SMERO/CALUZA HUMAN SETTLEMENT PROJECT, UMSUNDUZI LOCAL MUNICIPALITY, KWAZULU-NATAL

Phase 1 Heritage Impact Assessment

March 2022

FOR: Sphe Consulting Services

S.S. Dlamini

AUTHOR: JLB Consulting

Jean Beater

EXECUTIVE SUMMARY

The uMsunduzi Local Municipality proposes the construction of civil infrastructure and 1400 low-income housing and 600 sites for GAP market housing for the human settlements project in the Smero/Caluza area, Edendale.

The site is approximately 103.49 hectares (1034900 m²) in size hence it triggers section 41 (1) (c)(i) and (ii) of the KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No 5 of 2018) which lists developments or activities that require an HIA. The relevant sub-section refers to: any development or other activity which will change the character of a site- (i) exceeding 5000 m² and (ii) involving three or more existing erven or subdivisions thereof.

The site is located roughly 12km west of the centre of Pietermaritzburg and north of Sitebhisini Road (M70) in Edendale and just west of Caluza Road.

An inspection of the site was undertaken on 22 February 2022. Sections of the site are already occupied by dwellings whilst the area below the cliff and other unoccupied areas are covered with a dense grass layer interspersed with clumps of bushes. Visibility was fair. Much of the site was inspected on foot and the specialist spoke to several residents.

Residents told the specialist that there were old graves in the area in the vicinity of the northerneastern boundary of the study area but that new people moving into the area were building over the graves as they were unaware of the graves' existence. Some of the remaining old graves were pointed out to the specialist a resident. The area is overgrown with several rocks visible that were used at the time to mark the graves. Amongst the existing residences, several structures were observed that could be older than 60 years.

The area below the cliff and associated forest were inspected on foot. The specialist spoke to residents who said that to their knowledge there were no graves in the area. They said that people buried their dead at the Mountain Rise cemetery. In addition, there is a cemetery located between the Msunduzi River and Wadley Stadium on the southern boundary of the project area. At least one small area had been cleared for the construction of a dwelling in this area.

The fossil sensitivity map indicated that the project falls within an area of moderate and other fossil sensitivities. A desktop palaeontological study found that it is extremely unlikely that any fossils would be preserved in the covering soils and sands of the Quaternary. There is a small chance that fossils may occur below ground in the shales of the early Permian Vryheid Formation

therefore it is recommended that a Fossil Chance Find Protocol should be added to the Environmental Management Programme for the housing project.

Although it appears as if most residents bury their dead in formal cemeteries, there are still graves found close to homesteads but this practice appears to be fairly uncommon. This is important to note if there are any *in-situ* housing upgrades proposed for this project. Graves found were located amongst the houses on the eastern side of the project area which has been inhabited since the 1930s. From oral testimony, it appears that were graves in this area and some have been built on by people unaware of their existence. It is possible that there are more graves in the area and it is recommended that the developed eastern section of the project area be excluded from the housing project.

Graves are protected in terms of section 39 (1) of the KwaZulu-Natal Amafa and Research Institute Act which states that graves or burial grounds older than 60 years or deemed to be of heritage significance by a heritage authority- (b) not located in a formal cemetery managed or administered by a local authority, may not be damaged, altered, exhumed, inundated, removed from its original position, or otherwise disturbed without the prior written approval of the Institute having been obtained on written application to the Institute.

Graves are highly significant to many people and there are many sensitivities and norms concerning damage to graves or the relocation of graves. It is recommended that graves are not moved. If, for whatever reason, graves need to be altered or moved, the procedure provided in section 5 of the Draft KwaZulu-Natal & Research Institute Regulations, 2021 must be followed. The assessment of impacts indicated that even with the implementation of mitigation measures, the impact remains at a medium rating. Based on this, it is recommended that the developed eastern section of the project area be excluded from the project if possible.

Structures older than 60 years are protected by section 37 (1)(a) of the KwaZulu-Natal Amafa and Research Institute Act, 2018, which refers to the protection of structures that are or that may reasonably be expected to be older than 60 years. The structures will need to be assessed by a built heritage specialist if they are to be impacted. It is unclear if *in-situ* upgrades form part of the project as such developments could result in impacts to protected structures. If structures are to be impacted, then application must be made to the Institute in terms of the process described in section 3 of the draft KwaZulu-Natal & Research Institute Regulations, 2021 which outlines the steps to be followed. The assessment of significance of impacts on protected structures found that with the implementation of mitigation measures, the impact would reduce from a medium impact to a low impact.

The project may proceed as long as the recommendations, suggestions and mitigation measures provided in this report and in the desktop palaeontological study are implemented and adhered to where necessary.

TABLE OF CONTENTS

EXE	ECUTIVE SUMMARY	ii
TAE	BLE OF CONTENTS	V
1.	INTRODUCTION	7
2.	LEGISLATIVE BACKGROUND	7
3.	LOCATION	8
4.	TERMS OF REFERENCE	8
5.	METHODOLOGY	11
6.	HISTORICAL BACKGROUND OF AREA	11
7.	RESULT OF SITE INSPECTION	14
8.	ASSESSMENT OF SIGNIFICANCE OF IMPACTS	22
9.	DISCUSSION AND CONCLUSION	24
	MITIGATION MEASURES	25
	REFERENCES	27
	NUDEO	
FIG	GURES	
Figu	re 1: Surrounding area with project area outlined in yellow	9
Figu	re 2: Closer view of project area outlined in yellow	10
Figu	re 3: 1937 aerial image with project site outlined in yellow	13
_	re 4: Section of topographic map with project area outlined in yellow	
Figu	re 5: View across project area towards the south	14
Figu	re 6: Old grave indicated by rocks	15
Figu	ure 7: Grave indicated by rocks	15
Figu	ure 8: View across project area	16
Figu	ure 9: Structure that could be >60 years	16
Figu	are 10: Existing housing and topography in south-eastern section of project area	17
Figu	ure 11: Dwelling possibly >60 years	17
Figu	ure 12: Looking directly north over project area	18
Figu	ure 13: Looking west over project area with single dwelling in background	18
Figu	ure 14: Area cleared for dwelling looking southwards across project area	19
Figu	ure 15: Area cleared for dwelling looking northwards across project area	19
Figu	are 16: Southern boundary of project area with Wadley Stadium in background	20
TA	BLE	
Tabl	le 1: List of heritage sites	20
Tab	le 2: Assessment of impacts on graves	23
Tab	le 3: Assessment of impacts on protected structures	23
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APPENDIX 1

Desktop palaeontological study

I, **Jean Lois Beater**, act as an independent specialist for this project and I do not have any vested interest either business, financial, personal or other, in the proposed activity other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014.

SPECIALIST DETAILS

Name	Qualification	Professional Registration
Jean Beater	MA (Heritage Studies)	Member of Association of South African Professional
	MSc (Environmental Management)	Archaeologists (No. 349)
		Member of IAIAsa (No. 1538)

1. INTRODUCTION

The uMsunduzi Local Municipality proposes the construction of civil infrastructure and 1400 low-income housing and 600 sites for GAP market housing for the human settlements project in the Smero/Caluza area, Edendale.

The Phase 1 Heritage Impact Assessment (HIA) was undertaken to establish if any heritage resources would be impacted by the proposed housing development.

2. LEGISLATIVE BACKGROUND

The site is approximately 103.49 hectares (1034900 m²) in size hence it triggers section 41 (1) (c)(i) and (ii) of the KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No 5 of 2018) which lists developments or activities that require an HIA. The relevant sub-section refers to: any development or other activity which will change the character of a site- (i) exceeding 5000 m² and (ii) involving three or more existing erven or subdivisions thereof.

The project may also impact graves, structures, archaeological and palaeontological resources that are protected in terms of sections 37, 38, 39, and 40 of the KwaZulu-Natal Amafa and Research Institute Act, 2018.

In terms of section 3 of the National Heritage Resources Act 1999 (Act No 25 of 199), heritage resources are:

- (a) places, buildings, structures and equipment of cultural significance;
- (b) places to which oral traditions are attached or which are associated with living heritage;
- (c) historical settlements and townscapes;
- (d) landscapes and natural features of cultural significance;
- (e) geological sites of scientific or cultural importance;
- (f) archaeological and paleontological sites;
- (g) graves and burial grounds, including—
 - (i) ancestral graves;
 - (ii) royal graves and graves of traditional leaders;
 - (iii) graves of victims of conflict;
 - (iv) graves of individuals designated by the Minister by notice in the Gazette;
 - (v) historical graves and cemeteries; and

- (vi) other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- (h) of significance relating to the history of slavery in South Africa;
- (i) movable objects, including:
- (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
- (ii) objects to which oral traditions are attached or which are associated with living heritage;
- (iii) ethnographic art and objects;
- (iv) military objects;
- (v) objects of decorative or fine art;
- (vi) objects of scientific or technological interest; and
- (vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

3. LOCATION

The site is located roughly 12km west of the centre of Pietermaritzburg and north of Sitebhisini Road (M70) in Edendale and just west of Caluza Road (see **Figure 1**). The centre of the site is at 29°38'13.88" S; 30°17'33.27" E (**Figure 2**).

4. TERMS OF REFERENCE

Undertake a Phase 1 HIA in order to determine the possible existence of heritage resources, as listed above, that could be impacted by the proposed housing project. Provide mitigation measures to limit or avoid the impact of the proposed project on heritage resources (if any).

Submit the HIA report to the provincial heritage resources authority, namely the KwaZulu-Natal Amafa and Research Institute (hereafter referred to as the Institute), for their consideration and comment.

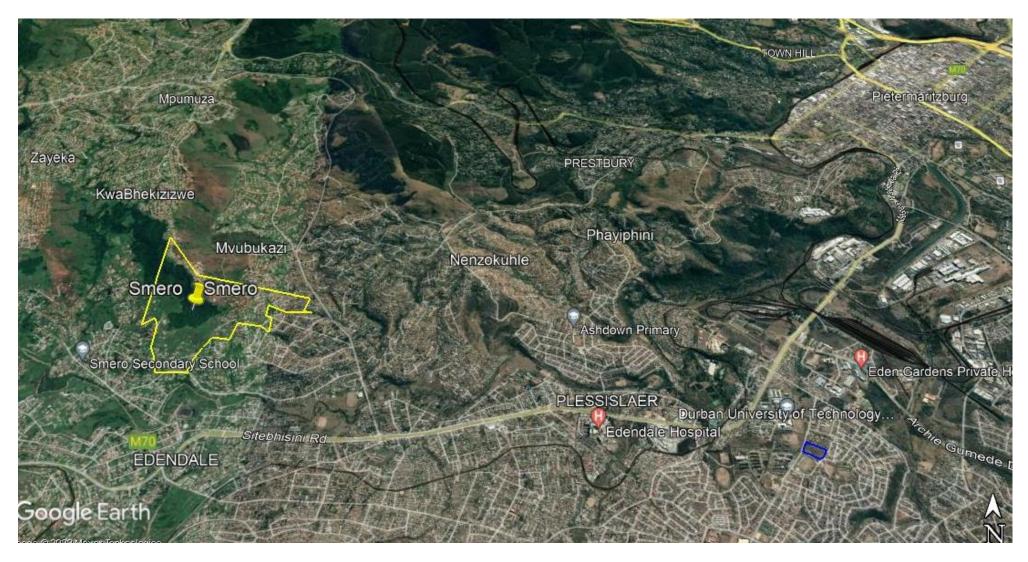


Figure 1: Surrounding area with project area outlined in yellow



Figure 2: Closer view of project area outlined in yellow

5. METHODOLOGY

A survey of literature, including other heritage impact assessment reports completed for the surrounding area, was undertaken in order to ascertain the history of the area and what type of heritage resources have or may be found in the area of development.

An inspection of the site was undertaken on 22 February 2022. Sections of the site are already occupied by dwellings whilst the area below the cliff and other unoccupied areas are covered with a dense grass layer interspersed with clumps of bushes. The area is criss-crossed with roads and paths. Visibility was fair.

6. HISTORICAL BACKGROUND OF AREA

The greater Pietermaritzburg area and surrounds have a long history of occupation by Stone Age hunter gather groups, Iron Age farming communities and colonial settlers. Middle Stone Age sites occur around the greater Pietermaritzburg area and are often located in rock shelters. The arrivalNguni speaking farming communities from Western Africa during the first half of the 1st millennium AD marks the end of the Stone Age in Southern Africa. During the Early Iron Age, settlements were situated on valley floors and next to rivers. The Later Iron Age period is characterised by stone walled settlements. These Later Iron Age communities in KwaZulu-Natal were the direct ancestors of the present-day Zulu people (NGT Holdings 2018: 24-26).

During the historical period the KwaZulu-Natal region was often left in turmoil due to wars and conflict between the different cultural groups that settled in the area. In the beginning of the 19th century various Nguni-speaking settled on the larger Umngeni Valley area which is located to the north of Pietermaritzburg. During the Mfecane/Difaqane at the end of the 18th and beginning of the 19th centuries, communities who had settled in KwaZulu-Natal were displaced and forced to move by wars between the Zulu chiefdoms (NGT Holdings 2018:26)

Voortrekkers, who became dissatisfied with British rule, started to move from the Cape and in 1837 Piet Retief led the Voortrekkers into Natal, where he met with King Dingane to arrange for permission to settle in Natal (NGT Holdings:26). After the Battle of Ncome/Blood River, the Voortrekkers settled across the province and named Pietermaritzburg after their leaders Piet Retief and Gert Maritz. In 1843, the town was taken over by the British and became an important staging post in the Colony of Natal (Derwent 2006:58).

Edendale was founded in 1851 when Christian families of Griqua, Rolong, Sotho, Tlokwa, Hlubi and Swazi origin under the leadership of the missionary Reverend James Allison settled on a farm called Welverdiend. 'The farm was purchased on a share basis between Allison and 90 members of the community when they seceded from the Wesleyan Church in 1850. Its name was changed from Welverdient(d) to Edendale. The primary goal of the mission was to create a Christian community. This farm was purchased from Afrikaner leader Andries Pretorius, who was awarded the farm for leading the Afrikaners to victory during the battle of Ncome / Blood River. In 1861 title deeds were handed over to the original landowners of Edendale – Jonathan Xaba, Daniel Msimang, Johannes Kumalo and Dan Molife. Other prominent families in the area were Kambule, Kunene, Hlubi, Mavuso and Dube. Over time, Edendale becoming a multiracial community. However, in later years the implementation of the Group Areas Act saw members of Edendale forcibly removed according to their racial classification (Gwala 2019:81 - 82).

The 1937 aerial photograph of the project area and surrounds shows several homesteads in the north-eastern and eastern sides of the project area with evidence of cultivation whilst the area below the cliff and forest is largely undeveloped and uninhabited with a footpath running through it. The 1944 aerial image is very similar.

The 1968 topographic map (2930CB) shows the project area with more residences to the east and south of the project area with cultivated land amongst the dwellings and trees and bushes in the valley area below the cliff.

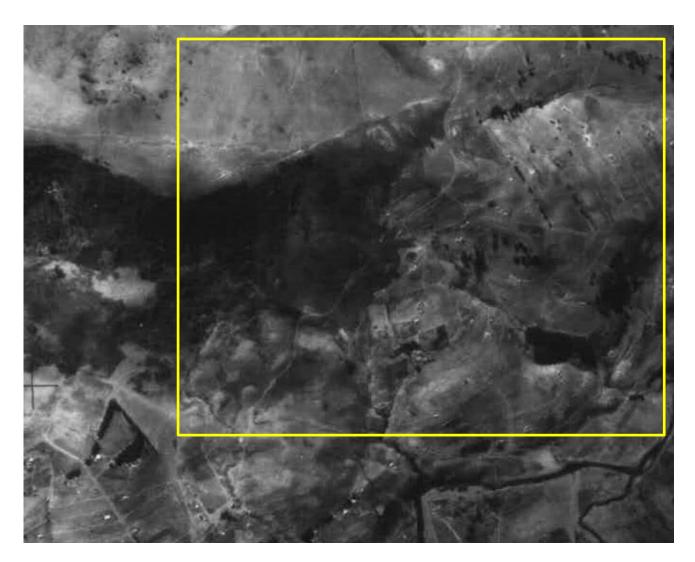


Figure 3: 1937 aerial image with project site outlined in yellow

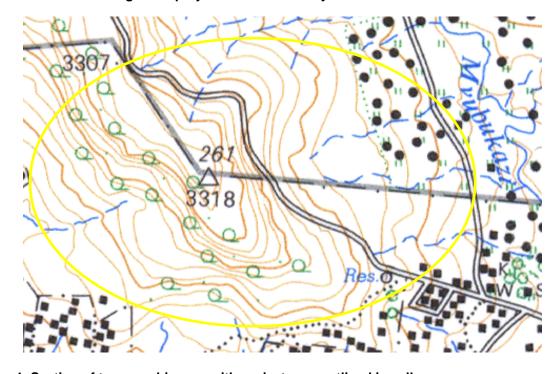


Figure 4: Section of topographic map with project area outlined in yellow

7. RESULT OF SITE INSPECTION

Much of the site was inspected on foot. Most of the area, including the developed sections, were overgrown with grass and vegetation due to the high rainfall the area has experienced. The specialist spoke to several residents who assisted in pointing out heritage sites.



Figure 5: View across project area towards the south

Residents told the specialist that there were old graves in the area in the vicinity of the northerneastern boundary of the study area but that new people moving into the area were building over the graves as they were unaware of the graves' existence. Some of the remaining old graves were pointed out to the specialist by Philane Ngubane, a resident of the area. The area is overgrown with several rocks visible that were used at the time to mark the graves.



Figure 6: Old grave indicated by rocks



Figure 7: Grave indicated by rocks

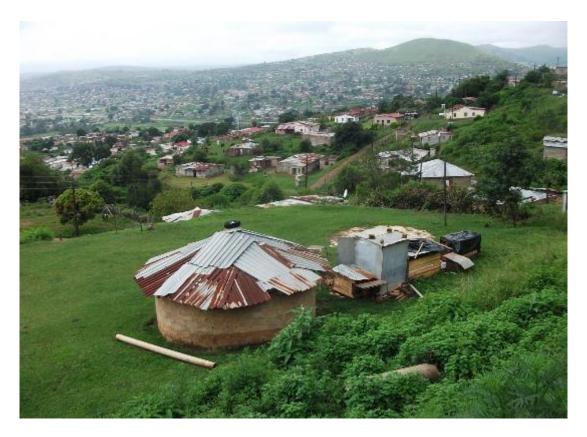


Figure 8: View across project area

Amongst the existing residences, several structures were observed that could be older than 60 years.



Figure 9: Structure that could be >60 years



Figure 10: Existing housing and topography in south-eastern section of project area



Figure 11: Dwelling possibly >60 years

The area below the cliff and associated forest were inspected on foot. The specialist spoke to Ntano Ngubane and Thembisile Tibe who reside in this area and they said that to their knowledge there were no graves in the area. Mrs Ngubane said that people buried their dead at

the Mountain Rise cemetery. In addition, there is a cemetery located between the Msundusi River and Wadley Stadium on the southern boundary of the project area. At least one small area in this section of the project area had been cleared for the construction of a dwelling.



Figure 12: Looking directly north over project area



Figure 13: Looking west over project area with single dwelling in background



Figure 14: Area cleared for dwelling looking southwards across project area



Figure 15: Area cleared for dwelling looking northwards across project area



Figure 16: Southern boundary of project area with Wadley Stadium in background

Heritage sites found during the site inspection are listed below.

Table 1: List of heritage sites

COORDINATES	HERITAGE RESOURCE	SIGNIFICANCE + MITIGATION MEASURES
29°37′55.6″ S 30°17′46.6″ E	Two graves (Ncgobo) within boundary of homestead; situated outside study area	High heritage significance; will not be impacted by project
29°38'04.2" S 30°17'51.5" E	Grave (Fig. 6)	High heritage significance; 20m buffer between grave & construction activity; recommended that burial site is fenced as a 'no-go' area
29°38'03.8" S 30°17'51.5" E	Grave (Fig. 7)	High heritage significance; 20m buffer between grave & construction activity; recommended that burial site is fenced as a 'no-go' area
29°38'03.7" S 30°17'51.3" E	Grave	High heritage significance; 20m buffer between grave & construction activity; recommended that burial site is fenced as a 'no-go' area
29°38'08.3" S 30°17'55.4" E	Structure potentially >60 years	Low heritage significance but sensitive as structure is occupied; age of structure to be confirmed if impacted by project
29°38'09.0" S 30°17'56.4" E	Structure potentially >60 years	Low heritage significance but sensitive as structure is occupied; age of structure to be confirmed if impacted by project

COORDINATES	HERITAGE RESOURCE	SIGNIFICANCE + MITIGATION MEASURES	
29°38'14.0" S 30°17'59.3" E	Structure potentially >60 years	Low heritage significance but sensitive as structure is occupied; age of structure to be confirmed if impacted by project	
29°38'14.6" S 30°18'00.8" E	Structure potentially >60 years	Low heritage significance but sensitive as structure is occupied; age of structure to be confirmed if impacted by project	

The fossil sensitivity map indicated that the project falls within an area of moderate and other fossil sensitivities. A desktop palaeontological study found that sections of the site fall in the non-fossiliferous Jurassic dykes and alluvium whilst the moderately fossiliferous Pietermaritzburg Formation is present in the southern part of the project area. There is a small area lying on the potentially very highly fossiliferous Vryheid Formation. The Pietermaritzburg Formation was deposited in shallow to deep water conditions and only in the ancient shoreline facies would there be a chance of finding trace fossils such as worm burrows. The Vryheid Formation in some parts of the basin has coal seams and associated carbonaceous shales. There are no known coal deposits this far south in the Karoo Basin. Vryheid Formation fossils are typical of the *Glossopteris* flora and include other plants such as ferns and early conifers. Vertebrates were not common at this time and they require different conditions for preservation from those required by plants (Bamford 2022:9-10).

The study states that it is extremely unlikely that any fossils would be preserved in the covering soils and sands of the Quaternary. There is a small chance that fossils may occur below ground in the shales of the early Permian Vryheid Formation therefore it is recommended that a Fossil Chance Find Protocol should be added to the Environmental Management Programme (EMPr). If fossils are found by the developer, contractor, environmental officer, or other responsible person once excavations for amenities, roads and foundations have commenced, then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low so, as far as the palaeontology is concerned, the project should be authorised (Bamford 2022:12).

8. ASSESSMENT OF SIGNIFICANCE OF IMPACTS

The assessment of significance of impacts on heritage resources identified during the site inspection has been undertaken 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;
 - o long term (> 15 years) assigned a score of 4; or
 - o permanent assigned a score of 5;
- The **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 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; and
- The **status**, which will be described as either positive, negative or neutral.
- The degree to which the impact can be mitigated.

The following formula was applied to calculate the impact significance after the factors were ranked for each impact: SP = (magnitude + duration + scale) x 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 decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- >60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

Table 2: Assessment of impacts on graves

	Without mitigation	With mitigation
xtent	Local (1)	Local (1)
uration	Permanent (5)	Permanent (5)
agnitude	High (8)	Moderate (6)
robability	Highly probable (4)	Probable (3)
ynificance	56 (Medium)	36 (Medium)
atus (positive or negative)	Negative	Negative
versibility	None	Low
eplaceable loss of resources	Yes	Yes
an impacts be mitigated?	Yes	

Mitigation measures

- Area where graves pointed out must be a 'no-go' area where no development activities take place.
- This area must be clearly demarcated with fencing. No work within 5 m of the fencing can take place.
- If grave/s are damaged during construction, then work must stop in the immediate vicinity and the grave must be
 rehabilitated to its previous condition. If the grave/s is >60 years, then the Institute must be informed and the
 necessary permits obtained from the Institute for the repair to the grave/s.
- If it is decided that grave/s are to be moved, then the procedure stipulated in section 5 of the Draft KwaZulu-Natal & Research Institute Regulations, 2021 must be followed. The section refers to the application process to be undertaken for the damage, alteration, exhumation or removal from its original position or any other disturbance of a grave in a traditional burial place or not located in a formal cemetery

Cumulative impacts: Low-medium

Table 3: Assessment of impacts on protected structures

Nature: Alteration, damage, destruction of protected structures		
Without mitigation With mitigation		With mitigation
Extent	Local (1)	Local (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Moderate (6)	Low (4)

Probability	Probable (3)	Probable (3)
Significance	30 (Medium)	24 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation measures

- Prior to the alteration or destruction of any structures that could potentially be >60 years, a built heritage specialist
 must assess the structure to confirm it's age.
- If the structure is >60 years and if it is possible, it should be left intact. However, if this is not possible, then written
 application must be made to the Institute according to the procedure stipulated in section 3 of the Draft KwaZuluNatal & Research Institute Regulations, 2021.
- If a protected structure is damaged accidently, then all work must stop in the immediate vicinity of the damage structure, the Institute informed and a qualified specialist appointed to repair the building once all necessary permits have been obtained from the Institute

Cumulative impacts: Low-medium

9. DISCUSSION AND CONCLUSION

During the site inspection, several heritage resources were identified. Although it appears as if most residents bury their dead in formal cemeteries, there are still graves found close to homesteads but this practice appears to be fairly uncommon in the area. This is important to note if there are any *in-situ* housing upgrades proposed for this project. At the time of compiling this report, it was unclear if *in-situ* housing upgrades were part of the housing project.

Graves found were located amongst the houses on the eastern side of the project area which has been inhabited since the 1930s (and possibly earlier). From oral testimony, it appears that were graves in this area and some have been built on by people unaware of their existence. It is possible that there are more graves in the area and it is recommended that the developed eastern section of the project area be excluded from the housing project. A polygon of the burial site pointed out to the specialist has been provided to the Environmental Assessment Practitioner as a 'no-go' area.

Graves are protected in terms of section 39 (1) of the KwaZulu-Natal Amafa and Research Institute Act which states that graves or burial grounds older than 60 years or deemed to be of heritage significance by a heritage authority- (a) not otherwise protected by the above Act and (b) not located in a formal cemetery managed or administered by a local authority, may not be

damaged, altered, exhumed, inundated, removed from its original position, or otherwise disturbed without the prior written approval of the Institute having been obtained on written application to the Institute. Graves are highly significant to many people and there are many traditional, cultural and personal sensitivities and norms concerning damage to graves or the relocation of graves. It is recommended that graves are not moved. If, for whatever reason, graves will need to be altered or moved, the procedure provided in section 5 of the Draft KwaZulu-Natal & Research Institute Regulations, 2021 must be followed.

The assessment of impacts indicated that even with the implementation of mitigation measures, the impact remains at a medium rating which could influence the decision to develop in the area. Based on this, it is recommended that the developed eastern section of the project area be excluded from the project if possible.

Structures older than 60 years are protected by section 37 (1)(a) of the KwaZulu-Natal Amafa and Research Institute Act, 2018, which refers to the protection of structures that are or that may reasonably be expected to be older than 60 years. The specialist writing this report is not a built heritage specialist so the structures will need to be assessed by such a specialist if they are to be impacted. It is unclear if *in-situ* upgrades form part of the project as such developments could result in impacts to protected structures. This needs to be clarified by the Applicant. If structures are to be impacted, then application must be made to the Institute in terms of the process described in section 3 of the draft KwaZulu-Natal & Research Institute Regulations, 2021 which outlines the steps to be followed regarding the demolition, alteration or addition to a structure which is, or which may reasonably be expected to be older than 60 years. The assessment of significance of impacts on protected structures found that with the implementation of mitigation measures, the impact would reduce from a medium impact to a low impact.

The project may proceed as long as the recommendations, suggestions and mitigation measures provided in this report and in the desktop palaeontological study are implemented and adhered to where necessary.

10. MITIGATION MEASURES

For any chance heritage finds, all work must cease in the area affected and the Contractor
must immediately inform the Project Manager. A heritage specialist must be called to site to
inspect the finding/s. The relevant heritage resource agency (the Institute) must be informed
about the finding/s.

- The specialist will assess the significance of the resource/s and provide guidance on the way forward.
- Permits must be obtained from the Institute if heritage resources are to be removed, destroyed or altered.
- Under no circumstances may any heritage material be destroyed or removed from the project site unless under direction of a heritage specialist.
- Should any recent remains be found on site that could potentially be human remains, the South African Police Service as well as the Institute must be contacted. No SAPS official may remove remains (recent or not) until the correct permit/s have been obtained.
- A Fossil Chance Find Protocol must be included in the EMPr for the proposed construction of the project.

11. REFERENCES

Bamford, M. 2022. Palaeontological Impact Assessment for the proposed Smero housing project, west of Pietermaritzburg, uMsunduzi Local Municipality, KwaZulu Natal Province Desktop study (Phase 1)

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