PHASE1: ARCHAEOLOGICAL IMPACT ASSESSMENT

RELATING TO THE PROPOSED DESIGN AND CONSTRUCTION OF MITIGATION MEASURES IN FAIRLANDS AND DARRENWOOD SPRUIT AND REMEDIAL WORKS FOR THE KELLAND WETLAND, WILLOWS IN RANDBURG, GAUTENG PROVINCE, SOUTH AFRICA.

***Compiled** by:* Millennium Heritage Group (PTY) LTD

For:

THOLOANA SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL CONSULTANTS

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2021

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06 January 2019 Final Report

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Property details	
Province	Gauteng
Magisterial District	City of Johannesburg Metropolitan Municipality
Topo-cadastral map	2627 BB
Coordinates	26°06'50.77"S, 27°57'44.03"E
Closest town	Randburg
Farm name	Kelland EXT 1, Re ERF 78PTN 0, Kelland EXT 1ERF84,PTN37 and Kelland ERF78 RE PTN1

Development criteria in terms of Section 38(1) of the NHR Act	Yes	No
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	yes	
Construction of bridge or similar structure exceeding 50m in length		no
Development exceeding 5000 sqm		
Development involving three or more existing erven or subdivisions	yes	
Development involving three or more erven or divisions that have been consolidated within past five years		
Rezoning of site exceeding 10 000 sqm		
Any other development category, public open space, squares, parks, recreation grounds	yes	

Development	
Description of development	Storm water and wetland Rehabilitation at Kelland, willows
Project name	Design and construction of mitigation measures in the Fairland's and Darren Woods Spruit and remedial works for the Kelland wetland
Developer	Johannesburg Road Agency
Heritage consultant	Eric Mathoho, Millennium Heritage Pty Ltd
Purpose of the study	Heritage Impact Assessment to identity and assess significance of sites (if any) to be impacted by the

	proposed design and construction of mitigation measures in the Fairland's and Darren woods spruit and remedial works for the Kelland wetland.

Land use	
Previous land use	Wetland/ Leisure Nature Reserve (Bird sanctuary)
Current land use	Wetland/ Leisure Nature Reserve (Bird sanctuary)

ii. Executive Summary

Tholoana Sustainable Development and Environmental Consultants requested Millennium Heritage Group (Pty) Ltd, an independent heritage consulting company to assess the heritage sensitivity of the area proposed for storm water and wetland rehabilitation at Kelland, Willows in Randburg. A multi-stepped methodology was used to address the terms of reference. To begin with, a desktop study was carried out to identify any known heritage sites and their significance. This involved consulting contract archaeology reports filed on SAHRIS, research reports and academic publications. Finally, the study was guided by the National Heritage Resources Act of 1999 and SAHRA Minimum Standards for Impact Assessment. The desktop study was followed by fieldwork. I am confident that the entire study area was covered by this survey.

The study reached the following conclusions and recommendations:

1. Desktop surveys indicated the presence of archaeological sites in the study area but mostly on hills and kopjes.
2. The proposed storm water and wetland rehabilitation is scheduled to take place on the immediate areas upstream of both Fairland's and Darren wood Spruits. The area is currently covered by local and alien vegetation species. A huge section of the site was disturbed by access roads and concrete infrastructure.
3. Ground truthing of the area proposed for development found no archaeological materials or heritage remains.

- Although no archaeological remains were found, it is possible that some significant features may be buried beneath the ground. Should buried archaeological materials and burials be encountered during the process of development, the following must apply:
- Work must stop immediately

  A professional archaeologist or nearest heritage authority must be contacted.

Based on this assessment which found no archaeological resources in a heavily disturbed area, we recommend that the heritage authorities approve the project as planned.

ACKNOWLEDGEMENTS:

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1. INTRODUCTION AND BACKGROUND INFORMATION

The study area lies on the northwestern boundary of Johannesburg in Randburg, Gauteng Province. The study area collects a large quantity of run-off water discharged from nearby metropolitan centers into the Fairland's and Darren Wood Spruits. Over time, large amounts of run off with a high velocity and high rate of flow damaged river banks through erosion. The eroded river banks of the two streams have reduced the functionality of the nearby Kelland wetland thereby affecting nearby communities. Wetlands are valuable components of the ecosystem; they perform various functions such as in protecting water quality, erosion control, flood water storage and recharging ground water and subsequently serves as recreational facility (Birds sanctuary).

The proposed project seeks to mitigate flooding by making interventions to control erosion to restore the functionality of the existing wetland and in the process improve its aesthetic appeal. Historically the Kelland wetland, just downstream of willows formed a balanced eco and hydrological system that allowed for level of flood mitigation by functioning as a sponge and reducing the velocity of floodwater with a wetland that support large collection of birds and aquatic life. Against this background, the Johannesburg Road Agency commissioned pre-development Archaeological Impact Assessment studies for the proposed storm water and wetland rehabilitation at Kelland, Willows in Randburg, Johannesburg Metropolitan Municipality, Gauteng Province. (Figure 1). Fairland and Darren woods spruit are perennial streams. Both are tributaries of the Klein Jukskei spruit with a total catchment area that covers roughly 8,7 to 9.4 km^2.

To ensure that the proposed development meets the environmental requirements in line with the National Environmental Management Act 107 of 1998 as amended in 2010, JRD appointed Tholoana Sustainable Development and Environmental Consultants who in turn appointed Millennium Heritage Group (PTY) LTD to undertake an Archaeological Impact Assessment of the proposed project as part of the broader EIA to assess the impact of the development on the receiving environment including heritage resources. In terms of EIA Regulations promulgated on 4 December 2014, read with Section 44 of the National Environmental Management Act (Act 107 of 1998), the proposed development falls within listed Activity 14 the development (V) weir, where the weir, including infrastructure and water surface area exceeds 10 square meters in size; (Xii) infrastructure or structures with physical footprint of 10 square meters or more. This study forms part of a series of reports prepared for Basic Assessment Report (BAR) to be submitted to the Gauteng Department: Agriculture and Rural Development (GDARD), in support of the application for development as provided by the National Environmental Management (NEMA) Act no 107 of 1998. In line with these statutory requirements, this report provides an assessment for archaeological resources to be impacted by the proposed construction of mitigation infrastructure as remedial works for the Kelland wetland.

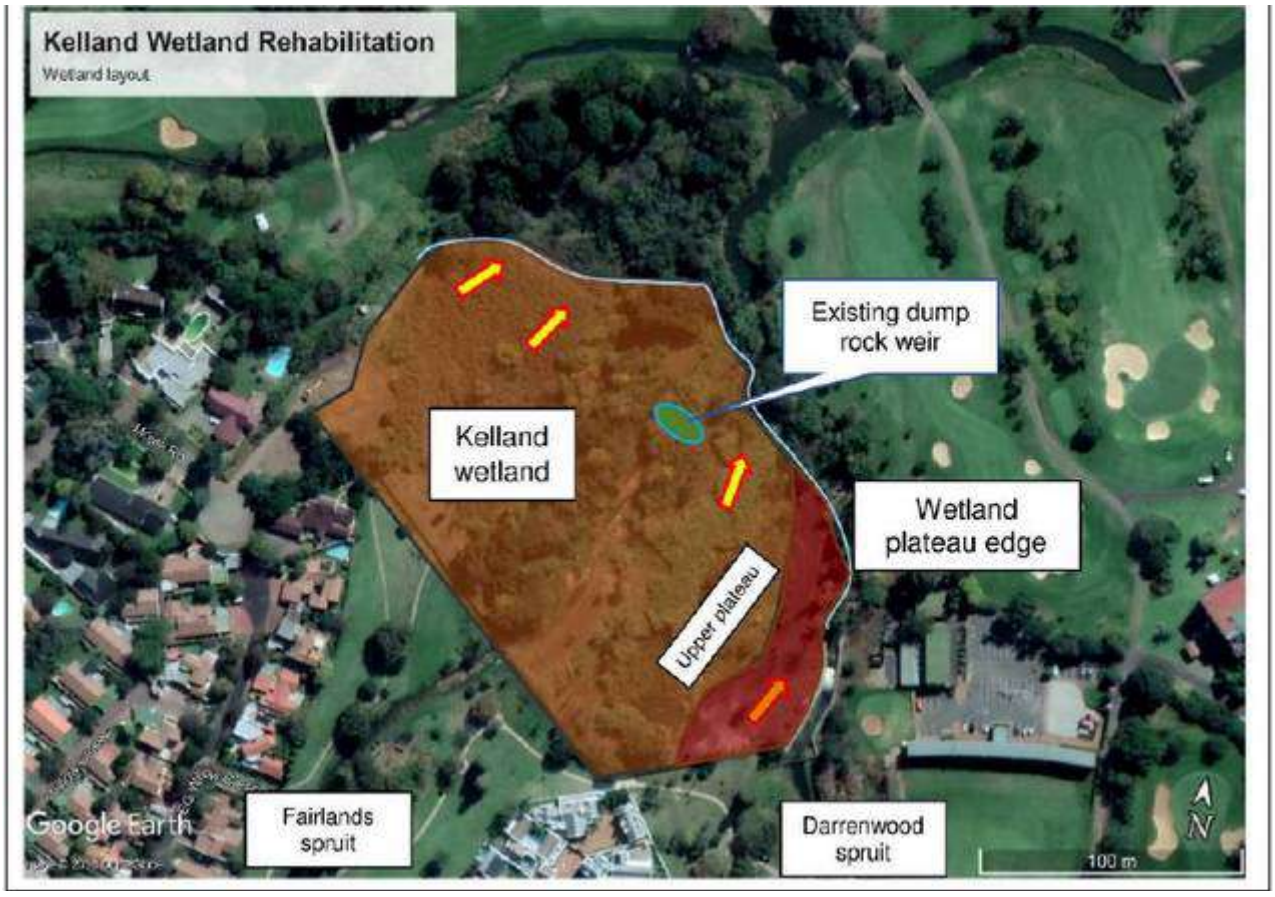


Figure 1: Google layout of the proposed study area

To comply with relevant legislations, Johannesburg Road Agency requires information on heritage resources that occur within or near the proposed site for development and their significance. Consequently, the objective of the study is to document the presence of archaeological, paleontological and historical sites of significance to inform and provide guidance on the proposed wetland rehabilitation project. The study contributes to the preservation of heritage resources, by ensuring that where possible, the development footprint is altered. In cases, where this is not possible, the heritage resources will be documented through mitigation to preserve them by record. This will enable the developer to advance development activities and at the same time minimizing potential impact on archaeological and heritage sites. Heritage Impact Assessments are conducted in line with

the National Heritage Resources Act of 1999 (Act No. 25 of 1999). The Act protects heritage resources through formal and general protections. Furthermore, the Act provides that certain developmental activities require authorization from relevant heritage authorities. The National Heritage Resources Act (NHRA - Act No. 25 of 1999) protects all built structures and features older than 60 years (Section, 34), archaeological sites and materials (Section 35) and graves and burial sites (Section, 36). In addition to heritage legislation, the South African Heritage Resources Agency (SAHRA) has developed minimum standards for impact assessment. While these local standards are operational, they are strengthened and complemented by the International Council of Monuments and Sites (ICOMOS) guidelines for assessing impacts on heritage resources, both cultural and natural. In addition, the Burra Charter of 1999, requires a cautious approach to the management of sites and firmly establishes that the cultural significance of heritage places must guide all decisions when it comes to dealing with heritage. To comply with relevant legislation, the applicant requires information on the heritage resources, that occur in the area proposed for development and their significance. This will enable the applicant to take pro-active measures to limit the adverse effects that the development could have on such heritage resources.

2. RELEVANT LEGISLATION

Two sets of legislation are relevant for the purposes of this study in as far as they contain provisions for the protection of tangible and intangible heritage resources including burials and burial grounds.

2.1. The National Heritage Resource Act (25 of 1999)

This Act established the South African Heritage Resource Agency (SAHRA) as the prime custodian of the heritage resources and makes provision for the undertaking of heritage resources impact assessments for various categories of development as determined by Section 38. It also provides for the grading of heritage resources (Section, 7) and allocates the responsibility and functions for managing different categories of heritage to the State, Provincial and Local authorities, depending on the grade of heritage resources (Section, 8). In terms of the National Heritage Resource Act 25, (1999) the following is of relevance:

Historical remains

Section 34 (1) No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the relevant Provincial Heritage Resources Authority.

Archaeological remains

Section 35(3) Any person who discovers archaeological and paleontological materials and meteorites during development or agricultural activity must immediately report the find to the responsible heritage resource authority or the nearest local authority or museum.

Section 35(4) No person may, without a permit issued by the responsible heritage resources authority-

- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;
- destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;

- trade in, sell for private gain, export or attempt to export from republic any category of archaeological or paleontological material or object or any meteorite; or
- bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment which assist with the detection or recovery of metal or archaeological material or object or such equipment for the recovery of meteorites.

Section 35(5) When the responsible heritage resource authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or paleontological site is underway, and where no application for a permit has been submitted and no heritage resource management procedures in terms of section 38 has been followed, it may

- serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order
- carry out an investigation for obtaining information on whether an archaeological or paleontological site exists and whether mitigation is necessary;
- if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and
- recover the cost of such investigation from the owner or occupier of the land on which it is believed an archaeological or paleontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

Subsection 35(6) the responsible heritage resource authority may, after consultation with the owner of the land on which an archaeological or paleontological site or meteorite is situated; serve a notice on the owner or any other controlling authority, to prevent activities within a specified distance from such site or meteorite.

Burial grounds and graves

Section 36 (3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority:

(i) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(ii) bring onto or use at a burial ground or grave any excavation equipment, or any equipment which assists in detection or recovery of metals.

Subsection 36 (6) Subject to the provision of any person who during development or any other activity discover the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resource authority which must, in co-operation with the South African Police service and in accordance with regulation of the responsible heritage resource authority-

(I) carry out an investigation for obtaining information on whether such grave is protected in terms of this act or is of significance to any community; and

if such grave is protected or is of significance, assist any person who or community which is a direct descendant to decide for the exhumation and re-interment of the

contents of such grave or, in the absence of such person or community, make any such arrangement as it deems fit.

Cultural Resource Management

Section **38(1)** Subject to the provisions of subsection (7), (8) and (9), any person who intends to undertake a development*…

- must at the very earliest stages of initiating such development notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

development 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 a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including:

(i) Construction, alteration, demolition, removal or change of use of a place or a structure at a place;

(ii) Any change to the natural or existing condition or topography of land, and

(iii) Any removal or destruction of trees, or removal of vegetation or topsoil;

place means a site, area or region, a building or other structure

structure means any building, works, device or other facility made by people and which is fixed to the ground.

2.2. The Human Tissue Act (65 of 1983)

This act protects graves younger than 60 years, these falls under the jurisdiction of the National Department of Health and the Provincial Health Department. Approval for the exhumation and reburial must be obtained from the relevant provincial MEC as well as relevant Local Authorities.

3. TERMS OF REFERENCE

The terms of reference for the study were to undertake an Archaeological Impact Assessment for the proposed stormwater and wetland rehabilitation at Kelland, willows in Randburg and submit a specialist report, which addresses the following:

- Executive summary
- Scope of work undertaken
- Methodology used to obtain supporting information
- Overview of relevant legislation
- Results of all investigations
- Interpretation of information
- Assessment of impact
- Recommendation on effective management measures
- References

4. TERMINOLOGY

The Heritage Impact Assessment (HIA) referred to in the title of this report includes a survey of heritage resources as outlined in the National Heritage Resources Act, 1999 (Act No25 of 1999) Heritage resources, (Cultural resources) include all human-made phenomena and intangible products that are result of the human mind. Natural, technological or industrial features may also be part of heritage resources, as places that

have made an outstanding contribution to the cultures, traditions and lifestyle of the people or groups of people of South Africa.

The term 'pre – historical' refers to the time before any historical documents were written or any written language developed in an area or region of the world. The historical period and historical remains refer, for the project area, to the first appearance or use of 'modern' Western writing brought to South Africa by the first colonists who settled in the Cape in the early 1652 and brought to the other different part of South Africa in the early 1800s.
The term 'relatively recent past' refers to the 20th century. Remains from this period are not necessarily older than sixty years and therefore may not qualify as archaeological or historical remains. Some of these remains, however, may be close to sixty years of age and may soon, qualify as heritage resources.

It is not always possible, based on the observation alone, to distinguish clearly between archaeological remains and historical remains or between historical remains and remains from the relatively recent past. Although certain criteria may help to make this distinction possible, these criteria are not always present, or when they are present, they are not always clear enough to interpret with great accuracy. Criteria such as square floor plans (a historical feature) may serve as a guideline. However circular and square floors may occur together on the same site.

The 'term sensitive remains' is sometimes used to distinguish graves and cemeteries as well as ideologically significant features such as holy mountains, initiation sites or other sacred places. Graves are not necessarily heritage resources if they date from the recent

past and do not have head stones that are older than sixty years. The distinction between 'formal' and 'informal' graves in most instances also refers to graveyards that were used by colonists and by indigenous people. This distinction may be important as different cultural groups may uphold different traditions and values regarding their ancestors. These values should be recognized and honored whenever graveyards are exhumed and relocated.

The term 'Stone Age' refers to the prehistoric past, although Late Stone Age people lived in South Africa well into the historical period. The Stone Age is divided into an Early Stone Age (3Million years to 150 000 thousand years ago) the Middle Stone Age (150 000 years ago to 40 years ago) and the Late Stone Age (40 000 years to 200 years ago).
The term 'Early Iron Age' and Late Iron Age respectively refers to the periods between the first and second millenniums AD.

The period covered by the term 'Late Iron Age' also includes the 17th and the 19th centuries and therefore includes the historical period.
Mining heritage sites refers to old, abandoned mining activities, underground or on the surface, which may date from the pre-historical, historical or relatively recent past.
The term 'study area' or 'project area' refers to the area where the developers wants to focus its development activities (refer to plan)

Phase I studies refer to survey using various sources of data in order to establish the presence of all possible types of heritage resources in a given area.

Phase II studies include in-depth cultural heritage studies such as archaeological mapping, excavating and sometimes laboratory work. Phase II work may include documenting of rock art, engravings or historical sites and dwellings; the sampling of archaeological sites or shipwrecks; extended excavation of archaeological sites; the exhumation of bodies and the relocation of grave yards, etc. Phase II work may require the input of specialist and require the co-operation and the approval of SAHRA.

5. METHODOLOGY

Sources of information

i. Desktop studies

A desktop study was performed to gain information on the heritage resources in the area. The study consulted existing Heritage Impact Assessment reports for the area including Van Schalkwyk (2007), Digby Wells (2016). Mason (1986) also performed detailed studies of the archaeology of the area within and around Johannesburg. These works identified a long history of human occupation in the study area stretching from the Stone Age, through the Iron Age to the recent past. Then there is historical heritage built from the late 19th century onwards.

ii. Field surveys

To identify sites on the ground and to assess their significance, a dedicated field visit to the site of the proposed development was performed (Figure 1). The fieldwork was undertaken by a team of four individuals on the 31th of January 2019. The fieldwork followed systematic inspections of predetermined linear transects which resulted in the

maximum coverage of the entire site. The general condition of the proposed terrain was photographed with a Canon 1000D Camera.

Assumption and Limitations

It must be pointed out that heritage resources can be found in unexpected places, and that surveys may not detect all the heritage resources in each project area, particularly that occurring beneath the ground. While some remains may simply be missed during surveys (observation) others may occur below the surface of the earth and may be exposed once development (such as the construction of the proposed facilities) commences. This study was limited to surface indications. Consequently, should heritage resources be identified during development, work must stop whilst a report is made to heritage authorities.

6. ASSESSMENTS CRITERIA

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The significance of archaeological and heritage sites was determined based on the following criteria:

- The unique nature of a site.
- The amount/depth of the archaeological deposit and the range of features (e.g. concentration of stone tools, activity areas etc.).
- The wider historic, archaeological and geographic context of the site.
- The preservation condition and integrity of the site.
- The potential to answer present research questions.

6.1 Site Significance

The site significance classification standards as prescribed in the guidelines and endorsed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used in determining the site significance for this report.

The classification index is represented in the Table below that show grading and rating systems of heritage resources in South Africa.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	Grade 4A	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium Significance	Recording before destruction
Generally Protected C (GP.C)	Grade 4C	Low Significance	Destruction

6.2 Impact Rating

VERY HIGH

These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or cultural) environment, and usually result in severe or very severe effects, or beneficial or very beneficial effects.

Example: The loss of a site would be viewed by informed society as being of VERY HIGH significance.

Example: The establishment of a large amount of infrastructure in a rural area, which previously had very few services, would be regarded by the affected parties as resulting in benefits with VERY HIGH significance.

HIGH

These impacts will usually result in long term effects on the social and /or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long-term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light.

Example: The loss of a diverse vegetation type, which is common elsewhere, would have a significance rating of HIGH over the long term, as the area could be rehabilitated.

Example: The change to soil conditions will impact the natural system, and the impact on affected parties (e.g. farmers) would be HIGH.

MODERATE

These impacts will usually result in medium- to long-term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by the

public or the specialist as constituting a unimportant and usually short-term change to the (natural and/or social) environment. These impacts are real, but not substantial.

Example: The loss of a sparse, open vegetation type of low diversity may be regarded as MODERATELY significant.

Example: The provision of a clinic in a rural area would result in a benefit of MODERATE significance.

LOW

These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by society as constituting an important and usually medium-term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.

Example: The temporary changes in the water table of a wetland habitat, as these systems are adapted to fluctuating water levels.

Example: The increased earning potential of people employed because of a development would only result in benefits of LOW significance to people living some distance away.

NO SIGNIFICANCE

There are no primary or secondary effects at all that are important to scientists or the public.

Example: A change to the geology of a certain formation may be regarded as severe from a geological perspective but is of NO SIGNIFICANCE in the overall context.

6.3 Certainty

DEFINITE: More than 90% sure of a fact. Substantial supportive data exist to verify the assessment.

PROBABLE: Over 70% sure of a fact, or of the likelihood of an impact occurring.

POSSIBLE: Only over 40% sure of a fact, or of the likelihood of an impact occurring.

UNSURE: Less than 40% sure of a fact, or of the likelihood of an impact occurring.

6.4 Duration

SHORT TERM : 0 – 5 years

MEDIUM: 6 – 20 years

LONG TERM: more than 20 years

DEMOLISHED: site will be demolished or is already demolished

6.5 Mitigation

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be classified as follows:

- ✓ **A** – No further action necessary
- ✓ **B** – Mapping of the site and controlled sampling required
- ✓ **C** – Preserve site, or extensive data collection and mapping required; and
- ✓ **D** – Preserve site

7. Background to the Archaeological History.

The Stone Age Periods

Conventionally speaking, the Stone Age period has been divided into the Early Stone Age (ESA) (3.5 million and 250 000 BP), the Middle Stone Age (MSA) (250 000 – 25000 BP) and the Later Stone Age (25000 – 2000 BP) (Phillipson 2005). Early Stone Age stone tool assemblages are made up of the earlier Oldowan and later Acheulian types. The Oldowan tools were very crude and were used for chopping and butchering. These were replaced by Acheulian ESA tools dominated by hand axes and cleavers which are remarkably standardized (Wadley, 2007; Sharon, 2009). Evidence presented from Sterkfontein, Swartkrans and Makapansgat caves shows that the first tool making hominids belong to either an early species of the Homo or an immediate ancestor which is yet to be discovered here in South Africa (Phillipson 2005; Esterhuysen, 2007). Both the Oldwan and Acheulian industries are well represented in the archaeology of Northern Cape South Africa (Kuman et al. 2005; Sumner and Kuman 2014).

The Middle Stone Age dates to between 250 000 ago and 25 000 years ago. In general, Middle Stone Age tools are characterized by a size reduction in tools such as hand axes, cleavers, and flake and blade industries. The period is marked by the emergence of modern humans and was accompanied by change in technology, behavior, physical appearance, art, and symbolism (Phillipson 2005). A variety of MSA tools includes blades, flakes, scraper and pointed tools that may have been hafted onto shafts or handles and used as pear heads. Surface scatters of these flake and blade industries occur widespread across southern Africa (Klein 2000; Thompson & Marean, 2008).

The assemblages contain bifaces as well as blades, prepared core and Levallois unifacial points (Beaumont &Vogel 2006). Residue analyses on some of the stone tools indicate

that these tools were certainly used as spear heads (Wadley, 2007). From about 25 000 BP, stone tool assemblages generally attributed to the Later Stone Age emerged. This period is marked by a reduction in stone tool sizes. Typical stone tools include microliths and bladelets. Later Stone Age stone tools were recovered at Glenferness cave which is located on the right bank of the Juekskei River (Mason, 1951). The stone industry consist of retouched flake tools, circular scarper and two large cores. This period is also associated with the development of rock art whose distribution is known across southern Africa (Deacon and Deacon 1999; Phillipson 2005).

The Iron Age communities

Records show that the earliest Iron Age settlement in the study area is well represented at Broederstroom with another settlement further north west on the opposite side of the Magalies Valley at Strauss sites (Mason 1986:129). Numerus small Iron Age settlements have been recorded further to the west. These sites shared the same ceramic attributes with Early Iron Age sites documented in the Mpumalanga area. Before their arrival the area was occupied by Stone Age people (hunter gatherers). As metallurgists, farmers produced implements for clearing and tiling the soil. Radiocarbon dates suggest that these sites were occupied from circa AD 350-AD 650 (Huffman 2007). The largest metal producing precinct at Broederstroom covers about 75 X 50 meters of slag debris with two furnace structures. This production site also led to the conclusion that the site produced metal artefacts not for local consumption but for trading purposes (Mason 1986:130).

The Early Iron Age sequence of Johannesburg was later followed by the advent of the Middle Iron Age communities. Most of the sites that represent this phase dated from circa AD 1100-1500. Several sites that fit well within this period were identified at Melville Koppies and Bruma. The Iron Age population did not change their basic technology; however, it remains stable through out to circa 1500AD.

Two iron smelting furnaces in association with slags and tuyères fragments were uncovered at Melvillekoppies the clay furnace has been recorded with radius of 1.2 meters. According to Mason (1986) corroborated by Maggs (1986) most areas were occupied on an increasingly extensive scale from the fifteen century onwards. It is at this time that the Late Iron Age brought significant changes in the patterns of land occupation, architectural style and building techniques marked by extensive use of stones for building fortified stone walls. Metal production played a dominant role in the region as shown by evidence of copper and iron production. South of Bruma, isolated traces of iron smelting slags were recorded while tuyère fragments were found in Klipriverberg. At Klipriverberg, a teenage girl burial with copper rings, and iron beads was recovered by Mason (1986). Another copper rod was uncovered at Suikerbosrand site. According to Mason (1986) copper was produced and functioned as an ornamental material for trading purposes. Ferrecrete was used as the major source of iron ore for producing iron implements. Archaeological excavation at Lone Hill reflected that ferecrete was mined and carried to the furnace site (Mason 1986:92). There elliptical furnace structures constructed on the foundation of granite plated were uncovered. Both Panorama and Lone hill dated to the 18century AD, contemporary with North Cliff Windsor Park Late Iron Age stone wall settlement and Klipriverberg. The Kliperiverberg stone walling site seems to have been

abandoned at about AD 1823 when Mzilikazi entered the area (Huffman, 2007). The panorama site is located in the northernmost Witwatersrand was excavated and yielded 15 furnaces, the plan of furnaces varies from circular to roughly elliptical with diameters from 20cm to approximately 1m. Some of these sites are predicted to have been occupied by Sotho-Tswana cultural groups. The Late Iron Age (AD 1300-1820s) is mostly characterised by socio political complexity, higher population, environmental degradation, intensive hunting, overgrazing and extensive use of stones as construction materials (Maggs, 1976; Badenhorst, 2009). Before the arrival of the Late Iron Age farmers, there is little evidence suggesting the dominance of stone built settlements.

The historical Period

Historical archaeology could be associated with the unwelcome political authority at the Cape which drove Dutch farmers in search of greener pastures outside the British sovereignty, particularly from the early 19th century onwards (Parkington *et al*, 2008). This period is associated with the last 500 years when European settlers and colonialism entered southern Africa. Movement into the interior was closely linked with the change from farming to stock farming. The movement of Dutch into the interior got underway when Wilhelm Adrien van der Stel began to issue free grazing permits in 1703. The exoduses went hand in hand with hunting expeditions into the interior which not only provided the farmers with meat, but also enabled them to learn more about the resources of the hinterland. The British government made its laws which undermined the freedom of the Boers. The mounting conflict between African and white stock farmers played the dominant part. This led to the general dissatisfaction and a feeling of insecurity among the

Afrikaners. The frontier wars of 1834/35 caused the frontier farmers to suffer heavy losses. To aggravate matters, land prices rose sharply during the 1820 and 1830 and drought was a serious problem. These conditions threatened the pastoral lifestyle. There was no land for the younger generations. They opted to migrate in search of land and grazing in the interior. During the great trek into the interior they were already acquainted with conditions of the interior and with the main trek routes. They got available information from travelers, hunters and missionaries' documents. During the great trek, the Dutch encountered African tribes. Some of the settler chose to farm where Johannesburg is located today. Each settler was entitled to one farm measuring 1500 morgen. Johannesburg was laid on areas that was excluded when farms was surveyed and demarcated (Unsuveyed state land) Roughly 600 stand were sold on auction on 8 December 1886. The settlement was named after Christiaan Johannes Joubert and Johannes Rissik (www.wikipedia.org). Documents suggest that Johannesburg started as a tented camp, where in 1886 about 3000 people were living in and around Johannesburg. In 1884 George Harrison stumbled across a rocky outcrop of conglomerated gold on farm Langlaagte. Mineral discoveries stimulated the arrival of people from all corners of the world (Nattrass, 2017). On 8 September 1886 nine farm extending from Driefontein in the east to Roodepoort in the west were declared public diggings with the earliest mining activities concentrated in and around the outcrop of the main reef. Africans were recruited to perform the unskilled work. Other minerals such as coal was discovered in the east Rand at springs and Boksburg. The discovery of minerals in Johannesburg led to the construction of rand steam tram connecting the colliery to the gold fields.

8. DESCRIPTION OF THE PROPERTY OR AFFECTED ENVIRONMENT

The proposed design and construction of mitigation measures in the Fairland's and Darren wood spruit and remedial works for the Kelland wetland, is located in the Willows, Randburg within the Gauteng Province. Fairland and Darren woods spruit are perennial streams. Both are tributaries of the Klein Jukskei spruit with a catchment area that covers roughly 8, 7 to 9.4 km2. These tributaries contribute to the Jukskei quaternary catchment with small dams located upstream. The great majority of the study area is underlain by igneous rocks constituting grey medium grained granodiorites of the Halfway House granite. The site is underlain by thick deposits of transported material deemed to be of an alluvial origin (Clayey and sand deposits).

The area is located on the following global positioning system co-ordinates (GPS S 26°06'50.77" and 27°57'44.03"E).

The project involves the following:

- Site clearance and construction of the suggested weirs (Type A & B) in both streams.
- The concrete weirs are to be anchored into the embankments and covered with dump rock in the case of the two lower weirs.
- Supply and installation of dual 280 mm buried HDPE pipelines that leads to the two parts of the wetland.

- A dual pipeline is suggested to allow for a level of redundancy in the system during low flow and for increased capacity during storm events. Service access will also be allowed for at intervals along the pipeline.
- Supply and installation of gabions, geotextiles and concrete protection on the river bank.
- Implementation of simplistic features that allow for access and designation of accessible areas to visit the wetland.
- Green Engineering as far as reasonably possible when looking at types of materials and vegetation for the above remedial works.

Figure 2: View of the Kelland wetland

Figure 3: Access road leading to fairland's stream

Figure 4: View of Fairland's down stream

Figure 5: Flood control measure, where rocks weir have been used to reduce the velocity of floodwater

Figure 6: The area is infested by Kikuyu grass cover

Figure 7: View of the previously rehabilitated river bank on the Derren wood stream

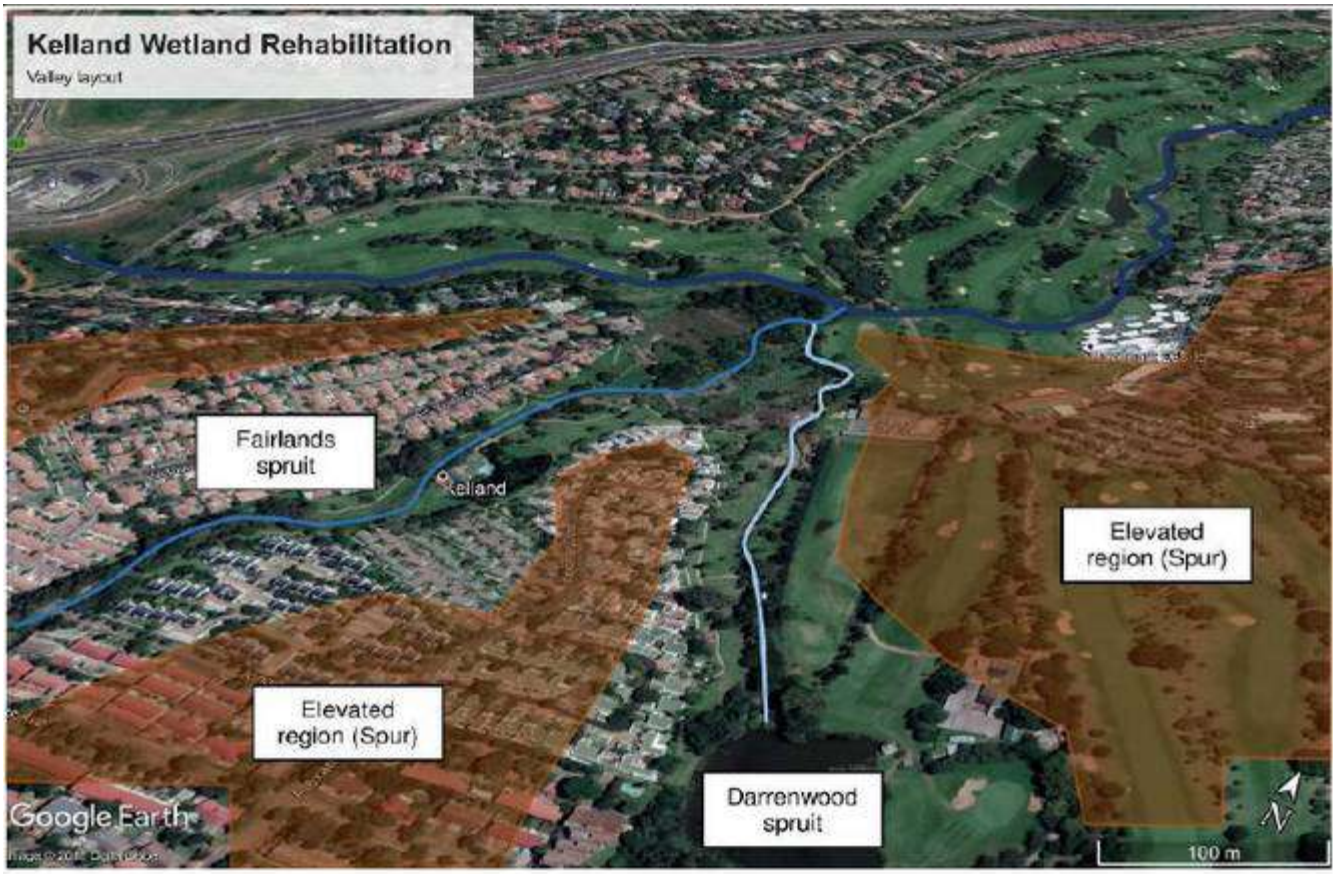
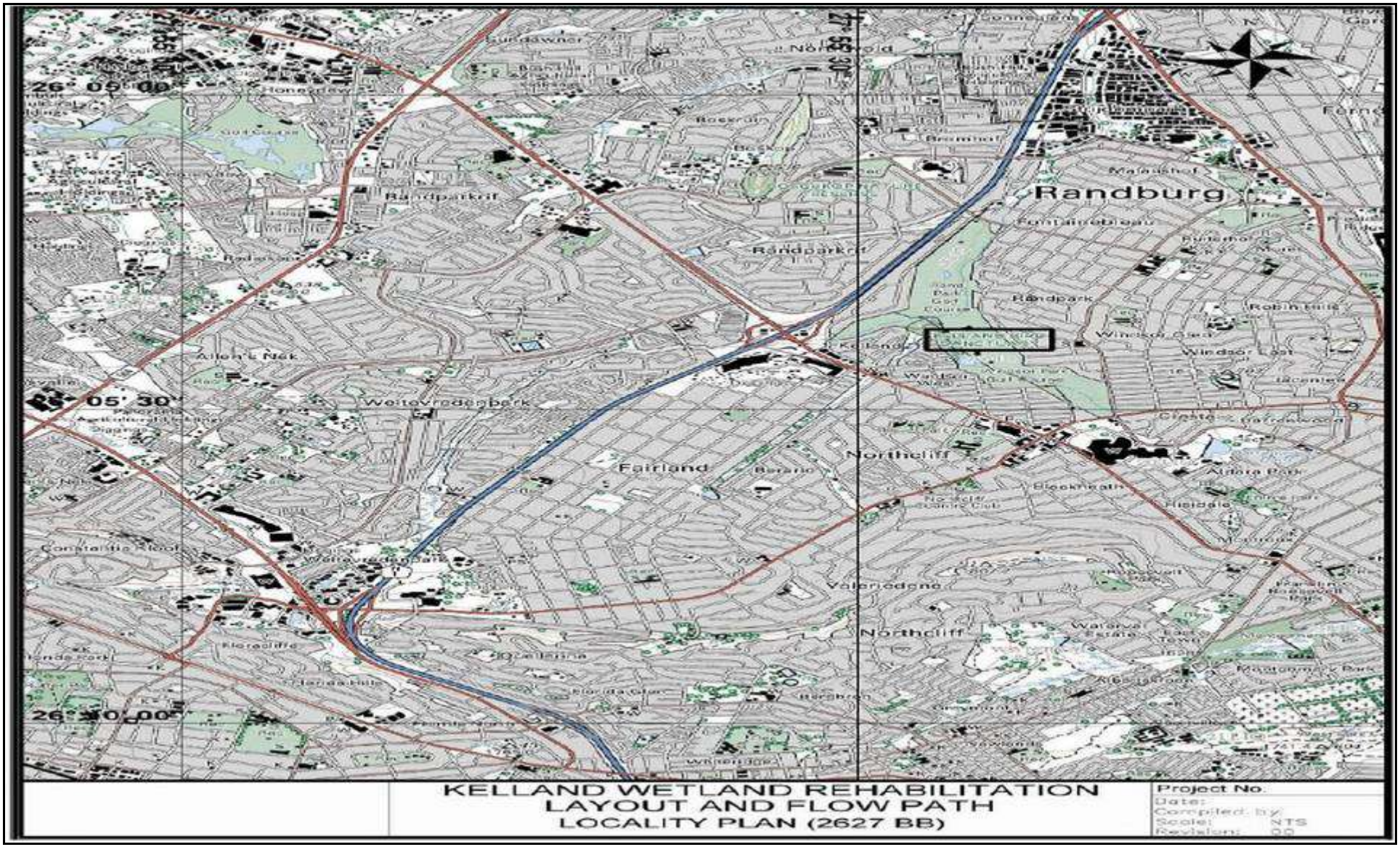
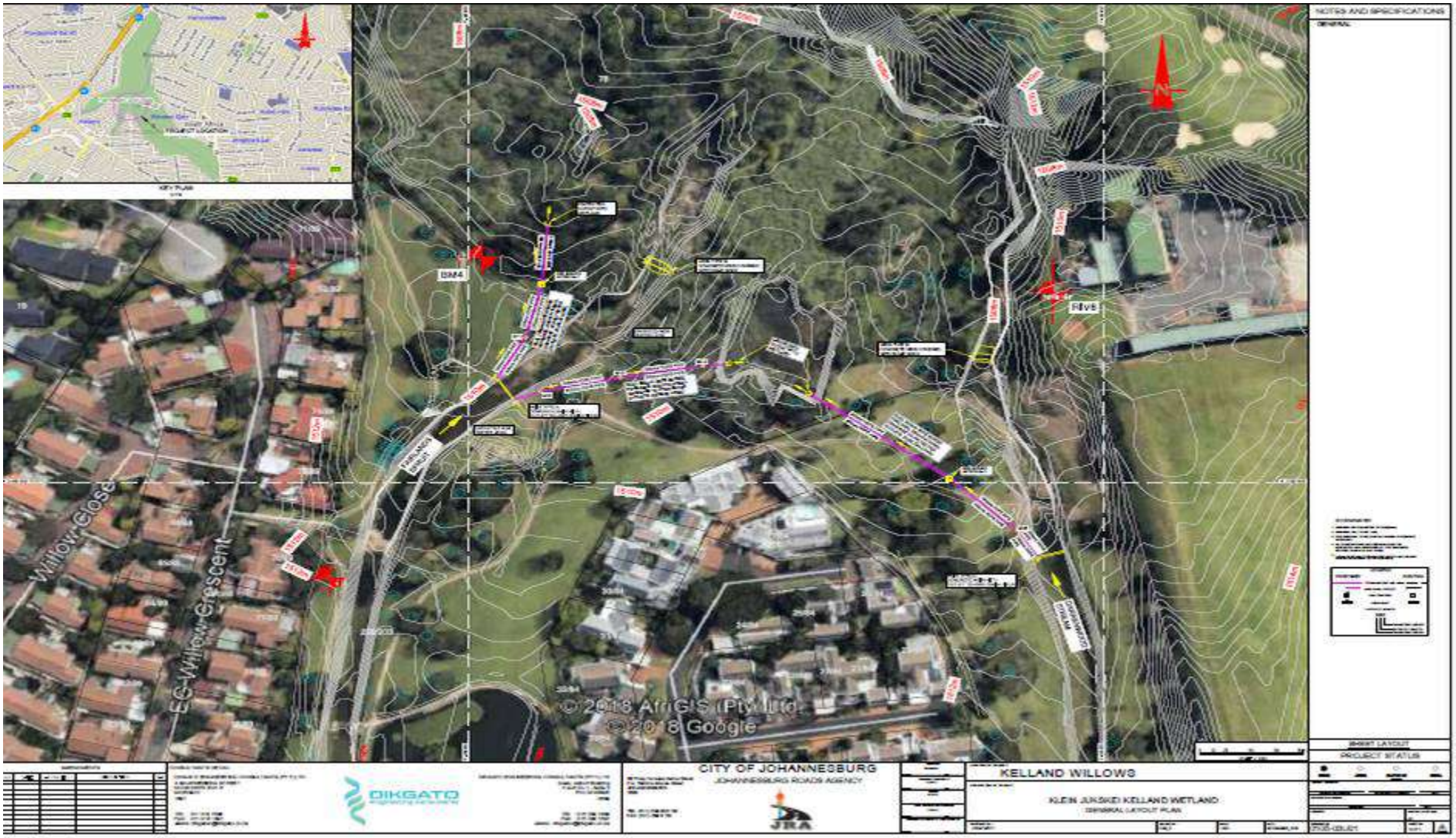


Figure 8: View of Kelland Wetland adopted from Google Earth program



KELLAND WETLAND REHABILITATION
LAYOUT AND FLOW PATH
LOCALITY PLAN (2627 BB)

Project No.
Date:
Compiled by:
Scale: NTS
Revision: 00


Willow Close
Willow Crescent
CITY OF JOHANNESBURG
JOHANNESBURG ROADS AGENCY
KELLAND WILLOWS
KLEIN JUKSKEI KELLAND WETLAND
JRA

9. ASSESSMENT OF SITES AND FINDS

This section contains the results of the heritage sites/finds assessment. The phase 1 heritage scoping assessment program as required in terms of the Section 38 of the National Heritage Resource Act (Act 25 of 1999) done for the proposed rehabilitation of Kelland wetland project.

No sites were found during the desktop study and subsequent field walking of the area. The project has the beneficial effect in that it will enhance the aesthetic appeal of a public space.

10. CONCLUSION AND RECOMMENDATIONS

The study reached the following conclusions and recommendations:

1. Desktop surveys indicated the presence of archaeological sites in the study area but mostly on hills and kopjes.
2. The proposed storm water and wetland rehabilitation is scheduled to take place on the immediate areas upstream of both Fairlands and Darrenwood Spruits. The area is currently covered by local and alien vegetation species. A huge section of the site was disturbed by access roads and concrete infrastructure.
3. Ground truthing of the area proposed for development found no archaeological materials or heritage remains.

- Although no archaeological remains were found, it is possible that some significant features may be buried beneath the ground. Should buried archaeological materials and burials be encountered during the process of development, the following must apply:
- Work must stop immediately

  A professional archaeologist or nearest heritage authority must be contacted.

Based on this assessment which found no archaeological resources in a heavily disturbed area, we recommend that the heritage authorities approve the project as planned.

11. PROFESSIONAL DECLARATION

I, the undersigned Mr. Ndivhuho Eric Mathoho hereby declare that I am a Professional archaeologist accredited with the Association for South African Professional Archaeologists (ASAPA) and that Millennium Heritage Group (Pty) Ltd is an independent Consultants with no association or with no any other interest what so ever with any institution, organization, or whatever and that the remuneration earned from consulting work constitute the basis of company livelihood and income.

Mr. Mathoho Ndivhuho Eric

…….

Archaeologists and Heritage Consultants for Millennium Heritage Group (Pty) Ltd

ASAPA Member

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13. PHOTO ADDENDUM AND CONCEPT DRAWINGS

Figure 9: Surface disturbances (crushed stones)

Figure 10: Recent alluvial sand and rock deposit on the Fairland's spruit

Figure 11: View of Fairland stream

Figure 12: View of an ablution structure

Figure 13 View of the location of the proposed weir adopted from Google earth map

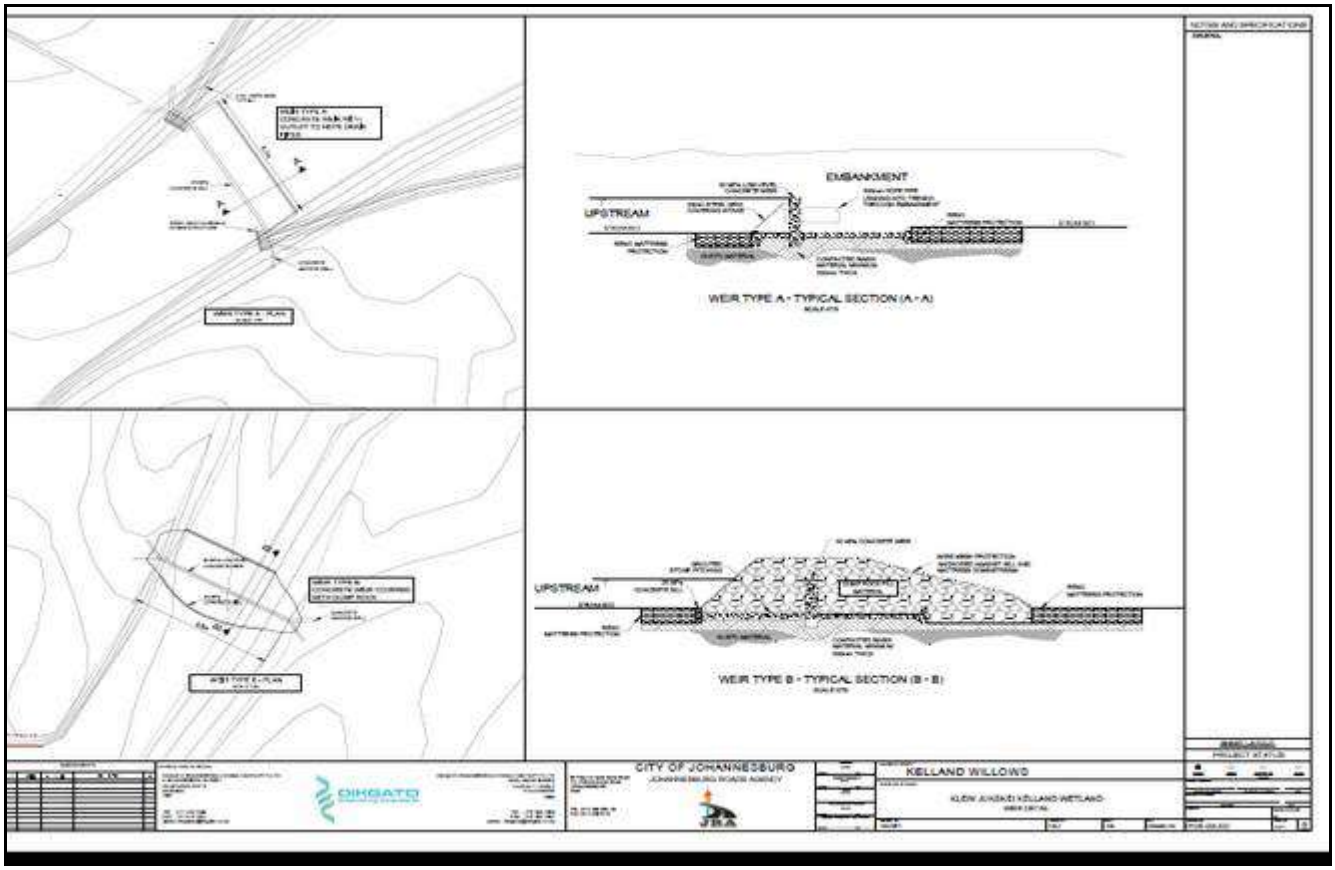

Figure 14: Concept drawing of the weir structures

14. Addendum 1: Definitions and Acronyms

Archaeological 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.

Chance Finds Archaeological artefacts, features, structures or historical cultural remains such as human burials that are found accidentally in context previously not identified during cultural heritage scoping, screening and assessment studies. Such finds are usually found during earth moving activities such as water pipeline trench excavations.

Cultural Heritage Resources Same as Heritage Resources as defined and used in the South African Heritage Resources Act (Act No. 25 of 1999). Refer to physical cultural properties such as archaeological and paleontological sites; historic and prehistoric places, buildings, structures and material remains; cultural sites such as places of ritual or religious importance and their associated materials; burial sites or *graves* and their associated materials; geological or natural features of cultural importance or scientific significance. Cultural Heritage Resources also include intangible resources such as religion practices, ritual ceremonies, oral histories, memories and indigenous knowledge.

Cultural Significance The complexities of what makes a place, materials or intangible resources of value to society or part of, customarily assessed in terms of aesthetic, historical, scientific/research and social values.

Grave A place of interment (variably referred to as burial), including the contents, headstone or other marker of such a place, and any other structure on or associated with such place. A grave may occur in isolation or in association with others where upon it is referred to as being situated in a cemetery.

Historic Material remains resulting from human activities, which are younger than 100 years, but no longer in use, including artefacts, human remains and artificial features and structures.

***In Situ* material** *Material culture* and surrounding deposits in their original location and context, for example an archaeological site that has not been disturbed by farming.

Late Iron Age this period is associated with the development of complex societies and state systems in southern Africa.

Material culture Buildings, structure, features, tools and other artefacts that constitute the remains from past societies.

Site A distinct spatial cluster of artefacts, structures, organic and environmental remains, as residues of past human activity.

Acronyms

AIA	Archaeological Impact Assesment
EIA	Environmental Impact Assesment
EIA	Early Iron Age
EMP	Environmental Management Plan
MHG	Millenium Heritage Group(PTY) LTD
NEMA	National Environmental Management Act, 1998 (Act No.107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No.25 of 1999)
SAHRA	South African Heritage Resources Agency
ESA	Early Stone Age
MSA	Middle Stone Age
LSA	Late Stone Age
IA	Iron Age
LIA	Late Iron Age
UNESCO	United Nations Educational, Scientific and culturural Organization
WHC	World Heritage Conventions of 1972

ADDENDUM 2: Types and ranges as outlined by the National Heritage Resource Act (Act 25 of 1999)

The National Heritage Act (Act No 25 of 1999, Art 3) outlines the following types and ranges of the heritage resources that qualify as part of the national estate, namely:

(a) Places, buildings structures and equipment of cultural significance;

(b) Places to which oral tradition are attached or which are associated with living heritage;

(c) Historical settlement and townscapes

(d) Landscape and natural features of cultural significance;

(e) Geological sites of scientific or cultural importance

(f) Archaeological and paleontological sites

(g) Graves and burial ground including-

- (I) Ancestral graves
- (II) Royal graves and graves of traditional leaders
- (III) Graves of victim 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 by in terms of the Human Tissue Act,1983(Act No 65 of 1983)

(h) sites of significance relating to the history of slavery in South Africa;

(i) movable objects, including-

- (I) object recovered from soil or waters of South Africa, including archaeological and paleontological 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) object of scientific or technological interest; and

(VII) books, records, documents, photographs, positive and negatives, graphic, film or video material or sound recording, excluding those that are public records as defined in section1(xiv) of the National Archives of South Africa Act,1996(Act No 43 of 1996).

The National Heritage Resource Act (Act No 25 of 1999,Art 3)also distinguishes nine criteria for places and objects to qualify as 'part of the national estate if they have cultural significance or other special value… these criteria are the following:

(a) its importance in the community, or pattern of South Africa's history;
(b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
(c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
(d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
(e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
(f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
(g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
(h) Its strong or special association with the life or work of a person, group or organization of importance in the history of South Africa
(i) Sites of significance relating to the history of slavery in South Africa.