



NGT ESHS Solutions

PROJECT TITLE:

**BASIC ASSESSMENT REPORT FOR THE PROPOSED KWATHEMA TO
GRUNDLINGH WWTW BULK OUTFALL SEWER: CAPITAL PROJECT
IMPLEMENTATION NEAR NIGEL, GAUTENG PROVINCE**

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SPECIALIST REPORT:

**Heritage Impact Assessment for the Proposed
KwaThema to Grundlingh WWTW Bulk Outfall Sewer:
Capital Project Implementation near Nigel, Gauteng
Province, South Africa**

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DECLARATION OF INDEPENDENCE

Cherene de Bruyn for NGT has compiled this report. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision-making process for the project.

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EXECUTIVE SUMMARY

NGT was appointed by Muny Consultants to conduct a Heritage impact assessment (HIA) for the proposed Kwathema To Grundlingh WWTW Bulk Outfall Sewer Capital Project Implementation near Nigel, within the Ekurhuleni Metropolitan Municipality, Gauteng Province, South Africa.

This HIA report forms part of the BAR and it also informs the EMPr report on the management and conservation of cultural heritage resources. This study is conducted independently in terms of Section 38 (3) of the National Heritage Resources Act (NHRA), No. 25 of 1999.

The standard NGT HIA study process entailed conducting a detailed background information search of the receiving environment. The search assesses among other forms of data, previous studies conducted in and around the proposed study area or the development area. This also includes conducting an onsite investigation (survey) to identify and map out heritage resources on site and assess impacts of the proposed development on the identified heritage resources. Recommendations are then made with regards to how the identified heritage resources should be managed and/or mitigated to avoid being negatively impacted by development activities. Furthermore, recommendations are made on how the positive project benefits can be enhanced, to ensure a long-term strategy for the conservation and promotion of heritage resources, if any are found.

The physical survey of the project area (footprint) was conducted on the following days:

- Monday the 20th of August 2018. The survey was conducted by Mr Nkosinathi Tomose (Principal Archaeologist and Heritage Consultant– NGT).
- Wednesday the 22nd of August 2018. The survey was conducted by Miss Cherene de Bruyn (Archaeology and Heritage Consultant – NGT). These findings are discussed in detail in this HIA report.

In terms of the SAHRA Paleontological Sensitivity Layer the area falls within a region a low to very high sensitivity area. As such a field assessment and protocol for finds is required. Based on the results of literature review, field survey and the assessment of identified heritage resources the following conclusions and recommendations are made in terms of the National Heritage Act about the proposed development:

Conclusions:

Based on the results of literature review and the survey results the following conclusions are made:

- It is concluded that 90% of the proposed sewer pipeline falls within a low sensitive palaeontological area. Approximately 10% is within a palaeontological sensitive area but will not be negatively impacted by the proposed sewer pipelines.
- It is concluded that the project is located in a region (Gauteng) rich in archaeology and heritage resources.
- No other archaeological or historical resources were identified in the project area.
- No graves or burial grounds were identified in the project area. However, as graves are subterranean in nature and might not have been identified during the initial site visit and survey.

Recommendations:

- It is recommended that the developer should note that, although there were no archaeological or heritage resources identified during the various project surveys; some archaeological material, including artefacts and graves can be buried underground and as such, may not have been identified during the initial survey and site visits. In the case where the proposed development activities bring these materials to the surface, they should be treated as Chance Finds. Should such resources be unearthed it is recommended that, the development activities be stopped immediately, and an archaeologist be contacted to conduct a site visit and make recommendations on the mitigation of the finds. SAHRA and PHRA-G should also be informed immediately on such finds.
- In terms of the SAHRA Paleontological Sensitivity Layer the area falls within a low to very high sensitivity area. As such a field assessment and protocol for finds are required.
- A portion of the pipeline falls within a Palaeontological Sensitive Layer, where the construction activities involve trenching to a depth of over 1.5m to 2m a palaeontological monitoring programme should be implemented by a qualified palaeontologist.
- The proposed development will not have an impact on the heritage and archaeological resources in the broader Nigel area.

- It is recommended that both the SAHRA and the PHRA-G grant the project a Positive Review Comment and allow the Kwathema To Grundlingh WWTW Bulk Outfall Sewer capital project implementation near Nigel to proceed.

TABLE OF CONTENTS

ACKNOWLEDGEMENT OF RECEIPT	2
COPYRIGHT	3
DECLARATION OF INDEPENDENCE	4
EXECUTIVE SUMMARY	5
TABLE OF CONTENTS	8
LIST OF TABLES	11
LIST OF ABBREVIATIONS	12
TERMS AND DEFINITIONS	13
1. INTRODUCTION	15
1.1. Background Information of Project	15
1.2. Description of the Affected Environment	15
1.3. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist.....	18
1.4. Legal Requirements for Completion of the Study.....	19
1.5. Limitations and Assumptions.....	19
2. METHODOLOGY.....	21
2.1. Approach to the Study	21
2.2. Step I – Literature Review (Desktop Phase)	21
2.3. Step II – Physical Survey.....	21
2.4. Step III – Report Writing and Site Rating.....	22
2.5. Site Significance Rating	22
3. BACKGROUND LITERATURE REVIEW: ARCHAEOLOGY	23
3.1. Stone Age.....	23
3.2. Iron Age.....	24
3.3. Historical Period	27
3.4. Conclusions on Literature Review	28
4. STUDY RESULTS	30
4.1. Archaeological sites.....	32
4.2. Built Environment Features	32
4.3. Burial Grounds and Graves	33
4.4. Paleontological Sensitivity	33
4.5. Site Ratings of stone walled site identified	33
5. CONCLUSION AND RECOMMENDATIONS	35

6. REFERENCES..... 36

TABLE OF FIGURES

Figure 1: Map indicating the location of the proposed pipeline.....	17
Figure 2: Google Earth images indicating access from the N1/N12 (Yellow arrow site).....	18
Figure 3: General view of site.....	30
Figure 4: Small river located to the east of the proposed pipeline.....	31
Figure 5: Sewer pipes running through the project area.....	31
Figure 6: Train tracks located near the southern section of the pipeline.....	32
Figure 7: The ruins of several structures identified throughout the project area.	32
Figure 8: Paleo-Sensitivity layer of the WWTW Bulk Outfall Sewer line (Blue circle) in the near Nigel, within the Ekurhuleni Metropolitan Municipality in the Gauteng Province.....	34

LIST OF TABLES

Table 1: Site Location and Property Information	16
Table 2-Legislation and relevance to this HIA Study	19
Table 3-Site significance classification standards as prescribed by SAHRA.....	22

LIST OF ABBREVIATIONS

ACRONYMS	DESCRIPTION
AUTHORITIES	
ASAPA	Association of South African Professional Archaeologists
NGT	Nurture, Grow, Treasure
PHRA-G	Provincial Heritage Resources Authority Gauteng
SADC	Southern African Developing Community
SAHRA	South African Heritage Resources Agency
DISCIPLINE	
AIA	Archaeological Impact Assessment
BAR	Basic Assessment Report
CMP	Cultural Management Plan
ESA	Early Stone Age
EIAs	Environmental Impact Assessment
EMPr	Environmental Management Programme
EIA	Early Iron Age
HCMP	Heritage Cultural Management Plan Report
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
LEGAL	
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act

TERMS AND DEFINITIONS

Archaeological resources

These include:

- Material remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- Rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- Wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- Features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Palaeontological

This means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- Construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- Carrying out any works on or over or under a place;

- Subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- Constructing or putting up for display signs or boards; any change to the natural or existing condition or topography of land;
- And any removal or destruction of trees, or removal of vegetation or topsoil.

Heritage resources: This means any place or object of cultural significance

1. INTRODUCTION

1.1. Background Information of Project

NGT was appointed by Munny Consultants to conduct a HIA for the proposed Kwathema To Grundlingh WWTW Bulk Outfall Sewer Capital Project Implementation near Nigel, within the Ekurhuleni Metropolitan Municipality, Gauteng Province, South Africa.

The HIA investigates the potential impacts of the proposed linear development (sewer pipelines) on any heritage resources identified within the receiving environment such as archaeological artefacts, burial grounds and historical built environment and landscape features such as historic buildings, monuments, and memorial all older than 60 years. The overall objective of the HIA is to give advice on the management of the heritage resources in and around the proposed project area in terms of known heritage resources management measures in line with the NHRA, No. 25 of 1999. According to Section 38 of the NHRA the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length requires a HIA.

1.2. Description of the Affected Environment

Description (*Figure 1*)

- The project area is located near Nigel in the Gauteng Province, South Africa (*Table.1*).
- The linear development covers an area of approximately 10,41 km in length.
- It is located in between the towns Nigel and Dunnottar.

Access (*Figure 2*)

- Take the N17 in Johannesburg South from Von Wielligh St and Wemmer Pan Rd
- Follow N17 to Nigel-Springs Rd/Wit Rd/R51 in Lodeyko, Springs.
- Take exit 157 from N17
- Turn left onto Nigel-Springs Rd/Wit Rd/R51

Table 1: Site Location and Property Information

Location of Site	
Name of affected property	Kwathema To Grundlingh
Street location	Nigel Springs Road (R51)
Erf or farm number/s	Grootfontein 165 IR
Town	Nigel
Responsible Local Authority	Ekurhuleni Metropolitan Municipality
Ward	88
Magisterial District	Ekurhuleni
Region	Gauteng Province
Country	South Africa
Site centre GPS coordinates	<ul style="list-style-type: none"> • 26°21'24.25"S • 28°27'14.20"E

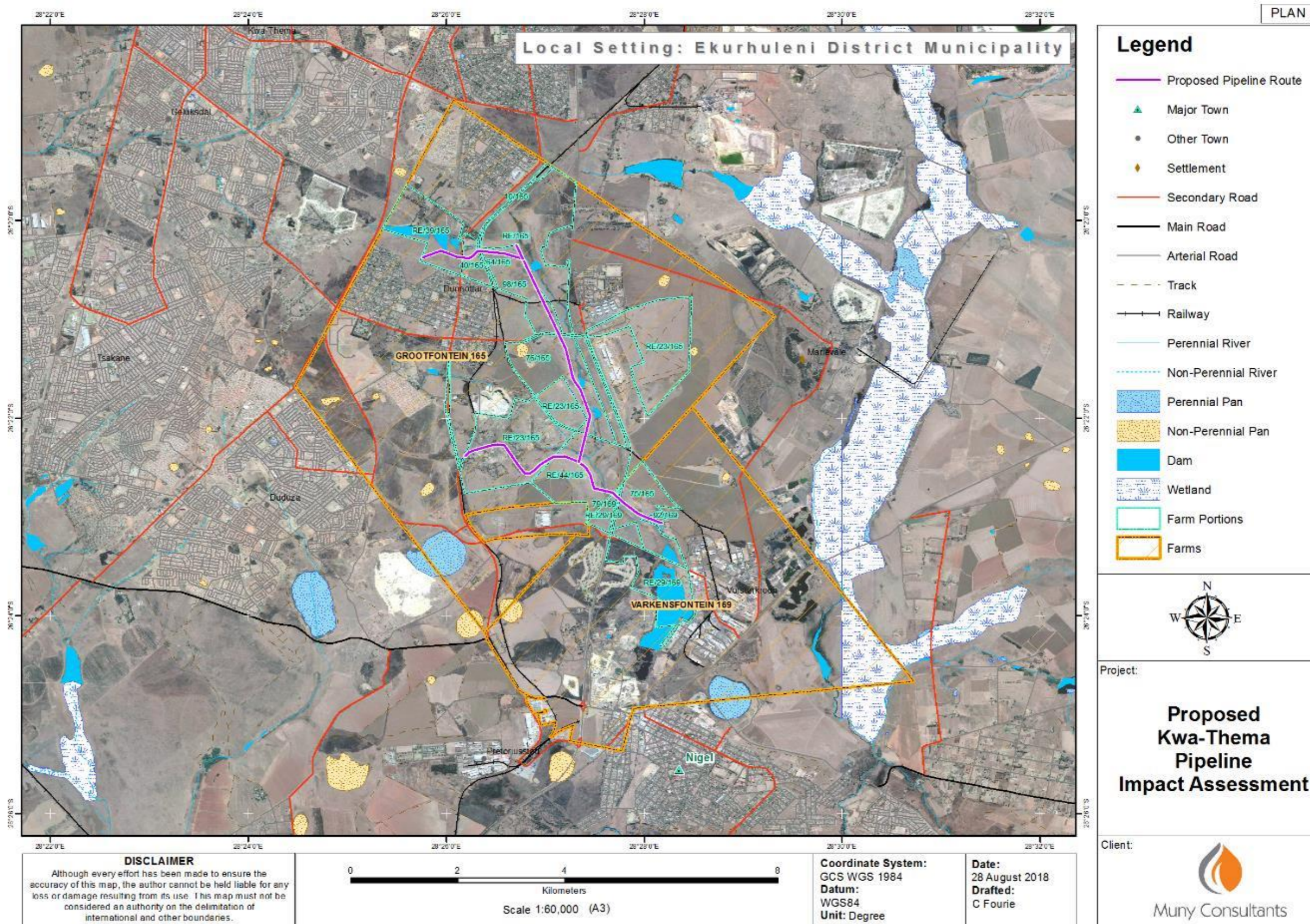


Figure 1: Map indicating the location of the proposed pipeline.

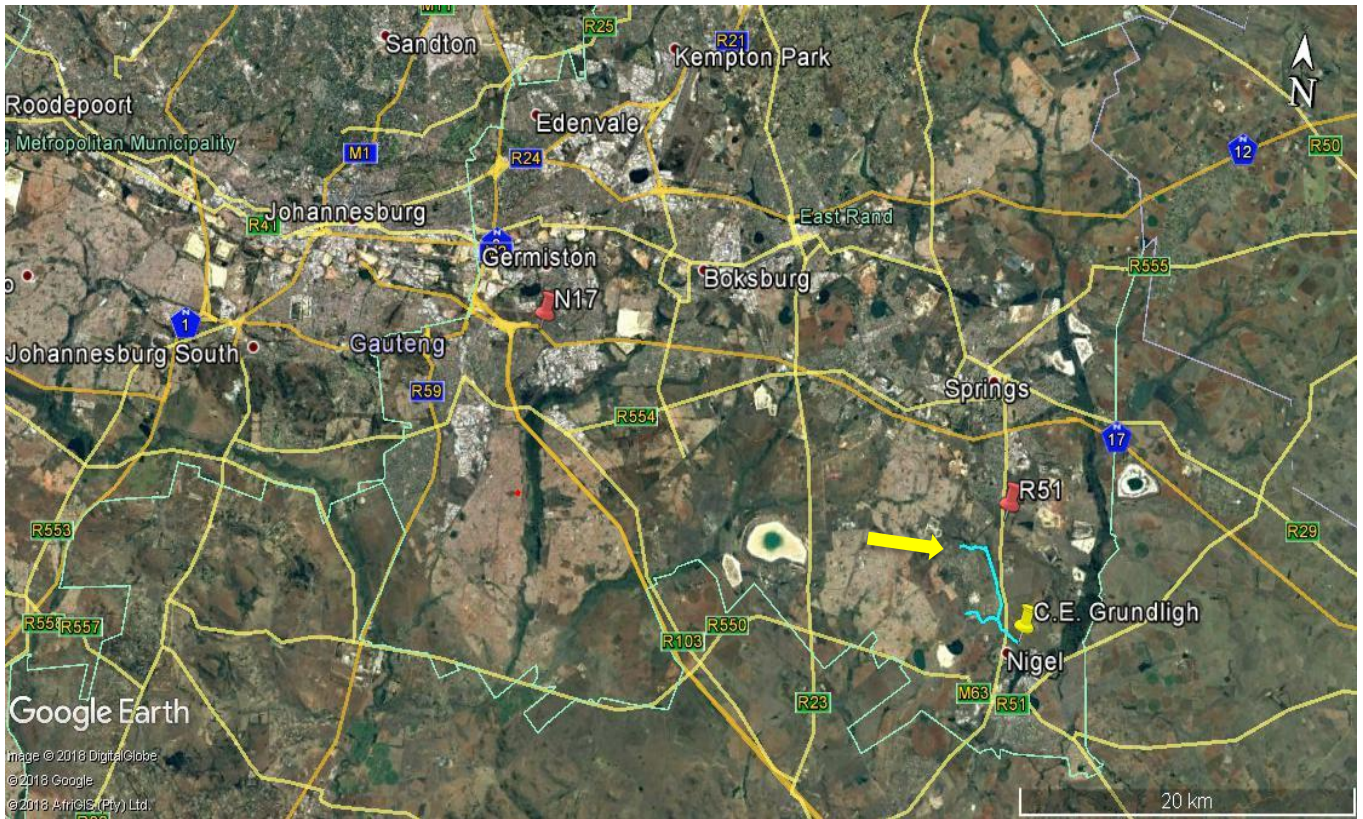


Figure 2: Google Earth images indicating access from the N1/N12 (Yellow arrow site).

1.3. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

The HIA is conducted in terms of Sections 38 the NHRA, No. 25 of 1999. This prescript of the Act Section 38:

“the responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (3) (a): Provided that the following must be included:

- (a) The identification and mapping of all heritage resources in the area affected;
- (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;
- (c) An assessment of the impact of the development on such heritage resources;
- (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- (e) The result of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.”

Muny Consultants appointed NGT as the lead cultural resources management (CRM) consultant to conduct and manage the HIA process. Cherene de Bruyn, Archaeologist and Heritage Consultant for NGT, conducted the HIA study for the proposed development. The appointment of NGT as an independent CRM firm is in terms of the NHRA, No. 25 of 1999.

1.4. Legal Requirements for Completion of the Study

The NHRA, No. 25 of 1999 sets norms and standards for the management of heritage resources in South Africa. Section 35 and 38 (3) of the NHRA, No. 25 of 1999 informs the current HIA study. Table 2 below gives a summary of all the relevant legislations that informed the current study.

Table 2-Legislation and relevance to this HIA Study

Legislation (incl. Policies, Bills and Framework)	
<i>Heritage</i>	<ul style="list-style-type: none"> Heritage resources in South Africa are managed through the NHRA, No. 25 of 1999. This Act sets guidelines and principles for the management of the <i>nation estate</i>. Section 35 and 38 of the Act becomes relevant in terms of nature of the proposed project in terms of developing the heritage impact assessment study. Section 34 becomes relevant in terms of structures. Section 35 becomes relevant in terms of terms of archaeology and palaeontology Section 36 becomes relevant in terms of graves and burial grounds. Section 38 of the Act becomes relevant in terms of nature of the proposed project in terms of developing the heritage impact assessment study.
<i>Environmental</i>	<ul style="list-style-type: none"> The National Environmental Management Act (NEMA), No. 107 of 1998. The cultural environment in South Africa is managed through Section 24 of the NEMA, No. 107 of 1998.

The following chapter outline the methodology used to assess the current site impacts and cumulative impacts that will result from the proposed project on the identified historic or archaeological sites.

1.5. Limitations and Assumptions

Although a comprehensiveness physical survey was undertaken it should be noted that some of the archaeological material, including artefacts and graves can be buried underground and as such, may

not have been identified during the initial survey and site visit. In the case where the proposed development activities bring these materials to the surface, they should be treated as Chance Finds. Should such resources be unearthed it is recommended that, the development activities be stopped immediately, and an archaeologist be contacted to conduct a site visits and make recommendations on the mitigation of the finds. SAHRA and PHRA-G should also be informed immediately on such finds. In this case no archaeological material of graves should be moved from the site, until the heritage specialist has been able to make an assessment regarding the significance of the site and archaeological material, which is also subject to SAHRA approval.

2. METHODOLOGY

2.1. Approach to the Study

Cherene de Bruyn, Archaeologist and Heritage Consultant for NGT, is responsible for the compilation of the current HIA report. The Review and Quality Control (RQC) process involved reviewing the First Draft HIA (Revision 01) and revising the Second Draft (Revision 02); the RQC was completed by Mr Nkosinathi Tomose, Principal Archaeologist and Heritage Consultant for NGT. The RQC is a standard process at NGT; in the case that the Director and Principal Consultant is responsible for the report another consultant must undertake the RQC process. This HIA is conducted for the proposed Kwathema To Grundlingh WWTW Bulk Outfall Sewer capital project implementation near Nigel, within the Ekurhuleni Metropolitan Municipality in the Gauteng Province, South Africa.

2.2. Step I – Literature Review (Desktop Phase)

Background information search for the proposed development took place following the receipt of appointment letter from the client. Sources used included, but not limited to published HIA studies, academic books, academic journal articles and the internet about the site and the broader area in which it is located. Interpretation of legislation (the NHRA, No. 25 of 1999) and local by-laws forms, form the backbone for the study.

2.3. Step II – Physical Survey

The physical survey of the project area (footprint) was conducted on two occasions:

- Monday, 20 August 2018 by Mr. Nkosinathi Tomose (Principal Archaeologist and Heritage Consultant– NGT)
- Wednesday the 22nd of August 2018 by Miss Cherene de Bruyn (Archaeology and Heritage Consultant – NGT).
- These findings are discussed in detail in this HIA report.

The aim of the survey was to identify archaeological and heritage sites and resources within the area proposed for construction of sewer pipelines and the 20m servitude (split in 10m on either side of the pipeline):

- The survey of the proposed pipeline development area was conducted on foot and the site was accessed using a bakkie;
- The aim of the surveys was to identify archaeological, burial grounds and graves, and built environment heritage sites and resources in and around the area proposed for development;

- To record and document the sites using applicable tools and technology;

The following technological tools were used for documenting and recording identified resources on site:

- Garmin GPS (i.e. Garmin 62s) – to take Latitude and Longitude coordinates of the identified sites and to track the site.
- Canon SLR – to take photos of the affected environment and the identified sites.

2.4. Step III – Report Writing and Site Rating

The final step involves compilation of the report using desktop research as well as the physical survey results. Archaeological resources, graves and sites found in the project area are rated according to the site significance classification standards as prescribed by SAHRA. The first draft of this report was produced in 2018.

2.5. Site Significance Rating

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by ASAPA for the Southern African Developing Community (SADC) region were used to grade the identified heritage resources or sites (*Table. 3*).

Table 3-Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	High Significance	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	High Significance	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP. A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP. A)	-	Low Significance	Destruction

3. BACKGROUND LITERATURE REVIEW: ARCHAEOLOGY

In southern Africa archaeology is divided into the Stone Age, Iron Age and the Historical Period. During these periods diverse groups of people settled on the southern African landscape. Several archaeological sites have been identified in the Gauteng Province.

Most of the research on the culture, archaeology, rock art in and around the Gauteng Province has been conducted by Huffman (2002, 2007); Mason (1968, 1982, 1986); Sutton (2012), Kuman & Field (2009) Kuman *et al.*, (1997). Previous HIA's and AIA's of Nigel and the broader Gauteng region have been conducted by Van Schalkwyk & Pelsler (2000); Birkholtz (2006); Van Der Walt (2015); Coetzee (2009; 2012; 2017); Van Schalkwyk (2011); Van Vollenhoven (2012, 2013); Gaigher (2013, 2015a, b, c) and Tomose (2014; 2018).

3.1. Stone Age

The Stone Age is divided into three periods. The Early Stone Age (ESA) (2 million to 250 000 years ago), the Middle Stone Age (MSA) (250 000 – 22 000 years ago) and the Later Stone Age (LSA) (25 000 to 200 years ago). The ESA is comprised of the Oldowan stone tool complex (2 and 1.7-1.5 million years ago), and the Acheulean stone tool complex (1.7-1.5 million years ago and 250-200 thousand years ago) (Klein 2000; Mitchell 2002). The ESA is comprised of the Oldowan stone tool complex and is characterized by small flakes, flaked cobbles and percussive tools (Klein 2000; Mitchell 2002; Diez-Martín *et al.*, 2015; De La Torre 2016). Several ESA sites have been researched and recorded in the Cradle of Humankind near Johannesburg. Oldowan stone tools have been found at Swartkrans (Sutton 2012), Sterkfontein (Kuman & Field 2009; Reynolds & Kibii 2011), Malapa (Berger *et al.*, 2010), and Kromdraai (Kuman & Field 1997). Several hominin fossil species have also been excavated at these sites (Reynolds & Kibii 2011). The Acheulean stone tool complex included large hand axes and cleavers (1.7-1.5 million years ago and 250-200 thousand years ago) (Klein 2000; Mitchell 2002; Diez-Martín *et al.*, 2015; De La Torre 2016). At the Gladysvale Cave located 5 kilometres north-northwest of Nigel, a hand axe dating to the Acheulean stone tool complex was found by Hall *et al.*, (2006). Other ESA sites have been identified to the west of Pretoria near the Magaliesriver as well as in the region of the Magaliesberg mountains (Van Vollenhoven 2006).

The transition from the Early to Middle Stone Age includes a change in technology from large stone tools to smaller blades and flakes. The MSA stone tool assemblage include blades, flakes, scrapers and pointed tools that could have been hafted and used as spears or arrowheads and is associated with anatomically modern humans (Wadley, 2007).

3.2. Iron Age

The Iron Age, according to Huffman (2007) can be divided into the Early Iron Age (EIA) (AD 200 – 900); the Middle Iron Age (MIA) (AD 900 – 1300); and the Late Iron Age (LIA) (AD 1300 – 1840). The Iron Age is characterized by farming communities who domesticated animals, produced various ceramic vessels, smelted iron for weapons and manufactured tools.

The EIA communities throughout eastern and southern Africa share a similar Iron Age culture called the Chifumbaze complex (Phillipson 1994; Huffman 2007). The Chifumbaze complex contains evidence of the first farmers who cultivated crops, herded domestic animals, used iron, and who made pots (Phillipson 1994). It can furthermore be divided into the Kalundu and Urewe Traditions (Huffman 2007). The Kalundu Tradition is also referred to as the western stream, while the Urewe Tradition is known as the eastern stream (Huffman 2007). The Kalundu Tradition can be found in southern Africa where the makers of these pots lived on wetter and more arable land (Mitchell 2013). The Urewe Tradition ceramic assemblage can be found in the eastern parts of south-central and south eastern Africa (Mitchell 2013). The Nkope and Kwale branches form part of the Urewe tradition (Phillipson 1994; Mitchell 2002; Huffman 2007).

Mzonjani Facies (AD 450-750) of Kwale branches form the Urewe tradition have been found in the areas surrounding Pretoria and Johannesburg as well as the region between Musina and Nelspruit (Evers 1975, 1977; Huffman 2007). In 1997, Mzonjani ceramics were found on the farm Derdepoort, north of Pretoria and in the Magaliesberg (Nienaber *et al.*, 1997; Van Vollenhoven 2006). Ceramics of the Mzonjani Facies have also been located around Richards bay in KwaZulu-Natal (Maggs 1980; Huffman 2007).

During the climatic conditions in southern and eastern Africa, Moloko people migrated from east Africa to southern Africa (Boeyens 2003). Moloko type ceramics of the Sotho-Tswana people, replaced earlier Eiland ceramics (AD 1000 – 1300), in the Limpopo Province as well as in Botswana (Evers 1983; Klapwijk & Evers 1987; Boeyens 2003). This take over indicates the movements of Sotho-Tswana people to South

Africa during the second millennium AD (Boeyens 2003; Badenhorst 2010). Icon (AD 1300 - 1500) a ceramic phase of the Moloko ceramics first appeared in Phalaborwa (Evers & Van der Merwe 1987; Mitchell 2002; Huffman 2007). This indicates that the Sotho-Tswana people originated from east Africa as indicated from tracing the Moloko ceramics back to the EIA of the Urewe Tradition (Hanish 1979; Huffman 1989; Jacobson *et al.*, 1991; Lane 1996; Boeyens 2003; Taylor *et al.*, 2003; Huffman 2007).

The Sotho-Tswana people can be divided into four clusters; the Fokeng, the Hurutshe, the Kgatla and the Rolong (Huffman 2002, 2007). However, Huffman later identified that ceramics of the Fokeng do not form part of the Sotho-Tswana tradition, and that the Fokeng were Nguni speakers (Sadr & Rodier, 2012). Their first migration of Sotho-Tswana people to the Waterberg dates to AD 1350 (Taylor *et al.*, 2003). It is argued that these people moved to southern Africa due to drought in eastern Africa (Taylor *et al.*, 2003). These Sotho-Tswana speaking people migrated north-westwards until they settled in the Limpopo Province (Taylor *et al.*, 2003). The second migration of Sotho-Tswana people was in AD 1350-1450 and is associated with the migration of the Kweana-Hurutshe (Huffman 2002; Boeyens 2003; Taylor *et al.*, 2003). The Hurutshe cluster (includes the Kwena, Ngwato, Ngwaketse and Tawana) are the descendants of those who claim lineage from Malope and his father Masilo (who originated from the Lowa waterhole in Botswana) who lived at Rathateng near Marico and Crocodile confluence in AD 1440 and 1560 (Huffman 2002, 2007). The oral traditions of the Hurutshe indicates that they settled in the Marico region of the North West Province during the 15th century AD (Boeyens 2003). The Hurutshe exiled the Rolong from the Mosega area south of Zeerust (Huffman 2002). The Rolong, a third cluster of the Sotho Tswana arrived in southern Africa between AD 1200 and 1350 and includes the Tlhaping groups (Boeyens 2003; Huffman 2002). The Rolong settled in the region between the Magaliesberg to the Vaal (Huffman 2002; Giliomee & Mbenga 2007; Huffman 2007). According to White (1977) the region north of Klerksdorp contains numerous Iron Age sites related to the Rolong capital of Thabeng.

The Fokeng cluster (Bafokeng) found at Ntsuanatsatsi Hill in the Free State Province, formed out of the Kwena (of the Hurutshe cluster) who migrated southeast across the Vaal in AD 1550 and 1650 (Huffman 2002, 2007). The Fokeng and Kwena settlements and associated material culture have been recorded at sites across the Vaal River into Balfour (in Mpumalanga Province), Klipriviersberg (jn Gauteng Province) and Vredefort (in the Free State Province) (Van Schalkwyk & Pelsner 1999; Tomose 2018).

Ceramics of the Ntsuanatsatsi facies (AD 1450 to 1650) of the Blackburn Branch and Urewe Tradition, have been found near Johannesburg and along the Vaal River in the Free State Province. (Mason 1986; Dreyer

1992; Huffman 2007). The Ntsuanatsatsi facies is closely related to the oral histories of the Early Fokeng and represent the movement of Nguni-speaking people out of Kwazulu-Natal into the interior of South Africa. The Uitkomst facies (AD 1650 – 1820) of the same branch is seen as the successors to the Ntsuanatsatsi facies and contains elements of both Nguni (Ntsuanatsatsi facies) and Sotho-Tswana speakers (Olifantspoort facies) pottery styles (Huffman, 2007). This represents contact between these two groups. Ceramics of the Uitkomst facies have been found throughout the Gauteng Province around Johannesburg and Pretoria as well as in the north-eastern regions of the North West Province (Huffman 2007).

The Olifantspoort facies (AD 1500-1700) of the Moloko Branch has been found around the Potchefstroom, Rustenburg and Pretoria regions (Mason 1986; Mitchell 2002; Huffman 2007). Mason (1973, 1974) has also found pottery similar to the Olifantspoort facies on the slopes of Platberg, near Klerksdorp. Olifantspoort pottery is characterised by “multiple bands of fine stamping and narrow incision separated by colour” (Huffman 2007). Ceramics of the Olifantspoort facies have been identified along the region surrounding the Vaal River, in Potchefstroom and in the Gauteng Province around the Johannesburg and Pretoria regions (Huffman 2007).

Buispoort ceramics (AD 1700 – 1840), of the Moloko Branch, have been found to the north of Potchefstroom, and in the Gauteng Province around the Johannesburg and Pretoria regions (Mason 1962, 1986; Boeyens 2000; Huffman 2007). Buispoort ceramics are characterised by “rim notching, broadly incised chevrons and white bands” (Huffman 2007).

Several stone-walled structures have been identified in the Suikerbosrand Nature Reserve 30 km west of Nigel (Sadr & Rodier 2012). Studies conducted on the LIA classification of stone wall settlement patterns have been done by Maggs (1976) and Mason (1986). Mason (1968) focused his research on stone wall sites located in the Magaliesberg and Johannesburg region, it is also in this area that the 19th century Tswana town, Marothodi is located (Anderson 2009). Mason (1986) published a review of his stone wall settlement types following more research that was conducted in the area. His classifications indicated the general chronological development of Sotho-Tswana Settlement style. According to Mason (1986) earlier Sotho-Tswana settlements had a simple layout that became more complex during the later periods.

Maggs (1976) research focused on stone walls found in the Free State Province, where his approach included linking the different site types to Sotho oral traditions, history and identities. Maggs (1976) stone

wall types included Type N (associated with the Early Fokeng and Kwena), V (attributed to the Sotho speaking groups collectively), Z (Kabung, a branch of the Rolong) and R (associated with bushman pastoralists). Type N walling, named after Ntsuanatsatsi hill in the Free State Province (Huffman 2007). According to Huffman (2007) Type N walling consists of cattle kraals linked to other walls in the centre of the settlement surrounded by an outer wall. Type N Iron Age walling settlements have been identified to the south of the Klipriviersberg (Tomose 2018)

Type V stone walls, named after Vegkop located near the town of Heilbron, in the Free State Province, developed from Type N walling (Huffman 2007). Type V walling is characterised by cattle kraals surrounded by huts and grain bins enclosed by an outer wall (Huffman 2007). Type Z walling, which is characterized by “bilobial huts” that surround the core of the settlement and dates to the 18th – 19th Centuries (Huffman 2007). Huffman (2007) identified another type of walling, called Molokwane walling, located in hilly regions in the Gauteng and North West Province. This type of walling is attributed to the Hurutshe and Kwena groups and dates to the late 18th century to the beginning of the historic period (Huffman 2007).

3.3. Historical Period

The Historical Period dates from AD 1600 and is generally the period related to colonial settlement in South Africa.

Following disputes with the British the Dutch-speaking Voortrekkers migrated north into the interior of southern Africa from the Cape Colony in 1836's in search of creating a homeland, independent of British rule. This migration of approximately 12000 – 140000 Voortrekkers is referred to as the Great Trek. The Convention of Sandrivier was signed in 1852 between Great Britain and the Voortrekkers (Kruger 2018). In the Convention the Voortrekkers were given independence. The Voortrekkers then established the South African Republic (Transvaal) (Ashman 1996). The Convention was signed at the Sand River, south of Kroonstad near Ventersburg. After the signing of the Sand River convention, Boers moved into the Gauteng region in 1852.

The first gold reef was discovered mid-1886 at the Witwatersrand Main Reef (Emden 1935; Cartwright 1962; Appelgryn 1984; Beavon 2004). However, the two brothers Frederick and Henry William Struben

have also claimed to have discovered gold during the same year (Cunningham 1987; Beck, 2013). When Cecil John Rhodes and Alfred Beit heard of the new discovery in the Witwatersrand they bought up claims and properties in the area (Beck 2013). Together they formed the company, Consolidated Gold Fields Limited (Beck 2013). When Cecil John Rhodes bought up claims and became interested in the Witwatersrand gold mines, the use of the compound system and migrant labour became the norm (Wentzel & Tlabela 2006). By the mid-1890s numerous other gold mining companies opened in the Rand, making the region the world biggest mining district at the time (Beck 2013). Large scale mining operations and developments soon took over, leading to investment and financial support from big companies overseas (Beck 2013).

The gold reef in Nigel was discovered by Nigel MacLeish, and he is possibly also the individual who the town was named after (Coetzee 2017). Another possibility is that the town was named after a character in the book “The Fortunes of Nigel” by Sir Walter Scott (Gaigher 2015b). Petrus Johannes Marais owned the farm Varkensfontein in the Heidelberg district and began prospecting for gold in 1888 (Gaigher 2015b). He later established the Nigel Gold Mining Company, after the character and plot of the book he was reading (Gaigher 2015b). President Paul Kruger declared the mining cap of Nigel as a public digging in 1888 (Gaigher 2013). The first mayor, Mr. C.L. Mackle was elected in 1930 (Gaigher 2013). In 1896 the Marievale Nigel Gold Mining Company was established in Nigel (Coetzee 2017). In the same year the Marievale Nigel Gold Mining company was known as the Marievale Nigel Gold Mining and Estate Ltd and later as the Marievale Consolidated Mines Ltd (Coetzee 2017). Today the Marievale Mine is owned by Gencor (Coetzee 2017).

The Air School of the South African Air Force was moved to Dunnottar Airbase near Nigel on 11 November 1940 after the Second World War (1939 to 1945) (Coetzee 2017). In 1946 the Air School stopped training pilots (Coetzee 2017). During the 1940’s to 1990’s, Springs was divided into middle- and upper-income white suburbs with the Indian areas located in Bakerton (Nieftagodien 1996). Black South Africans were relocated to KwaThema (Gaigher 2015c).

3.4. Conclusions on Literature Review

The Gauteng Province is a region rich in archaeology, history and heritage. Several groups have settled in the region, which lead to several conflicts and battles. The region around Johannesburg is particularly well

known for heritage resources related to the Stone and Iron Age. Throughout the region stone tools and several Iron Age stone-walled sites and ceramics can be found. These settlement types and ceramics indicate that the region was occupied by Sotho-Tswana speaking communities from AD 1200 and that Nguni speaking groups later moved into the region. When gold was discovered in the mid-1886 Witwatersrand many people flocked to the cities to prospect and mine for gold. As such mining camps were set up. Nigel played an important role during the 'gold rush' and was later declared a town.

4. STUDY RESULTS

The background information search yielded information about the archaeological and history of the Gauteng Province, and particularly the Nigel region. The physical survey focused on the area proposed for the Kwathema To Grundlingh WWTW Bulk Outfall Sewer Capital Project Implementation near Nigel, within the Ekurhuleni Metropolitan Municipality in the Gauteng Province, (*Figure. 3*).

The survey specifically focussed on the areas proposed for the pipeline. The proposed locations were situated along a small river (*Figure. 4*). The area has been slightly transformed by previous construction activities. A pre-existing sewer pipeline, the ruins of several contemporary buildings and train tracks were identified in the project area (*Figure. 5-6*).



Figure 3: General view of site



Figure 4: Small river located to the east of the proposed pipeline



Figure 5: Sewer pipes running through the project area



Figure 6: Train tracks located near the southern section of the pipeline

4.1. Archaeological sites

No archaeological sites were identified during the survey and site visit.

4.2. Built Environment Features

The ruins of several structures were identified during the survey and site visit. These structures are contemporary and not older than 60 years and as such hold no heritage or historical value (*Figure. 7*).



Figure 7: The ruins of several structures identified throughout the project area.

4.3. Burial Grounds and Graves

No graves of burial sites were identified during the survey and site visit.

4.4. Paleontological Sensitivity

The SAHRA Paleo-Sensitivity Layer shows that the significant part of the sewer pipeline falls within the area of low palaeontological sensitivity (*Figure 8*). Approximately 5% of the sewer pipelines falls within an area of high palaeontological sensitivity. As such field assessment and protocol for finds is required.

4.5. Site Ratings of stone walled site identified

No sites of heritage significance were identified during the survey and site visit.

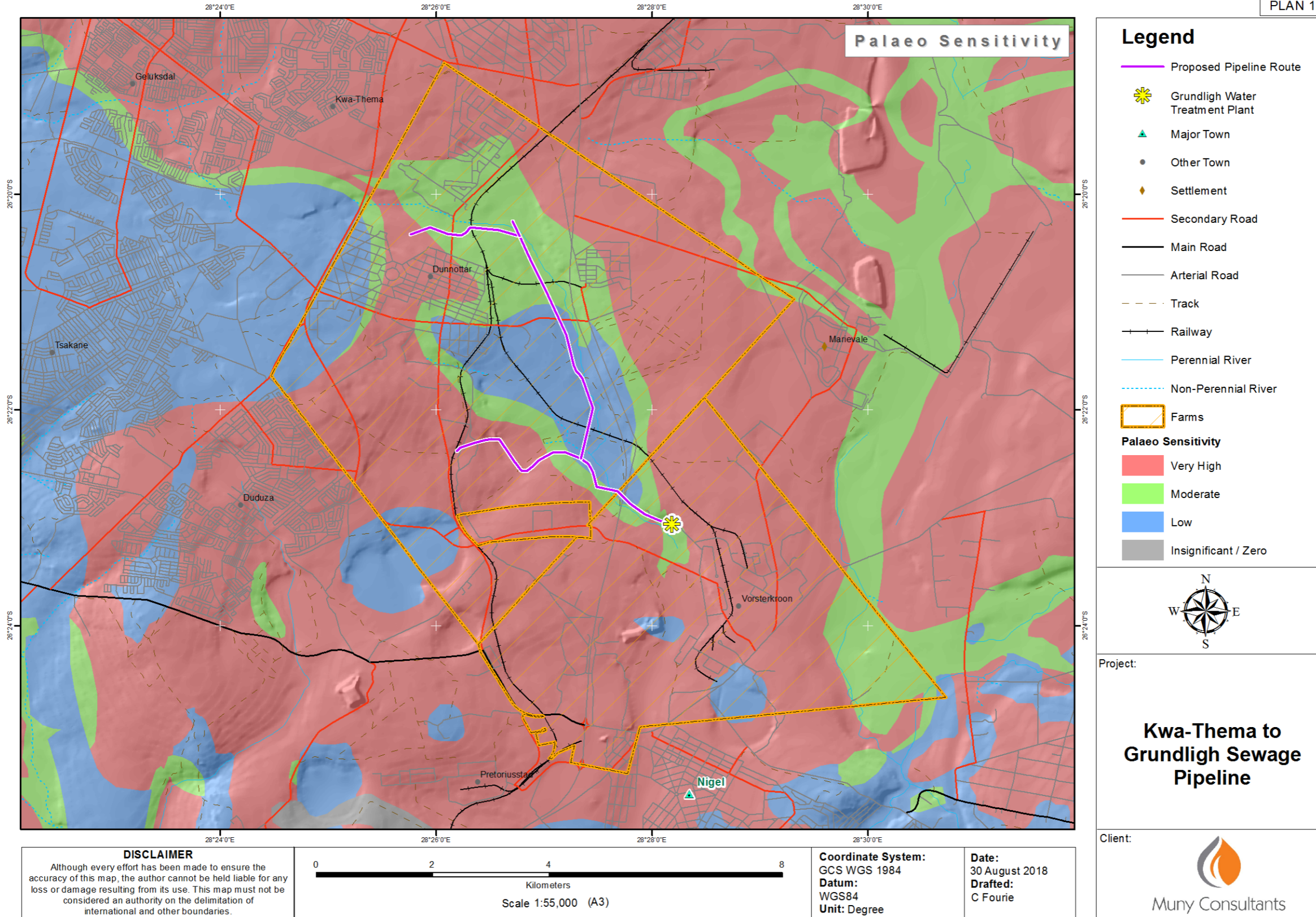


Figure 8: Paleo-Sensitivity layer of the WWTW Bulk Outfall Sewer line (Blue circle) in the near Nigel, within the Ekurhuleni Metropolitan Municipality in the Gauteng Province.

5. CONCLUSION AND RECOMMENDATIONS

Based on the results of literature review and the survey results the following conclusions are made:

- It is concluded that 90% of the propose sewer pipeline fall within a low sensitive palaeontological area. Approximately 10% within a palaeontological sensitive area but will not be negatively impacted by the proposed sewer pipelines.
- It is concluded that the project is located in a region (Gauteng) rich in archaeology and heritage resources.
- No other archaeological or historical resources were identified in the project area.
- No graves or burial grounds were identified in the project area. However, as graves are subterranean in nature and might not have been identified during the initial site visit and survey.

Recommendations:

- It is recommended that the developer should note that, although there were no archaeological or heritage resources identified during the various project surveys; some archaeological material, including artefacts and graves can be buried underground and as such, may not have been identified during the initial survey and site visits. In the case where the proposed development activities bring these materials to the surface, they should be treated as Chance Finds. Should such resources be unearthed it is recommended that, the development activities be stopped immediately, and an archaeologist be contacted to conduct a site visits and make recommendations on the mitigation of the finds. SAHRA and PHRA-G should also be informed immediately on such finds.
- In terms of the SAHRA Paleontological Sensitivity Layer the area falls within a low to very high sensitivity area. As such an assessment and protocol for finds are required.
- A portion of the pipeline falls within a Palaeontological Sensitive Layer, as such should the construction activities involve trenching to a depth of over 1.5m to 2m a palaeontological monitoring programme should be implemented by a qualified palaeontologist.
- The proposed development will not have an impact on the heritage and archaeological resources in the broader Nigel area.

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