A HERITAGE IMPACT ASSESSMENT STUDY FOR THE PROPOSED PRASA'S MODERN MAINTENANCE DEPORTS UPGRADE, WOLMERTON DEPOT, CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE

PROJECTS & HERITAGE CONSULTANTS (PTY)LTD

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DECLARATION OF INDEPENDENCE

This report has been compiled by Nkosinathi Tomose, leading archaeologist and heritage consultant for NGT Project and Heritage Consultants. 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 Projects and Heritage Consultants (Pty) Ltd was been contracted by Ecosolve Consulting (Pty) Ltd to conduct an Heritage Impact Assessment(HIA) (exclusive of Palaeontological desktop study) for the proposed PRASA's modern maintenance deports upgrade, Wolmerton Depot (City of Tshwane Metropolitan Municipality) as part of specialists inputs impact assessment studies required to fulfil the BA process. Nkosinathi Tomose, the lead archaeologist and heritage consultant of NGT Projects and Heritage Consultants, conducted the HIA study for the proposed PRASA's modern maintenance deports upgrade, Wolmerton Depot, City of Tshwane Metropolitan Municipality, Gauteng Province, South Africa.

The following conclusions and recommendations are made about the proposed PRASA's modern maintenance deports upgrade, Wolmerton Depot based on existing literature about the project area, observations made during the physical survey of the proposed development area, assessment and evaluation methods using SAHRA minimum standards for evaluation and grading of archaeological and other heritage resources as well as the National Heritage Resources Act (NHRA), No 25 of 1999 for the protection, conservation and management of the Nation Estate (Section 3 of the NHRA, No 25 of 1999), and assessment of associated impacts in term of the Basic Assessment guidelines.

The physical survey of the proposed project area, which took place between the 21 May 2013 did not yield any archaeological (Stone Age, Iron Age, Historical), historical built environment and landscape features (those built environment and landscape features dated to be over 60 years old - mostly dominated by settlers and colonial architecture, civil and industrial sites) and burial grounds and graves, and other cultural features such as places of worship and prayer. The only features identified at the site were recent built environment and landscape features such as Running Sheds, Staging Yard, racks and modernised staff quarters (outside project area), offices, automated washer, storage shed and a guard house point building. As such 8 none heritage site were yielded by the survey and grouped into six site complexes allocated Unique IDs Wol-1 to Wol-6 (Figures 13-18). Based on the results of the assessment and evaluation of the identified features the following conclusion and recommendations are made about the project area:

- It is conclude that there are no objections to the project and no negative perceptions about the project, PRASA's modern maintenance deports upgrade, Wolmerton Depot.

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- It is also recommended that both SAHRA and PHRA-G approve the project in terms of cultural resources management since there were no heritage resources found within and immediately outside the project area.

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ABBREVIATIONS

Acronyms	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
ARCH	Archaeological
BA	Basic Assessment
BEL	Built Environment and Landscape
BGG	Burial Grounds and Graves
BGG	Proven not to be Burial Ground and Grave
CBD	Central Business District
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DoE	Department of Energy
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
K.y.a	Thousand years ago
LHRA	Limpopo Province Heritage Resources Authority
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age

NHRA	National Heritage Resources Act
NEMA	National Environmental Management Act
NWA	National Water Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
PRASA	Passenger Rail South Africa
PDAFP	Proposed Development Area Footprint
SAHRA	South African Heritage Resources Agency

TERMS AND DEFINITIONS

Archaeological resources

This includes:

- 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.

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. Project Background

This project is one of the proposed PRASA's deports upgrade and maintenance projects. The Wolmerton rolling stock (upgrade and maintenance) depot is an existing PRASA facility in the Gauteng northern region. Located within City of Tshwane Local Municipality- the ervens making up the site are owned by PRASA and are zoned for railway use (Figure 1). The site covers approximately 64 hectare and a length of 2150 meters. Wolmerton was identified as the most suitable site in Gauteng north region, to stage and maintain the new PRASA fleet that will be introduced starting in 2015, during the site selection process which took place in March 2012 (Arcus GIBB (Pty) Ltd, 2012). It is proposed that over a period of 20 years, new rolling stock will be introduced whilst the existing stock will be phased out. During this phasing period, both existing and new rolling stock will be maintained at the Wolmerton Depot - a process which will also involve construction or upgrade of maintenance depots and staging yards. This HIA study forms part of specialists' studies inputs into the BA process. The study aims to advise on some of the best suitable heritage mitigation measures for heritage resources in terms of known heritage resources management measures.

1.1.1. Proposed Project Aims

"PRASA intends to modernise and upgrade their current services and their key objective is to promote rail as the preferred mode of transport for the majority of South Africans. [it is suggested by PRASA- 2011] that... 'this will only [be achieved or] become reality through adequate investment in the existing neglected system'. The poor conditions of the unreliable, aging rolling stock is the "single largest obstacle" for PRASA to achieve their planned objective. Combined with the broader strategy to acquire modern technology and a changing passenger demand, PRASA is focused on upgrading and investing in new rolling stock over the next 20 years" (Arcus GIBB, 2012). All the current existing metro trains will be phased out within the 20 year period. The newly proposed technology and improved maintenance practices envisaged for the new fleet will require newly refurbished maintenance depots. Other than infrastructure improvement - the overarching objective is to modernise and make relevant to metro passenger trains to existing and potential clientele/passengers - making the rail industry

in the country more user friendly and preferred mode of transport. The current survey area was selected as the best suitable place for the proposed project out of a number of other proposed alternatives - eleven sites were selected during the feasibility or screening phase (Arcus GIBB, 2012). Therefore, the aim of the current study is to advise PRASA on the suitable and sustainable measures to use during the construction and operational phases of the project and its closure in terms of management of the natural and cultural environment. This is done through a compilation of various impact assessment studies that will feed into the current BA process and ultimately the Environmental Management Plan (EMP) document following the completion of the BA. This HIA study will contribute to the development of such documents through assessing and evaluating impacts that affect or have the potential to impact on the cultural environment. The general proposed infrastructure upgrade for this project throughout the country will predominantly involve the follow upgrades:

- Upgrade/Modification of the existing maintenance depots;
- New maintenance infrastructure which will include;
- Approximately 6 or 7 full length roads per depot for routine exams and repairs
- Component exchange roads, 2 full length roads per depot;
- Drop pits, under floor lift, or synchronised jacks for rapid bogie exchange;
- Specialised lifting equipment as required for trains;
- Shore supply (external power supply for trains auxiliaries);
- Roof access platforms;
- An automatic train washing plant, and facilities for pressurised cleaning of under frame equipment;
- An under floor wheel lathe;
- Paint booth;
- Adequate undercover storage for both small and large components;
- Fork lift trucks;
- New Storage Yards; and
- Upgrade/Modification of existing Storage Yards

At Wolmerton Depot the proposed upgrade will include the following Depot Buildings:

- Running Shed - The existing running shed will be extended by 2 roads to include a new maintenance road and a new fork lift access road. The existing running shed will be refurbished in a phased manner to enable existing maintenance activities to continue during this process.

- Lifting Shop - A new lifting shop will be constructed.
- Wheel lathe - A new wheel lathe shed will be constructed.
- Workshop - A new component repair, workshops area will be constructed between the lifting shop and running shed.
- Stores - A new main store and component store will be constructed.
- Cleaning facilities - New intensive cleaning, external was and CET facilities will be constructed.
- Welfare facilities - A new shower block and new shunters/drivers resting facility will be constructed.
- Administration buildings - A new administration building will be constructed
- Train operations- A new DOCC building will be constructed.

And the Rail Infrastructure will include:

- The existing staging yard will be remodelled/refurbished to provide for 60 new generation rains.
- The length of the remodelled staging lines will be 300m for the 12-car trains and 150m for the 6-car modules.
- New railway lines will be provided for reversing of trains at eastern and western extremities of the depot site.
- The access lines to/from the existing main line will be remodelled.
- The entire staging yard will be signalled to allow for centralized train control for train operations within the depot area .

The above infrastructure is proposed because PRASA wants to design and construct a fully functional depot that:

- Will be able to service PRASA's new metro trains by the time that the new train sets are delivered in April 2015 and will cater for the increased new fleet maintenance demand required by the full fleet deployment up until 2034.
- Will be able to service PRASA's existing metro trains up until the new trains full fleet deployment is completed in 2034.

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

Because of the nature and size of the proposed development - upgrade and maintenance of Springfield Flats PRASA depot and associated infrastructure exceeding a total area of 5000m^2 on an area covering approximately 17 hectares a need to conduct a BA developed. In terms of the EIA Regulations of June 2010 (Government Notice 543-546 published in terms of the NEMA, No 107 of 1998) the construction of the proposed facilities is listed as an activity that requires environmental authorisation. This is because the project comprises development of structures and bulk infrastructure such as roads, water supply and electrification – a development that occupies an area of less than 20ha. Undertaking an a BA instead of full EIA process is therefore a requirement. The current process comprises of a BA and it involves the identification and assessment of environmental impacts through specialist studies.

Ecosolve Consulting (Pty) Ltd was appointed by PRASA (Ltd) as a lead Environmental Impact Practitioner to manage the BA process and associated impact studies for the proposed development project. Ecosolve Consulting appointment of NGT Projects & Heritage Consultants (Pty) Ltd as an independent and lead CRM firm to conduct an HIA (exclusive of Palaeontological desktop study) for the proposed development as part of specialists (inputs) impact assessment studies required to fulfil the BA process and its requirements. Nkosinathi Tomose, the lead archaeologist & heritage consultant for NGT Projects & Heritage Consultants, conducted the HIA study for the proposed Wolmerton PRASA depot Tshwane Metropolitan Municipality, KwaZulu-Natal Province, South Africa (Figure 1).

The appointment of NGT Projects & Heritage Consultants (as an independent CRM firm) is in terms of the NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations), as well as other applicable legislations.

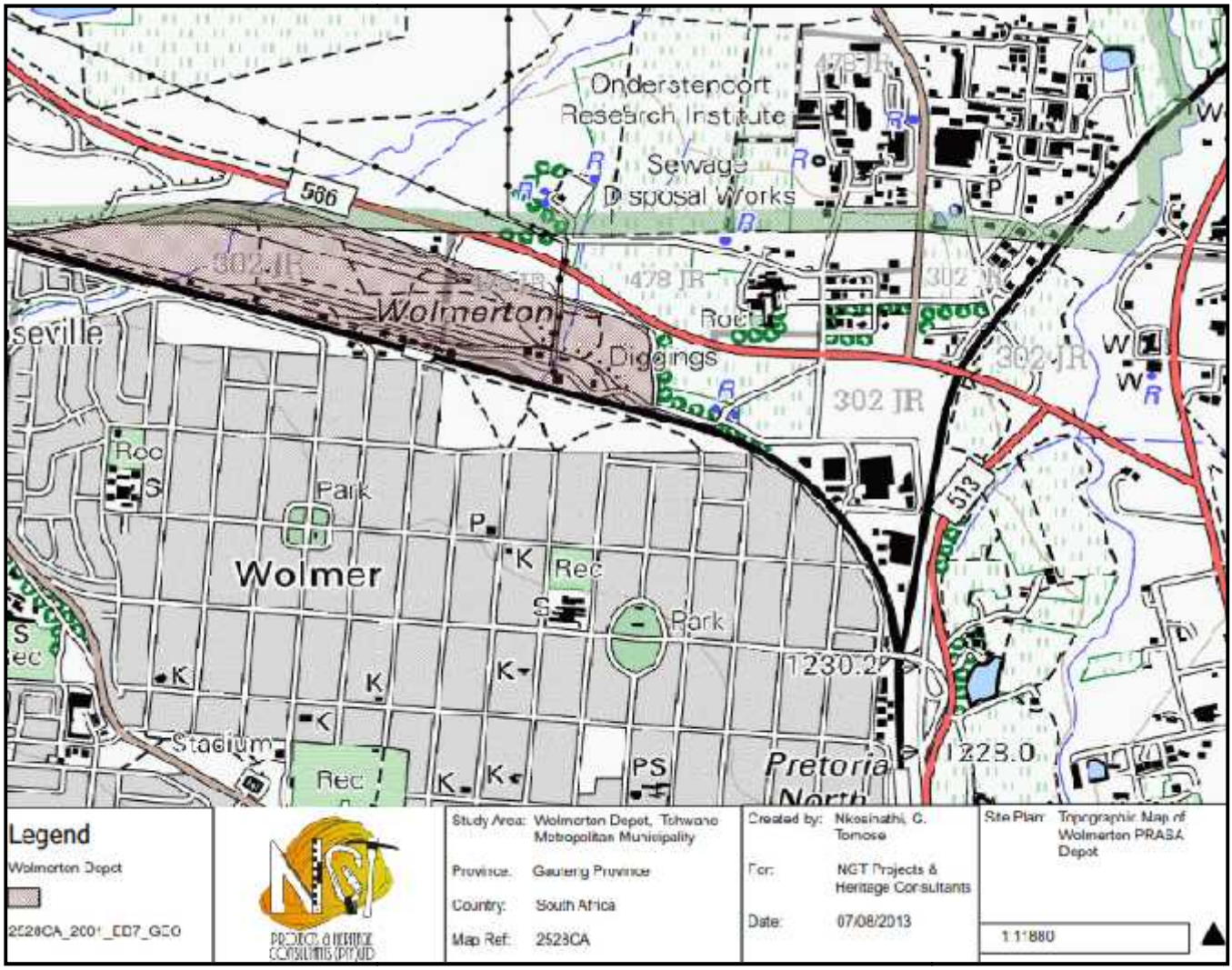

Figure 1- A 2001 Topographic Map of Wolmerton PRASA Depot showing the broader study area. Note the built environment and landscape feature (black boxes) and the existing railway tracks.

2. BACKGROUND OF THE STUDY AREA

South Africa is rich in diverse forms and types of heritage, ranging from natural to cultural heritage. The natural heritage includes among other things: Geological, Palaeontological, and the various plant and animal species that define the country. The cultural heritage, which dates as far back as 2.5 million years ago (m.y.a), includes - the different periods of Stone Age Archaeology, the Iron Age Archaeology, Historical and Industrial Archaeology, as well as

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the “Political/Historic” geographies of South Africa. The region in which the study area is located is known for Sotho-Tswana and Ndebele Iron Age period and the late historical periods.

2.1. Description of the affected environment

Table 1 -Wolmerton PRASA Depot, Gauteng Province, South Africa

Location	• The project area is located approximately 11km north and north-west of the Pretoria CBD, within Tshwane Local Municipality, Gauteng Province of South Africa. It covers approximately 64 hectare and a length of 2150 meters. The site centre GPS Coordinates are: 25^{o} 39’ 18.37"S 28^{o} 09’ 52.88" E.
Surrounding Towns/Townships/Industrial Zones/ Villages	• Wolmer, Onderstepoort, Onderstepoort AH, Hesteapark and Klerksoord AH (Figure 3)
Land Uses in and around the study area	• Residential (e.g. Wolmer & Hesteapark), Industrial (e.g. Onderstepoort & Klerksoord AH) and Conservation/Farming (e.g. Onderstepoort AH - ref Figure 2), Government Parastatals (Eskom (Figure 4) and PRASA depot (our study area - Figure 1)). • Within the study area PRASA uses the site for staging and maintenance which include: running maintenance; heavy maintenance; component repairs; train cleaning; operations staging for approximately 23 sets; train operating staff resting facilities.
Land Owner(s)	• Government - City of Tshwane, PRASA and Eskom • Private -residential (Figure 9) and industrial sites (Figure 10)
Current Conditions (on site)	• Highly disturbed landscape - mix of railway infrastructure (Figure 5), storm water (Figure 6), quarries (Figure 7), Eskom infrastructure (Figure 4) and access roads/routes (Figure 8)
Applicant	• Ecosolve Consulting on behalf of PRASA
Proposed Development	• Upgrade and maintenance of Wolmerton PRASA depot
Access	• Existing national, provincial and local roads, routes and human foot paths.

	The study area is ensconced between Wolmer, Onderstepoort, Onderstepoort AH, Hesteapark and Klerksoord AH (Figure 3). the N4, the R566 (both north), Daan De Wet Nel DR, President Steyn Street (both south), Emily Hobhouse road (east) and R101 (further east) (Figure 2-3)
Defining natural features	• A big tributary is found west of the proposed development area (Figure 7). Appies River is a biggest river in the broader study area (Figure 11)
Zoned for	• Railway use

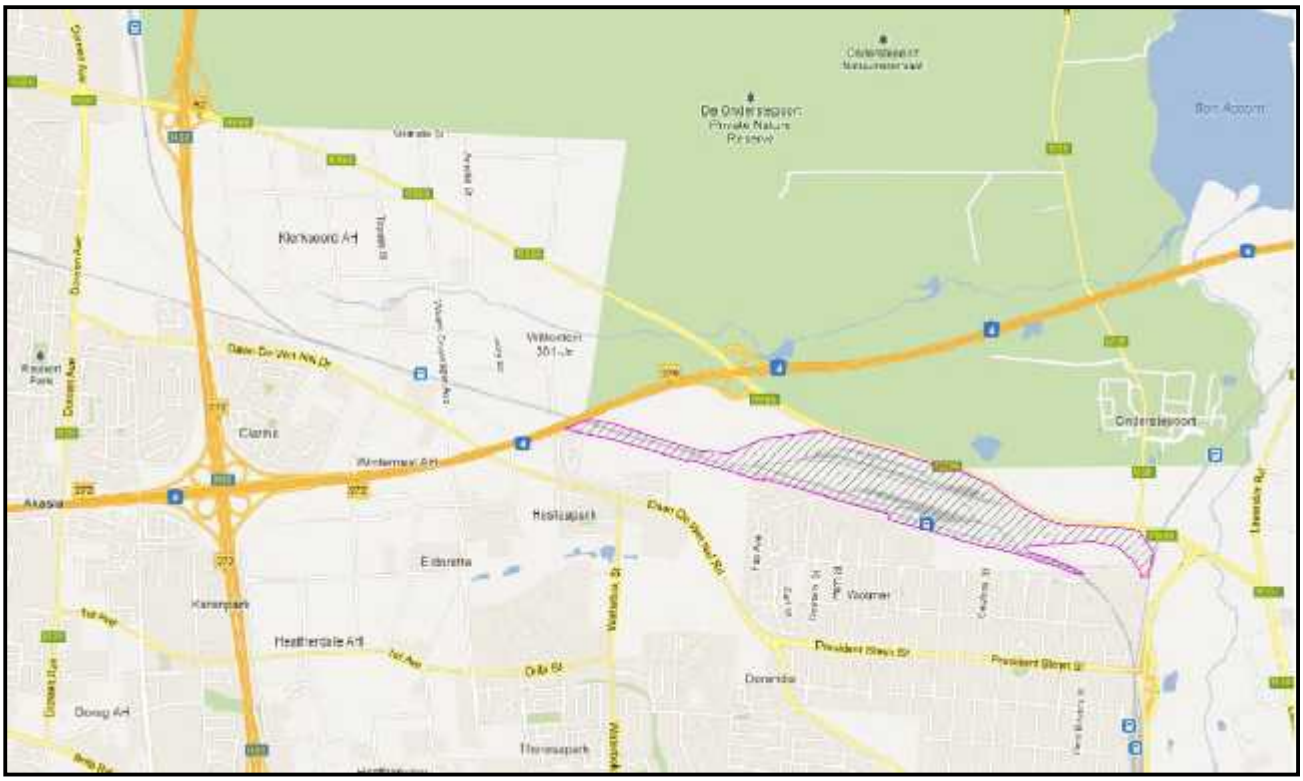

Figure 2 - Location of the study area in relation to some of the important landmarks such as the N4, the R566 (both north), Daan De Wet Nel DR, President Steyn Street (both south) and R101 (further east).

Figure 3- Location of the study area in relation to Wolmer, Onderstepoort, Onderstepoort AH, Hesteapark and Klerksoord AH

Figure 4- Eskom Transmission Lines (cross the site) and a Substation on the south-eastern tip of the site

Figure 5 - Rail infrastructure

Figure 6 - Storm water infrastructure

Figure 7 - Quarries

Figure 8 - Access road to site and a paved foot bath between the yarding

Figure 9- Residential (left - private & right - PRASA train staff resting facility)

Figure 10 - Industrial dump site. Located north-west of the study

2.2. Description of proposed activities: Infrastructure Proposed

Table 2 - List of Activities

Activity 1	• Upgrade and maintenance of Wolmerton depo buildings and railway infrastructure
Activity 2	• Clearing of access roads and bulk infrastructure to support the newly proposed Wolmerton depo buildings and railway infrastructure .

2.3. Needs and Desirability

Table 3 –List of activities in-line with the project scope

Activity 1	• Desktop study of the heritage value and integrity of the area under consideration and its surrounding with a particular focus on resources within Wolmerton PRASA depot (refer to 2.4 below for detailed overview of resources in the region under consideration). • Physical identification, documentation and recording of cultural resources within the proposed development area (Wolmerton depot).
Activity 2	• The mapping, assessment and evaluation of the heritage value and integrity of the identified heritage resources and assessment of potential impacts as a result of the proposed development on these resources.
Activity 3	• Proposing heritage management measures for inclusion in the BA and later EMP document • Making recommendations to SAHRA and provincial heritage resources authority - PHRA-G

3. METHODOLOGY

This chapter outlines the methodologies used in conducting the HIA study for the proposed Wolmerton PRASA depot upgrade and maintenance project. The study area is located within

Tshwane Local Municipality. This is done in accordance to the Terms of Reference provided by the client for the completion of this study. However, some areas of the report follow minimum standards for completion of professional HIA as stipulated in SAHRA minimum standard (2012) such as detailed account to the archaeological and historical background of the study area or region.

3. 1. Step I – Literature Review (Desktop Phase):

- Sources used in this study included, but not limited to published academic papers and HIA studies conducted in and around the region where the current development will take place.
- There was limited use of archival maps -one historical map and one archaeological map and one general travel map showing the proposed area of development and its surround were assessed to aid information about the proposed area of development and its surrounding.
- The above also included a review and assessment of relevant environmental and heritage legislations such as the NEMA (together with the 2010 EIA Regulations) and the NHRA.

3.2. Step II – Physical Survey:

The physical survey of the study area aimed to address the following main areas of concern raised by the client in the specialist Terms of Reference:

1. To conduct an onsite verification survey for the proposed Wolmerton PRASA depot upgrade and maintenance project area.
2. To identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the proposed Wolmerton PRASA depot upgrade and maintenance project area. Use will be made of an notated maps where appropriate.

In order to address these concerns:

- The physical survey of the proposed Wolmerton PRASA depot upgrade and maintenance project area was conducted between 21 May 2013.
- The survey covered an area of approximately 40ha - on foot and track logs of the survey were recorded using Garmin GPSmap 62s.
- The objective of the survey was to locate and identify archaeological and heritage resources and/or sites and objects, occurrence within and immediately outside the proposed development footprint. To record and map them using necessary and applicable tools and technology.

- The physical survey was deemed necessary since the desktop phase of the project yielded few known archaeological resources and other heritage/historic resources about the region in which the current study area is located. The survey also paid special attention to disturbed and exposed layers of soils as such as eroded surfaces because these areas are more likely to exposed or yield archaeological and other heritage resources that may be buried underneath the soil and be brought to the earth surface by animal and human activities such as animal barrow pits and human excavated grounds. The edges/sides of dirt roads were also inspected for possible Stone Age scatters as well as exposed Iron Age implements and other resources. Drainage and ephemeral wash were also investigated for resources.
- The following technological tools and platforms were deemed important for documenting and recording located and/or identified sites:
  - Garmin GPSmap 62s – to take Lat/Long coordinates of the identified sites and to take track logs of each of the three corridors.
  - Lenovo ThinkPad aided with Garmin Basecamp Software, Google Earth – to plot the propose corridors.
  - Quantum GIS Lisboa (1.8.0) was used to plot all the identified features and/or resources and to develop heritage maps in order to inform the heritage analysis of the proposed Wolmerton PRASA depot upgrade and maintenance project area.
  - Maps provided by the client before the survey also proved invaluable
  - Survey coordinates and data provided by the client were used to map the development area footprint.
  - Samsung camera – was used to take photos of the affected environment and the identified heritage sites.

3.3. Step III – Data Consolidation and Report Writing:

During field work and on the return from the field the following were addressed:

1. Assessment ofthesignificanceoftheculturalresourcesintermsoftheirarchaeological,historical,scientific, social, religious, aesthetic and tourism value"
2. Description of possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
3. Proposal ofsuitable mitigation measures to minimize possible negative impacts on the culturalresources;

4. Review of applicable legislative requirements - Section 3.1. of this Chapter (i.e. Chapter 3) addresses this concern as well as Section 5.5 of Chapter 5 discusses Sections of the NHRA, No. 25 triggered by the current study findings
5. Highlighting of assumptions, exclusions and key uncertainties". Chapter 4 (below) of this report address this concern.

The final step involved the consolidation of the data collected using the various sources as described above. This involved the manipulation of data through Quantum GIS. Assessing the significance and potential impact of the identified sites, discussing the finds, report writing and making recommendation on the management and mitigation measures of the identified sites and resources as well as the impact and influence of these sites and resources on the proposed corridor.

3.3. Assessment of Site Significance in Terms of Heritage Resources Management Methodologies

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context)
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
  - Density of scatter (dispersed scatter)
  - Low - <10/50m^2
  - Medium - 10-50/50m^2
  - High - >50/50m^2
- Uniqueness and
- Potential to answer present research questions.

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

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and
- E - Preserve site
- F - Impacts on these sites by the development will be evaluated as follows:

Measure of Heritage Sites Significance

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by the ASAPA for the SADC region were used for the purpose of this report.

Table 4: Site significance classification standards as prescribed by SAHRA

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)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	-	Low Significance	Destruction

3.4. Methodology for Impact Assessment in terms of Environmental Impact Assessment Methodologies including Measures for Environmental Management Plan Consideration

The determination of the effects of environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the BA. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts. This is in line with specialist requirements as required by the client. For example, the request that:-

The impact methodology [should]concentrate on addressing key issues. This methodology to be employed in the report thus results in a circular route, which allows for the evaluation of the efficiency of the process itself. The assessment of actions in each phase [that should] be conducted in the following order:

- Assessment of key issues;
- Analysis of the activities relating to the proposed Wolmerton PRASA depot upgrade and maintenance project area;
- Assessment of the potential impacts arising from the activities, without mitigation, and
- Investigation of the relevant mitigation measures for both the construction and operational phases.

The following Assessment Criteria is Used for Impact Assessment

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to alternatives under study for meeting a project need. The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significance of the impacts will be determined through a synthesis of the criteria below:

Probability: describes the likelihood of the impact actually occurring

- Improbable:thepossibilityoftheimpactoccurringisverylow,duetothecircumstances,designor experience.
- Probable:thereisaprobabilitythattheimpactwilloccurtotheextentthatprovisionmustbemade therefore.
- Highly Probable: it is most likely that the impact will occur at some stage of the development.
- Definite: theimpactwilltakeplaceregardlessofanypreventionplansandtherecanonlyberelied on mitigatory measures or contingency plans to contain the effect.

Duration: the lifetime of the impact

- Short Term: the impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.
- Medium Term: the impact will last up to the end of the phases, where after it will be

negated.

- Long Term: the impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
- Permanent: the impact is non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

Scale: the physical and spatial size of the impact

- Local: the impacted area extends only as far as the activity, e.g. footprint
- Site: the impact could affect the whole, or measurable portion of the above mentioned properties.
- Regional: the impact could affect the area including the neighbouring residential areas.

Magnitude/Severity: Does the impact destroy the environment, oral ter its function

- Low: the impact alters the affected environment in such a way that natural processes are not affected.
- Medium: theaffectedenvironmentisaltered,butfunctionsandprocessescontinueinamodified way.
- High: functionorprocessoftheaffectedenvironmentisdisturbedtotheextentwhereittemporarilyor permanently ceases.

Significance:

Thisisanindicationoftheimportanceoftheimpactintermsofbothphysicalextentand time scale, and therefore indicates the level of mitigation required.

- Negligible: the impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
- Low: the impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
- Moderate: the impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
- High: The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management

intervention will be a significant factor in mitigation.

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

Sum (Duration, Scale, Magnitude) x Probability(Table -2)

S = Significance weighting; Sc = Scale; D = Duration; M = Magnitude; P = Probability

Table 5 -The significance weightings for each potential impact are as follows:

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

Thesignificanceofeachactivitywasratedwithoutmitigationmeasures(WOM)andwithmitigation(W

M) measures for both construction, operational and closure phases of the proposed development. To address the question of Heritage Management Plan the following table is used for Measures to be included in the EMP. This table is relevant in that it addresses key issues at the various stages of the project by also addresses how some of the key concerns that develop from a heritage point of view can be mitigated.

Table 6 -Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies			
Project component/s	List of project components affecting the objective		
Potential Impact	Brief description of potential environmental impact if objective is not met		
Activity/risk source	Description of activities which could impact on achieving objective		
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion		
Mitigation: Action/control		Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above		Who is responsible for the measures	Time periods for implementation of measures
Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.		
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting		

4. ASSUMPTIONS, EXCLUSIONS AND UNCERTAINTIES

The assumptions, exclusions and uncertainties that exist in terms of the present study are discussed the following sub-sections.

4.1. Assumptions

The current study is Phase 1 HIA. As such, a historical and archival desktop study as well as a field survey were undertaken to identify tangible heritage resources located in and around the proposed development area footprint. The assumption is that a heritage social consultative process would have taken place with some of the locals or farm owners to uncertain known archaeological or heritage sites in their properties such as presence or existence of graves and cemeteries etc. However, there was no formal heritage social consultation that took place as part of the study - this is due to the fact that nature of the current study -BA instead of full EIA. The study assumes that the amount of resources located in and around Wolmerton PRASA depot represents the total amount of physical or tangible resources distributed in and around it.

4.2. Exclusions

The following exclusions or limitations have direct consequence to the study and its results:

- There was no deeds search for the proposed Wolmerton PRASA depot upgrade and maintenance project area - the study area is owned by the developer, PRASA
- The survey was conducted in May, late Autumn - as such there was still high level of vegetation cover in some areas of the study site for the archaeologist/heritage surveyor to pick up all the different archaeological and heritage features in the landscape such as unmarked graves, the different Stone Age, Iron Age and Historical Archaeology material culture and artefacts.
- This forms one major limitation in terms of observing and recording all forms of archaeological and heritage sites in and immediately outside or along the proposed development area. The issue of graves was, however, addressed through informal social consultation with one of the field assistance familiar with the site (No graves or burial grounds).

4.3. Uncertainties

Heritage studies like most other specialist studies often experience many challenges during and after the physical survey of the proposed development area. From an archaeological and general heritage perspective, the assumption is often made that, the amount of identified archaeological and heritage resources during physical survey of the proposed development area represent some of the total amount of resources that exist in and around or along the

development area. This is not often true because the nature of some the archaeological and heritage resources are subterranean in nature and as such, one cannot totally rule out their presence or existence within the proposed development area even though they are not recorded and map as part of the current study. These resources may be exposed or brought to the surface of the earth during the construction phase of the project which will involve excavation for infrastructure development and clearing of vegetation and top soil in some instances. This presents one of the major uncertainties regarding the 'holistic' management or archaeological and heritage resources within and around the proposed development area.

Archaeologist and heritage specialist alike refer to discovery of such resources as chance finds and to mitigate such uncertainty, it is advisable that should such chance finds be made of archaeological and heritage resources on site, the Environmental Control Officer(ECO) responsible for the site should report them to the nearest SAHRA office or the nearest museum or call an archaeologist and heritage specialist to investigate the finds make necessary recommendations.

5. FINDINGS

5.1. Cadastral Search

The following maps of the study area were used to assess the evolutions of the landscape in and around the area in which the proposed Wolmerton PRASA depot upgrade and maintenance project area:

Both the 1909 and the 1905 maps showing the study area do not show any human activities in the areas in which the proposed Wolmerton PRASA depot upgrade and maintenance project area is located. The 1909 map shows the Appies River as the dominant physical and natural feature in the landscape (Figure 11). The 1905 map shows that the area under consideration falls within the Middle Veld and Low Veld (Figure 12).

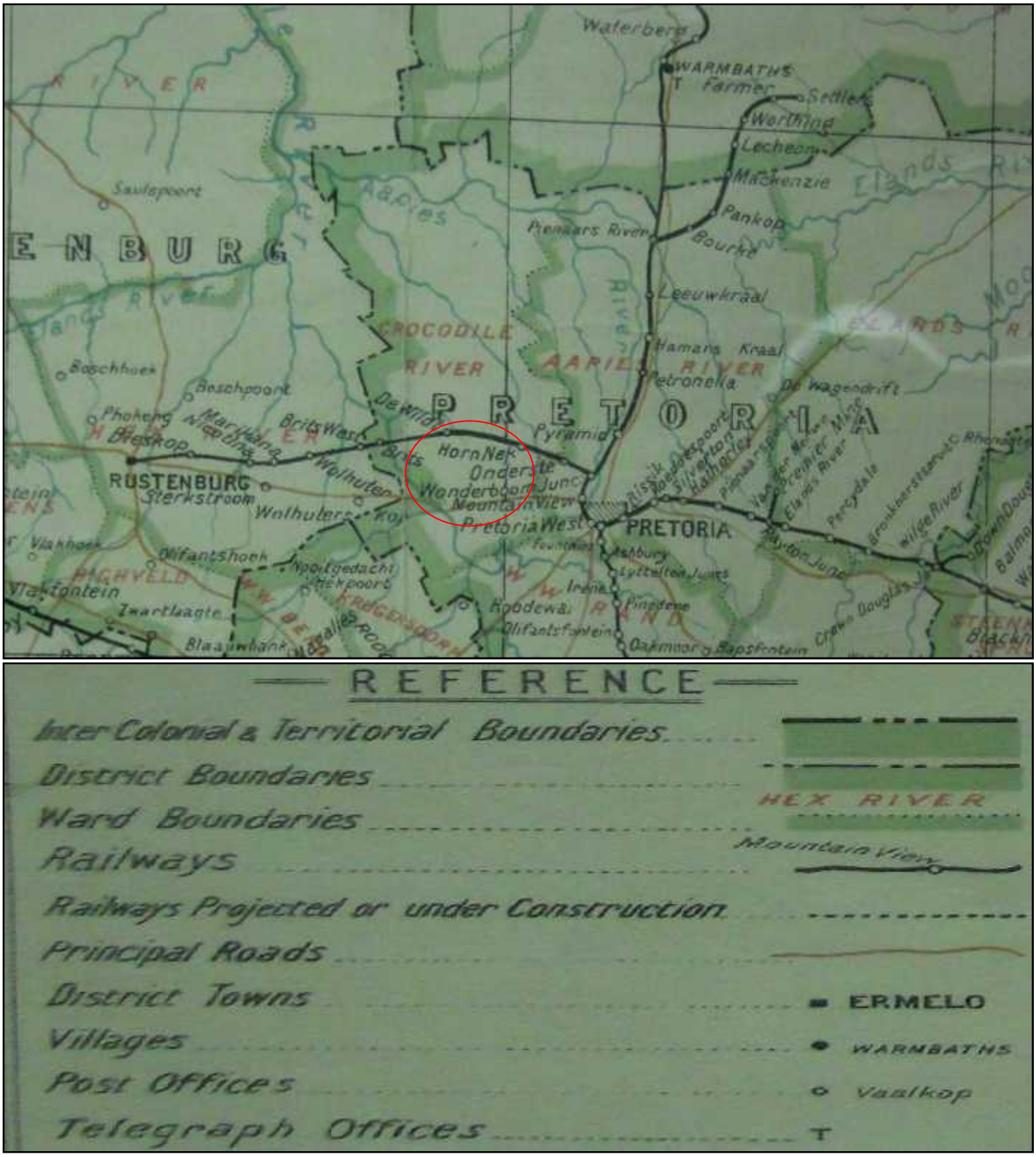

Figure 11-Map of the Transvaal Colony. Compiled and lithographed in the surveyor-general's office Pretoria in December 1902. Revised in January 1909.

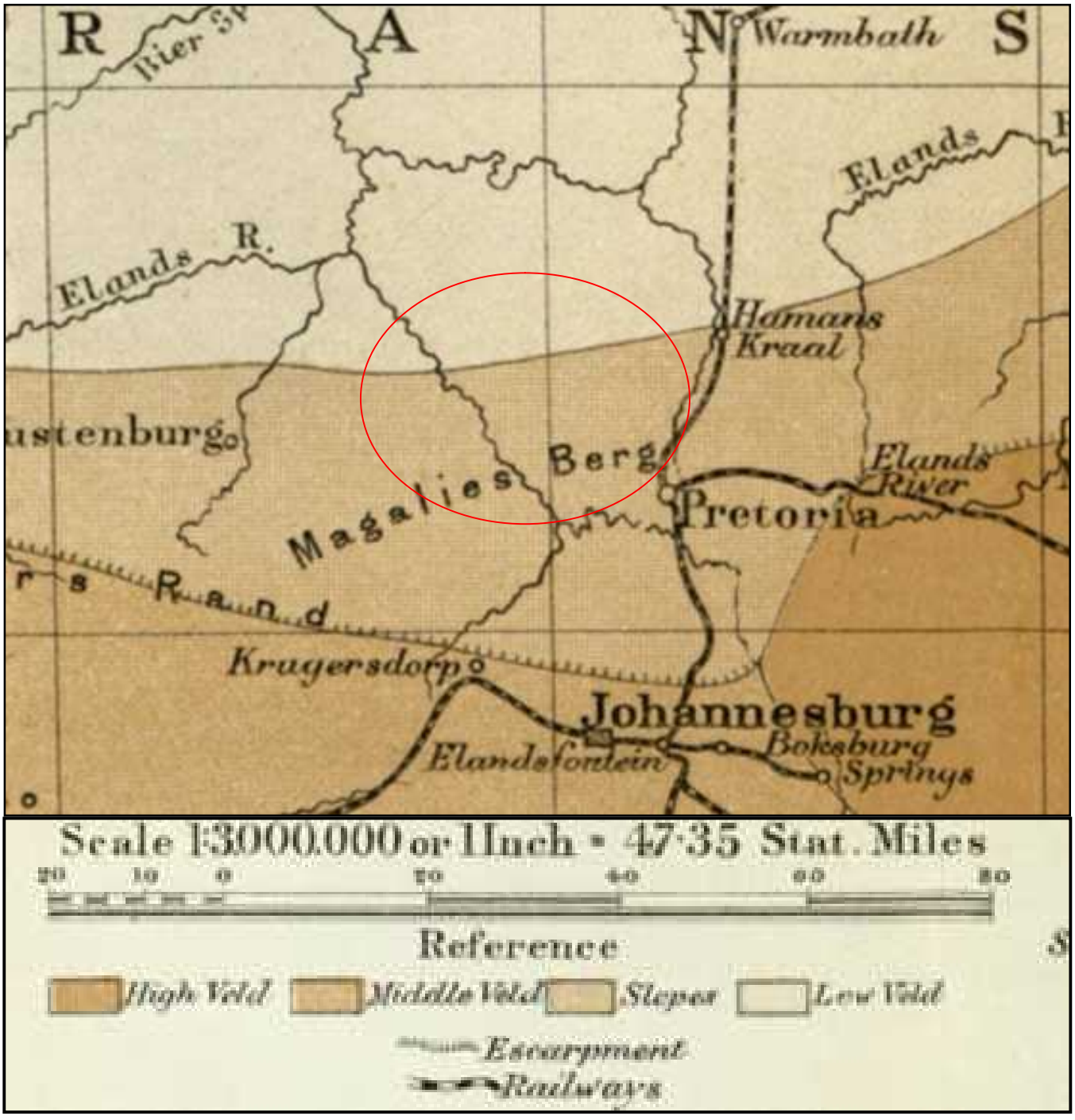

Figure 12-1905 Map illustrating the physical features of the Transvaal by Tudor G. Trevor, - F.G.S.A.R.S.M @ Trevor, 1906.

5.2.Deeds Search:

No deeds search was conducted as part of the study. The project area is known to be the property of PRASA and it involves upgrade and maintenance of existing infrastructure. No new land will be surveyed for the purposed of the current proposed development - as such title deeds search was not deemed necessary. Instead the deeds information provided in the Arcus GIBB (2012) report will be used:

5.3. Field Survey and Identified Archaeological/Heritage Resources

The physical survey of the project area took place on the 21st May 2013. The survey did not yield any archaeological (from Stone Age to industrial archaeology), historic built environment and landscape features, burial grounds and graves, and other cultural features such as places or spaces of prayer both within and immediate outside the site -as well as the general surrounding landscape as described in the 'affected environment' section above. The survey yielded 9 recent industrial structures which include among other built environment and landscape features on site:

- Existing lifting shop (Figure 13), lifting shop stabling, running shed (Figure 14), running shed stabling, stabling yard 1, stabling yard 2, stabling yard 3, external washing, vehicle turntable (Figure 13). These built environment and landscape features (including rail tracts, roads/paths) are further mapped up (in Figure 19) below.

Site	Wol-1
Type	Structures
Density	Approximately 4 structures in total
Location/Coordinates	S28^{o} 39' 09.42" E28^{o} 09' 46.79"
Approximate Age (More than 60 0r Less than 60 years old)	Less than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
Description: The site complex consist of lifting shop, 3 small shed and parking offices (Figure 13).	

Figure 13- Existing Wolmerton lifting shop

Site	Wol-2
Type	Structure
Density	Approximately 2 structures in total
Location/Coordinates	S28^{o} 39' 11.11" E28^{o} 09' 45.26"
Approximate Age (More than 60 0r Less than 60 years old)	Less than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
Description: The site consist of a running shed as a smaller shed/office attached to it (Figure 14).	

Figure 14- Existing Wolmerton running shed

Site	Wol-3
Type	Structures
Density	Approximately 2 structures in total
Location/Coordinates	S28° 39' 16.65" E28° 09' 32.20"
Approximate Age (More than 60 0r Less than 60 years old)	Less than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
Description: The site complex consist of 2 structures - brick structure and external automated washer in state of disrepair (Figure 15).	

Figure 15- Existing Wolmerton external automated washer

Site	Wol-4
Type	Structure
Density	1 structure
Location/Coordinates	S28° 29' 14.05" E28° 10' 02.02"
Approximate Age (More than 60 0r Less than 60 years old)	Less than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
Description: The site is a guard house (Figure 16).	

Figure 16-Existing Wolmerton guard house/security check point

Site	Wol-5
Type	Structures
Density	2 structure
Location/Coordinates	S28^{o} 29' 14.05" E28^{o} 10' 02.02"
Approximate Age (More than 60 0r Less than 60 years old)	Less than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
Description: The site is a storage facility guard house (Figure 13).	

Figure 17-Existing storage facility

Site	Wol-6
Type	Structure
Density	1 structure
Location/Coordinates	S28° 39' 20.36" E28° 10' 10.52"
Approximate Age (More than 60 0r Less than 60 years old)	Less than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
Description: The site is a coach turntable (Figure 13).	

Figure 18 - coach turn table

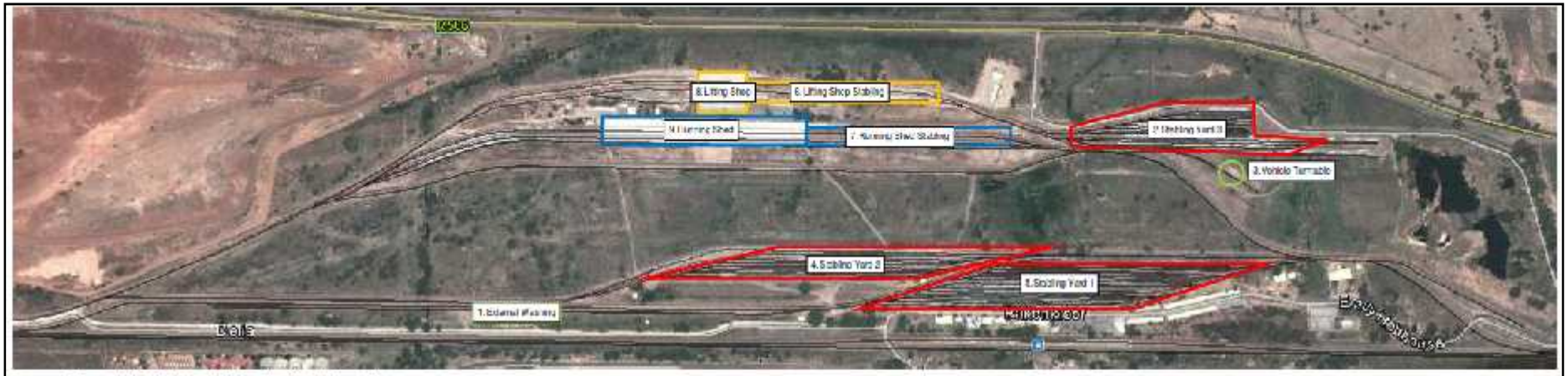

Figure 20: Existing Wolmerton Yard Layout

Key			
1	External Washing	2	Stabling Yard 3
3	Vehicle Turntable	4	Stabling Yard 2
5	Stabling Yard 1	6	Lifting Shop Stabling
7	Running Shed Stabling	8	Lifting Shop
9	Running Shed		

Figure 19- Distribution of existing depot building and rail infrastructure

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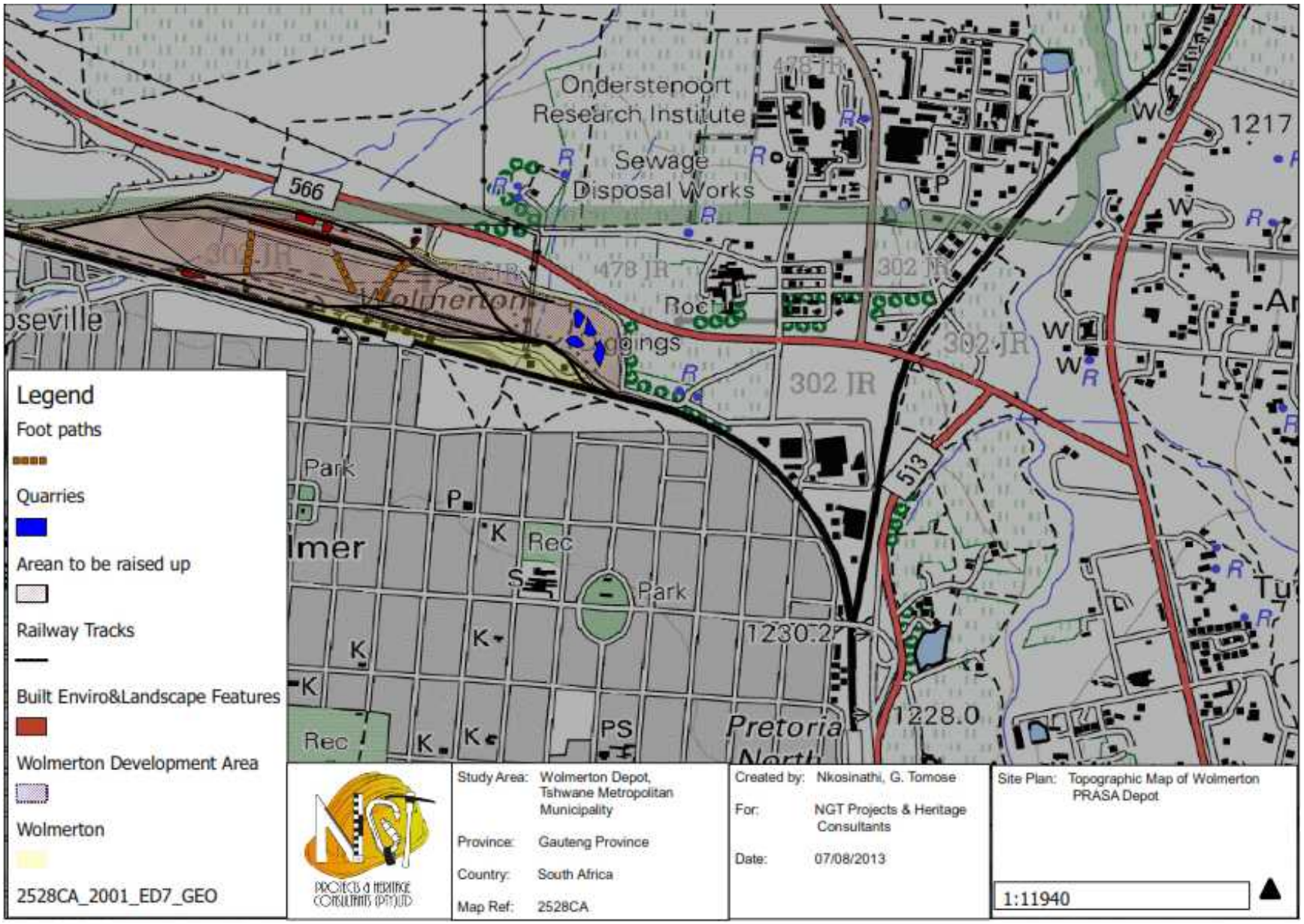
Onderstenoort
Research Institute
Sewage
Disposal Works
566
513
1217
1230.2
1228.0
Pretoria
Park
Rec
PS
Legend
Foot paths
Quarries
Arean to be raised up
Railway Tracks
Built Enviro&Landscape Features
Wolmerton Development Area
Wolmerton
2528CA_2001_ED7_GEO
Study Area: Wolmerton Depot, Tshwane Metropolitan Municipality
Province: Gauteng Province
Country: South Africa
Map Ref: 2528CA
Created by: Nkosinathi, G. Tomose
For: NGT Projects & Heritage Consultants
Date: 07/08/2013
Site Plan: Topographic Map of Wolmerton PRASA Depot
1:11940

Figure 20 - Distribution of identified built environment and landscape features (all of recent age) with the proposed development footprint of the proposed Wolmerton depot upgrade and maintenance project area

6. FIELD SURVEY RESULTS AND PROPOSED INFRASTRUCTURE

The physical survey of the Wolmerton depot proposed for PRASA depot upgrade and maintenance did not yield any heritage resources or sites. Eight none heritage site were yielded by the survey and grouped into six site complexes allocated Unique IDs Wol-1 to Wol-6 (Figures 13-18). Also refer to Figure 20 for the distribution. Wolmerton was established in the late 1960s and if we use 1960 as an age bench mark for relative dating of the existing site infrastructure - this makes the site to be 53 years old. Therefore all the built environment and landscape features located within and immediately outside the site are less than the stipulated 60 year bench mark for historical structures in term of Section 34 of the NHRA, No. 25 of 1999. Out of the eight built environment and landscape features identified approximately three will be demolished to make way for the newly proposed upgrades and maintenance (Figure 21). The rest of the structures will be upgraded to suit requirements of the new PRASA rolling stock (Figure 21). Because there were no heritage sites in form archaeological, built environment and landscape, burial grounds and graves, and other places of cultural significance such as sites of gathering, worship and prayer or initiation sites - it is recommended that development may proceed as planned. However, it has to be noted that some archaeological and heritage resources such as unmarked graves are subterranean in nature and might have been missed by the current study. The developer should take note of this. In cases such resources are unearthed during the excavation processes for infrastructure development at Wolmerton depot.

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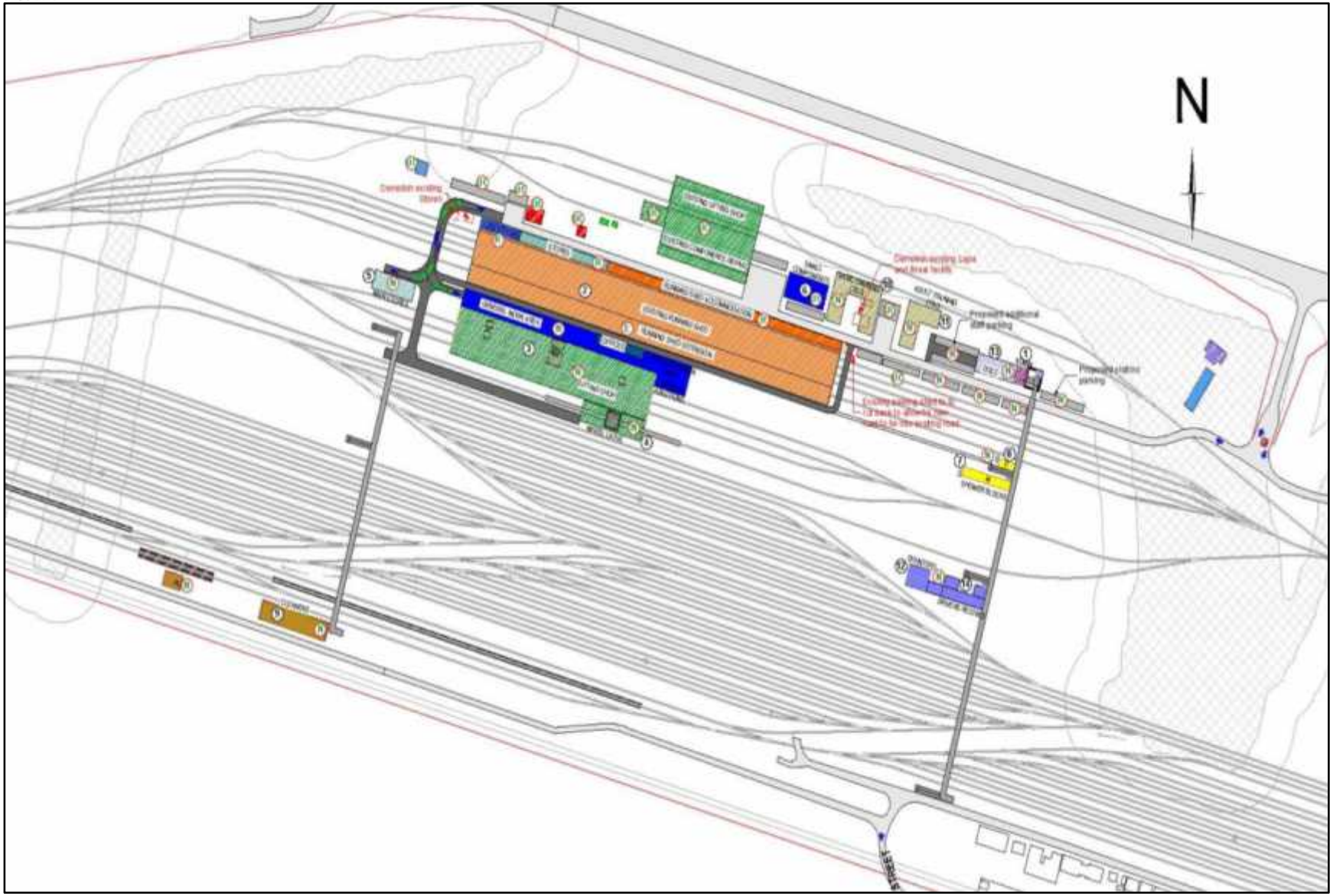

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Figure 21- Spatial Development Framework - showing the proposed infrastructure at Wolmerton PRASA depot against the existing infrastructure.

7. CONCLUSIONS

In conclusion, from a cultural resources management point of view, there are no objections to the project and there are no negative perceptions about the project, Wolmerton deport upgrade and maintenance project.

8. RECOMMENDATIONS

- Base on the fact that the survey did not yield any heritage resources, it is recommended that SAHRA approves the project in terms of archaeological resources and burial grounds and graves management since there were no such sites identified within and immediately outside the project area.
- It is also recommended that GPHRA allows the project to go ahead in terms of the management of historical built environment and landscape resources - there were no historical built environment and landscape features identified by the study.

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9. REFERENCES

Arcus GIBB. 2012. Environmental Screening Studies, Construction or Upgrading of Maintenance Depots and Staging Yards

SOUTH AFRICA 1999. NATIONAL HERITAGE RESOURCES ACT (No 25 of 1999), Government Gazette. Cape Town..

SAHRA APMHOB. 2004. Policy for the management of Archaeology, Palaeontology, Meteorites and Heritage Object. SAHRA: Cape Town.

SAHRA APM. 2006. Guidelines: Minimum standards for the archaeological and palaeontological Component of Impact Assessment Reports. . SAHRA: Cape Town.

SAHRA APMHOB 2002. General Introduction to surveys, impact assessments and management plans SAHRA: CT.

SAHRA. 2002. General guidelines to Archaeological Permitting Policy. SAHRA: Cape Town.

SAHRA. 2002. General Introduction to surveys, impact assessments and management plans.

SAHRA. What to do when Graves are uncovered accidentally.

Arcus GIBB, 2012 - HO/EPMO/256/08/2012 -MODERNISATION OF MAINTENANCE DEPOTS

Arcus GIBB, 2012 - PRASA ROLLING STOCK PROCUREMENT PHASE 2, ROLLING STOCK RENEWAL PROGRAMME HO/EPMO/08023/08 WORKSTREAM, METRORAIL DURBAN, ROLLING STOCK MAINTENANCE DEPOT CONCEPT DESIGN REPORT

Internet Sources:

http://www.safrica.info/doing_business/economy/key_sectors/transport.htm

http://www.transnet.co.za and other Transnet sites as indicated in the text.

http://www.sahistory.org.za/

Appendix 1: Wolmerton Concept Technical Solution

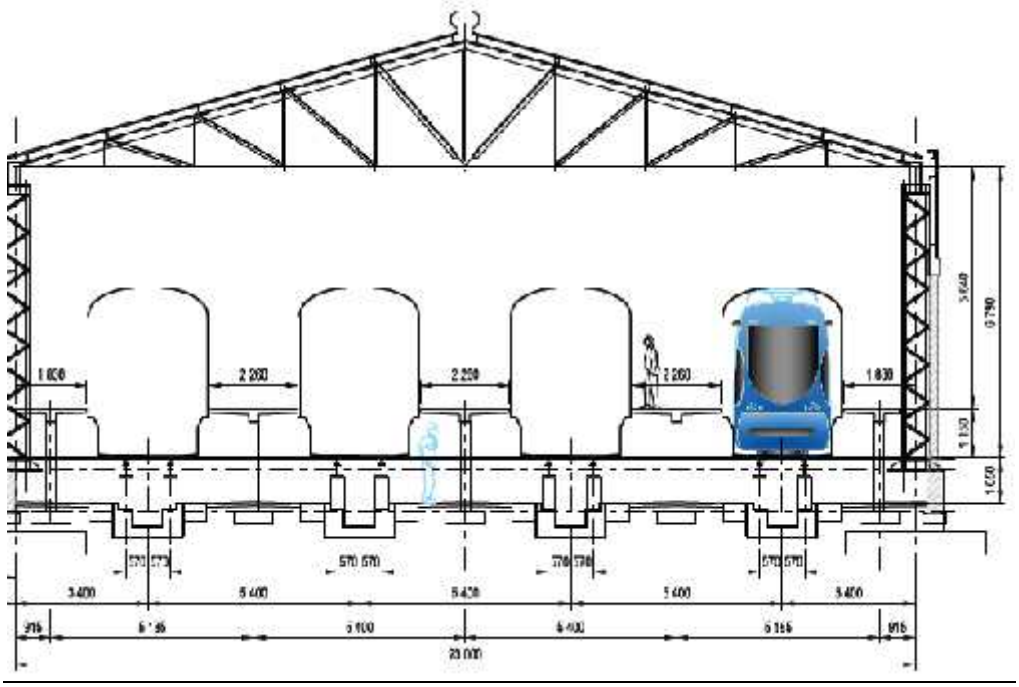
Facility	Status Quo	Preferred Solution
Running Shed Length of lines Technology	4 lanes 300m 5M/10M maintenance	5 lanes + 1 forklift lane 300m New trains + 5M/10M
Lifting Shop Length of lines Bogie drop pit Bogie repair road Technology	3 lanes 70m No Yes, 20m Crane + lifting jacks	4 lanes + 1 bogie repair road 160m Yes, spanning 2 lines 70m minimum (12 bogies) 6-car module lifting jacks, drop pit
Component repairs and other work areas Storage facilities Underfloor wheel lathe	Yes No	As per the depot specification and to cater for 5M/10M requirements New facility outside workshops
External Washer Intensive cleaning Controlled Emissions Toilets	Yes – not reliable Not a dedicated facility No	New equipment on new layout New equipment on new layout As per depot spec on new layout
Staging capacity Length of lines	23 sets (5M/10M) 23 lines are =300m	60 full sets 300m
Admin, train ops staff, and training facilities	Yes	Yes, as per depot spec

Work Package	High-level Scope of Work

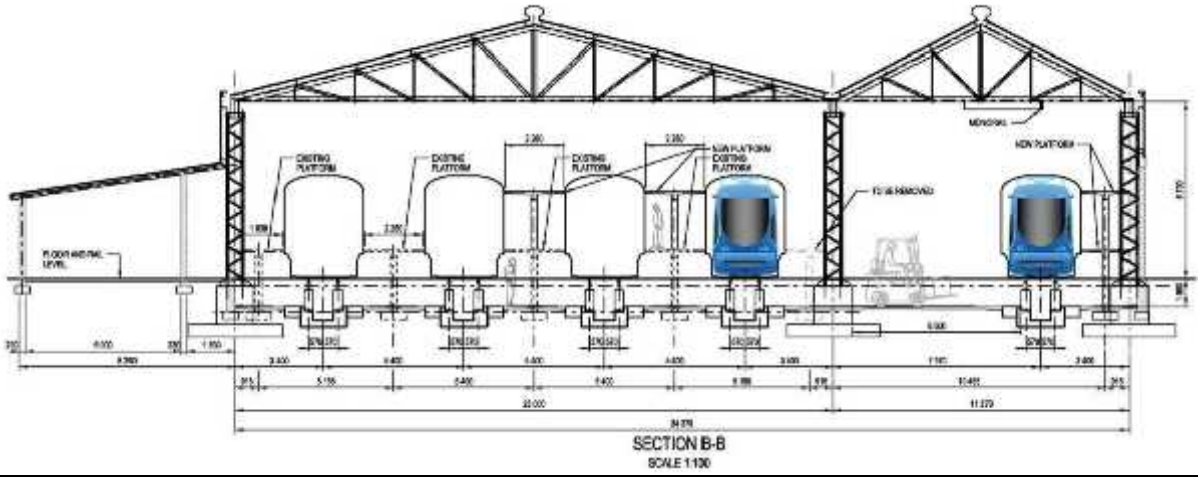
Running Shed, other work areas, and staff support facilities	• Secure existing shed for construction • Construct additional pit line • Construct forklift access road • Construct access platforms • Install mechanical and electrical equipment • Refurbish other work areas and staff support facilities
Lifting Shop including component repairs, storage facilities, other work areas, and staff support facilities	• Construct new lifting shop • Construct bogie drop pit, bogie repair road • Fit out component repair workshops/work areas, stores and staff support facilities • Install mechanical and electrical equipment
Buildings (admin, train ops - DOCC, and training facilities)	• Refurbish existing admin building • Construct new train ops building • Construct new training centre • Construct other support buildings
• External Washer • Intensive cleaning • Controlled Emissions Toilets • Under floor wheel lathe	• Construct washer facility • Construct wheel lathe facility • Construct intensive cleaning facility • Construct CET facility • Install mechanical & electrical equipment • Supply and install specialised mechanical equipment

Wolmerton Running Shed Cross Section

Existing Layout

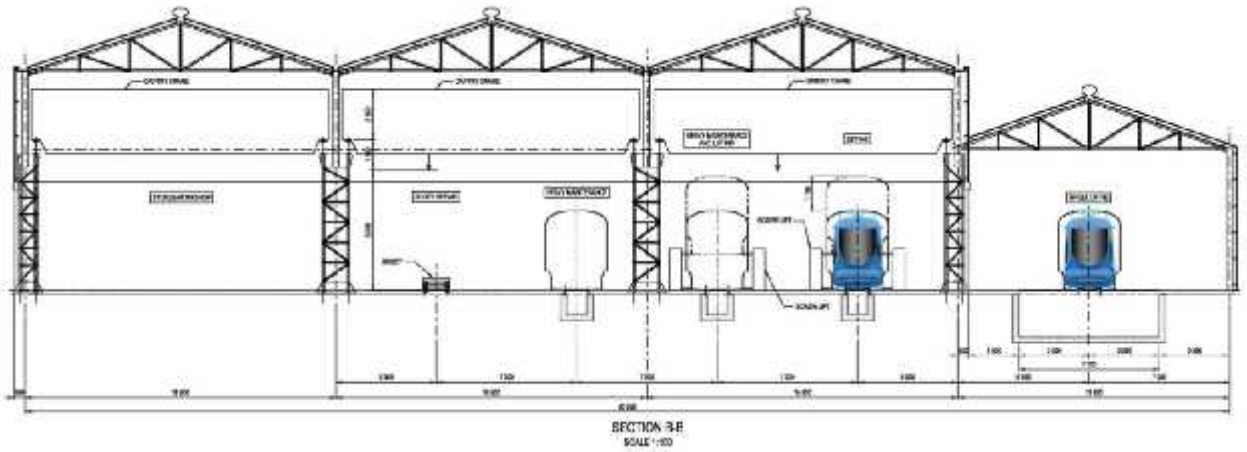


Preferred Layout
Addition to
existing building



Wolmerton Lifting Shop Cross Section

Proposed Layout (new structure)



Wolmerton Work Packages (2)

Work Package	High-level Scope of Work
Staging yard remodelling and construction – per way	• Remodel one existing staging yard • Construct new staging yards • Construct reverse lines • Construct wheel lathe line • Construct external wash facility line • Construct intensive cleaning facility lines • Construct test track
Staging yard remodelling – electrical	• Remodel OHTE for one existing staging yard • Construct new OHTE, gantry, mast pole foundations for new staging yards
Staging yard remodelling – signalling	• Installation new signalling equipment • Fitment of DOCC building and interlocking

Work Package	High-level Scope of Work
Long lead time materials	• Procurement of rails • Procurement of sleepers • Procurement of turnouts • Procurement of turn table • Procurement of lathe • Procurement of wheel measuring equipment • Procurement of lifting jacks • Procurement of drop pit jack • Procurement of external washer
Investigations (BY PRASA)	• Geotechnical surveys • Topographical surveys • EIA assessments • Town planning
Detection and relocation of existing utilities	• Confirmation of existing utilities • Relocate to new position
Demolition of identified structures	• Demolish of identified structures as per the demolition schedule