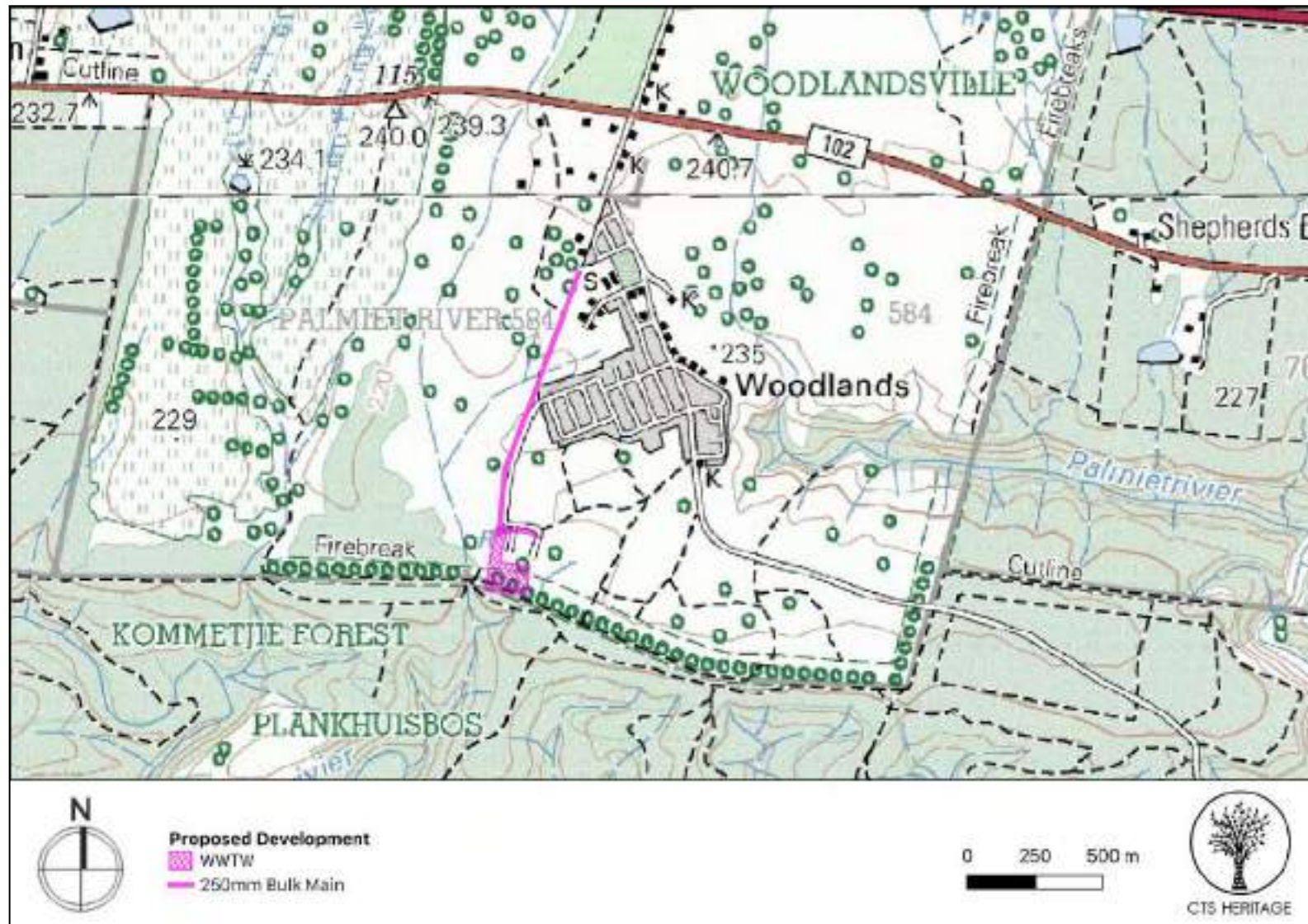


Figure 1.3 The proposed development area reflected on the recent edition of the 1:50 000 Topo Map

2. METHODOLOGY

2.1 Purpose of Palaeontological Study

According to the SAHRIS Palaeosensitivity Map (Figure 2), the area proposed for development is underlain by sediments of moderate and very high paleontological sensitivity. The purpose of this palaeontological study is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999) in terms of impacts to palaeontological resources. Guidelines for the report are in accordance with the *Minimum Standards: Palaeontological Component of Heritage Impact Assessment Reports* (SAHRA, 2012).

2.2 Summary of steps followed

- Primary research literature was consulted for detailed accounts of the geology and palaeontological representation across the study area. References of these primary research articles are provided.
- Geological maps (provided at various scales by CTS Heritage and the South African Council for Geosciences) and Satellite Imagery were consulted to identify represented geological contexts within the study area.
- A site visit was undertaken on 02 November 2025. In order to gain a representative sample of all aspects of the development area, as much land as possible was covered by vehicle and by foot (see Figure 4 for GPS track).
- Where possible, other Palaeontological Impact Assessments were consulted to provide additional information on local geomorphological, geological and palaeontological contexts. These often provide valuable additional information to primary research publications and formal geological maps, which can lack resolution at a local scale and it is important that discussions regarding alternative stratigraphic attributions of exposed rocks are noted and considered.

2.3 Constraints and Limitations

- Constraints: No property constraints were encountered. Other constraints include the dense vegetation cover. Other constraints include:
 - Comparable rock units outside the project site, if not present in the project area, such as riverbanks, gullies, and burrowing pits, offer insights into the underlying strata but are not always accessible.
 - Fossils are often concealed by overlying deposits of soil, vegetation, or other surface materials. This obscures their presence and limits direct observation.
 - Data from distant exposures may be required, reducing the resolution of site-specific interpretations.
- Limitations: There are several factors limit the effectiveness of Palaeontological Impact Assessments:
 - The absence of a comprehensive South African fossil heritage database.
 - Varying accuracy levels in geological maps, affecting the reliability and precision of studies.
 - Insufficient explanations accompanying geological maps and availability of published palaeontological materials.
 - Limited palaeontological studies conducted in most regions of South Africa, leading to reliance on extrapolation from other locations.

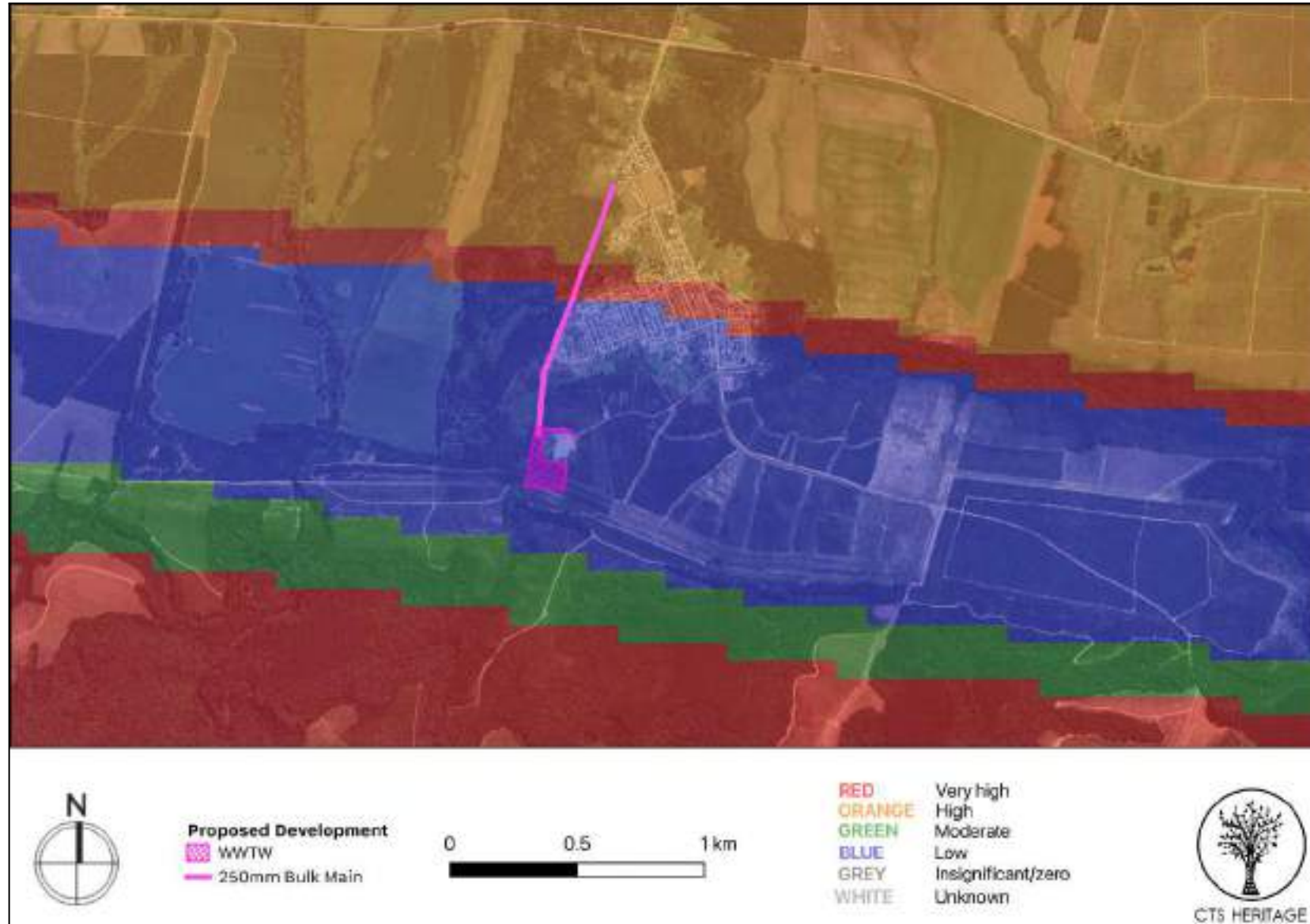


Figure 2 Map indicating the variable palaeontological sensitivity of the development area, from Low to High and Very High, from the SAHRIS PalaeoMap

3. SITE SENSITIVITY

According to the SAHRIS Palaeosensitivity map (Figure 2), the development area is underlain by geological units with low to very high palaeontological sensitivity. According to the extract from the Council of Geoscience map for Port Elizabeth (3324), the area proposed for the Woodlands WWTW and associated sewer reticulation upgrade is underlain by sediments of the Peninsula Formation (Op), the Cederberg Formation (Oc), the Goudini Formation (Sg) and the Skurweberg Formation (Ss).

Almond (2013, SAHRIS ID 131953) in a PIA that intersects with the proposed development (Figure 2. Previous Heritage Impact Assessments), wrote *“Body fossils (shells, teeth, bones etc) are so far unknown from the Peninsula Formation but a modest range of shallow marine to nearshore fluvial and / or estuarine trace fossils have been recognised, mainly from the Western Cape outcrop area (e.g. Rust 1967, Potgieter & Oelofsen 1983, Broquet 1990, 1992, Almond 1998a,b, Braddy & Almond 1999, Thamm & Johnson 2006). These traces include trilobite resting and feeding burrows (Cruziana, Rusophycus), arthropod trackways (e.g. Diplichnites, Palmichnium) that are variously attributed to eurypterids, crustaceans or trilobites, palmate, annulated feeding burrows (Arthropycus), dense assemblages (“pipe rock”) of vertical dwelling burrows of unknown suspension feeders (Skolithos, Trichichnus), vertical columns or cones of densely reworked sediment (Metaichna / possible Heimdallia), and several types of horizontal burrows (Palaeophycus, possible Aulichnites)...An important, albeit low diversity, assemblage of Peninsula Formation trace fossils was recently recorded from heterolithic beds exposed in the Rosenhof Quarry site within the broader Tsitsikamma Community Wind Energy Facility study region to the southwest of Humansdorp by Almond (2012). Traces here include vertical Skolithos burrows, Rusophycus and Cruziana arthropod scratch burrows that were probably generated by trilobites, possible bivalve burrows (Lockeia) and teichichnoid spreiten burrows, as well as abundant flower-shaped “gyrophyllitid” burrows that had previously been reported from beach boulders at Cape Saint Francis.”* In the Palaeotechnical report on formations in the Eastern Cape (2009, SAHRIS ID 108744), the Peninsula Formation has low palaeontological sensitivity.

On the Cederberg Formation, Almond (2013) writes *“An exceptionally important and interesting biota of soft-bodied (i.e. unmineralised) and shelly invertebrates, primitive jawless vertebrates and microfossils has been recorded since the middle 1970s from finely laminated, black mudrocks of the Soom Member, forming the lower, mudrock dominated portion of the Cederberg Formation. This is one of only two so-called soft-body Lagerstaette of Late Ordovician age recorded worldwide (the other example was recently discovered in Canada; Young et al., 2007). The “Soom Shale” is between 10-15m thick, and fossils occur sporadically throughout the succession, from 1m above the base upwards. This biota has been extensively reviewed by Aldridge et al. (1994, 2001) and Selden and Nudds (2004) while much new information remains to be published (See review in Almond 2008 and refs. therein). The macrofossils include a range of macroalgae, shelly invertebrates (e.g. inarticulate brachiopods, conical-shelled nautiloids and other molluscs, crustaceans, unmineralised trilobites and eurypterids or “water scorpions”) and several groups of primitive jawless fish (e.g. anaspids, conodonts). Important microfossil groups include chitinozoans, spore tetrads of land plants and marine acritarchs. A further interesting category of fossils recorded from the Soom Member of Kromrivier are bromalites. These are the various fossilised products of ancient animal guts such as droppings (coprolites), regurgitates and stomach contents that sometimes contain the comminuted remains of recognisable prey animals such as conodonts or brachiopods (Aldridge et al., 2006). The majority of Soom fossils have been collected from a handful of localities, most of which lie on the Clanwilliam sheet within the central to northern Cedarberg (Gray et al. 1986, Cocks & Fortey 1986,*

Theron et al. 1990, Aldridge et al. 1995). New fossiliferous localities have recently been identified in the Clanwilliam area, while well preserved trilobite trace fossils (*Rusophycus*) have been collected from thin tempestite sandstones towards the base of the Soom Member in the Hex River Mountains by Almond (unpublished obs., 2011).” In the Palaeotechnical report (2009) the Cederberg Formation recommendation is “field scoping study recommended before excavation takes place” followed by “This unit often obscured by Cape age deformation and poor exposure of mudrocks in mountainous terrain. Its development in the Eastern Cape is not well understood.” It is determined to have high sensitivity for impacts to palaeontology.

Almond (2013) summarises the next two formations in the Table Mountain group as *“The fossil record of the Goudini and Skurweberg Formations, dominated by braided fluvial sandstones, is very sparse indeed. This reflects major global regression (low sea levels) during the Silurian Period, peaking during the latter part of the period (Cooper 1986). Sporadic, low diversity ichnoassemblages from thin, marine-influenced stratigraphic intervals have been recorded from all three Nardouw formations in the Western Cape by Rust (1967a, 1981) and Marchant (1974). There are also scattered, often vague reports of trace fossils in geological sheet explanations and SACS reports (e.g. Malan et al. 1989, De Beer et al. 2002). Most involve “pipe rock” (Skolithos ichnofacies) or various forms of horizontal epichnial burrows, including possible members of the Scolicia group which may be attributable to gastropods. Also recorded are typical Early Silurian palmate forms of the annulated burrow Arthropycus, poorly preserved “bilobites” (bilobed arthropod scratch burrows), gently curved epichnial furrows and possible arthropod tracks (Almond 2008). It is possible that more diverse ichnoassemblages (and even microfossils from subordinate mudrock facies where these have not been deeply weathered or tectonised) may eventually be recorded from the more marine-influenced outcrops of the Eastern Cape Fold Belt.”* In the Palaeotechnical report (2009, SAHRIS ID 108744), both the Goudini and Skurweberg Formation have low palaeontological sensitivity.

On the Table Mountain Group formations in the area Almond (2013) surveyed, he wrote *“During the present one-day field study almost all the Table Mountain Group exposures showed high levels of tectonic deformation (e.g. steep bedding, quartz veins, pervasive cleavage within mudrock intervals) as well as deep chemical weathering. These two factors, which are both more extremely developed within the potentially more fossiliferous mudrock-rich intervals of the Table Mountain Group (e.g. Cederberg, Goudini and Baviaanskloof Formation), have seriously compromised fossil preservation here. No fossil remains were observed within the Table Mountain Group sediments in the study area and the various formations concerned are considered to have a low palaeontological sensitivity in this region.”*

Based on Almond et al. (2009) and Almond (2013), a field survey is usually recommended for geology that has high and very high palaeontological sensitivity, but due to tectonic deformations, the fossil finds may be limited. In the HIA by Van Schalkwyk and Wahl (2012, SAHRIS ID 131946), the palaeontological sensitivity of the area is summarised it as *“underlain by potentially fossiliferous bedrocks of Palaeozoic, Mesozoic and Caenozoic age that crop out within the Cape Fold Belt, Southern coastal plain and Gamtoos River Valley of the Eastern Cape. The Dieprivier-Kareedouw sector runs along the grain of the Cape Fold Belt and is partially underlain by Early Devonian sediments of the Baviaanskloof and Gydo Formations that may contain early land plants and marine invertebrates respectively. However, given the tight folding here, it is quite likely that most of the original fossil content of these rocks has been destroyed by tectonism.”*



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The area proposed for development in this application has not been previously assessed for impacts to palaeontological heritage however, due to the limited nature and scale of the proposed WWTW, it is unlikely that this proposed development will negatively impact on significant archaeological heritage. The proposed sewer reticulation network is to be located within the existing road network for the existing Woodlands residential development. As such, the establishment of this water infrastructure will be located in areas that have been extensively previously disturbed and as such, it is unlikely that this proposed development will negatively impact on significant palaeontological heritage.

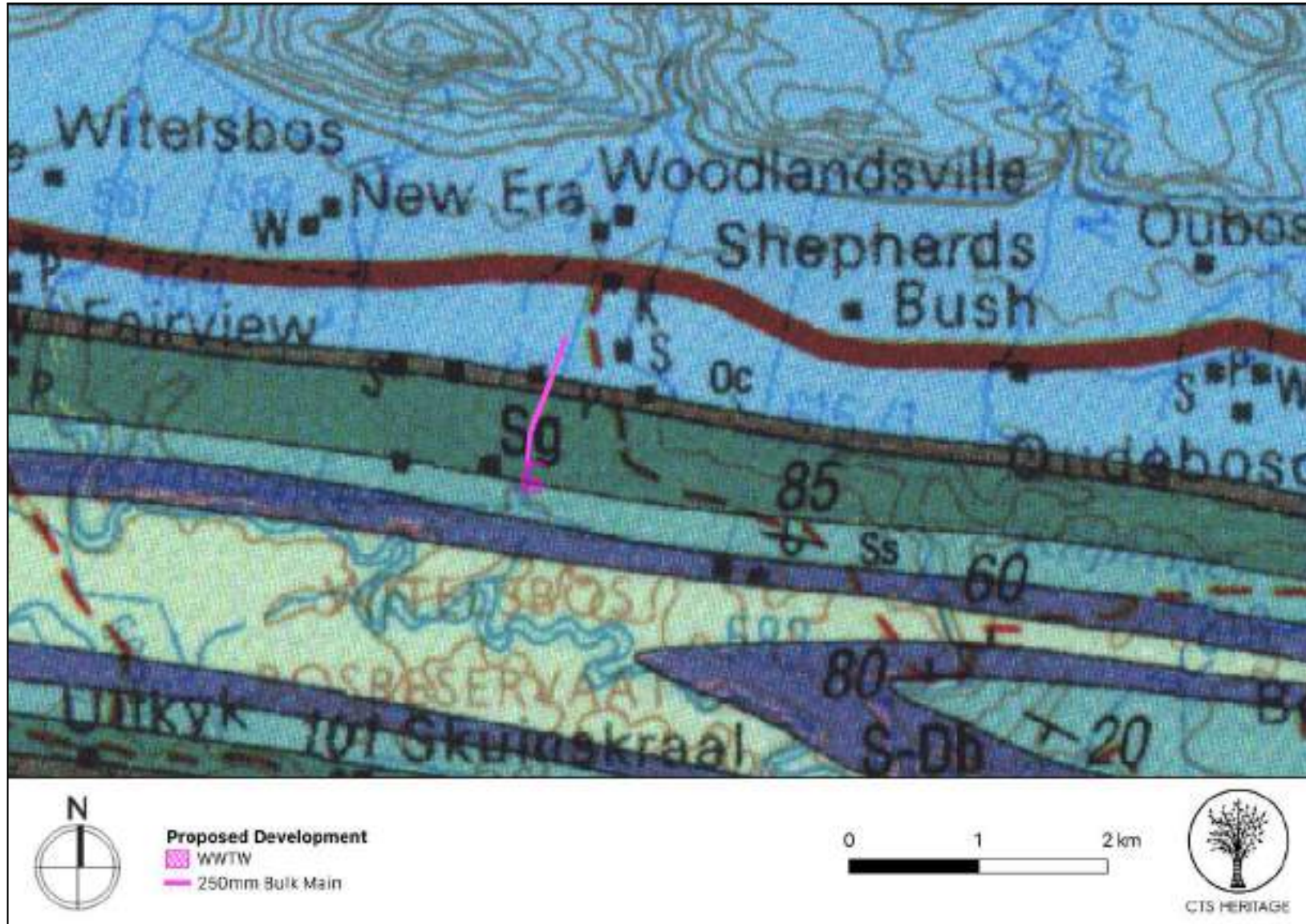
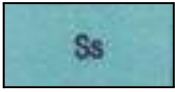
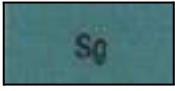
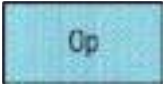


Figure 3 Extract from the CGS 3324 Port Elizabeth Map indicating that the development area is underlain by sediments of the Table Mountain Group Op: Peninsula Formation, Sg: Goudini Formation, Ss: Skurweberg Formation

Table 1: Geological Summary Table

Geological unit	Age	Lithology	Symbol on Figure 3	Fossil heritage	Palaeontological sensitivity
Cape Supergroup, Table Mountain Group, Nardouw Subgroup, Skurweberg Formation	Early Silurian	Quartzitic sandstone profusely cross-bedded		Sparse marine / estuarine /?fluvial trace fossil assemblages (trilobite burrows, Skolithos “pipe rock”, horizontal burrows) within more mudrock-rich part of succession (W. Cape)	Low
Cape Supergroup, Table Mountain Group, Nardouw Subgroup, Goudini Formation	Early Silurian	Brownish weathered quartzitic sandstone		Sparse marine / estuarine /?fluvial trace fossil assemblages (trilobite burrows, Skolithos “pipe rock”, horizontal burrows) within more mudrock-rich part of succession (W. Cape)	Low
Cape Supergroup, Table Mountain Group, Cederberg Formation	Late Ordovician	Shale, arenaceous towards the top		Soom Member with moderately diverse marine biota of various microfossils, “algae”, soft-bodied and shelly invertebrates (eurypterids, trilobites, nautiloids, brachiopods etc), primitive jawless fish, some showing exceptional soft tissue preservation. Disa Member with low-diversity shelly invertebrate dominated by brachiopods, also rare molluscs, trilobites, shallow marine trace fossil assemblages	Very High
Cape Supergroup, Table Mountain Group, Peninsula Formation	Early to Late Ordovician	Quartzitic sandstone with subordinate mudrock		Sparse shallow marine / coastal /estuarine to freshwater trace fossils, including eurypterid trackways, trilobite burrows	High (SAHRIS Palaeosensitivity Map) Low (Fossil Heritage Browser and Almond et al., 2009)

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Underlying Geology of the Development Area

According to the 1:250 000 scale geological map of Port Elizabeth (Sheet 3324) (Toerien & Hill, 1989) (Figure 3), the development area is underlain by sedimentary rocks of the Table Mountain Group, Cape Supergroup. These include formations from the Early to Late Ordovician and Early Silurian periods, namely the Peninsula, Cedarberg, Goudini, and Skurweberg formations.

The Peninsula Formation (Op) represents the oldest unit in the area and comprises light grey, quartzitic sandstone with subordinate mudrock interbeds, dating from the Early to Late Ordovician. Overlying this is the Cedarberg Formation (Oc) of Late Ordovician age, consisting predominantly of fine-grained shale and arenaceous sandstone towards the top. The Goudini Formation (Sg), of Early Silurian age, is composed of brownish, weathered quartzitic sandstone, while the Skurweberg Formation (Ss), also of Early Silurian age, consists of profusely cross-bedded quartzitic sandstone (Figure 4). These formations record a transition from deeper marine to shallow marine depositional environments, typical of the early Cape Fold Belt sequence.

4.2 Detailed Review of the Underlying Geology of the Development Area

Cape Supergroup

The Cape Supergroup is represented by a distinct depositional sequence extending for approximately 850 km along the southwestern and southern coastal regions of South Africa. The geological units of the Cape Supergroup start at the Cederberg, situated 200 km north of the Cape Peninsula, and continue along the southern coastline, ultimately reaching Port Elizabeth, approximately 650 km to the east (Blewett et al., 2019). Deposition of the Cape Supergroup sediments took place in the Agulhas Sea, a seaway formed as a result of rifting and extension of the Pan-African belt as Gondwana drifted northwards. Sedimentation took place throughout approximately 190 Ma (Booth et al., 1999), from 500 to 330 Ma (Ordovician to Carboniferous).

The Cape Supergroup is subdivided into the Table Mountain Group, Bokkeveld Group, and Witteberg Group. Deposition of the Table Mountain Group took place in shallow marine and terrestrial environments (with minor glaciation), whereas sedimentation of the Bokkeveld and Witteberg groups took place in deltaic and shallow marine shelf settings respectively (Rust, 1973). The Table Mountain Group comprises six formations, Sardinia Bay, Peninsula, Cederberg, Goudini, Skurweberg, and Baviaanskloof (Booth, et al., 1999; Thamm & Johnson, 2006).

Table Mountain Group: Peninsula Formation

The deposits at the site form part of the eastern section (east of 21°E) of the Table Mountain Group, and are classified as part of the Peninsula Formation (Johnson, 1976). The Peninsula Formation comprises resistant sandstone and quartzite, with a maximum thickness of 2700m (Johnson, 1976). Deposition of the Peninsula Formation sediments predominantly took place in a fluvial succession with minor shallow marine and estuarine intercalations (Broquet, 1992; Thamm & Johnson, 2006).

Cederberg Formation



This Cederberg Formation has a thickness seldom exceeding 120 m, and can be traced from the northwestern edge of the Cape Basin southwards to the Cape Town region and further eastwards to Port Elizabeth (Hiller, 1992). The formation comprises dark shale (i.e., Soom Shale Member), coarsening upward into siltstone (Thamm & Johnson, 2006), interpreted as an offshore shelf deposit. However, it is worth noting that, in the eastern regions, the shale and siltstone have undergone metamorphism, resulting in their transformation into sheared slate and the consequent obliteration of their original internal characteristics.

Goudini Formation

The Goudini Formation comprises interbedded siltstone and very fine-grained, non-amalgamated quartz-wacke sandstones, with heterolithic layers of laminated siltstone and sandstone at the base. These transition upwards into amalgamated, fine-grained quartz-wacke sandstones, followed by medium- to coarse-grained quartz arenite and subarkose sandstones, with occasional conglomeratic stringers. Key features include channel cut-and-fill structures, trough and tabular cross-bedding, and planar lamination. The quartzites in the Goudini Formation are interpreted as fluvial deposits, while the interbedded siltstones indicate sporadic marine incursions (Thamm & Johnson, 2006).

Skurweberg Formation

The early Silurian aged Skurweberg Formation consists of white quartzitic sandstones, often found in thick cross-bedded layers, occasionally interspersed with lenses of quartz-pebble conglomerates and thin mudrock deposits. The depositional environment has been interpreted as sandy alluvial braid-plains, shaped by the deposition of sediments by numerous river courses (Theron & Basson, 1989). These rivers, lacking substantial vegetation along their banks, meandered freely across expansive fluvial plains towards the sea. Periods of marine influence are evident in the presence of thinner, muddier deposits (Almond & Pether, 2008; Pether, 2022). The formation is overlain by the Rietvlei and Baviaanskloof formations with a sharp contact (Theron & Basson, 1989).

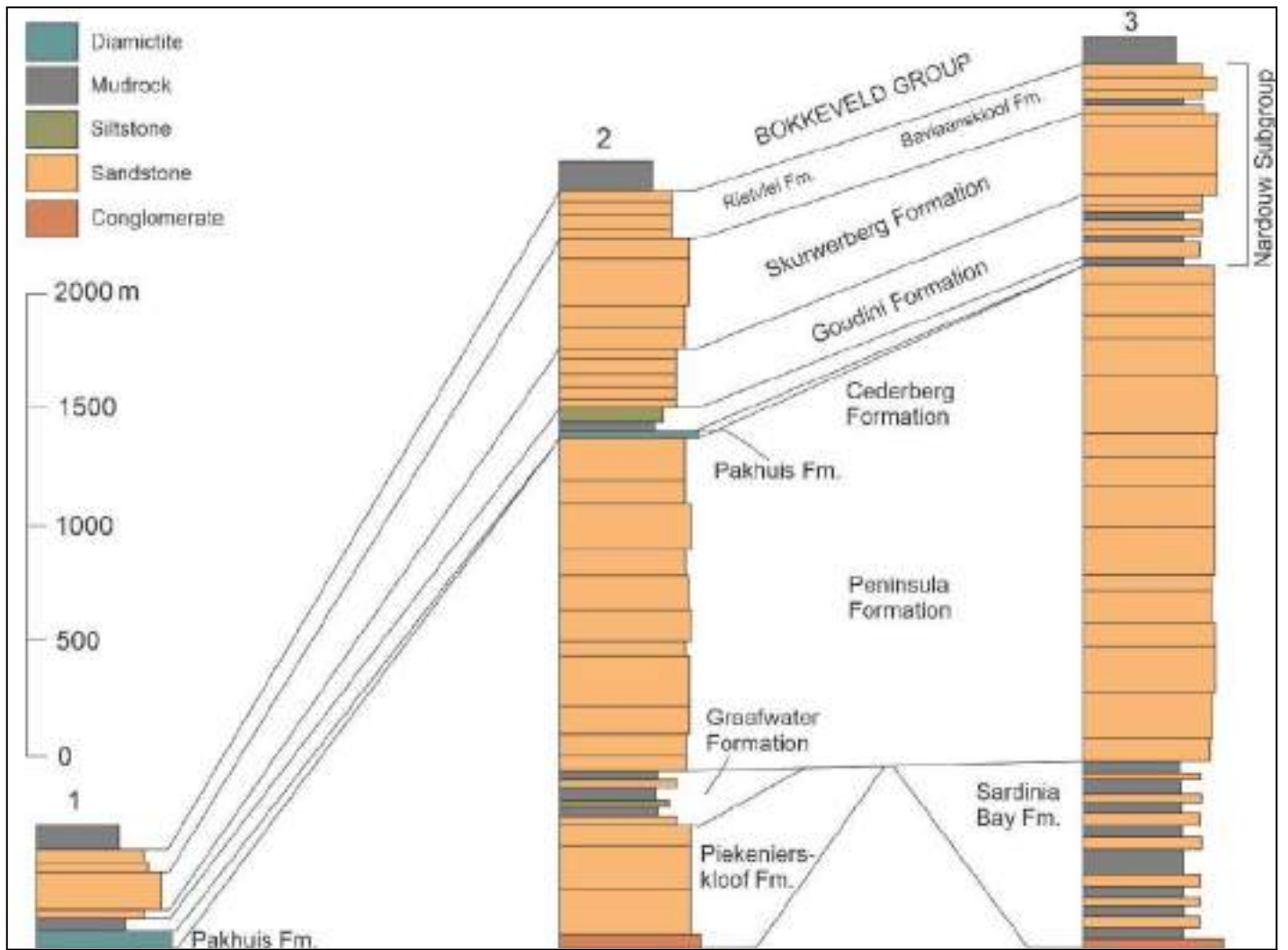


Figure 4. A stratigraphic illustration of the Table Mountain Group, depicting the succession of its constituent formations across various sections (adapted from Johnson et al., 1999). Column 3 highlights the formations relevant to the current project area.

4.3 Results of Field Assessment

The field assessment indicated that the project area within the development footprint has been extensively modified, particularly in the eastern and central sections where surface disturbance from infrastructure and previous land use is evident. The western portion of the site is dominated by dense forest vegetation, which significantly limits bedrock exposure and therefore hampers direct observation of the underlying geology. Areas to the north and northwest are occupied by residential developments and small-scale, self-sustaining agricultural plots. No *in situ* geological outcrops or fossil material were identified during the survey.

Landscape Photography



Figure 5.1 Northward facing view of the developed area in the central northern part of the development area.



Figure 5.2 Northward facing landscape view with the Cape Fold Mountains in the background and removed vegetation in the foreground.



Figure 5.3 Southward view of the secondary access roads, dense vegetation coverage (right) and areas that are fenced off for agricultural activities (left).



Figure 5.4 Northward view in the westernmost part of the development area showing the dense vegetation coverage that prevents direct observation of the underlying geological units.



Figure 5.5 Westward view of the easternmost part of the project area illustrating the vegetated nature of the landscape preventing direct observation of the underlying geological units.



Figure 5.6 Eastward view of the easternmost part of the project area illustrating the vegetated nature of the landscape preventing direct observation of the underlying geological units.



Figure 5.7 Eastward view of the easternmost part of the project area illustrating the vegetated nature of the landscape preventing direct observation of the underlying geological units.



Figure 5.8 Eastern facing view in the eastern southern part of the development area illustrating infrastructure and dense vegetation.



Figure 5.9 Southward facing view in the southernmost part of the development area illustrating the dense overgrowth of the vegetation in the area.



Figure 5.10 Existing WWTW facility in the southwestern part of the development area.



Figure 5.11 Dense vegetated nature of the landscape in the southernmost part of the development area. On the left is the fence for the refuse site and on the right is the start of the Kommetjie Forest.



Figure 5.12 Northward facing view just next to the WWTW facility illustrating the dense overgrown nature of the vegetation. The image is taken on the westernmost part of the development area within the lowest lying area.



Figure 5.13 Southward facing view in the Westernmost part of the development area illustrating the dense overgrowth of the vegetation in the area.



Figure 5.14 Southward facing view in the westernmost part of the development area illustrating the dense overgrowth of the vegetation in the area.



Figure 5.15 Southward facing view in the westernmost part of the development area illustrating the dense overgrowth of the vegetation in the area.

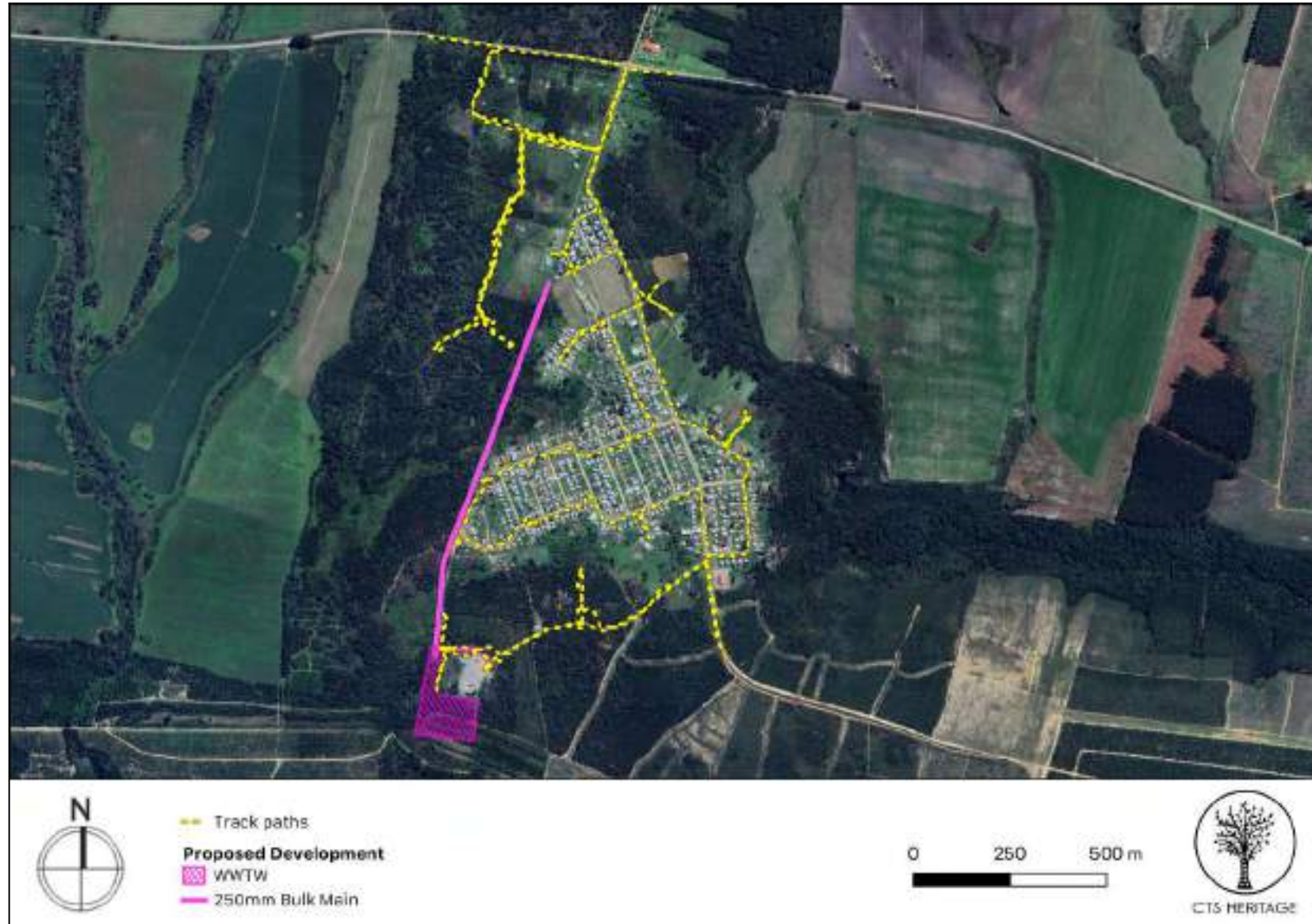


Figure 6 GPS tracks of field assessment conducted on 2 November 2025

4.4 Palaeontological Sensitivity of the Development Area

The palaeontological sensitivity of the proposed development area has been classified as ranging from Low to Very High, corresponding to the geological units mapped on the 1:250 000 scale, Port Elizabeth sheet 3324 (Council for Geoscience, Pretoria; Toerien & Hill, 1989) (Figure 3). The Skurweberg (Ss) and Goudini (Sg) formations are characterised by sparse marine to estuarine trace-fossil assemblages, including *Skolithos* “pipe rock” and horizontal burrows within mudrock-rich successions of the Western Cape. These units are therefore assigned a Low palaeontological sensitivity. In contrast, the Soom Shale Member (Oc) of the Cederberg Formation contains richly fossiliferous marine biotas with soft-bodied and shelly invertebrates such as trilobites, eurypterids, brachiopods, and nautiloids, and is assessed as Very High in sensitivity due to its exceptional preservation potential and scientific value, however herein assessed as Low. The underlying Peninsula Formation (Op), comprising quartzitic sandstones with occasional marine trace fossils such as *Skolithos* and *Cruziana*, is assigned a Low palaeontological sensitivity in accordance with the SAHRIS Palaeosensitivity Map and supporting literature (Almond & Pether, 2008; Almond et al., 2009).

Cape Supergroup: Table Mountain Group

Peninsula Formation

The Peninsula Formation, part of the Table Mountain Group, exhibits **Low** palaeontological sensitivity within the project area. Due to extensive structural deformation and the geological history of the Eastern Cape, fossil preservation is limited. Fossils recorded from this formation primarily include trace fossils such as arthropod trackways, trails, and *Skolithos* burrows (Rust, 1973). Most palaeontological evidence for the Peninsula Formation comes from outcrops in the Western Cape (Rust, 1967; Potgieter & Oelofsen, 1983; Broquet, 1990; Thamm & Johnson, 2006). Given the current assessment findings, it is unlikely that significant fossil material will be encountered during construction activities.

Cederberg Formation

The Cederberg Formation contains marine invertebrates which include brachiopods, trilobites, eurypterids, conodonts, chitinozoans, and numerous trace fossils and are best preserved and represented in the Soom Shale in the Western Cape. Spore tetrads of land plants have also been recorded into dark shale of the Soom Shale Member. Exceptionally well-preserved conodonts have also been described from this formation (Thamm & Johnson, 2006). However, due to the lack of exposure in the area and the nature of the vegetation the palaeontological sensitivity is assigned as **Low** for the current project area.

Goudini Formation

The Goudini Formation encompasses rare remnants of trace fossils, which have been documented in the Western Cape. However, it's worth noting that no body fossils have been reported from the Goudini Formation to date (Thamm & Johnson, 2006). This formation in the current project area is classified as having a **Low** palaeontological sensitivity.

Skurweberg Formation

The Skurweberg Formation contains sparse fossil remains, and has been classified as having a **Low** palaeontological sensitivity. The formation contains trace fossils, such as trilobite scratch burrows, arthropod tracks and feeder burrows



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found within the finer-grained mudbeds, related to shallow marine or estuarine settings. Vertical tube burrows of suspension feeding invertebrates are found in the sandier beds (Pether, 2022). The Skurweberg Formation within the current project area is also considered to have a **Low** palaeontological sensitivity.

Table 2: Verified Palaeontological sensitivity for the geological units present in the current development project

Geological Unit	Verified Paleontological Sensitivity	Scientific Importance	Mitigation
Cape Supergroup, Table Mountain Group, Nardouw Subgroup, Skurweberg Formation	Low	Low	Chance Fossil Find Protocol
Cape Supergroup, Table Mountain Group, Nardouw Subgroup, Goudini Formation	Low	Low	Chance Fossil Find Protocol
Cape Supergroup, Table Mountain Group, Cederberg Formation	Low	Low	Chance Fossil Find Protocol
Cape Supergroup, Table Mountain Group, Peninsula Formation	Low	Low	Chance Fossil Find Protocol

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of Impact to Palaeontological Resources

The construction and upgrading of the Woodlands WWTW and associated sewer reticulation network will involve vegetation clearance, excavation, trenching, and grading. These activities will disturb surface and shallow subsurface deposits and may affect any fossil material preserved within the underlying strata.

The development area is underlain by the Peninsula, Cederberg, Goudini, and Skurweberg formations of the Table Mountain Group. Each of these formations has been assigned a Low palaeontological sensitivity. Fossil material known from these units elsewhere consists almost exclusively of sparse trace fossils, such as *Skolithos* and *Cruziana* burrows, with body fossils being rare or absent.

No fossil material was identified during the field assessment. The site is extensively disturbed in areas associated with existing infrastructure and residential development, while dense vegetation limits visibility in the remaining portions of the footprint. No *in situ* bedrock exposures were observed, and no fossiliferous horizons were detected.

The potential for encountering significant fossil material during construction is regarded as **low**. Fossil occurrences, if present, are expected to be isolated and of limited scientific importance. The overall impact on palaeontological resources from the proposed development is considered **low**.

6. CONCLUSION AND RECOMMENDATIONS

The palaeontological assessment for the proposed Woodlands WWTW and associated sewer reticulation upgrade confirms that the development footprint is underlain by sedimentary units of the Table Mountain Group (Cape Supergroup), namely the Peninsula, Cederberg, Goudini, and Skurweberg formations. These units, of Ordovician to Silurian age, are regionally known to preserve sparse trace-fossil assemblages — such as *Skolithos* and *Cruziana* burrows — but are generally unfossiliferous in the Eastern Cape due to extensive tectonic deformation and deep weathering.

Field observations revealed that the project area is largely disturbed by prior development, infrastructure, and vegetation cover, with no *in situ* fossil material or fossiliferous horizons identified during the survey. As such, the overall palaeontological sensitivity of the area is verified as Low, and the likelihood of encountering scientifically significant fossil material during the proposed works is minimal. The anticipated impact on palaeontological heritage resources from construction-related activities — including excavation, trenching, and grading — is therefore regarded as Low.

Recommendations

- Chance Fossil Finds Protocol (CFFP): A Chance Fossil Finds Protocol must be incorporated into the Environmental Management Programme (EMPr) to guide on-site personnel during all ground-disturbing activities.

With the implementation of these measures, the proposed Woodlands WWTW and sewer upgrade can proceed with negligible risk to palaeontological heritage.

7. REFERENCES

Heritage Impact Assessments				
NID	Report Type	Author/s	Date	Title
4255	HIA Letter of Exemption	Johan Binneman	01/06/2006	Letter Of Recommendation (With Conditions) For The Exemption Of A Full Phase 1 Archaeological Heritage Impact Assessment For The Subdivision And Rezoning Of Portion 28 Of The Farm "Melkhoutekraal" No. 254 In Kareedouw (Koukama Municipality), From Agriculture
6890	AIA Phase 1	Johan Binneman	04/06/2011	A Phase 1 Archaeological Impact Assessment For The Proposed Happy Valley Wind Energy Facility Near Humansdorp, Kouga Local Municipality, District Of Humansdorp, Eastern Cape Province
6891	AIA Desktop	Johan Binneman	01/06/2009	An Archaeological Desktop Study For The Proposed Happy Valley Wind Energy Facility. Kou-Kamma Municipality, Humansdorp District, Eastern Cape Province
7124	AIA Phase 1	Karen Van Ryneveld	20/09/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa
7594	AIA Phase 1	Johan Binneman	01/08/2011	Phase 1 Archaeological Impact Assessment For The Proposed Oyster Bay Wind Energy Facility, Kouga Local Municipality, Humansdorp, Eastern Cape Province
7595	AIA Desktop	Johan Binneman	01/11/2010	An Archaeological Desktop Study For The Proposed Oyster Bay Wind Energy Facility, Local Kuga Municipality, Humansdorp District, Eastern Cape Province
8101	AIA Desktop	Johan Binneman	07/03/2011	An Archaeological Desktop Study For He Construction Of The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province
8102	AIA Phase 1	Johan Binneman	01/08/2011	A Phase 1 Archaeological Impact Assessment For The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.
8445	HIA Phase 1	Karen Van Ryneveld	31/12/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa 1
8446	HIA Phase 1	Karen Van Ryneveld	31/12/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa
8914	PIA Phase 1	Robert Gess	30/03/2011	Palaeontological Heritage Component Of Fibreco Telecommunications, Basic Assessment For The Proposed Fibre Optic Data Cable Project: Route 5: Pe To Durban
8929	PIA Phase 1	Billy De Klerk	04/01/2011	Palaeontological Heritage Impact Assessment Of The Proposed Happy Valley Wind Energy Facility On A Site East Of Humansdorp, Eastern Cape
8955	PIA Phase 1	Billy De Klerk	17/12/2010	Palaeontological Heritage Impact Assessment Of The Proposed Wind Farms In The Coastal Region Of The Kouga Local Municipality Near The Villages Of Oyster Bay And St Francis Bay.
8988	PIA Phase 1	John E Almond	20/09/2011	Proposed Oyster Bay Wind Energy Facility Near Humansdorp. Kouga Local Municipality, Eastern Cape
9033	PIA Phase 1	John E Almond	02/08/2011	Proposed Tsitsikamma Community Wind Energy Facility Near Humansdorp, Kouga Local Municipality, Eastern Cape Province
26808	AIA Phase 2	Karen Van Ryneveld	03/06/2012	Phase 1 Archaeological Assessment Micro-Siting & Phase 2 Archaeological Test Pitting Turbine Line 33-36, Red Cap Kouga Wind Farm, Central Cluster, Oyster Bay, Eastern Cape, South Africa
44916	AIA Phase 1	Karen Van Ryneveld	25/06/2012	Mining Right Application: Farms Klein Rivier (713-32) And Buffelsbosch (742-14), Humansdorp District, Eastern Cape, South Africa



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44918	PIA Desktop	John Pether	05/06/2012	Mining Right Application On Farms Klein Rivier 713 Ptn 32 And Buffelsbosch 742 Ptn 14 District Of Humansdorp, Eastern Cape Province
120032	AIA Phase 1	Elizabeth Wahl, Len van Schalkwyk	08/05/2013	Phase 1 Archaeological Impact Assessment Report: Proposed 132kV Power Line and Substation Infrastructure, Melkhout-Dieprivier, Kouga Local Municipality, Cacadu District, Eastern Cape Province, South Africa
108744	Palaeotechnical Report	John E Almond, Billy De Klerk, Robert Gess	01/05/2009	Palaeontological heritage of the Eastern Cape
125085	AIA Phase 1	Karen Van Ryneveld	15/07/2013	Tsitsikamma Wind Farm - Borrow Pits Project, Humansdorp Registration Division, Eastern Cape
125089	PIA Phase 1	Karen Van Ryneveld	17/07/2013	Palaeontological Heritage Study For Proposed Establishment Of Borrow Pits (For Road And Concrete Construction Materials) To Primarily Serve The Tsitsikamma Community Wind Farm Project
131946	AIA Desktop	Len van Schalkwyk, Elizabeth Wahl	30/05/2012	Phase 1 Heritage Impact Assessment Report: 132kV Power Line and Substation Infrastructure, Dieprivier-Kareedouw, Kouga Local Municipality, Cacadu District Municipality, Eastern Cape Province, South Africa
131953	PIA Phase 1	John E Almond	01/05/2013	Palaeontological specialist assessment: combined field-based and desktop study PROPOSED KAREEDOUW-DIEPRIVIER 132 kV TRANSMISSION LINE PROJECT, HUMANSDORP MAGISTERIAL DISTRICT, EASTERN CAPE.
162676	HIA Phase 1	Johan Binneman	31/10/2012	A Phase 1 Archaeological Impact Assessment For The Proposed 132kv Power Line Linking The Tsitsikamma Community Wind Energy Facility To The Proposed Extension Of The Dieprivier Substation, Kouga Local Municipality, Humansdorp District, Eastern Cape Province
177466	AIA Phase 2	Karen Van Ryneveld	01/10/2014	Phase 2a Archaeological Monitoring (Final Report) - The Kouga Wind Farm (Red Cap Kouga Wind Farm, Central Cluster), Oyster Bay, Eastern Cape, South Africa
179415	Palaeontological Specialist Reports	John E Almond	31/08/2012	Palaeontological Specialist Study: Combined Desktop & Field-Based Assessment For The Proposed Tsitsikamma Community Wind Energy Facility Near Humansdorp, Kouga Local Municipality, Eastern Cape Province
179470	Archaeological Specialist Reports	Johan Binneman	28/09/2012	Archaeological Walk Through Survey Of The Final Turbine Footprint For The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality
269397	AIA Phase 1	Celeste Booth	02/03/2015	Fibreco Repeater Sites Routes 3 And 4_heritage_2015 Aia Report
384447	Heritage Statement	Stefan de Kock	09/01/2017	Proposed Establishment Of A New Dam On A Portion Of The Farm Rietfontein 594/1, Sarah Baartman District And Nelson Mandela Bay Municipality
513392	AIA Phase 1	Peter Nilssen	02/07/2018	Phase 1a Archaeological Impact Assessment, Scoping Phase, Proposed Impofu West Wind Farm, Kouga Local Municipality, Sarah Baartman District Municipality, Eastern Cape Province

Additional Relevant Literature Cited:

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APPENDIX 3: Heritage Screening Assessment and response to NID

HIGH-LEVEL DESKTOP HERITAGE REPORT

CTS Reference Number:	CTS25_021	
Client:	Blue Pebble	
Date:	March 2025	
Title:	WOODLANDS WASTEWATER TREATMENT WORKS (WWTW) AND SEWER RETICULATION UPGRADE FOR THE KOUKAMMA MUNICIPALITY	

Figure 1a. Satellite map indicating the location of the proposed development in the Eastern Cape Province.



1. Proposed Development Summary

Bluepebble Sustainable Solutions has been appointed by SMEC South Africa (Pty) Ltd to undertake a Basic Assessment process to ensure compliance with regulations contained in the National Environmental Management Act (NEMA Act No. 107 of 1998) and the Environmental Impact Assessment Regulations (2014), as amended, for the Woodlands Wastewater Treatment Works (WWTW) and sewer reticulation upgrade for the Koukamma Municipality.

The Woodlands sanitation services consist of digester tanks and a 110mm diameter small bore gravity sewer reticulation system. Effluent from digesters is regularly removed by means of vacuum tankers, transported, and disposed of at the Wastewater Treatment Works (WWTW) at Woodlands Settlement. The WWTW is located 0.5km south of the southwestern boundary of the Woodlands Settlement. Effluent then undergoes an activated sludge treatment process followed by a clarification process where the solids and liquid are separated before the final effluent is discharged into a surface water course. Sludge settlement is conveyed to a pit close to the treatment works where it is then disposed of. As soon as the hole is 80% full it is then backfilled, and a new hole is formed. The WWTW is capable of handling flows up to 400Kl/d of solids free sewage. The hydraulic and treatment capacity of the existing treatment plant will be further studied during the concept and design phases.

The proposed activities for the upgrade of bulk sewers, replacing of small-bore sanitation system at Woodlands is as follows:

- Replace Internal Sewer Reticulation of the woodlands area.
- Design new sewer infrastructure for the proposed development.
- Realign and replace the Bulk Sewer Main.
- Refurbish the existing Waste Water Treatment works.

2. Application References

Name of relevant heritage authority(s)	ECPHRA
Name of decision making authority(s)	DFFE

3. Property Information

Latitude / Longitude	24.1596118,-34.0126160
Erf number / Farm number	Remainder of Erf 1 Woodlands
Local Municipality	Koukamma
District Municipality	Sarah Baartman
Province	Eastern Cape



Current Use	Agriculture
Current Zoning	Agriculture

4. Nature of the Proposed Development

Total Surface Area of development	TBA
Depth of excavation (m)	TBA
Height of development (m)	TBA

5. Category of Development

X	Triggers: Section 38(8) of the National Heritage Resources Act
	Triggers: Section 38(1) of the National Heritage Resources Act
	1. Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.
	2. Construction of a bridge or similar structure exceeding 50m in length.
	3. Any development or activity that will change the character of a site-
X	a) exceeding 5 000m ² in extent
	b) involving three or more existing erven or subdivisions thereof
	c) involving three or more erven or divisions thereof which have been consolidated within the past five years
	4. Rezoning of a site exceeding 10,000 m ²
	5. Other (state):

6. Additional Infrastructure Required for this Development

TBA

7. Mapping (please see Appendix 3 and 4 for a full description of our methodology and map legends)

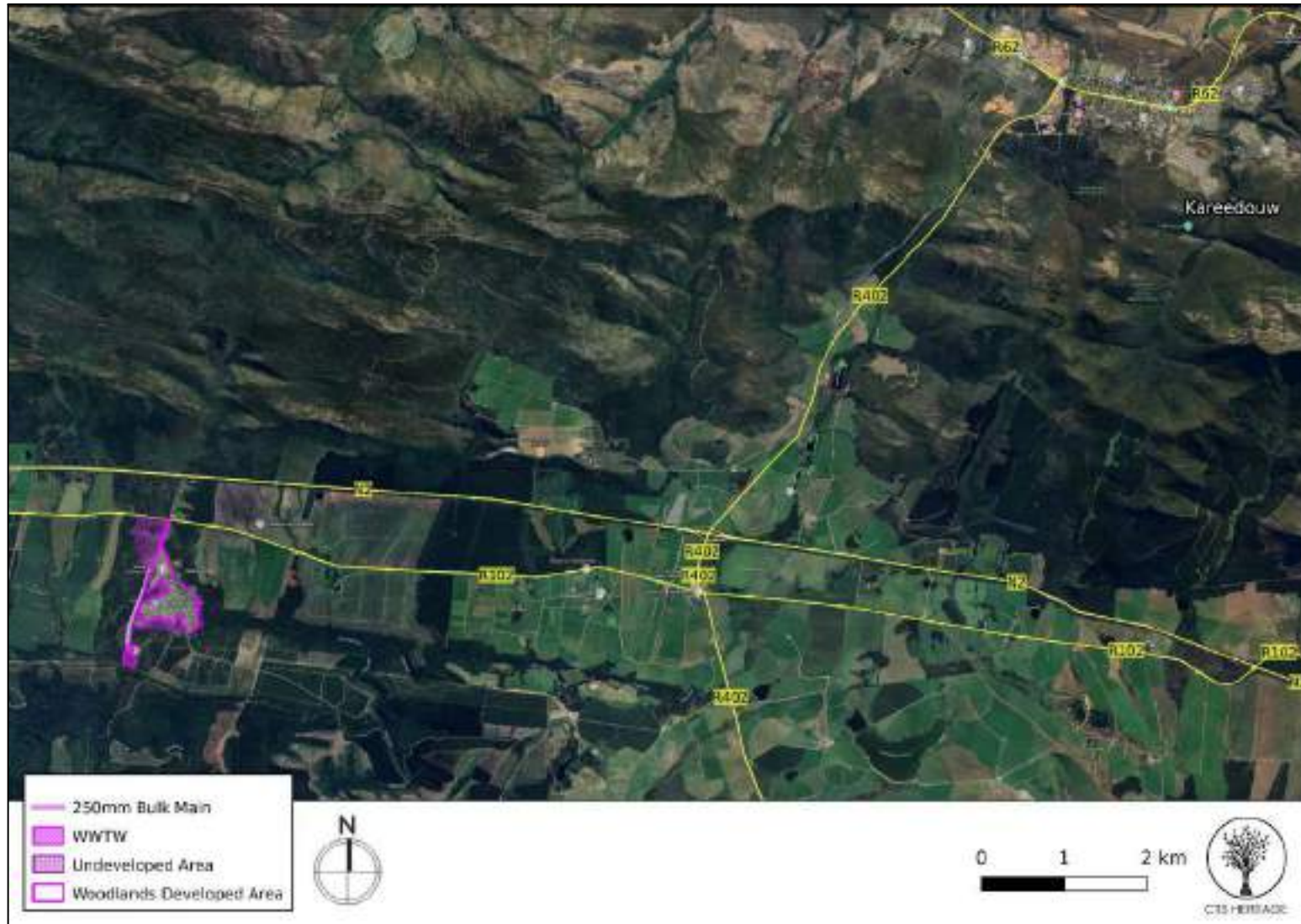
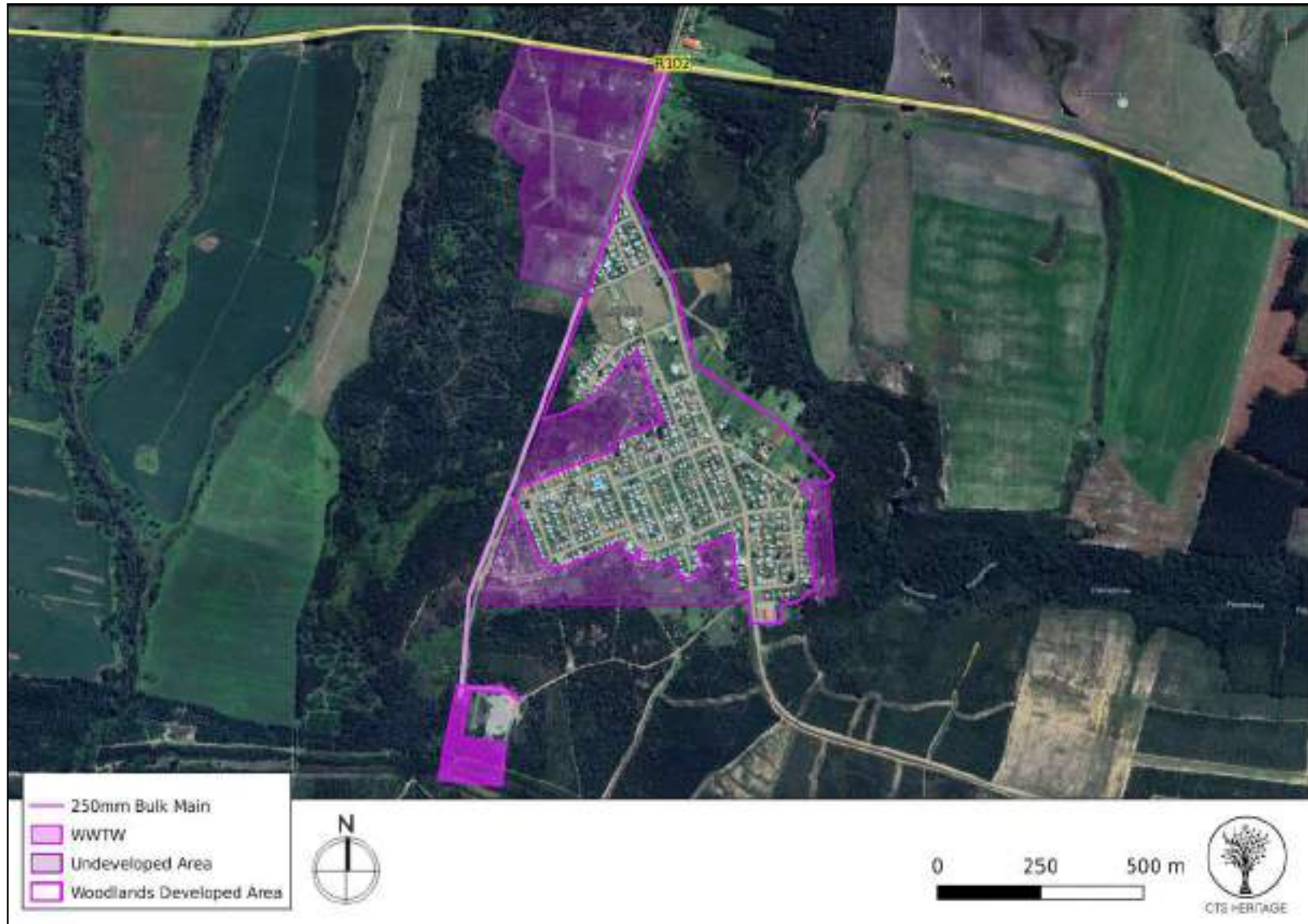


Figure 1b Overview Map. Satellite image (2025) indicating the proposed development area at closer range, relative to Kareedouw.



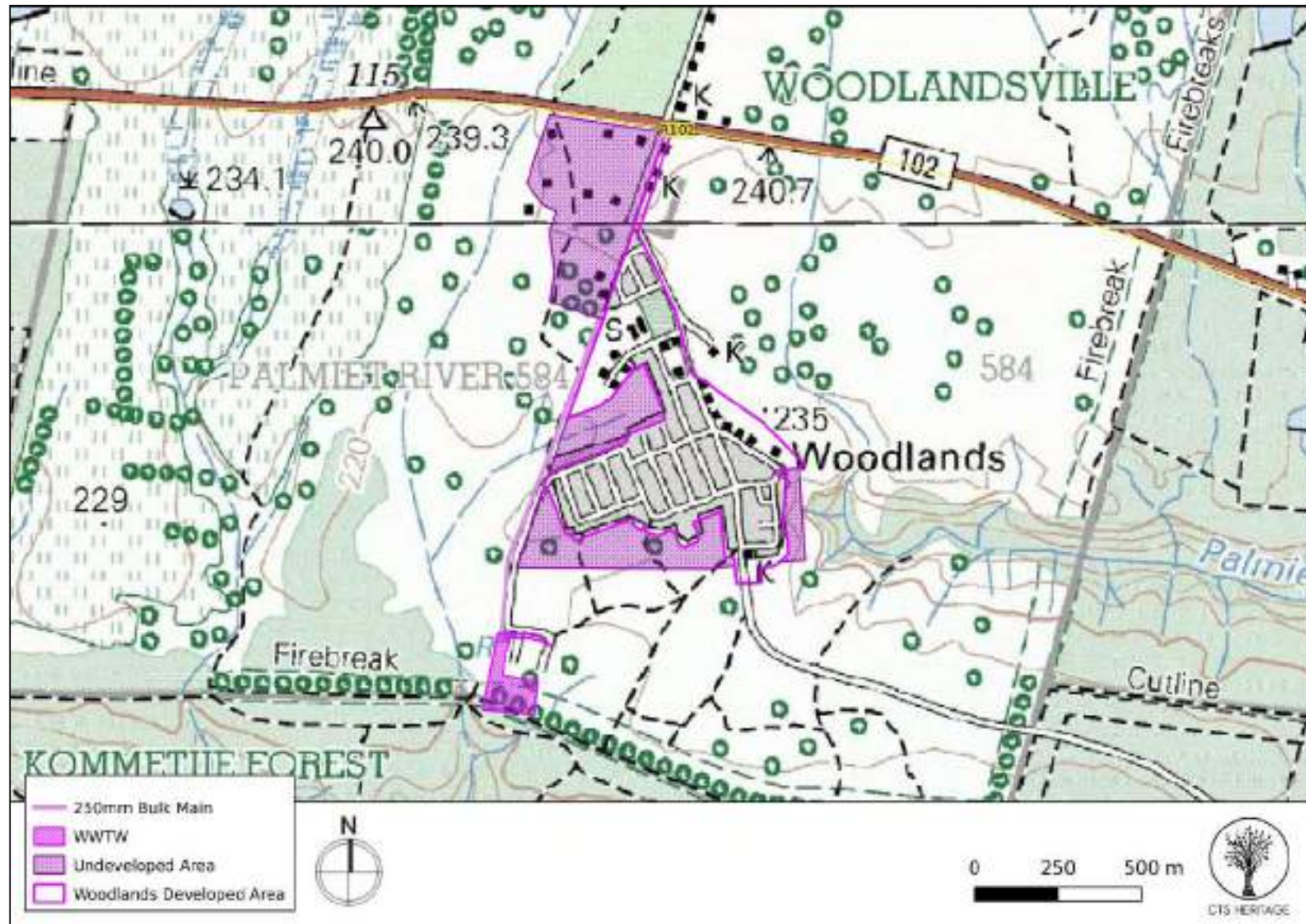


Figure 1d. Overview Map. 1:50 000 Topo Map for the development area



Figure 3.1. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs, indicated. Please See Appendix 4 for a full description of heritage resource types.

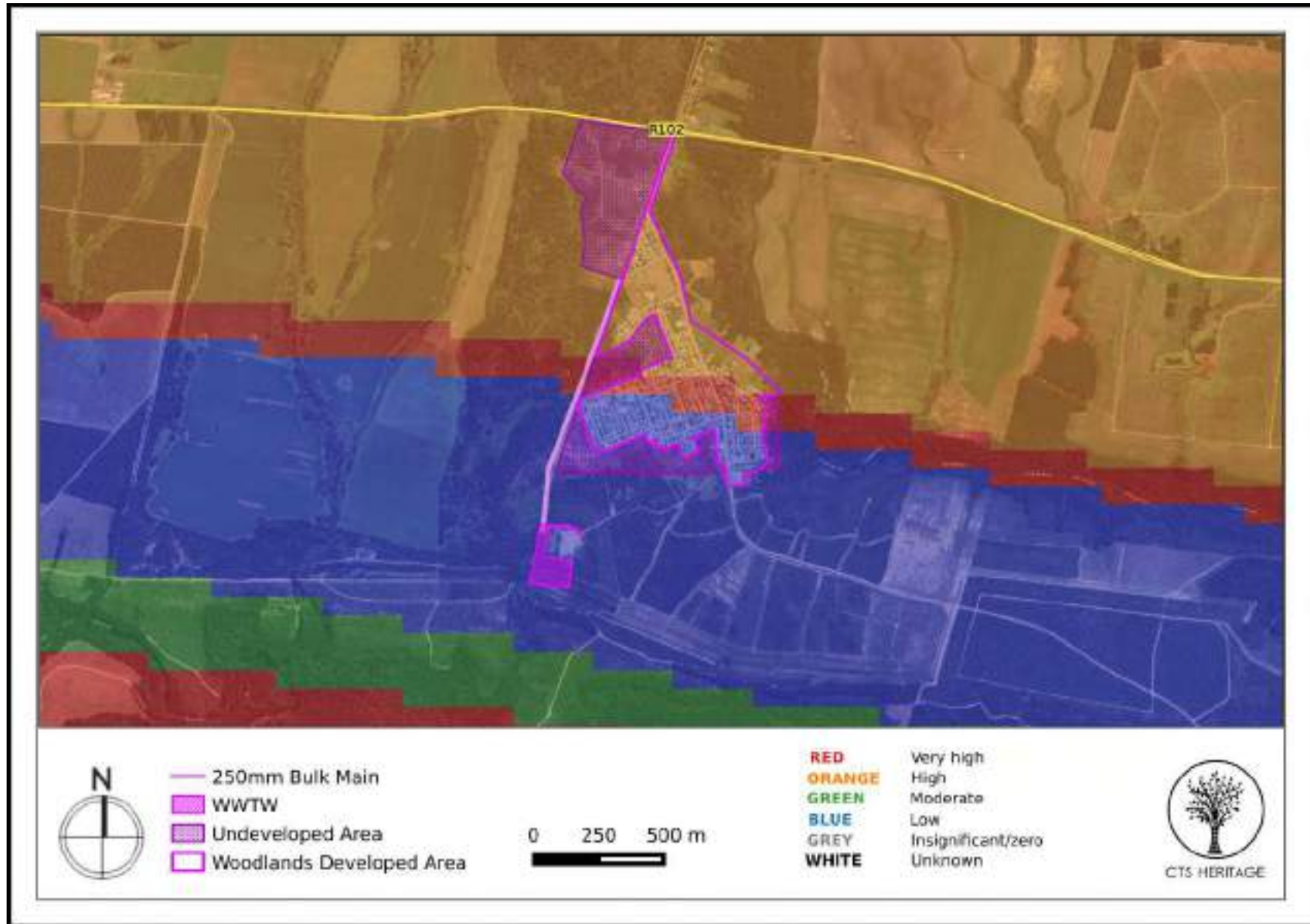


Figure 4. Palaeosensitivity Map. Indicating Low fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

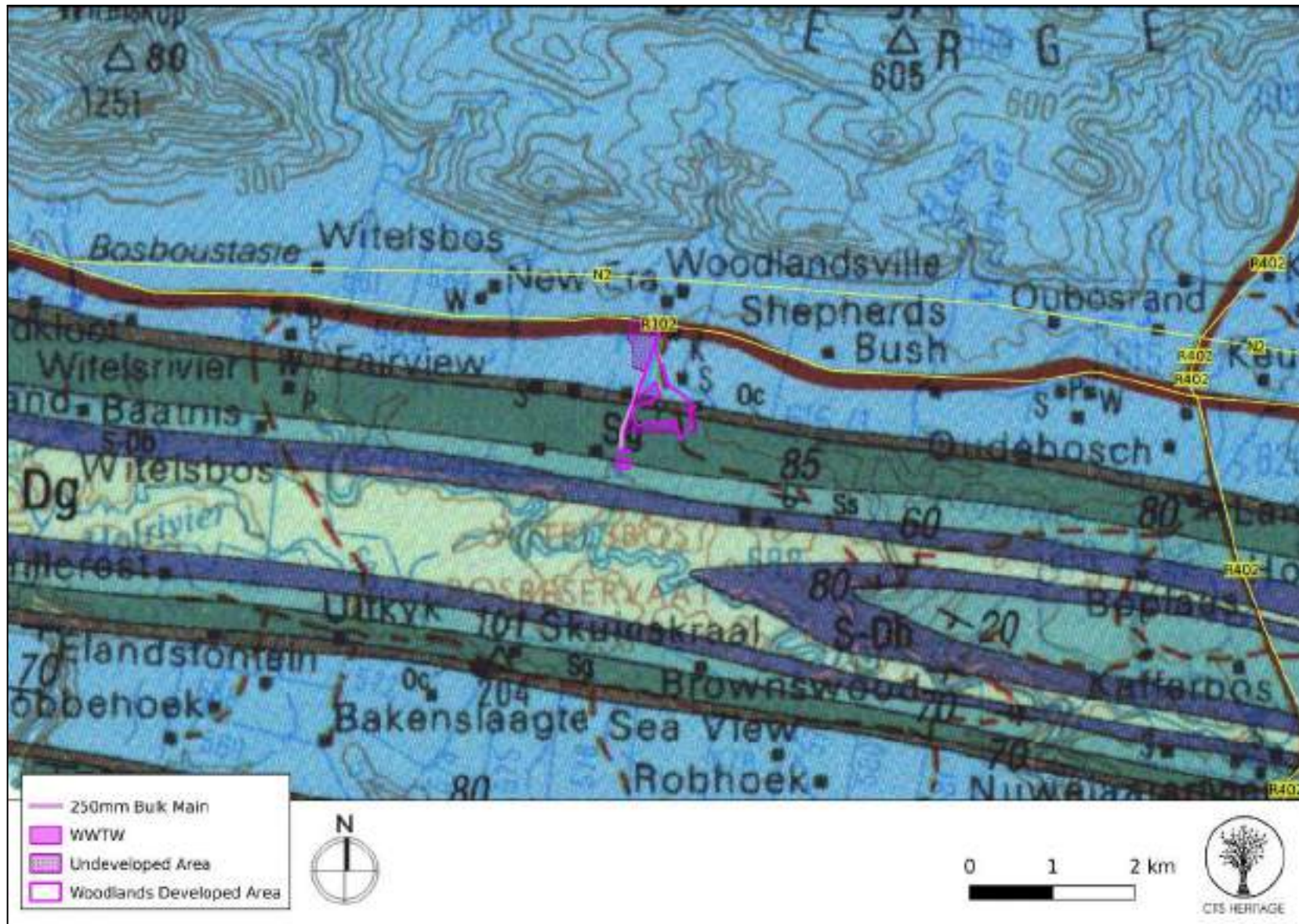


Figure 5. Geology Map. Extract from the CGS 3324 Port Elizabeth Map indicating that the development area is underlain by sediments of the Table Mountain Group Op: Peninsula Formation, Sg: Goudini Formation, Ss: Skurweberg Formation



8. Heritage statement and character of the area

The proposed development area is situated approximately 10 km southwest of Kareedouw, the nearest major town, within the Sarah Baartman District Municipality of the Eastern Cape Province, South Africa. Kareedouw got its name from the Khoe phrase “path by the Karee trees.” It was established in 1906 when the Dutch Reformed Church decided to build a church there, which is still in use. South Africa’s late former Prime Minister, John Vorster is buried next to the Dutch Reformed Church in Kareedouw. It has a long history of wood cutting and has a statue in the town to commemorate the town’s woodcutters. The town still has a large wood and lumber industry, with a creosote plant. It is also known as the gateway to the Langkloof as well as the Southern Entrance to the Baviaanskloof. In 2020 it won the Kwela Town of the Year title. The R62 is one of the more well-known routes in South Africa, boasting natural splendour and many hiking trails.

Cultural Landscape

Cultural Landscape is defined as a symbiosis of human activity and environment. As defined by the World Heritage Committee, it is the “cultural properties [that] represent the combined works of nature and of man” and often encompasses various elements within an area that overlap with each other to create a unique sense of place. Cultural Landscapes include elements of palaeontological, archaeological, built environment and historical significance as well as elements of natural and aesthetic value. These elements are interrogated further below, as they pertain to the area proposed for development.

The broader area, as part of the renowned Garden Route, is known for its scenic value, especially along the R62. The location of this development between two nature reserves speaks further to the scenic and wilderness value of this broader context. Wahl and Van Schalkwyk (2013) note that the R62 and the Langkloof Scenic Routes have high local and regional significance for their aesthetic and economic (tourism) values. Based on the location of the proposed WWTW adjacent to the existing waste disposal site, and its distance from any major access routes, it is unlikely that the proposed development of the WWTW will negatively impact on the cultural landscape value of the area. The proposed sewer reticulation network is to be located within the existing road network for the existing Woodlands residential development. As this network will be buried, it is unlikely that this infrastructure will negatively impact on the cultural landscape.

Archaeology

Nilssen (2018) [SAHRIS ID 513392] in a nearby AIA as part of the Impofu WEF located 30km east of the proposed development area, wrote, “*The most sensitive portion of the Impofu Wind Farms site, from an archaeological and heritage standpoint, is the coastal strip where archaeological resources are abundant up to a distance of about 5 km from the shoreline. This stretch is described as a pre-colonial cultural landscape and is highly valued by scientists and the Gamtkwa Khoisan Council. Due to the scarcity of rock shelters and caves in the study area, archaeological sites are rare further inland and are expected to cluster on higher lying areas overlooking the relatively flat to undulating surroundings. Many finds reported inland of the pre-colonial cultural landscape consist of isolated Stone Age specimens or very low density scatters of Stone Age artefacts that occur in disturbed contexts and devoid of any faunal remains or other cultural materials. For the most part, such heritage resources are rated to be of low significance.*” This proposed development area is located further inland which means that it is located outside of this sensitive coastal band. According to Van Schalkwyk (2013), “Little is known about the Stone Age in the region, especially with regard to the Middle Stone Age and even more so about the Early Stone Age.” However, he goes on to note that rock art and shelters occupied during the Later Stone Age are known from the broader region. Rock art sites and associated archaeological deposit may be located within the kloofs and valleys located within the mountains located north of the area under assessment here.

Few heritage impact assessments have been completed in proximity to the area proposed for development, resulting in some Heritage resources being identified within the broader area, most of which are palaeontological in nature (Figure 3). In their Archaeological Assessment as part of a larger project for a 132 kv line running from Melkhout through Humansdorp and Dieprivier to Kareedouw, Wahl and Van Schalkwyk (2013, SAHRIS ID 120032, and Van Schalkwyk & Wahl, 2012, SAHRIS ID 131946) found very few archaeological artefacts or remains. They also included no mitigation recommendations pertaining to archaeology. They do list some finds from other prior assessments completed by Binneman in the vicinity [SAHRIS IDS 6890 and 162676]. The archaeological sensitivity of the broader area can be summarised as follows, “*ESA stone artefacts*



are common throughout the region and a large site is present on the hill slopes close to the confluence of the Krom and Diep Rivers, about 3.5 km south-east of Dieprivier Substation (Binneman 2010; 2012). Binneman also identified MSA /ESA artefacts about 2.3 km south-east of Dieprivier Substation (Binneman 2010), a single ESA handaxe 2.7 km north-west of proposed Tower 46 (Binneman 2011) and a scatter of ESA artefacts about 8 km south-west of Dieprivier Substation (Binneman 2012).” In Binneman’s report, (2011, SAHRIS ID 6890, the large orange polygon in Figure 2) he wrote “The proposed Happy Valley Wind Energy Facility is approximately 20 kilometres from the coast and falls outside the coastal sensitive zone. The site is covered by dense grass and fynbos vegetation, which made archaeological observation very difficult. Only one large Earlier Stone Age handaxe was observed eroding from the exposed gravel in a track leading to the top of the ridge.”

The area proposed for development in this application has not been previously been assessed for impacts to archaeological heritage however, due to the location of the proposed WWTW adjacent to the existing waste disposal site, as well as the limited nature and scale of the proposed WWTW, it is unlikely that this proposed development will negatively impact on significant archaeological heritage. The proposed sewer reticulation network is to be located within the existing road network for the existing Woodlands residential development. As such, the establishment of this water infrastructure will be located in areas that have been extensively previously disturbed and as such, it is unlikely that this proposed development will negatively impact on significant archaeological heritage.

Palaeontology

According to the SAHRIS Palaeosensitivity map, the area proposed for development is underlain by sediments of varying levels, from low to very high palaeontological sensitivity. According to the extract from the Council of GeoScience map for Port Elizabeth (3324), the area proposed for the WEF is underlain by sediments of the Peninsula Formation (Op), the Cederberg Formation (Oc), the Goudini Formation (Sg) and the Skurweberg Formation (Ss).

Almond (2013, SAHRIS ID 131953) in a PIA that intersects with the proposed development (Figure 2. Previous Heritage Impact Assessments), wrote “*Body fossils (shells, teeth, bones etc) are so far unknown from the **Peninsula Formation** but a modest range of shallow marine to nearshore fluvial and / or estuarine trace fossils have been recognised, mainly from the Western Cape outcrop area (e.g. Rust 1967, Potgieter & Oelofsen 1983, Broquet 1990, 1992, Almond 1998a,b, Braddy & Almond 1999, Thamm & Johnson 2006). These traces include trilobite resting and feeding burrows (Cruziana, Rusophycus), arthropod trackways (e.g. Diplichnites, Palmichnium) that are variously attributed to eurypterids, crustaceans or trilobites, palmate, annulated feeding burrows (Arthropycus), dense assemblages (“pipe rock”) of vertical dwelling burrows of unknown suspension feeders (Skolithos, Trichichnus), vertical columns or cones of densely reworked sediment (Metaichna / possible Heimdallia), and several types of horizontal burrows (Palaeophycus, possible Aulichnites)...An important, albeit low diversity, assemblage of Peninsula Formation trace fossils was recently recorded from heterolithic beds exposed in the Rosenhof Quarry site within the broader Tsitsikamma Community Wind Energy Facility study region to the southwest of Humansdorp by Almond (2012). Traces here include vertical Skolithos burrows, Rusophycus and Cruziana arthropod scratch burrows that were probably generated by trilobites, possible bivalve burrows (Lockeia) and teichichnoid spreiten burrows, as well as abundant flower-shaped “gyrophyllitid” burrows that had previously been reported from beach boulders at Cape Saint Francis.” In the Palaeotechnical report on formations in the Eastern Cape (2009, SAHRIS ID 108744), the Peninsula Formation has low palaeontological sensitivity.*

On the Cederberg Formation, Almond (2013) writes “*An exceptionally important and interesting biota of soft-bodied (i.e. unmineralised) and shelly invertebrates, primitive jawless vertebrates and microfossils has been recorded since the middle 1970s from finely laminated, black mudrocks of the Soom Member, forming the lower, mudrock dominated portion of the **Cederberg Formation**. This is one of only two so-called soft-body Lagerstaette of Late Ordovician age recorded worldwide (the other example was recently discovered in Canada; Young et al., 2007). The “Soom Shale” is between 10-15m thick, and fossils occur sporadically throughout the succession, from 1m above the base upwards. This biota has been extensively reviewed by Aldridge et al. (1994, 2001) and Selden and Nudds (2004) while much new information remains to be published (See review in Almond 2008 and refs. therein). The macrofossils include a range of macroalgae, shelly invertebrates (e.g. inarticulate brachiopods, conical-shelled nautiloids and other molluscs, crustaceans, unmineralised trilobites and eurypterids or “water scorpions”) and several groups of primitive jawless fish (e.g. anaspids, conodonts).*



Important microfossil groups include chitinozoans, spore tetrads of land plants and marine acritarchs. A further interesting category of fossils recorded from the Soom Member of Kromrivier are bromalites. These are the various fossilised products of ancient animal guts such as droppings (coprolites), regurgitates and stomach contents that sometimes contain the comminuted remains of recognisable prey animals such as conodonts or brachiopods (Aldridge et al., 2006). The majority of Soom fossils have been collected from a handful of localities, most of which lie on the Clanwilliam sheet within the central to northern Cedarberg (Gray et al. 1986, Cocks & Fortey 1986, Theron et al. 1990, Aldridge et al. 1995). New fossiliferous localities have recently been identified in the Clanwilliam area, while well preserved trilobite trace fossils (*Rusophycus*) have been collected from thin tempestite sandstones towards the base of the Soom Member in the Hex River Mountains by Almond (unpublished obs., 2011). In the Palaeotechnical report (2009) the Cedarberg Formation recommendation is “field scoping study recommended before excavation takes place” followed by “This unit often obscured by Cape age deformation and poor exposure of mudrocks in mountainous terrain. Its development in the Eastern Cape is not well understood.” It is determined to have high sensitivity for impacts to palaeontology.

Almond (2013) summarises the next two formations in the Table Mountain group as “*The fossil record of the **Goudini** and **Skurweberg Formations**, dominated by braided fluvial sandstones, is very sparse indeed. This reflects major global regression (low sea levels) during the Silurian Period, peaking during the latter part of the period (Cooper 1986). Sporadic, low diversity ichnoassemblages from thin, marine-influenced stratigraphic intervals have been recorded from all three Nardouw formations in the Western Cape by Rust (1967a, 1981) and Marchant (1974). There are also scattered, often vague reports of trace fossils in geological sheet explanations and SACS reports (e.g. Malan et al. 1989, De Beer et al. 2002). Most involve “pipe rock” (*Skolithos* ichnofacies) or various forms of horizontal epichnial burrows, including possible members of the *Scolicia* group which may be attributable to gastropods. Also recorded are typical Early Silurian palmate forms of the annulated burrow *Arthropycus*, poorly preserved “bilobites” (bilobed arthropod scratch burrows), gently curved epichnial furrows and possible arthropod tracks (Almond 2008). It is possible that more diverse ichnoassemblages (and even microfossils from subordinate mudrock facies where these have not been deeply weathered or tectonised) may eventually be recorded from the more marine-influenced outcrops of the Eastern Cape Fold Belt.*” In the Palaeotechnical report (2009, SAHRIS ID 108744), both the Goudini and Skurweberg Formation have low palaeontological sensitivity.

On the Table Mountain Group formations in the area Almond (2013) surveyed, he wrote “*During the present one-day field study almost all the Table Mountain Group exposures showed high levels of tectonic deformation (e.g. steep bedding, quartz veins, pervasive cleavage within mudrock intervals) as well as deep chemical weathering. These two factors, which are both more extremely developed within the potentially more fossiliferous mudrock-rich intervals of the Table Mountain Group (e.g. Cedarberg, Goudini and Baviaanskloof Formation), have seriously compromised fossil preservation here. No fossil remains were observed within the Table Mountain Group sediments in the study area and the various formations concerned are considered to have a low palaeontological sensitivity in this region.*”

Based on Almond et al. (2009) and Almond (2013), a field survey is usually recommended for geology that has high and very high palaeontological sensitivity, but due to tectonic deformations, the fossil finds may be limited. In the HIA by Van Schalkwyk and Wahl (2012, SAHRIS ID 131946), the palaeontological sensitivity of the area is summarised it as “underlain by potentially fossiliferous bedrocks of Palaeozoic, Mesozoic and Caenozoic age that crop out within the Cape Fold Belt, Southern coastal plain and Gamtoos River Valley of the Eastern Cape. The Diepriver-Kareedouw sector runs along the grain of the Cape Fold Belt and is partially underlain by Early Devonian sediments of the Baviaanskloof and Gydo Formations that may contain early land plants and marine invertebrates respectively. However, given the tight folding here, it is quite likely that most of the original fossil content of these rocks has been destroyed by tectonism.”

The area proposed for development in this application has not been previously been assessed for impacts to palaeontological heritage however, due to the limited nature and scale of the proposed WWTW, it is unlikely that this proposed development will negatively impact on significant archaeological heritage. The proposed sewer reticulation network is to be located within the existing road network for the existing Woodlands residential development. As such, the establishment of this water infrastructure will be located in areas that have been extensively previously disturbed and as such, it is unlikely that this proposed development will negatively impact on significant palaeontological heritage



RECOMMENDATIONS

Based on the information available, and the limited nature and scale of the proposed development, it is unlikely that significant heritage resources will be impacted by the proposed development and no further heritage studies are recommended in terms of section 38(3) of the NHRA.



APPENDIX 1

List of heritage resources within close proximity to the development area from SAHRIS

Site ID	Site no	Full Site Name	Site Type	Grading
28471	9/2/044/0003	Klasies River Caves, Humansdorp District	Archaeological	Grade I
28467	9/2/044/0006	Moravian Mission Complex, Clarkson, Humansdorp District	Building	Grade II
28468	9/2/044/0006-001	Church, Moravian Mission Complex, Clarkson, Humansdorp District	Building	Grade II
28469	9/2/044/0006-002	Parsonage, Moravian Mission Complex, Clarkson, Humansdorp District	Building	Grade II
28459	9/2/044/0006-003	School, Moravian Mission Complex, Clarkson, Humansdorp District	Building	
28460	9/2/044/0006-004	Church offices, Moravian Mission Complex, Clarkson, Humansdorp District	Building	Grade II
28461	9/2/044/0006-005	Mission store, Moravian Mission Complex, Clarkson, Humansdorp District	Building	Grade II
28462	9/2/044/0006-006	Cemetery, Moravian Mission Complex, Clarkson, Humansdorp District	Burial Grounds & Graves	Grade II
28463	9/2/044/0006-007	Memorial to Pastor Nauhaus, Moravian Mission Complex, Clarkson, Humansdorp District	Monuments & Memorials	Grade II
28464	9/2/044/0006-008	Church bell, Moravian Mission Complex, Clarkson, Humansdorp District	Building	Grade II
669	SHIPWRECKID454	Mary	Shipwreck	
2223	SHIPWRECKID2018	Evdokia	Shipwreck	
84427	TSITSI002	Tsitsikamma Borrow Pits 002	Structures	Grade IIIc



88098	KAREED001	KAREEDOUW-DIEPRIVIER 001	Transport infrastructure	Ungraded
88099	KAREED002	KAREEDOUW-DIEPRIVIER 002	Transport infrastructure	Ungraded
88100	KAREED003	KAREEDOUW-DIEPRIVIER 003	Transport infrastructure	Ungraded
88101	KAREED004	KAREEDOUW-DIEPRIVIER 004	Transport infrastructure	Ungraded
88102	KAREED005	KAREEDOUW-DIEPRIVIER 005	Transport infrastructure	Ungraded
88103	KAREED006	KAREEDOUW-DIEPRIVIER 006	Transport infrastructure	Ungraded
88104	KAREED007	KAREEDOUW-DIEPRIVIER 007	Transport infrastructure	Ungraded
88105	KAREED008	KAREEDOUW-DIEPRIVIER 008	Transport infrastructure	Ungraded
88106	KAREED009	KAREEDOUW-DIEPRIVIER 009	Transport infrastructure	Ungraded
88107	KAREED010	KAREEDOUW-DIEPRIVIER 010	Transport infrastructure	Ungraded
88126	KAREED011	KAREEDOUW-DIEPRIVIER 011	Deposit	Ungraded
88127	KAREED012	KAREEDOUW-DIEPRIVIER 012	Archaeological	Grade IV
88128	KAREED013	KAREEDOUW-DIEPRIVIER 013	Transport infrastructure	Ungraded
88129	KAREED014	KAREEDOUW-DIEPRIVIER 014	Archaeological	Ungraded
88130	KAREED015	KAREEDOUW-DIEPRIVIER 015	Archaeological	Ungraded
88131	KAREED016	KAREEDOUW-DIEPRIVIER 016	Transport infrastructure	Ungraded
88132	KAREED017	KAREEDOUW-DIEPRIVIER 017	Transport infrastructure	Ungraded
88133	KAREED018	KAREEDOUW-DIEPRIVIER 018	Transport infrastructure	Ungraded
88134	KAREED019	KAREEDOUW-DIEPRIVIER 019	Archaeological	Ungraded



88135	KAREED020	KAREEDOUW-DIEPRIVIER 020	Transport infrastructure	Ungraded
88156	KAREED021	KAREEDOUW-DIEPRIVIER 021	Archaeological	
107983	Klasies River Mouth Caves 1/1A		Archaeological	
108202	KLPDRF 01	Klipdrif Oos 01	Artefacts	Grade IIIc
108203	KLPDRF 02	Klipdrif Oos 02	Artefacts	Grade IIIb
127256	KLPDRF 03	Klipdrif Oos 03	Artefacts	Grade IIIc
127257	KLPDRF 04	Klipdrif Oos 04	Artefacts	Grade IIIc
127258	KLPDRF 05	Klipdrif Oos 05	Artefacts	Grade IIIc
131995	3424BB/ Renewable energy/ Cape St Francis/ site 1	Stona Age tools	Archaeological	Ungraded
138200	KRMC	Klasies River Mouth Caves	Archaeological	



APPENDIX 2

Reference List from SAHRIS

NID	Type	Author(s)	Date	Title
4255	HIA Letter of Exemption	Johan Binneman	01/06/2006	Letter Of Recommendation (With Conditions) For The Exemption Of A Full Phase 1 Archaeological Heritage Impact Assessment For The Subdivision And Rezoning Of Portion 28 Of The Farm "Melkhoutekraal" No. 254 In Kareedouw (Koukama Municipality), From Agriculture
6890	AIA Phase 1	Johan Binneman	04/06/2011	A Phase 1 Archaeological Impact Assessment For The Proposed Happy Valley Wind Energy Facility Near Humansdorp, Kouga Local Municipality, District Of Humansdorp, Eastern Cape Province
6891	AIA Desktop	Johan Binneman	01/06/2009	An Archaeological Desktop Study For The Proposed Happy Valley Wind Energy Facility. Kou-Kamma Municipality, Humansdorp District, Eastern Cape Province
7124	AIA Phase 1	Karen Van Ryneveld	20/09/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa
7594	AIA Phase 1	Johan Binneman	01/08/2011	Phase 1 Archaeological Impact Assessment For The Proposed Oyster Bay Wind Energy Facility, Kouga Local Municipality, Humansdorp, Eastern Cape Province
7595	AIA Desktop	Johan Binneman	01/11/2010	An Archaeological Desktop Study For The Proposed Oyster Bay Wind Energy Facility, Local Kuga Municipality, Humansdorp District, Eastern Cape Province
8101	AIA Desktop	Johan Binneman	07/03/2011	An Archaeological Desktop Study For He Construction Of The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province
8102	AIA Phase 1	Johan Binneman	01/08/2011	A Phase 1 Archaeological Impact Assessment For The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.
8445	HIA Phase 1	Karen Van Ryneveld	31/12/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa 1
8446	HIA Phase 1	Karen Van Ryneveld	31/12/2010	Establishment Of A Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa



8914	PIA Phase 1	Robert Gess	30/03/2011	Palaeontological Heritage Component Of Fibreco Telecommunications, Basic Assessment For The Proposed Fibre Optic Data Cable Project: Route 5: Pe To Durban
8929	PIA Phase 1	Billy De Klerk	04/01/2011	Palaeontological Heritage Impact Assessment Of The Proposed Happy Valley Wind Energy Facility On A Site East Of Humansdorp, Eastern Cape
8955	PIA Phase 1	Billy De Klerk	17/12/2010	Palaeontological Heritage Impact Assessment Of The Proposed Wind Farms In The Coastal Region Of The Kouga Local Municipality Near The Villages Of Oyster Bay And St Francis Bay.
8988	PIA Phase 1	John E Almond	20/09/2011	Proposed Oyster Bay Wind Energy Facility Near Humansdorp. Kouga Local Municipality, Eastern Cape
9033	PIA Phase 1	John E Almond	02/08/2011	Proposed Tsitsikamma Community Wind Energy Facility Near Humansdorp, Kouga Local Municipality, Eastern Cape Province
26808	AIA Phase 2	Karen Van Ryneveld	03/06/2012	Phase 1 Archaeological Assessment Micro-Siting & Phase 2 Archaeological Test Pitting Turbine Line 33-36, Red Cap Kouga Wind Farm, Central Cluster, Oyster Bay, Eastern Cape, South Africa
44916	AIA Phase 1	Karen Van Ryneveld	25/06/2012	Mining Right Application: Farms Klein Rivier (713-32) And Buffelsbosch (742-14), Humansdorp District, Eastern Cape, South Africa
44918	PIA Desktop	John Pether	05/06/2012	Mining Right Application On Farms Klein Rivier 713 Ptn 32 And Buffelsbosch 742 Ptn 14 District Of Humansdorp, Eastern Cape Province
120032	AIA Phase 1	Elizabeth Wahl, Len van Schalkwyk	08/05/2013	Phase 1 Archaeological Impact Assessment Report: Proposed 132kV Power Line and Substation Infrastructure, Melkhout-Dieprivier, Kouga Local Municipality, Cacadu District, Eastern Cape Province, South Africa
108744	Palaeotechnical Report	John E Almond, Billy De Klerk, Robert Gess	01/05/2009	Palaeontological heritage of the Eastern Cape
125085	AIA Phase 1	Karen Van Ryneveld	15/07/2013	Tsitsikamma Wind Farm - Borrow Pits Project, Humansdorp Registration Division, Eastern Cape
125089	PIA Phase 1	Karen Van Ryneveld	17/07/2013	Palaeontological Heritage Study For Proposed Establishment Of Borrow Pits (For Road And Concrete Construction Materials) To Primarily Serve The Tsitsikamma Community Wind Farm Project



131946	AIA Desktop	Len van Schalkwyk, Elizabeth Wahl	30/05/2012	Phase 1 Heritage Impact Assessment Report: 132kV Power Line and Substation Infrastructure, Dieprivier-Kareedouw, Kouga Local Municipality, Cacadu District Municipality, Eastern Cape Province, South Africa
131953	PIA Phase 1	John E Almond	01/05/2013	Palaeontological specialist assessment: combined field-based and desktop study PROPOSED KAREEDOUW-DIEPRIVIER 132 kV TRANSMISSION LINE PROJECT, HUMANSDORP MAGISTERIAL DISTRICT, EASTERN CAPE.
162676	HIA Phase 1	Johan Binneman	31/10/2012	A Phase 1 Archaeological Impact Assessment For The Proposed 132kv Power Line Linking The Tstisikamma Community Wind Energy Facility To The Proposed Extension Of The Dieprivier Substation, Kouga Local Municipality, Humansdorp District, Eastern Cape Province
177466	AIA Phase 2	Karen Van Ryneveld	01/10/2014	Phase 2a Archaeological Monitoring (Final Report) - The Kouga Wind Farm (Red Cap Kouga Wind Farm, Central Cluster), Oyster Bay, Eastern Cape, South Africa
179415	Palaeontological Specialist Reports	John E Almond	31/08/2012	Palaeontological Specialist Study: Combined Desktop & Field-Based Assessment For The Proposed Tsitsikamma Community Wind Energy Facility Near Humansdorp, Kouga Local Municipality, Eastern Cape Province
179470	Archaeological Specialist Reports	Johan Binneman	28/09/2012	Archaeological Walk Through Survey Of The Final Turbine Footprint For The Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality
269397	AIA Phase 1	Celeste Booth	02/03/2015	Fibreco Repeater Sites Routes 3 And 4_heritage_2015 Aia Report
384447	Heritage Statement	Stefan de Kock	09/01/2017	Proposed Establishment Of A New Dam On A Portion Of The Farm Rietfontein 594/1, Sarah Baartman District And Nelson Mandela Bay Municipality
513392	AIA Phase 1	Peter Nilssen	02/07/2018	Phase 1a Archaeological Impact Assessment, Scoping Phase, Proposed Impofu West Wind Farm, Kouga Local Municipality, Sarah Baartman District Municipality, Eastern Cape Province



APPENDIX 3 - Keys/Guides

Key/Guide to Acronyms

AIA	Archaeological Impact Assessment
DARD	Department of Agriculture and Rural Development (KwaZulu-Natal)
DEA	Department of Environmental Affairs (National)
DEADP	Department of Environmental Affairs and Development Planning (Western Cape)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape)
DEDECT	Department of Economic Development, Environment, Conservation and Tourism (North West)
DEDT	Department of Economic Development and Tourism (Mpumalanga)
DEDTEA	Department of economic Development, Tourism and Environmental Affairs (Free State)
DENC	Department of Environment and Nature Conservation (Northern Cape)
DMR	Department of Mineral Resources (National)
GDARD	Gauteng Department of Agriculture and Rural Development (Gauteng)
HIA	Heritage Impact Assessment
LEDET	Department of Economic Development, Environment and Tourism (Limpopo)
MPRDA	Mineral and Petroleum Resources Development Act, no 28 of 2002
NEMA	National Environmental Management Act, no 107 of 1998
NHRA	National Heritage Resources Act, no 25 of 1999
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
VIA	Visual Impact Assessment

Full guide to Palaeosensitivity Map legend

RED:	VERY HIGH - field assessment and protocol for finds is required
ORANGE/YELLOW:	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN:	MODERATE - desktop study is required
BLUE/PURPLE:	LOW - no palaeontological studies are required however a protocol for chance finds is required
GREY:	INSIGNIFICANT/ZERO - no palaeontological studies are required
WHITE/CLEAR:	UNKNOWN - these areas will require a minimum of a desktop study.

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APPENDIX 4 - Methodology

The Heritage Screener summarises the heritage impact assessments and studies previously undertaken within the area of the proposed development and its surroundings. Heritage resources identified in these reports are assessed by our team during the screening process.

The heritage resources will be described both in terms of **type**:

- Group 1: Archaeological, Underwater, Palaeontological and Geological sites, Meteorites, and Battlefields
- Group 2: Structures, Monuments and Memorials
- Group 3: Burial Grounds and Graves, Living Heritage, Sacred and Natural sites
- Group 4: Cultural Landscapes, Conservation Areas and Scenic routes

and **significance** (Grade I, II, IIIa, b or c, ungraded), as determined by the author of the original heritage impact assessment report or by formal grading and/or protection by the heritage authorities.

Sites identified and mapped during research projects will also be considered.

DETERMINATION OF THE EXTENT OF THE INCLUSION ZONE TO BE TAKEN INTO CONSIDERATION

The extent of the inclusion zone to be considered for the Heritage Screener will be determined by CTS based on:

- the size of the development,
- the number and outcome of previous surveys existing in the area
- the potential cumulative impact of the application.

The inclusion zone will be considered as the region within a maximum distance of 50 km from the boundary of the proposed development.

DETERMINATION OF THE PALAEOONTOLOGICAL SENSITIVITY

The possible impact of the proposed development on palaeontological resources is gauged by:

- reviewing the fossil sensitivity maps available on the South African Heritage Resources Information System (SAHRIS)
- considering the nature of the proposed development
- when available, taking information provided by the applicant related to the geological background of the area into account

DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON

Each report assessed for the compilation of the Heritage Screener is colour-coded according to the level of coverage accomplished. The extent of the surveyed coverage is labeled in three categories, namely low, medium and high. In most instances the extent of the map corresponds to the extent of the development for which the specific report



was undertaken.

Low coverage will be used for:

- desktop studies where no field assessment of the area was undertaken;
- reports where the sites are listed and described but no GPS coordinates were provided.
- older reports with GPS coordinates with low accuracy ratings;
- reports where the entire property was mapped, but only a small/limited area was surveyed.
- uploads on the National Inventory which are not properly mapped.

Medium coverage will be used for

- reports for which a field survey was undertaken but the area was not extensively covered. This may apply to instances where some impediments did not allow for full coverage such as thick vegetation, etc.
- reports for which the entire property was mapped, but only a specific area was surveyed thoroughly. This is differentiated from low ratings listed above when these surveys cover up to around 50% of the property.

High coverage will be used for

- reports where the area highlighted in the map was extensively surveyed as shown by the GPS track coordinates. This category will also apply to permit reports.

RECOMMENDATION GUIDE

The Heritage Screener includes a set of recommendations to the applicant based on whether an impact on heritage resources is anticipated. One of three possible recommendations is formulated:

(1) The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.

This recommendation is made when:

- enough work has been undertaken in the area
- it is the professional opinion of CTS that the area has already been assessed adequately from a heritage perspective for the type of development proposed

(2) The heritage resources and the area proposed for development are only partially recorded - The surveys undertaken in the area have not adequately captured the heritage resources and/or there are sites which require mitigation or management plans. Further specific heritage work is recommended for the proposed development.

This recommendation is made in instances in which there are already some studies undertaken in the area and/or in the adjacent area for the proposed development. Further studies in a limited HIA may include:



- improvement on some components of the heritage assessments already undertaken, for instance with a renewed field survey and/or with a specific specialist for the type of heritage resources expected in the area
- compilation of a report for a component of a heritage impact assessment not already undertaken in the area
- undertaking mitigation measures requested in previous assessments/records of decision.

(3) The heritage resources within the area proposed for the development have not been adequately surveyed yet - Few or no surveys have been undertaken in the area proposed for development. A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development.



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APPENDIX 4: Chance Finds Fossil Procedure



CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL

(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO. It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent. Procedure to



follow if it is likely that the material identified is a fossil: - The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;

- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
 - The date
 - A description of the discovery
 - A description of the fossil and its context (e.g. position and depth of find) - Where and how the find has been stored
 - Photographs to accompany the preliminary report (the more the better):
 - A scale must be used
 - Photos of location from several angles
 - Photos of vertical section should be provided
 - Digital images of hole showing vertical section (side);
 - Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- If the find cannot be stabilised, the fossil may be collect with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find (within 10m) until SAHRA has indicated, in writing, that it is appropriate to proceed.



FOSSIL DISCOVERIES: 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:		