DIGBY WELLS
ENVIRONMENTAL

Proposed Expansion, Upgrade and Maintenance Projects within the Sun City Complex, North West Province

Final Environmental Impact Assessment and Environmental Management Programme Report

Project Number:

SUN4642

Prepared for:

Sun International

January 2019

Digby Wells and Associates (South Africa) (Pty) Ltd
Co. Reg. No. 2010/008577/07. Turnberry Office Park, 48 Grosvenor Road, Bryanston, 2191. Private Bag X10046, Randburg, 2125, South Africa
Tel: +27 11 789 9495, Fax: +27 11 069 6801, info@digbywells.com, www.digbywells.com

This document has been prepared by Digby Wells Environmental.

Report Type:	**Final Environmental Impact Assessment and Environmental Management Programme Report**
Project Name:	**Proposed Expansion, Upgrade and Maintenance Projects within the Sun City Complex, North West Province**
Project Code:	**SUN4642**

Name	Responsibility	Signature	Date
Anita Gutu	Report Compilation		August 2018 Updated January 2019
Sanusha Govender	Project Manager Report Review		September 2018 Updated January 2019
Barbara Wessels	Reviewer		October 2018

EXECUTIVE SUMMARY

Introduction

Sun International plans to undertake expansion, upgrade and maintenance projects at the Sun City Resort Complex located within the Moses Kotane Local Municipality, North West Province. The Sun City Resort is located on property that is leased from the National Department of Rural Development and Land Reform. The total lease area comprises 3,400 hectares.

The Resort complex is bordered by the R556 road in the south and the Pilanesberg National Park in the north and east. The community of Ledig is located immediately south-west of the Sun City Property.

The Sun City Resort has been expanded significantly since it was initially established in 1979 and comprises four hotels, entertainment area as well as two international standard 18-hole Golf Courses, various swimming pools and recreational areas. Sun International now intends to roll out numerous projects within the next ten to fifteen years. Three Project Types are identified in this report totalling 17 projects:

- Resort Expansion Projects;
- Utilities and Services Expansion Projects; and
- Maintenance Projects.

The Resort Expansion Projects proposed are the facilities from which the Resort generates income and remains a viable business. The need for expansion of existing Services and Utilities Projects stems from the age of the existing infrastructure, and the lack of capacity of existing infrastructure to accommodate the current and planned activities at the resort. Maintenance Projects are required on a continuous basis at the Resort. Cleaning of culverts and maintenance of fire-breaks at the resort comprise two such important maintenance activities.

Project Applicant

The details of the Project Applicant are included in the table below.

Project applicant:	Sun International		
Responsible position	Sun City Resort Safety, Health and Environment (SHE) Manager		
Contact person:	Daniel Boshoff		
Postal address:	Sun City Resort, North West Province, 0316		
Telephone:	+27 (0) 14 557 3079	E-Mail:	daniel.boshoff@suninternational.com

Environmental Consultants

Digby Wells and Associates (South Africa) (Pty) Ltd. (t/a Digby Wells Environmental) has been appointed by Sun International to facilitate the environmental-legal applications relevant to the proposed projects. The details of the Environmental Assessment Practitioner are contained in the table below.

Name of Practitioner:	Ms Sanusha Govender
Company	Digby Wells and Associates (South Africa) (Pty) Ltd
Telephone:	011 789 9495
Fax:	011 789 9498
Email:	sanusha.govender@digbywells.com

Purpose of this Report

The Environmental Impact Assessment (EIA) process is a tool to identify and manage potential impacts on the environment as a result of a particular project. Environmental risks associated with such a project are also identified and mitigation measures proposed. The completion of an EIA is a regulatory requirement in terms of the provisions of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the EIA process which is regulated in accordance with the EIA Regulations, 2014 (the EIA 2014 Regulations, as amended).

This EIA and Environmental Management Programme (EMPr) Report aims to outline the project activities and examine environmental and social impacts that may be caused by the implementation of the project. It aims to identify the potential impacts, based on the specialist investigations undertaken, that could result from the proposed project activities (positive or negative), and to propose management measures for such impacts.

Summary of the Baseline Environment

The Sun City Resort falls within the Moses Kotane Local Municipality, of the Bojanala Platinum District Municipality and was opened on 7 December 1979. The site comprises of lower-lying areas with gentle slopes, as well as higher-lying areas with steeper slopes on hilltops. The dominance of steep and rocky areas results in generally very shallow soils within the resort limiting agricultural potential.

The whole of the Sun City Resort Complex is located in Zeerust Thornveld according to the National Vegetation Map (2012). This vegetation type is part of the Central Bushveld Bioregion of the Savanna Biome. Zeerust Thornveld is considered to be “least threatened” at a national scale.

Locally, the site falls within Nature Reserve Protected Areas in accordance with the South African Protected Areas Database (2017) and falls within a Critical Biodiversity Area 2 in

terms of the North West Biodiversity Sector Plan, however, the resort does not fall within a Threaten Ecosystem. The ecological sensitivity categorisations provided for the site are mainly attributed to its proximity to the Pilanesberg National Park, which is a protected area.

A total of seven wetland areas were delineated within the boundary of the resort which were found to range from Largely Natural to Largely Modified in terms of their Present Ecological State. In terms of Ecological Importance and Sensitivity, these wetlands were found to range from moderate and high sensitivity which can be attributed to the proximity to the Pilanesberg National Park and the associated presence of various protected species.

Within the Bojanala Platinum District Municipality, a total of 177 heritage resources have been identified, of which 17 occur within the resort. The heritage resources comprise of expressions from mainly the Late Farming Community period including farming community sites, the historical built environment, burial grounds and graves and recent heritage.

The current land uses include urban development which includes roads, hotels, gardens, golf courses, natural areas (shrubland/thicket/woodland and grassland) associated with the project site and surrounds. Furthermore, at a local and district municipality scale, surrounding land uses include Nature Reserves, mines, residential areas and other urban development as well as agriculture (mainly subsistence farming).

Approach and Methodology for the Public Participation Process

A Public Participation Process (PPP) was initiated during the Scoping Phase, which is central to the investigation of environmental and social impacts, as it is important that stakeholders that may be affected by the project are given an opportunity to identify concerns and to ensure that local knowledge, needs and values are understood and taken into consideration as part of the impact assessment process. The comments from the stakeholders from the Scoping Phase are included in the Comment and Response Report (CRR) (Appendix 3). The CRR will be updated after the next public review period.

The draft EIA and EMPr report was submitted to the public for input and comments for a period of 30 days. The commenting period was from the 28 November 2018 and ended on 18 January 2019. The draft EIA and EMPr was available for review on the Digby Wells website (www.digbywells.com). Electronic copies (CDs) are available from the Digby Wells Stakeholder Engagement Office, with hardcopies available at the locations listed below:

- Sun Central; and
- Bakubung Tribal Hall.

The draft EIA and EMPr has been updated with all the comments received from the I&APs for submission to the Competent Authority for consideration. Once the Competent Authority has made a decision this will be communicated to all the registered I&APs.

Project Alternatives

The Project alternatives considered for this project include the following:

- Site layout in terms of the environmental and social sensitivities associated with areas where developments are planned;
- Project schedule in terms feasible roll-out rates for the individual projects;
- Technology alternatives in terms of energy sources; and
- The no-go alternative, resulting in no further development taking place at Sun City at all.

Impact Assessment Summary

The EIA and EMPr report, the associated specialist studies and the PPP have been undertaken and completed in line with the legislative requirements discussed in Section 5 (Part A) of this report. A quantitative impact rating methodology was applied to determine the significance of the expected impacts pre-mitigation and post-mitigation.

The most significant impacts (rated Moderate or Major) expected during the various phases of the project include potential direct disturbance of heritage resources of Cultural Significance and positive impacts related to employment and income creation. It is noted that due to the disturbed nature of the project area and the magnitude of the proposed activities, the majority of the impacts identified have been rated to be of Minor or Negligible significance.

Conclusions and Recommendations

The resort is located in proximity to ecologically sensitive areas and as such all proposed developments need to be executed in a way that minimises disturbance outside of the resort as far as possible. The findings of the Impact Assessment generally show that that potential negative impacts associated with the proposed developments will be of low environmental significance.

Based on the assessment of the potential negative and positive impacts associated with the project, it is concluded that the proposed project can be authorised. Mitigation measures have been proposed to minimise the significance of the identified negative impacts and avoid any long-term negative effects as far as possible.

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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation / Acronym	Description
BID	Background Information Document
BPDM	Bojanala Platinum District Municipality
CFP	Chance Find Procedure
CMP	Conservation Management Plan
CRR	Comments and Response Report
CS	Cultural Significance
DAFF	Department of Agriculture, Fisheries and Forestry
dB, dBA	Decibel -- a measure of sound level and used as a measure of noise pollution.
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Programme
GPGC	Gary Player Golf Course
GN	Government Notice
ha	Hectares
HIA	Heritage Impact Assessment
km^2	Square Kilometre
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IWWMP	Integrated Water and Waste Management Plan
LCGC	Lost City Golf Course
LED	Local Economic Development
m	Metres
m^2	Square Metres

Abbreviation / Acronym	Description
mamsl	Metres Above Mean Sea Level
MKLM	Moses Kotane Local Municipality
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MW	Megawatts
N	Nitrogen
NAAQS	National Ambient Air Quality Standards
NEMA	Environmental Management Act, 1998 (Act No 107 of 1998)
NEM: WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NEM: AQA	National Environment Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PPP	Public Participation Process
READ	Department of Rural, Environment and Agricultural Development
SAHRA	South African Heritage Resources Agency
SABS	South African Bureau of Standards
SANS	South African National Standards
SASS5	South African Scoring System Version 5
SDF	Spatial Development Framework
SMS	Short Message Service
SSC	Species of Special Concern
TDS	Total Dissolved Solids
VC	Vacation Club
VOW	Valley of Waves
WML	Waste Management Licence
WUL	Water Use Licence
WULA	Water Use Licence Application
WWTW	Wastewater Treatment Works

DIGBY WELLS ENVIRONMENTAL

Part A: Scope of Assessment and Environmental Impact Assessment Report

1 Introduction

Digby Wells Environmental (hereafter Digby Wells) has been appointed by Sun City Resort to undertake an Environmental Impact Assessment (EIA) Process in relation to proposed future expansion, upgrade and maintenance projects within the Sun City Resort Complex, North West Province.

The Sun City Resort has been in operation since 1979 and comprises various accommodation and entertainment/ recreational facilities. The Sun City Resort Complex is bordered by the R556 road in the south and the Pilanesberg National Park in the north and east. The community of Ledig is located immediately south-west of the Sun City Property (refer to Plan 1 and Plan 2, Appendix 1). The property is leased from the National Department of Rural Development and Land Reform. The total lease area comprises 3,400 hectares (ha). The areas actively being managed and used by Sun City Resort comprises three Zones, as follows (Also refer to Plan 3, Appendix 1):

- Area A: 492 ha – between the Resort and the town of Ledig;
- Area B: 597 ha – the developed area comprising Sun City Resort; and
- Area C: 469 ha – area used by Mankwe Gametrackers.

A total of 17 proposed projects are presented in this report which are planned to be carried out over a ten to fifteen year period at the resort. The overarching aim of undertaking these projects is to increase the capacity of some of the accommodation and entertainment facilities at the resort as well as to undertake maintenance and upgrades of some aged operational infrastructure to ensure optimal functioning thereof.

1.1 Purpose of this Report

The proposed future expansion, upgrade and maintenance projects trigger Listed Activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and associated Regulations, namely the EIA Regulations of 2014 (as amended[1]).

In accordance with the provisions of NEMA and associated EIA Regulations, 2014 (as amended), an environmental-legal process, namely Scoping and EIA Process, to obtain Environmental Authorisation for triggered Listed Activities is being duly undertaken. Following the completion of the Scoping Phase of this project, this report constitutes the Final EIA and Environmental Management Programme (EMPr) Report which is submitted to the North West Department of Rural, Environment and Agricultural Development (READ) for final appraisal of the application.

[1] As amended by GN R 326 of 07 April 2017.

Broadly, this EIA and EMPr Report aims to achieve the following:

- Outline the proposed project activities;
- Examine the physical and social environment associated with the project area;
- Identify the potential impacts, based on the specialist investigations undertaken, that could result from the proposed project activities (positive or negative); and
- Propose mitigation and management measures for identified impacts to ensure that negative impacts are avoided or reduced as far as possible while positive impacts associated with the project are enhanced.

A Plan of Study was submitted as part of the Scoping Phase of this process and approved accordingly (Reference: NWP/EIA/22/2018). This report has therefore been compiled in accordance to the approved Plan of Study.

The figure below provides a simplified schematic of the Scoping and EIA Process subject to this application.

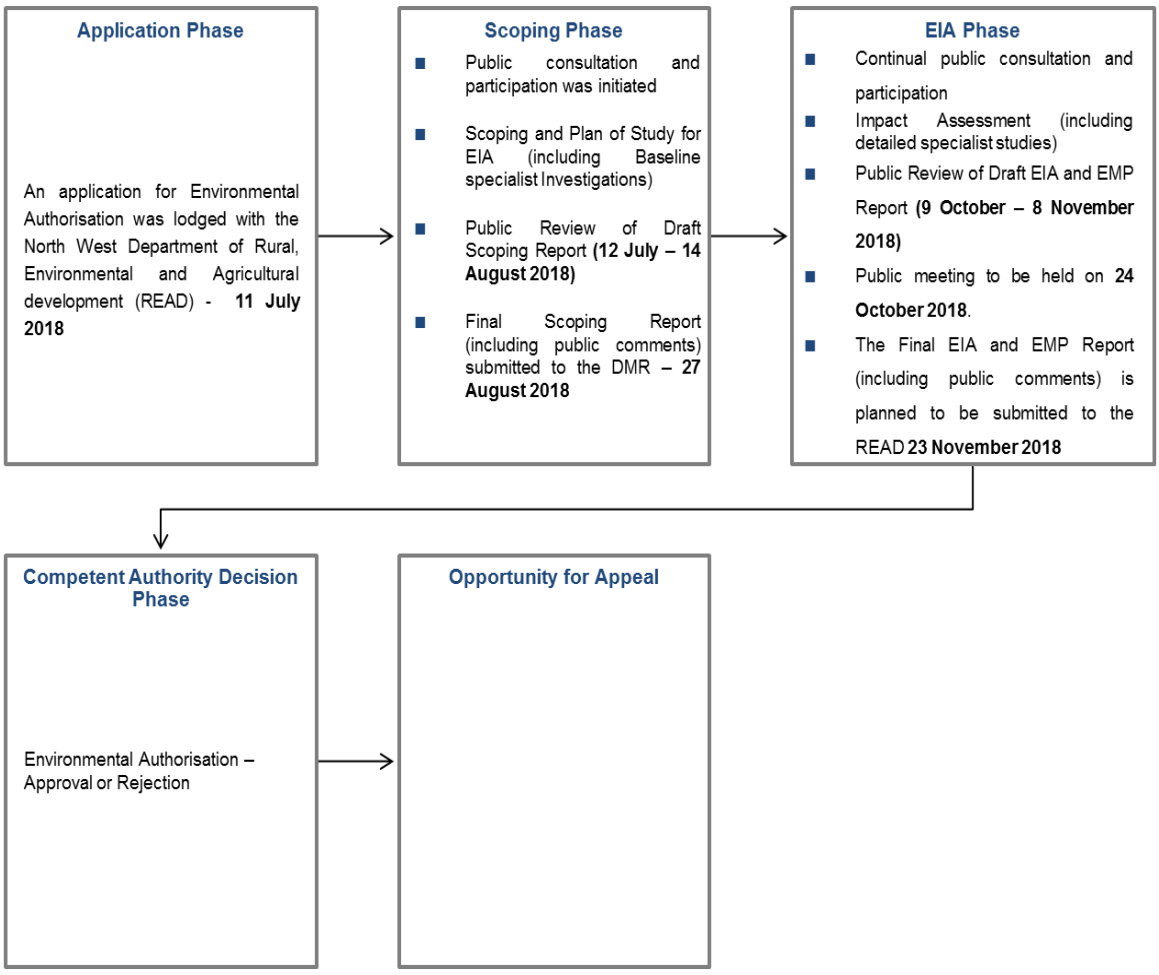


Figure 1-1: Scoping and EIA Process

1.2 Project Applicant Details

Sun International is the lawful occupier and operator of the Sun City Resort. The details of the Project Applicant are provided in Table 1-1.

Table 1-1: Details of the Applicant

Project applicant:	Sun International		
Responsible position	Sun City Resort Safety, Health and Environment (SHE) Manager		
Contact person:	Danie Boshoff		
Postal address:	Sun City Resort, North West Province, 0316		
Telephone:	+27 (0) 14 557 3079	E-Mail:	daniel.boshoff@suninternational.com

Details of the Land Owner are provided in Table 1-2.

Table 1-2: Details of the Land Owner

Land Owner	National Government of the Republic of South Africa Property is leased from the Government of South Africa (Notarial Deed of Lease: K6/1978L, as amended).		
Responsible position			
Contact person:	Richard Keothaile		
Postal address:	Private Bag 74 Mmabatho 2745		
Telephone:	+27 (0) 18 397 7600	Fax:	+27 (0) 18 381 1875

Details of the Competent Authority are provided in Table 1-3.

Table 1-3: Details of the Competent Authority

Competent Authority	Department of Rural, Environment and Agricultural Development (READ), North West Provincial Government		
Contact person:	Ouma Skosana		
Postal address:	Private Bag X2039, Mmabatho 2735		
Telephone:	+27 (18) 389 5156	Fax:	086 507 6333
E-Mail	oskosana@nwpg.gov.za		

1.3 Structure of this Report

Table 1-4 identifies the required contents of an EIA Report according to Appendix 3 of the NEMA EIA Regulations, 2014 (as amended) and cross-references the requirements to the relevant sections in this Report.

Table 1-4: Structure of this EIA Report

Regulatory Requirement for EIA Reports[2]	Relevant Section of this report
3. (1) An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-	
(a) details of— (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Please refer to Section 2: Details of the EAP
(b) the location of the activity as contemplated in the accepted Scoping Report, including— (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Please refer to Section 3: Description of the location of the proposed activity.
(c) plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale;	Please refer to Plan 1 and Plan 2, Appendix 1.
(d) a description of the scope of the proposed activity, including— (i) all listed and specified activities triggered and being applied for; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Please refer to Section 4: Description of the scope of the proposed activity.
(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Please refer to Section 0: Relevant policy and legislative context.
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred development footprint with the approved site as contemplated in the accepted Scoping Report;	Please refer to Section 6: Need and desirability of the proposed development.
(g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report	Section 7: Preferred Development Footprint
(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including— (i) details of all the alternatives considered;	Please refer to Section 8: Details of Alternatives considered.
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Please refer to Section 9: Details of the Public Participation Process.

[2] In accordance with Appendix 3 of the NEMA EIA Regulations, 2014 (as amended).

Regulatory Requirement for EIA Reports[2]	Relevant Section of this report
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Please refer to Section 10: Environmental Attributes associated with the alternatives.
(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Please refer to Section 11: Impact Assessment
(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Please refer to Section 11: Impact Assessment
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Please refer to Section 12: Summary of identified Impacts.
(viii) the possible mitigation measures that could be applied and level of residual risk;	Please refer to Section 11: Impact Assessment
ix) if no alternative development footprints for the activity were investigated, the motivation for not considering such; and	Not applicable.
(x) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Please refer to Section 18: Concluding Statement
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including-	Please refer to Section 11: Impact Assessment
(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Please refer to Section 11: Impact Assessment
(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Please refer to Section 11: Impact Assessment
(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of	Please refer to Section 11: Impact Assessment

Regulatory Requirement for EIA Reports[2]	Relevant Section of this report
resources; and (vii) the degree to which the impact and risk can be mitigated;	
(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Please refer to Section 13: Summary of Findings and Recommendations of the Specialist Studies.
(l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment: (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Please refer to Section 14: Environmental Impact Statement.
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Please refer to Section 16: Reasoned Opinion of the EAP.
(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Please refer to Section 8: Alternatives Considered.
(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Please refer to Section 16: Reasoned Opinion of the EAP.
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Please refer to Section 15: Description of Assumptions, Uncertainties and Gaps in Knowledge.
(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Please refer to Section 16: Reasoned Opinion of the EAP.
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	Please refer to Section 17: Period for which the Environmental Authorisation is required
(s) an undertaking under oath or affirmation by the EAP in relation to- (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and	Please refer to Section 9 (Part B): Undertaking by EAP.

Regulatory Requirement for EIA Reports[2]	Relevant Section of this report
(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Not applicable.
(u) an indication of any deviation from the approved scoping report, including the plan of study, including- (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	Not applicable.
(v) any specific information that may be required by the competent authority; and	Not applicable.
(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.	Not applicable.

2 Details of the EAP

Digby Wells has been appointed by Sun International as the independent Environmental Assessment Practitioner (EAP) to conduct the Scoping and EIA Process according to the NEMA, as well as the associated specialist studies and the required Public Participation Process (PPP) for the proposed project.

Details of the EAP representative are provided in Table 2-1.

Table 2-1: Details of the EAP

Name of Practitioner:	Ms Sanusha Govender
Company	Digby Wells and Associates (South Africa) (Pty) Ltd
Telephone:	011 789 9495
Fax:	011 789 9498
Email:	sanusha.govender@digbywells.com

2.1 Expertise of the EAP

Sanusha Govender is a Senior Environmental Consultant at Digby Wells. She holds a Bachelor of Science (BSc) in Environment & Development together with over 12 years of experience as both an Environmental Impact Assessment Consultant and as a Sustainability Programme Manager. She has project managed and delivered quality products on a range of environmental assessments and sustainability solutions. Projects have included EIA's across various sectors, managing large teams of interdisciplinary specialists and advisors.

Please refer to Appendix 2 for the EAP's Curriculum Vitae (CV) and qualifications.

3 Description of the Location of the Proposed Activity

The proposed projects are planned within the existing Sun City Resort Complex footprint in the North West Province. The site falls within the Moses Kotane Local Municipality (MKLM), of the Bojanala Platinum District Municipality (BPDM).

The Sun City Resort is located on property that is leased from the National Department of Rural Development and Land Reform. The total lease area comprises 3,400 ha. The areas actively being managed and used by Sun City Resort comprises three Zones, as follows:

- Area A: 492 ha – between the Resort and the town of Ledig;
- Area B: 597 ha – the developed area comprising Sun City Resort complex; and
- Area C: 469 ha – area used by Mankwe Gametrackers.

The Sun City Resort Complex comprises the properties listed in Table 3-1 below. These properties are illustrated in Plan 3, Appendix 1.

Table 3-1: Affected Properties – Sun City Resort

Farm Name and Portion	21 digit Surveyor General code	Surface Right Owner	Property Size (Ha)
Remaining Extent (RE) of the farm Styldrift 90	T0JQ00000000009000000	Government of the Republic of South Africa	4439
Portion 7 of the farm Styldrift 90	T0JQ00000000009000007	Government of the Republic of South Africa	19
RE of the farm Ledig 909	T0JQ00000000090900000	Government of the Republic of South Africa	708
Portion 3 of the farm Ledig 909	T0JQ00000000090900003	Government of the Republic of South Africa	0
Portion 4 of the farm Ledig 909	T0JQ00000000090900004	Government of the Republic of South Africa	0
Portion 6 of the farm Ledig 909	T0JQ00000000090900006	Government of the Republic of South Africa	367
Portion 7 of the farm Ledig 909	T0JQ00000000090900007	Government of the Republic of South Africa	431
Portion 15 of the farm Ledig 909	T0JQ00000000090900015	Government of the Republic of South Africa	364
RE of the farm Doornhoek 910	T0JQ00000000091000000	Government of the Republic of South Africa	1804
RE of Portion 1 of the farm Doornhoek 910	T0JQ00000000091000001	Government of the Republic of South Africa	969
Portion 2 of the farm	T0JQ00000000091000002	Government of the	24

Farm Name and Portion	21 digit Surveyor General code	Surface Right Owner	Property Size (Ha)
Doornhoek 910		Republic of South Africa	
Portion 3 of the farm Doornhoek 910	T0JQ00000000091000003	Government of the Republic of South Africa	250
Portion 4 of the farm Doornhoek 910	T0JQ00000000091000004	Government of the Republic of South Africa	6

The locations of each of the individual proposed projects within the Sun City Resort Complex are detailed in Section 4 below.

4 Description of the Scope of the Proposed Activities

Sun City Resort was developed in 1979 and initially comprised the Sun City Hotel and Casino, as well as the Gary Player Country Club. The resort was subsequently expanded with the development of the Cabanas and Cascades Hotel accommodation facilities as well as the Entertainment Centre. In 1992, the Palace of the Lost City, Valley of Waves and Lost City Country Club were opened to the public.

The Sun City Resort comprises of four hotels, entertainment area as well as two international standard 18-hole Golf Courses, various swimming pools and recreational areas.

Sun City proposes to expand and maintain the resort complex, by **developing 18 projects over a ten to fifteen year period.** These 18 projects are grouped under the following categories:

- Resort Expansion Projects;
- Utilities and Services Projects; and
- Maintenance Projects.

Refer to Table 4-1 below, which summarises, all 18 categorised projects, as proposed by Sun International. It is important to reiterate that this, Environmental Authorisation application is compiled for the projects detailed in Table 4-1.

Note that in-depth project detail is provided in subsequent subsections. The project locations are illustrated in Plan 4, Appendix 1.

Table 4-1: Proposed Future Projects at Sun City (Summary of Projects)

Category	No.	Project Name	Project Summary
Resort Expansion Projects (REP)	REP1	Eco-Lodge	Development of an Eco-Lodge at the Gary Player Golf Course (GPGC) Workshop.
	REP2	Driving Range Road	Construct a road to connect the Driving Range at Lost City Golf Course (LCGC) to the GPGC via the Palace garden road and Valley of

Category	No.	Project Name	Project Summary
			Waves (VOW) road.
	REP3	Kwena Gardens Expansion	Construct 20 additional Rustic Chalets at Kwena Gardens.
	REP4.1	Vacation Club (VC) Phase 3	Construct an additional 150 simplex units, 2-3 bed units and associated infrastructure to expand capacity at the VC. The site identified for the expansion currently houses the Helipad and Nursery.
	REP4.2	VC Phase 4	Construct of an additional 150 simplex units, 2-3 bed units and associated infrastructure to expand capacity at the VC. The site identified for the expansion is located within an undeveloped area.
	REP5	Recreational Lake Beach Expansion	Expand the existing artificial beach at the Lake and construct an additional shallow swimming pool at Waterworld Beach.
	REP6	Helipad relocation and expansion	Decommission the existing helipad, to make space for VC Phase 3, and construct a new helipad with increased bays closer to the Palace.
	REP7	Additional Parking Garage, Convention Centre and Hotel	Construct an additional parking garage, Convention Centre and Hotel (250 rooms) including a bridge link from Sun Central to the new Hotel.
	REP8	Soccer Fields	Develop two soccer fields at the Warehouse.
Utilities and Services Projects (USP)	USP1	Stormwater culverts at Golf Course Roads	Install Stormwater pipes / culverts at Golf Course Roads to allow water to flow under the roads and maintain the road surface for fence inspections by security (prevent floods washing away the road).
	USP2	Additional Reservoirs to Supplement existing water storage capacity	Construct 2 x 10Ml reservoirs or alternatively 1x 20Ml Reservoir on Telkom Hill next to existing Upper Reservoir.
	USP3	Effluent transfer line replacement.	Currently there is an effluent transfer line (old asbestos line) through Sunset Drive to the irrigation lake at Hole 2. This line will be decommissioned (shut down) but remain in place. A new line will then be installed against the fence of Letsatsing.
	USP4	Sunset-Skytrain Fresh Water Line	Construct a main water line from the Welcome Centre to Skytrain (pipe will be attached to Skytrain route).
	USP5	Ledig Sewer Line decommissioning, new	Currently the sewer line running through Ledig (old asbestos line) is reaching its end of life and

Category	No.	Project Name	Project Summary
		Wastewater Treatment Works (WWTW) for VC and Palace.	was previously dysfunctional in certain areas. The line will be decommissioned (shut down but remain in place). A new WWTW will be established to manage sewage from VC and The Palace. A new pipeline will be required to the Lost City Hole 3 dam to return the treated water for irrigation.
	USP6	South Village Pipeline	Construct an additional pipeline for water supply to South Village.
	USP7	Generator Park	Consolidate the generators throughout the site into one area for effective monitoring and control, or establish a generator park to service the east side business units.
Maintenance Projects (MP)	MP1	Clearance of Fence Roads	Vegetation Clearance at perimeter fences to serve as maintenance roads and fire breaks (25 km).
	MP2	Sun Park Culverts	Clear both sets of culverts under the road at Sun Park from debris and siltation. Construct maintenance road to facilitate future maintenance.

4.1 Resort Expansion Projects

A detailed description of the proposed Resort Expansion Projects is provided in the subsections below.

4.1.1 Eco-Lodge (REP1)

Project Description	Development of an Eco-Lodge at GPCC Workshop. The Eco-Lodge will include 20 to 25 Lodges of 4 to 5 bedrooms each (i.e. accommodation for between 80 and 125 people). Electricity supply to the Eco-Lodge will be via a new 11MVA line from GPCC Workshop. Water supply to the Eco-Lodge will be from GPCC Workshop via a 50mm diameter pipeline. Sewage will be conveyed to a sceptic tank. Domestic Waste Collection areas will be included in the detailed design. Domestic waste will be collected from the Eco-Lodges by Sun City Waste Management contractor and conveyed to the new Waste to Energy Plant. Access to the Eco-Lodge Site is via the existing golf course Road.		
Project Location		**Latitude**	**Longitude**
	Approximate centre point of the Eco-Lodge	25°20'7.23"S	27° 5'58.43"E

4.1.2 Driving Range Road (REP2)

Project Description	There is currently a driving range associated with the LCGC. Golfers at GPGC are obliged to drive around the hotels on the main resort road to gain access to the driving range. Sun City is proposing the upgrade of existing footpaths and service roads and the construction of minor sections of new road to create a golf-cart route from the GPGC to the driving range. The road will be roughly 2.5 m wide and have a paved surface. The route is approximately 900 metres.		
Project Location		**Latitude**	**Longitude**
	Start point of road	25°20'22.26"S	27° 5'30.77"E
	End point of road	25°20'34.65"S	27° 5'57.17"E

4.1.3 Kwena Gardens Expansion (REP3)

Project Description	Sun City is proposing to expand the accommodation capacity at the existing Rustic Chalets at Kwena Gardens by constructing an additional 20 chalets. The new chalets will be based on the same design principles as the existing chalets and will also be able to tie into the existing water, electricity and sewer infrastructure. Each chalet will accommodate between 2 and 4 people allowing for a maximum of an additional 80 guests. The access road to the existing chalets will be extended past the current development and a new parking lot (approximately 25 parking bays) will also be constructed to service the additional accommodation facilities. The expansion will also mean that the existing staff facilities (change house and store room) may have to be relocated. These facilities will however remain within the Kwena Gardens Development footprint, closely associated with the Rustic Chalets.		
Project Location		**Latitude**	**Longitude**
	Approximate centre-point of new Chalets.	25°21'24.68"S	27° 6'30.48"E

4.1.4 Vacation Club (VC) Phase 3 (REP4.1)

Project Description	The existing VC provides self-catering accommodation on a time-share scheme basis to guests of the Sun City Resort. Recently, the VC Phase 1 redevelopment saw the refurbishment and remodelling of 184 two-bedroom and 50 three-bedroom Units. Phase 2 consists of 148 Units in total, which are all two- bedroom units sleeping six guests each. Phase 3 will comprise a total of 150 units which will include simplex units, two-bedroom and three-bedroom units. Phase 3 will increase the VC capacity by a maximum of an additional 1,000 guests, as follows: ▪ 100 x 2 bed units, plus 2 additional people per unit on sleeper couch = 600 people ▪ 50 x 3 bed units plus 2 additional people per unit on sleeper couch = 400 people VC Phase 3 will tie in to existing infrastructure (water, power, sewer) but will necessitate the development of additional access roads and parking areas as well as the construction of a new restaurant. The site that has been identified for VC Phase 3 expansion currently houses the helipad, which will have to be relocated (see Project 0 – REP6).		
Project Location		**Latitude**	**Longitude**
	Approximate centre point of VC Phase 3	25°20'26.37"S	27° 4'54.81"E

4.1.5 Vacation Club (VC) Phase 4 (REP4.2)

Project Description	Upon completion of the VC Phase 3 development, Sun International intends to develop VC Phase 4. Similar to the Phase 3, the development will comprise a total of 150 units which will include: ▪ Simplex units; ▪ Two-bedroom (100 units); and ▪ Three-bedroom units (50 units) This will result in an additional capacity to accommodate up to 1,000 guests. The VC Phase 4 area occupies a total footprint of 82 ha and is located between the decommissioned landfill site and Bakubung Gate. This area falls within the undeveloped area of the resort which is not fenced, therefore fencing of this area will be required as part of its establishment. VC Phase 4 will require infrastructure for municipal services namely water, power, sewer and additional access roads. It is however noted that there is a private water line (Bakubung water line) which the area could possibly tie into.		
Project Location		**Latitude**	**Longitude**
	Approximate centre point of VC Phase 4	25° 20' 19.732" S	27° 4' 17.09" E

4.1.6 Recreational Lake Beach Expansion (REP5)

Project Description	One of the Water Theme Parks at the Sun City Resort, known as Waterworld, is associated with the Sun City Lake and provides action-oriented facilities such as parasailing, wakeboarding, water-skiing, bumper boats and land-based activities including jungle-gyms and an artificial beach. Sun City proposes to expand the facilities at Waterworld to include an additional swimming pool and enlarge the beach area on the bank of the lake, to accommodate more visitors to this section of the Resort.		
Project Location		**Latitude**	**Longitude**
	Approximate centre of Beach Expansion Site	25°20'48.46"S	27° 6'12.94"E

4.1.7 Helipad relocation and expansion (REP6)

Project Description	The current Helipad provides one landing area and three parking bays. It is located west of the vacation club and just over one kilometre by road from the Palace Hotel. The Majority of Sun City Guests who arrive by Helicopter are guests at the Palace. Sun City Proposes to move the Helipad to the roof of the Palace Parking Garage and increase its capacity. The existing Helipad footprint is 0.6 hectares. The footprint area cannot increase dramatically due to the size of the Parking Garage Roof restricting the maximum size. The proposed new Helipad will not exceed 1 hectare. Access to the Helipad and parking bays by road will be provided from “Elephant Circle”. Refuelling facilities are not provided at the existing helipad. No new fuel storage or handling facilities are to be constructed.		
Project Location		**Latitude**	**Longitude**
	Approximate centre point of new Helipad	25°20'28.65"S	27° 5'28.48"E

4.1.8 Additional Parking Garage, Convention Centre and Hotel (REP7)

Project Description	To further expand capacity of the Sun City Resort it is proposed to construct an additional parking garage, Convention Centre and Hotel (250 rooms) at the existing parking lot between The Cascades and Sun City Hotels. The new hotel garage and convention centre is planned to be 0.8 ha in extent.		
Project Location		**Latitude**	**Longitude**
	Approximate centre of Site	25°20'47.21"S	27° 5'55.11"E

4.1.9 Soccer Fields (REP8)

Project Description	A motocross grand prix track was constructed at Sun City near the Main Entrance and Warehouse, to house the 2005 Motocross World Championships. Today the track still remains but is in disuse due to lack of interest from visitors to the Resort. Sun City now proposes to construct two soccer fields on this site for use by the local soccer clubs.		
Project Location		**Latitude**	**Longitude**
	Approximate centre of Site	25°21'30.94"S	27° 6'7.96"E

4.2 Utilities and Services Projects

A detailed description of the proposed Utilities and Services Projects is provided in the subsections below.

4.2.1 Stormwater Channels at Golf Course Roads (USP1)

Project Description	Existing Service Roads allow fence inspections by security throughout the complex, and especially along the northern boundary with Pilanesberg National Park. These also act as fire breaks. North of the LCGC and north of the GPGC, these service roads cross watercourses by means of “low water bridge” structures. During and after rain events, these roads become completely flooded (impassable) and in significant rainfall events wash away significantly. Sun City proposes to install stormwater pipes or culverts underneath these roads to allow rainwater to pass underneath the roads, thereby protecting the road integrity as well.		
Project Location		**Latitude**	**Longitude**
	LCGC river crossing	25°19'43.79"S	27° 5'42.47"E
	GPGC river crossing	25°19'51.07"S	27° 6'22.08"E

4.2.2 Additional Reservoirs (to supplement existing water storage capacity) (USP2)

Project Description	To supplement existing water storage capacity at the resort complex, Sun City proposes to construct additional reservoirs. Two options are currently being considered: Construction of two Reservoirs of 10Mℓ capacity each, or the construction of one 20Mℓ Reservoir (total capacity therefore 20,000 cubic metres).		
Project Location		**Latitude**	**Longitude**
	Approximate Centre Point of New Reservoir(s)	25°20'51.96"S	27° 5'15.99"E

4.2.3 Effluent transfer line replacement (USP3)

Project Description	Currently there is an old asbestos effluent (Greywater) transfer line through Sunset Drive to Hole 2. This line will be decommissioned (shut down) but will remain in place. A new line will be installed against the fence of Letsatsing, east of the Lake. Pipe diameter is planned to be 250mm. The entire Project footprint comprises 11,420m^2. The pipeline length is 3,000 metres and the servitude width varies between 2 metres and 5 metres. The maximum throughput will be 25 ℓ/s.		
Project Location		**Latitude**	**Longitude**
	Start of New Line	25°21'40.19"S	27° 06'15.26"E
	Middle of New Line	25°21'08.51"S	27° 06'26.81"E
	End of New Line	25°20'17.51"S	27° 06'20.26"E

4.2.4 Sunset-Skytrain Fresh Water Line (USP4)

Project Description	A main water line will be constructed from the Cabanas to the Skytrain Station (pipe will be attached to the Skytrain route). The pipeline will be a total length of 700 m and have a diameter of 250 mm. There is one water crossing at 25°21'03.39"S and 27° 06'17.42"E.		
Project Location		**Latitude**	**Longitude**
	Start of New Line	25°20'58.84"S	27° 06'11.75"E
	Middle of New Line	25°21'10.07"S	27° 06'18.77"E
	End of New Line	25°21'19.51"S	27° 06'22.72"E

4.2.5 Ledig Sewer Line decommissioning, and new WWTW for VC and Palace (USP5)

Project Description	There is an old asbestos sewer line from the Sun City Complex that runs on the property boundary through the north-east section of Ledig. This line is reaching its end of life. As best practice Sun City is proposing to shut down this line, but leave it in place so as to avoid destruction of informal housing that the removal of the line would necessitate. The existing line conveys sewage from the Vacation Club and Palace to the Sun City Waste Water Treatment

	Works (WWTW). To manage the sewage from Vacation Club and the Palace, Sun City proposes the construction of a new WWTW on what is known as the "old borrow pit area" west of the current Vacation Club. The use of a sewage package plant instead of a formal WWTW is also being considered. Additionally, a new pipeline will have to be constructed from the new WWTW to the Lost City Hole 3 Dam to return the treated water for use as irrigation water. The pipeline will be less than 800 m long and have a diameter of 400mm. The site of the WWTW (or package plant) will comprise a footprint of approximately 1.5 ha, and will have a daily throughput capacity of 1,500 cubic metres.		
Project Location		**Latitude**	**Longitude**
	Approximate centre of new WWTW site	25°20'37.05"S	27° 4'51.55"E

4.2.6 South Village Pipeline (USP6)

Project Description	Water Supply to Sun City starts at the Doornkop Reservoir in the south of the Resort. South Village is supplied from a reservoir located immediately north of South Village. Water quality from this reservoir has often shown signs of containing too much chlorine. Sun City is proposing the construction of an additional pipeline to provide water to South Village from the Complex reservoirs. This pipeline will be 480 metres long, have a diameter of 110 mm and a peak throughput of 10 ℓ/s.		
Project Location		**Latitude**	**Longitude**
	Start of pipeline (at Reservoir)	25°21'19.04"S	27° 5'52.02"E
	End of pipeline (tie-in point)	25°21'24.074"S	27° 06'05.25"E

4.2.7 Generator Park (USP7)

Project Description	Sun City currently has 13 operational Diesel Generators throughout the Resort, servicing different facilities in the event of a power outage. Sun City is proposing to consolidate these generators into one area, adjacent to the existing primary substation and car park near the Resort Entrance, to ensure the Generators are not visually intrusive and that the noise from the generators can be effectively screened off from receptors. As an alternative solution, Sun City proposes to establish a smaller generator park servicing the east side business units only located at No 1 substation. The substation is located between the Cabanas Bus Stop and the Skytrain on the top road. This alternative would involve re-establishing a diesel storage

	facility (building existing), trenching and excavation adjacent to the existing sub. This would be an 11 kV step-up generating facility, with a paved access road. The generator park will connect directly to the existing grid.		
Project Location		**Latitude**	**Longitude**
	Approximate Centre of Site: Alternative 1	25°21'23.35"S	27° 6'19.15"E
	Approximate Centre of Site: Alternative 2	25°20'57.20"S	27° 6'4.46"E

4.3 Maintenance Projects

4.3.1 Clearance of Fence Roads (MP1)

Project Description	The entirety of the Sun City Property is not fenced. The “developed area” comprising the existing resort is fenced and access controlled. The perimeter fence between Sun City and Pilanesberg National Park is also fenced with game fencing. Other areas such as the landfill site and nursery are fenced individually. Service roads are associated with the Sun City fence-lines, to enable access to these areas for fence inspection. In addition to fence inspections, vegetation clearance in these areas is necessary frequently to act as fire breaks. Apart from the ecological repercussions of uncontrolled veld fires, human safety and economic liability also has to be considered in assessing the importance of maintaining effective fire breaks.
Project Location	Sun City Perimeter Fence-line.

4.3.2 Sun Park Culverts (MP2)

Project Description	The bottom access road to Sun City crosses a watercourse at two points downstream of the Sun City Recreational Lake. There are a number of culverts, allowing water to flow underneath the road. The culverts in question are pairs of culverts at two sites close to the Sun Park. These culverts have not been cleaned out in recent years and have begun to silt up with soil, vegetation and litter. Sun City wishes to establish an access road to the Culverts to enable regular maintenance of the culverts, and periodically clean the culverts as necessary. This is considered an ongoing maintenance project and not a once-off activity.		
Project Location		**Latitude**	**Longitude**
	Culvert Location	25°21'1.54"S	27° 6'17.65"E

4.4 Project Schedule

The projects that are the subject of this report are planned for implementation at Sun City of the next ten to fifteen years. The table provides a description of the anticipated duration of each project's construction phase (where relevant). Operational phases of the proposed projects are indefinite.

Table 4-2: Duration and Scheduling of Projects

No.	Project Name	Duration
REP1	Eco-Lodge	Construction of the Eco Lodges will take approximately 12 months. This is not considered a priority project for the resort and is anticipated to be implemented towards the end of the 15-year Project development schedule.
REP2	Driving Range Road	Construction of the golf-cart path is not anticipated to exceed three month. This is a priority project for Sun City and is anticipated to be scheduled in the first five years of the Project development schedule.
REP3	Kwena Gardens Expansion	Construction of the additional chalets is not anticipated to exceed 18 months. This is considered a priority project, currently planned for implementation in mid-2020.
REP4.1	Vacation Club (VC) Phase 3	Construction of VC Phase 3 is anticipated to be complete within 24 months. This is a priority project earmarked for 2020.
REP4.2	Vacation Club (VC) Phase 4	Construction of VC Phase 4 is anticipated to be complete within 24 months.
REP5	Recreational Lake Beach Expansion	Expansion of these facilities can be completed within six months. This is not considered a high-priority Project and is likely to be implemented in year 5 of the Project development schedule.
REP6	Helipad relocation and expansion	This will coincide with the VC Phase 3, as the existing Helipad has to be relocated before VC Phase 3 can be constructed.
REP7	Additional Parking Garage, Convention Centre and Hotel	Construction of this project should not exceed two years period. The Project is earmarked to commence in 2022.

No.	Project Name	Duration
REP8	Soccer Fields	Establishment of the soccer fields will not exceed 6 months. This project is anticipated to be implemented in 2020.
USP1	Stormwater culverts at Golf Course Roads	Construction of the culverts should not exceed 1 month. This is considered a priority project and is anticipated in 2019. It is imperative that this project is scheduled for construction during the dry season.
USP2	Additional Reservoirs to Supplement existing water storage capacity	Reservoir and associated pipeline construction is not anticipated to exceed 12 months. The project is a priority for Sun City and is currently scheduled for 2020.
USP3	Effluent transfer line replacement	It is anticipated that construction of the new line will take approximately 6 months. The Project is earmarked for implementation in 2019
USP4	Sunset-Skytrain Fresh Water Line	The project is not anticipated to exceed 6 months and is considered a priority project, scheduled for implementation in 2019.
USP5	Ledig Sewer Line decommissioning, New WWTW for VC and Palace	Establishment of the new WWTW will take approximately 12 months. This project is earmarked for implementation in 2020.
USP6	South Village Pipeline	Establishment of the pipeline will not exceed three months, this is considered a priority project and will be implemented in 2019.
USP7	Generator Park	Establishment of the generator park (for all generators, or for the east-side generators) will not exceed 2 months. This project is not considered a high priority and is currently scheduled for 2023.
MP1	Clearance of Fence Roads	This project will recur at least annually as it is a maintenance project aimed at fire safety (among other considerations). Clearance of the 25 km fence road will most likely not exceed one month and be undertaken annually.
MP2	Sun Park Culverts	This project will recur as necessary when the culverts silt up. Clearance of the culverts will most likely not exceed a 2-week duration.

A preliminary schedule is presented in Figure 4-1 below.

	REP1	REP2	REP3	REP 4.1	REP 4.2	REP5	REP6	REP7	REP8	USP1	USP2	USP3	USP4	USP5	USP6	USP7	MP1	MP2
2019																		
2020																		
2021																		
2022																		
2023																		
2024																		
2025																		
2026																		
2027																		
2028																		
2029																		
2030																		
2031																		
2032																		
2023																		

Figure 4-1: Implementation Schedule

4.5 Listed Activities associated with the Proposed Development

Together with the EIA Regulations, 2014 (as amended)[3] , the Minister published Regulations in terms of Sections 24 and 24D of the NEMA for Activities that require Environmental Authorisation prior to their commencement.

Activities identified in Listing Notice 1 GN R 983 (as amended by GN R 327) or Listing Notice 3 GN R 985 (as amended by GN R 324) require a Basic Assessment Process be followed when applying for EA. Activities identified in Listing Notice 2 GN R 984 (as amended by GN R 325) require the Scoping and EIA Process to be undertaken. The proposed project involves activities which are identified in all three Listing Notices and therefore requiring the Scoping and EIA Process to be followed.

Table 4-3 identifies the Listed Activities in terms of NEMA which are relevant to the proposed future developments at Sun City and provides a motivation for inclusion of each Activity. These triggered Activities were identified during the Scoping Phase of this project and no subsequent amendments have been made.

[3] As amended by GN R 326 of 07 April 2017.

Table 4-3: Listed Activities relevant to the Project

Notice No	Listing No	Activity No	Activity Description	Describe each listed activity as per project description
GN R 327	Listing Notice 1	Activity 2	The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where— (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.	**Generator Park (USP7)** - Neither alternative solution will comprise a footprint exceeding 1 Hectare. Electricity output from all of the generators cumulatively is **12MWA** (more than 10 megawatts) and therefore the activity is considered applicable to both alternatives.
GN R 327	Listing Notice 1	Activity 9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—	**VC Phase 4 (REP4.2)** - This development of will require bulk water supply.
GN R 327	Listing Notice 1	Activity 11	**Activity 11**: The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	**VC Phase 4 (REP4.2)** - The development will require electricity transmission and distribution. The parameters of which will be defined during the scoping phase. It can be assumed that this activity is likely to be triggered.
GN R 327	Listing Notice 1	Activity 12	The development of — (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) **infrastructure or structures with a physical footprint of 100 square metres or more**; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, **within 32 metres of a watercourse**, measured from the edge of a watercourse;	**Recreational Lake Beach Expansion (REP5)** - This development will be located in close proximity to the existing Sun City Lake and will likely comprise a footprint exceeding 100m2. **Eco-Lodge (REP1)** - each of the proposed Eco-Lodges might exceed 100m2 in footprint, and cumulatively the footprint will definitely exceed 100m2. Wetlands have been identified in close proximity to the Eco-Lodges site. **VC Phase 3 (REP4.1)** - the cumulative footprint of the VC Phase 3 will exceed 100m2 and is located in close proximity to a wetland identified on site.
GN R 327	Listing Notice 1	Activity 14	The development and related operation of facilities or infrastructure for the storage, or for the storage and handling of a dangerous good,	**Generator Park (USP7)** - The existing Generators at Sun City were established prior to the current regulations

Notice No	Listing No	Activity No	Activity Description	Describe each listed activity as per project description
			where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	requiring licensing of diesel storage facilities. They have flammable liquid certificates issued by the local fire chief but no environmental authorisation. If the combined capacity of diesel storage on site exceeds 80m^3, this activity will be relevant. Consolidation of all 13 Generators is expected to require more than 80 cubic metres diesel storage capacity.
GN R 327	Listing Notice 1	Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	**Stormwater Culverts at Golf Course Roads (USP1)** - Construction of the culverts underneath the Golf Course Roads will most likely involve the moving of more than 10m^3 of material from the watercourses. It is also noted that this project will require authorisation under the National Water Act, 1998 (Act No. 36 of 1998) (NWA). **Clearance of Fence Roads (MP2)** - The physical act of maintenance activities at the Sun Parks Culverts (removal of built-up silt) constitutes this activity. **VC Phase 4 (REP4.2)** – has watercourses in the development area, although sensitives area will be avoided after the specialist assessment has been undertaken it is possible that there may be some infilling or depositing of material of more than 10 cubic metres from a watercourse. To be confirmed in assessment phase.
GN R 327	Listing Notice 1	Activity 31	The decommissioning of existing facilities, structures or infrastructure for— (v) any activity regardless the time the activity was commenced with, where such activity: (a) is similarly listed to an activity [that is currently a listed activity]; and (b) is still in operation or development is still in progress;	**Helipad relocation and expansion (REP6)** - The existing Helipad is considered a “similarly Listed” Activity. Decommissioning thereof thus requires authorisation.

Notice No	Listing No	Activity No	Activity Description	Describe each listed activity as per project description
GN R 327	Listing Notice 1	Activity 46	The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure— (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more;	**Effluent transfer line replacement (USP3)** - The Effluent transfer line replacement project can be regarded an expansion of Sun City's existing infrastructure for the bulk transportation of sewage, effluent, and waste water. The proposed new Effluent line is 3,000m in length and this activity is therefore applicable to the proposed projects. **VC Phase 3 (REP4.1) –** this development may require an expansion of bulk services, diameters to be confirm after the scoping phase.
GN R 327	Listing Notice 1	Activity 48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	**Recreational Lake Beach Expansion (REP5)** - The existing infrastructure at Waterworld exceeds a 100m^2 footprint and it is anticipated that at least some of this infrastructure may remain, and that the expansion will also exceed 100m^2 in footprint size. The Recreational Lake Beach Expansion development is proposed adjacent to the Sun City Lake.
GN R 324	Listing Notice 2	Activity 15	Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation.	Cumulatively, the proposed activities associated with this application will remove more than 20 Ha of indigenous vegetation. Particularly with regard to VC phase 4, which is an undeveloped area.
GN R 324	Listing Notice 3	Activity 2	The Development of reservoirs (excluding dams) with a capacity of more than 250 cubic metres, in North-West in	**Additional Reservoirs (USP2)** - The proposed additional reservoir(s) will have a capacity of 20,000 cubic metres.

Notice No	Listing No	Activity No	Activity Description	Describe each listed activity as per project description
GN R 324	Listing Notice 3	Activity 4	The development of a road wider than 4 metres with a reserve less than 13,5 metres, in North-West: i. Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from a biosphere reserve;	**Eco-Lodge (REP1)** - It is possible that the access road to the Eco-Lodge may require upgrading and the development of new roads to access the individual lodges will also likely be required. The site is adjacent to Pilanesberg National Park.
				VC Phase 3 and Phase 4 (REP4.1 and 4.2) – The access road and internal roads at the VC Phase 3 expansion may also have to be wider than 4 metres.
				Helipad relocation and expansion (REP6) - The access road to the new Helipad may have to cater for one lane of traffic in each direction and thus be wider than 4 metres.
				Clearance of Fence Roads (MP1) - The “fence roads” which serve as fire breaks will in places be immediately adjacent to Pilanesberg National Park and to be effective will have to be wider than 4 metres.
GN R 324	Listing Notice 3	Activity 10	The development and related operation of facilities or infrastructure for the storage, or for the storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 cubic metres or more but not exceeding 80 cubic metres, in North-West, in Critical Biodiversity Areas, sensitive areas or within 100m from the edge of a watercourse or wetland.	**Generator Park (USP7)** - Consolidation of the generators at Sun City to one site will also involve consolidation of Diesel Storage Facilities, which combined capacity therefore is anticipated to exceed 30 cubic metres.
GN R 324	Listing Notice 3	Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation, in North-West: i. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;	**Eco-Lodge (REP1)** - The development of the Eco-Lodge will necessitate clearance of more than 300 m^2 of vegetation within an area deemed ‘sensitive’ due to the natural and undeveloped state of the site and its proximity to Pilanesberg National Park. The proximity to the downstream

Notice No	Listing No	Activity No	Activity Description	Describe each listed activity as per project description
			ii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or iii. Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.	watercourse will be verified once designs are completed
				Driving Range Road (REP2) - The development of the Golf Cart road will comprise a minimum footprint of 2,250m^2 (900m in length with an average width of 2.5m). The area is expected to be sensitive due to the natural state of vegetation, stream crossing and proximity to Pilanesberg National Park.
				Additional Reservoirs (USP2) - Construction of the additional reservoir(s) will necessitate the clearance of more than 300m^2 of vegetation.
				Effluent transfer line replacement (USP3) - Construction of the new Effluent transfer line will require the clearance of vegetation.
				Kwena Gardens Expansion (REP3) - Development of an additional 20 Chalets at Kwena Gardens will necessitate the clearance of vegetation. The ecological study will confirm whether this comprises indigenous vegetation. The site is in close proximity to watercourses and wetlands associated with the Kwena Gardens Crocodile Farm facilities.
				Clearance of Fence Roads (MP1) - Fence roads in some cases cross watercourses and cumulatively vegetation clearance for fire breaks will exceed this threshold.
				Sun Park Culverts (MP2) - The access road establishment to service the Culverts at SunPark will most likely require the clearance of more than 300m^2 of vegetation in close

Notice No	Listing No	Activity No	Activity Description	Describe each listed activity as per project description
				proximity and within the watercourse.
GN R 324	Listing Notice 3	Activity 16	The expansion of reservoirs excluding dams, where the capacity will be increased by more than 250 cubic metres, in North-West:	**Additional Parking Garage, Convention Centre and Hotel (REP7)** - The proposed Additional Reservoirs project will increase over-all storage capacity at Sun City by 20,000 cubic metres.
GN R 324	Listing Notice 3	Activity 17	The expansion of a resort, lodge, hotel, tourism or hospitality facilities where the development footprint will be expanded and the expanded facility can accommodate an additional 15 people or more, in North-West: i. World Heritage Sites; core of biosphere reserve; or sites or areas identified in terms of an international convention; ii. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation; iii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999); iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; v. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or vi. Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.	**Eco-Lodge (REP1)** - The development of the Eco-Lodge can be considered expansion of Sun City Report as a whole. **Additional Parking Garage, Convention Centre and Hotel (REP7)** - The development of the Parking Garage, Hotel & Convention Centre is considered an expansion of the Sun City Resort. **Kwena Gardens Expansion (REP3)** - Development of an additional 20 Rustic Chalets constitutes expansion of the existing Rustic Chalets at Kwena Gardens. **VC Phase 3 and Phase 4 (REP4.1 and 4.2)** - Development of the VC Phase 3 and VC Phase 4 constitutes expansion of the existing VC Phase 1,2 and 3. The area is regarded as sensitive but this will be confirmed by the specialist studies.
GN R 324	Listing Notice 3	Activity 18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre, in North-West: i. Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from a biosphere reserve; ii. Areas within a watercourse or wetland, or within 100	**Driving Range Road (REP2)** - In places the path associated with the Driving Range Road may reach a width of 4 metres to allow for golf carts to pass each other. It may be assumed that the construction servitude is likely to exceed 4 metres in places where allowance must be made

Notice No	Listing No	Activity No	Activity Description	Describe each listed activity as per project description
			metres from the edge of a watercourse or wetland	for laydown areas etc. The Sun City Resort is adjacent to Pilanesberg National Park. The golf course path involves a stream crossing.
GN R 324	Listing Notice 3	Activity 6	The development of resorts, lodges, hotels, tourism or hospitality facilities that sleeps 15 people or more, in North-West: i. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; ii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or iii. Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.	**Eco-Lodge (REP1)** - The Eco-Lodge will be able to accommodate a total of 80 to 125 additional guests. It is not seen as expansion of existing lodges, hotels etc. as the Eco-Lodge development presents a new accommodation typology within the Sun City Resort. The area is deemed sensitive. The proximity to the downstream watercourse will be verified once designs are completed. It is noted that the VC Phase 3 and Kwena Gardens Expansion are regarded expansion and not development Projects.
				Additional Parking Garage, Convention Centre and Hotel (REP7) - Although the site of the proposed new Parking Garage, Hotel and Convention Centre is not deemed sensitive as it is currently a parking lot, this project is considered expansion of the existing Sun City Resort and development of a new Hotel.

5 Relevant Policy and Legislative Context

An application in terms of NEMA to obtain an Environmental Authorisation has been submitted to the Department of Rural, Environment and Agricultural Development (READ), North West Provincial Government for the Listed Activities provided in Section 4.4 above. Various policy and legislative requirements are applicable to the Environmental Authorisation application and assessment process as detailed in Table 5-1 below.

Table 5-1: Relevant National Legal Framework

Applicable legislation and guidelines used to compile the report	Reference where applied
The Constitution of the Republic of South Africa, 1996 (the Constitution) Under Section 24 of the Constitution it is clearly stated that: *Everyone has the right to* *(a) an environment that is not harmful to their health or well-being; and* *(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -* *(i) Prevent pollution and ecological degradation;* *(ii) Promote conservation; and* *(iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*	Sun City is undertaking a Scoping and EIA Process to identify and determine the potential impacts associated with the proposed developments within the Sun City Resort Complex. Mitigation measures which have been recommended aim to ensure that the potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.
National Environmental Management Act, 1998 (Act No 107 of 1998) and EIA Regulations (December 2014) NEMA, as amended, was set in place in accordance with Section 24 of the Constitution. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that: *The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.* The EIA Regulations, Government Notice (GN) Regulation (R) 982 were published on 04 December 2014 and promulgated on 08 December 2014 together with the amended Listing Notices: GN R326, (EIA Regulations) GN R 327 (Listing Notice 1); GN R325 (Listing Notice 2) and GN R324 (Listing Notice 3) of 7 April 2017.	Activities associated with the proposed developments are identified as Listed Activities in the Listing Notices (as amended) and therefore require Environmental Authorisation prior to being undertaken. This Scoping and EIA Process has been duly informed by the requirements of the NEMA and Regulations thereunder.

Applicable legislation and guidelines used to compile the report	Reference where applied
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)(NEMWA) The NEMWA provides for national norms and standards for regulating the management of waste, and the licensing and control of waste management activities. On 29 November 2013, the list of waste management activities published under GN R718 of 3 July 2009 (GN R718) was repealed and replaced with a new list of waste management activities under GN R921 of 29 November 2013. Included in the new list are activities listed under Category A, B and C for which a Waste Management Licence (WML) may be required.	General waste is generated at Sun City as well as building rubble from maintenance activities. Waste is recycled as far as possible at the Sun City onsite recycling yard. Waste that cannot be recycled is temporary stored at the recycling yard removed from site by subcontractor. Medical waste is removed from the site by Compass Medical Waste Services and is incinerated at their facilities either in Roodepoort or Berlin, Johannesburg. Sun International intends to decommission and cap its existing landfill site at Sun City, for which a separate environmental regulatory process is underway, as a Zero-Waste-to-Landfill initiative which comprises of waste-to-energy, waste-to-brick and waste-to-protein solutions has been initiated for the resort. This initiative is planned to be progressively implemented and achieved by 2020. The proposed activities will not warrant a WML, however the norms and standards for waste management under the Act will be duly observed.
National Water Act, 1998 (Act No. 36 of 1998) (NWA) The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA. GN R 704 was published in June 1999 and aims to regulate the use of water for mining and related activities for the protection of water resources and states the following: ▪ Regulation 4: No residue deposit, reservoir or dam may be located within the 1:100 year flood line, or less than a horizontal distance of 100 m from the nearest watercourse. Furthermore, person(s) may not dispose of any substance that may cause water pollution; ▪ Regulation 5: No person(s) may use substances for the construction of a dam or impoundment if that substance will cause water pollution;	Sun City is in possession of a Water Use License (WUL) (License No. 03/A22F/ABCEFGI/2627) for various water uses associated with activities at the resort. Further development at Sun City situated within 500 meter (m) from delineated wetlands and within 100 m from water drainage lines will require licensing in terms of the NWA. A Wetland Delineation and Impact Assessment have being undertaken as part of this EIA. The following projects will require a WUL: ▪ REP1: Development of Eco Lodges within 500m from watercourse (Section 21(c) and (i)); ▪ REP2: Driving Range Road also crosses local drainage lines (Section 21(c) and (i));

Applicable legislation and guidelines used to compile the report	Reference where applied
▪ Regulation 6 is concerned with the capacity requirements of clean and dirty water systems, and ▪ Regulation 7 details the requirements necessary for the protection of water resources.	▪ REP5: Recreational beach expansion (Section 21(c) and (i)); ▪ USP1: Stormwater culverts at Golf Course Roads (Section 21(c) and (i)); ▪ USP3: Effluent transfer lines replacement (Section 21(c) and (i)); ▪ USP5: New WWTW for VC and Palace (Section 21(g); (c) and(i); and ▪ MP2: Sun Park Culverts (Section 21(c) and (i)). A separate regulatory process with the Department of Water and Sanitation (DWS) will be undertaken to authorise these water uses.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) The NEMBA regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management of alien and invasive species. The following regulations which have been promulgated in terms of the NEMBA are also of relevance: ▪ Alien and Invasive Species Lists, 2014 published (GN R.599 in GG 37886 of 1 August 2014); ▪ National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations; and ▪ National list of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of the Biodiversity Act (GG 34809, GN R.1002, 9 December 2011).	Certain Fauna and Flora species of conservation concern are known to occur in the general vicinity of the site and have been recorded on site A Fauna and Flora Impact Assessment has been undertaken which includes the characterisation of the natural habitat and provides mitigation measures that must be applied to sensitive habitats. The majority of the infrastructure associated with the proposed developments is planned on already disturbed land as far as possible to reduce disturbance of natural vegetation.
National Environmental Management Protected Areas Act, 2003 (Act No 57 of 2003)(NEMPAA) The NEMPAA provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, for the establishment of a national register of all national, provincial and local protected areas and for the management of those areas in accordance with national norms and standards.	Portions of the resort are located within the 1 km buffer of a Protected Area and in proximity to other biodiversity nodes. As such, every reasonable effort must be taken to ensure that the activities at Sun City do not negatively impact on adjacent natural areas, including and especially Pilanesberg National Park.

Applicable legislation and guidelines used to compile the report	Reference where applied
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEMAQA) According to the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA) the Department of Environmental Affairs (DEA), the provincial environmental departments and local authorities (district and local municipalities) are separately and jointly responsible for the implementation and enforcement of various aspects of NEM: AQA. A fundamental aspect of the new approach to the air quality regulation, as reflected in the NEM: AQA is the establishment of National Ambient Air Quality Standards (NAAQS) (GN R 1210 of 2009). These standards provide the goals for air quality management plans and also provide the benchmark by which the effectiveness of these management plans is measured.	The proposed future projects at Sun City are not expected to contribute significantly to deterioration of air quality and are not associated with generation of excessive emissions. The current generator capacity at the resort will remain unchanged through the implementation of USP 7, though emissions will be from a concentrated point. None of the proposed projects require an Atmospheric Emissions Licence (AEL). Nonetheless, an Air Quality Impact Assessment has been undertaken as part of this EIA process to establish a clear baseline of current air quality in the projects' vicinity, quantify anticipated impacts from projects and prescribe mitigation and management measures for the impacts that may be deemed significant.
National Noise Control Regulations, R.154 of 1992 (the Noise Regulations) promulgated in terms of Section 25 of the Environmental Conservation Act, 1989 (Act 73 of 1989) The National Noise-Control Regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) (NCRs) form part of the Environmental Conservation Act and these Regulations apply to external noise. The NCRs differentiates between Disturbing Noise levels (which is objective and scientifically measurable which are generally compared to existing ambient noise level) and Noise Nuisance (which is a subjective measure and is defined as noise that "*disturbs or impairs or may disturb or impair the convenience or peace of any person*"). Local Authorities use Controlled Areas to identify areas with high noise levels. Restrictions have been set out for development that occurs in these Controlled Areas. These regulations make provision for guidelines pertaining to noise control and measurements. The regulations make reference to the use of the South African National Standards 10103:2008 (SANS) guidelines for the Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication. As such, a Noise Impact Assessment in accordance with the NCRs must be undertaken for submission to determine the potential disturbing and nuisance noise levels associated with a particular development.	A Noise Impact Assessment, including modelling, impacts and proposed mitigation measures has been undertaken for this EIA.

Applicable legislation and guidelines used to compile the report	Reference where applied
The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is the overarching legislation that protects and regulates the management of heritage resources in South Africa. The Act requires that Heritage Resources Agency's in this case the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Resources Authority of Mpumalanga (MHRA), be notified as early as possible of any developments that may exceed certain minimum thresholds. This act is enforced through the National Heritage Regulations GN R 548 (2000).	A Heritage Resource Management (HRM) process has been undertaken for the proposed project with the specific aim of detailing identified heritage resources within the site-specific area which may be disturbed.
Restitution of Land Rights Act, 1994 (Act No. 22 of 1994) The Restitution of Land Rights Act, 1994 (Act No. 22 of 1994) was passed 1994 with the aim of offering a solution to people who had lost their land as a result of racially discriminatory practices such as forced removals. The Act made provision for Land Claims lodgements through the Land Claims Commissioner for the restitution of land rights.	Consultation with the Land Claims Commissioner has confirmed that there are no current Land Claims on the affected properties. The Sun City Property is leased by Sun International from the National Government of RSA. The lease was initially entered on 23 October 1978 with subsequent amendments made to the agreement executed on 13 March 1979. The lease for the Sun City property is valid until 31 March 2079.

Table 5-2: Relevant Provincial and Local Legal Framework

Applicable legislation and guidelines used to compile the report	Reference where applied
The North West Provincial Development Plan The North West Provincial Development Plan (PDP) was produced by the North West Planning Commission and serves as an implementation strategy and guideline for local government in line with the NDP. The North West PDP provides various priority areas for the province including but not limited to economy and employment, economic infrastructure as well as environmental sustainability.	The projects proposed will require additional workforce which is in line with the PDP objective to improve economic productivity within the province as well as provide additional capacity to host and accommodate consumers. In terms of environmental sustainability, the EIA process has been undertaken in accordance with the principles of Section 2 of NEMA as well as with the NEMA EIA Regulations, 2014 (as amended) which have the overarching aim of promoting Sustainable Development.
Integrated Development Plans The BPDM IDP recognises the tourism sector as a key economic contributor to the local economy. The IDP makes specific reference to the development of tourism facilities and bulk infrastructure around the Sun City node to enhance tourism activities. Similarly, the MKLM's IDP (2016/17) states that the strategy to address the root causes of unemployment and poor economic development must focus on a number of sectors, one of which is tourism.	The proposed developments at Sun City will increase accommodation capacity which can be linked to other tourism activities within the region. Furthermore, this proposal to expand the resort in terms of accommodation capacity and recreational areas will contribute to local employment.
Spatial Development Frameworks The North West SDF (2016) and MKLM SDF (2010) indicate the Sun City Complex as a main node of economic activity within the municipality and provides that future economic development opportunities should be channelled into activity corridors and nodes.	The expansion of the Sun City Complex will align to this objective as the Sun City Resort is a major tourism node. Furthermore, the resort lies adjacent to a proposed Heritage Park and the Pilanesberg National Park providing a link to the Madikwe Game Reserve further north-west of the resort. The proposed expansion of the Sun City Complex will strengthen the capacity of the primary tourism node for the North West Province in terms of accommodation for consumers and the variety of recreational activities available.
Environmental Management Frameworks Environmental Management Frameworks (EMFs) delineate environmentally sensitive areas and areas favoured for development within a region. Currently there is a Draft EMF that has recently been published in 2018 specifically for the BPDM. EMFs for the surrounding municipalities (namely Madibeng and Rustenburg Local Municipalities) have	The Sun City Complex falls within an ONA, however it is noted that this is directly adjacent to a Protected Area, namely the Pilanesberg National Park. This EIA Process has been undertaken to ensure that negative environmental and social impacts associated with the proposed developments are avoided/ mitigated as far as possible

Applicable legislation and guidelines used to compile the report	Reference where applied
the common goal of balancing economic development, social development and environmental resource management. The EMFs recognises the tourism sector as a key activity with potential for future development within the region and therefore provision for recreational and tourism areas is endorsed. The Madibeng Local Municipality EMF provides that elements associated with tourism demand are currently met by a variety of economic activities, however, it is necessary to ensure that new tourism developments contribute to the economic growth of the region in a sustainable manner. The Rustenburg Local Municipality EMF indicates that tourism areas and heritage sites form part of conservation management zones within the region. A Biodiversity Sector Plan (BSP) was compiled in 2015 by the Department of READ, North West Province which serves as a tool for land use planning and natural resource management within the province. Tourism and accommodation is recognised as a land use zone in the BSP which provides for opportunities for the development of a broad range of tourist and recreational facilities, inclusive of tourism, recreation and accommodation facilities. This zone has been divided into low impact and high impact tourism facilities aligned to conservation management zones. The low impact facilities comprise of small scale activities such as outdoor recreation and camping sites which can be developed in Protected Areas, Critical Biodiversity Areas and Ecological Support Areas with appropriate biodiversity controls being in place while high impact facilities include developments such as lodges, hotels and large resorts which can only be developed in Other Natural Areas (ONAs).	which in turn will ensure that the objective which align with these Environmental Management Frameworks are maximised as far as possible.

6 Need and Desirability of the Proposed Development

The Integrated Environmental Management Guideline Series 9: Guideline on Need and Desirability was promulgated in terms of the EIA Regulations, 2010 in Government Notice 891 of 2014. The Department of Environmental Affairs (DEA) published an updated Integrated Environmental Management Guideline on Need and Desirability in 2017.

According to these guidelines, the consideration of "need and desirability" in EIA decision-making requires the consideration of the strategic context of the proposed projects along with the broader public interest and societal needs. The guidelines further state that the development must not exceed ecological limits and the proposed actions must be measured against the short-term and long-term public interest to promote justifiable social and economic development, essentially ensuring the simultaneous achievement of the triple bottom line (Social, Environmental and Financial sustainability).

6.1 Questions To Be Engaged With When Considering Need and Desirability

The latest Guideline Document on the assessment of Need and Desirability (DEA, 2017) includes a number of questions, the answers to which should be considered in the EIA Process. These questions (as per the Guideline) and answers to each are presented in Table 6-1.

Table 6-1: Need and Desirability

Theme	No	Specific Questions	Answer related to the Proposed future developments at Sun City
"Securing ecological sustainable development and use of natural resources"	1	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	The impact of the proposed projects at Sun City have been assessed according to recognised rating methodologies, based on the specialist investigations undertaken. Management measures have been prescribed as part of the EMPr to (among other goals) limit the extent of ecological impacts of the proposed developments to the development footprints within the existing Sun City Resort, and prevent impact creep and edge-effects on adjacent undisturbed and naturally functioning ecological areas.
	1.1	How were the following ecological integrity considerations taken into account?	
	1.1.1	Threatened Ecosystems	The whole of the Sun City Resort Complex is located in Zeerust Thornveld according to the National Vegetation Map (2012) (sanbi.bgis.org). This vegetation type is part of the Central Bushveld Bioregion of the Savanna Biome. Zeerust Thornveld is considered to be "least threatened" (Mucina & Rutherford, 2006).
	1.1.2	Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure	The Sun City Resort Complex is not affected by coastal shores or estuaries but wetland and riparian systems do occur on the site. A wetland delineation and impact study has been undertaken and considered in the site layout. This did not result in a change in the preferred layout.
	1.1.3	Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs)	The existing Sun City Resort Complex contains areas designated as CBA 1, CBA 2, and ESA 1. The CBA1 area is in the northernmost corner of the resort complex (refer to Plan 12, Appendix 1). REP 1 (Eco-Lodges) and USP1 (stormwater culverts at golf course roads) will affect the CBAs. CBA 2 areas will be affected by the following proposed projects: REP4.1 and REP4.2 (VC Phase 3 and Phase 4); REP 8 (Soccer Fields); USP2 (Reservoirs); USP5 (new WWTW); and USP3 (new effluent line). The remaining projects are located in ESA1 areas. It is important to note that already built up areas within the Sun City Complex are also located within the CBA and ESA areas. Parts of the site are also identified as aquatic CBAs and ESAs (including areas that are currently built-up).
	1.1.4	Conservation targets	The conservation target for Zeerust Thornveld is 19% and less than 4% is statutorily conserved (Mucina & Rutherford, 2006). The lease area east of the existing Sun City Resort Complex is being used by Game Trackers for game drives and related activities and will remain as natural area – this part of the lease area is not affected by the proposed future projects at Sun City. This part of the lease area also comprises Zeerust Thornveld, making a significant (approximately 470 ha) contribution to conservation of this vegetation type.
	1.1.5	Ecological drivers of the ecosystem	The existing Sun City Resort has resulted in an alteration of the ecological drivers of the ecosystem. The specialist investigation undertaken as part of this EIA included assessments of the ecological state of the affected ecosystem and further potential impacts as a result of the proposed projects. Key ecological drivers including wetland systems and Species of Special Concern (SSC) were identified and measures for their preservation have been provided to ensure that ecological integrity is maintained as far as possible.
	1.1.6	Environmental Management Framework	There are no EMFs that exist specifically for the MKLM or the broader BPDM, however one is currently being finalised. Surrounding municipalities, namely Madibeng and Rustenburg Local Municipalities, recognise the tourism sector as an area for social and economic development as well as a contributor to environmental conservation strategies and thus holds potential for future development for the area. For the broader province, the North West BSP serves as a tool for spatial planning and includes tourism and accommodation as a land use zone which provide opportunities for the development of a broad range of tourist and recreational facilities, inclusive of tourism, recreation and accommodation facilities. The Sun City Complex falls within an ONA tourism area, which is permitted to include developments such as lodges, hotels and large resorts.

Theme	No	Specific Questions	Answer related to the Proposed future developments at Sun City
	1.1.7	Spatial Development Framework	The North West SDF (2016) and MKLM SDFs (2010) indicate the Sun City Complex as a main node of economic activity within the municipality and further future economic development opportunities should be channelled into activity corridors and nodes. The expansion of the Sun City Complex will align to this objective as the Sun City Resort is a major tourism node and will strengthen the capacity of the primary tourism node for the North West Province. Furthermore, the resort lies adjacent to a proposed Heritage Park and the Pilanesberg National Park providing a link to the Madikwe Game Reserve further north-west of the resort. This has been identified as the primary tourism node within the province.
	1.1.8	Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)	Sun City has embarked on several internal projects to reduce energy consumption, water consumption and waste generation at the Resort. There are no RAMSAR Sites in the immediate vicinity of the Sun City Resort. The Closest RAMSAR Site is the Blesbokspruit, approximately 165km south-east of the Resort. The closest World Heritage Site is the Cradle of Humankind approximately 80km south-east from the resort.
	1.2	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	The proposed Projects at Sun City involve expansion projects of resort facilities, expansion of services, and maintenance projects. The proposed projects are the subject of an EIA Process, inclusive of a suite of specialist studies that will determine site-specific sensitivities. Where plausible, the proposed layout was adjusted avoid sensitive ecological environments. Furthermore the specialist studies compiled as part of this EIA include management and mitigation measures to reduce the severity and/or likelihood of potentially significant impacts to acceptable levels. The EIA Process has identified some positive impacts associated with the proposed projects, and provide an assessment of the significance of positive impacts and ways to enhance them. Essentially, the projects are aimed at continued and efficient functioning of the Sun City Resort, which contributes positively to job creation and tourism in the region.
	1.3	How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	
	1.4	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	Construction waste will be generated for all Expansion and Services Projects. In the operational phases, some of the projects will not generate waste (water pipelines, reservoirs etc.) others will generate additional domestic waste, that will feed into the existing waste management system at Sun City and eventually feed into the waste-to-energy plant.
	1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	There are known Heritage Resources on the Sun City Property. A Heritage Specialist Study was undertaken as part of the EIA Process. Furthermore, the location of the proposed projects within the Sun City Resort Complex have been chosen based on Heritage Sensitivities identified on the site by the Heritage Specialist as part of the Heritage Resources Management (HRM) process.
	1.6	How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Expansion of accommodation facilities at Sun City Resort will necessitate the use of additional water and power, and lead to the generation of additional domestic waste. **Water Resources**: Sun City is located in the Moses Kotane Local Municipality. The water services provider for the Municipality is Magalies Water, next to the Vaalkop Dam. Sun City uses treated water for irrigation and has a water policy in place, which will also apply to the proposed new developments. Treated water from the new WWTW will also be used as irrigation water. New Resort Accommodation Facilities will be fitted with water-saving technologies and landscaping will be indigenous and water-wise plants. **Electricity**: The majority of electricity used at Sun City is supplied by Eskom. The Resort also uses LGP for cooking and coal for heating water at the Crocodile Farm (Kwena Gardens). Hot water supply is delivered through heat pumps or solar geysers in the majority of accommodation facilities. Back-up power is supplied by Diesel Generators (Sun City currently has 13 operational Diesel Generators throughout the Resort, servicing different facilities in the event of a power outage. All new accommodation facilities must be designed to incorporate energy-saving technologies (such as solar heating and ecological-
	1.7	How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure	

Theme	No	Specific Questions	Answer related to the Proposed future developments at Sun City
		responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	design principles).
	1.7.1	Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)	
	1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)	
	1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	
	1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts?	Potential ecological impacts have been evaluated in detail as part of the EIA. Mitigation and management measures have been provided to avoid or minimise potential adverse environmental and socio-economic impacts and risks as far as possible.
	1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	
	1.8.2	What is the level of risk associated with the limits of current knowledge?	
	1.8.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
	1.9	How will the ecological impacts resulting from this development impact on people's environmental right in terms following	
	1.9.1	Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	A detailed impact assessment has been undertaken (refer to Section 11). The impact assessment was informed by the various specialist assessments which were undertaken. The location of the proposed projects have (where possible) been identified based on sensitivities identified on site by the specialist team, to avoid impacting on sensitive environments within Sun City as far as possible.
	1.9.2	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	
	1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	The proposed projects are classified as Resort expansion projects, service and utilities projects (to improve service delivery within Sun City Resort) and maintenance projects (to improve maintenance of existing facilities in the Resort). The project therefore does not have any direct impacts outside of Sun City, except arguably in the construction phase where some temporary job opportunities may be created.
	1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	Projects associated with an increased development footprint will result in loss of vegetation within the Sun City Complex. The majority of these projects are planned on land that has already been impacted upon by past activities. Project locations have been strategically chosen in an attempt to avoid sensitive ecological environments and heritage resources/based on the existing complementing infrastructure.

Theme	No	Specific Questions	Answer related to the Proposed future developments at Sun City
	1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	For each of the identified projects, different alternatives have been considered as appropriate (See Section 8). Location alternatives were based mainly on practical considerations (access to services, access to the site, engineering considerations) and identified site sensitivities. The project layout has been designed and adjusted so as to avoid known ecologically sensitive areas and sensitive heritage resources on the site.
	1.13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	The impact assessment includes a discussion and assessment of cumulative impacts (refer to Section 11.4). The projects that are proposed are within the existing Sun City Resort complex and are not considered likely to contribute negatively to regional ecological considerations. The projects will improve an existing world-renowned tourism facility and in that manner contribute positively to tourism.
"promoting justifiable economic and social development"	2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
	2.1.1	The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,	The Bojanala Platinum District IDP (2012/17) identifies "Further development of tourism facilities around Sun City node" as a potential priority project, in terms of Tourism development. Though the projects to which this Report relates are related to development within Sun City (and not in the surroundings as the IDP would suggest) it does contribute to the Tourism Sector, and is therefore responsive to the plans outlined in the IDP. The Sun City Projects do not specifically address community development. However, could likely result in the expansion of its Corporate Social Invest which would in turn benefit surrounding communities. The Sun City Projects are in keeping with the existing land uses at the Resort, and were designed with particular focus on avoidance of sensitive spatial features including heritage resources and visual impacts. The Municipality recognises tourism as one of the key local economic sectors. As such the proposed Sun City Projects are in line with the Municipal plans.
	2.1.2	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	
	2.1.3	Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and	
	2.1.4	Municipal Economic Development Strategy ("LED Strategy").	
	2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	The proposed projects are aimed at improving the services delivered by Sun City Resort and does not specifically address the development of communities outside of Sun City. Tourism development is however identified as a priority in local and district municipal development plans. The socio-economic impacts of the project have been assessed as part of this EIA Report. It is anticipated that the Project will contribute at least to some degree to local job creation in the construction phases.
	2.2.1	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	
	2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	The projects are not specifically aimed at community development but rather at improvement of facilities at the existing Sun City Resort. It does not therefore directly address the social needs and interest of surrounding communities but rather provides world-class facilities for local and international travellers.
	2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	It is considered unlikely that the impacts of the project will extend beyond the borders of the Sun City Resort.
	2.5	In terms of location, describe how the placement of the proposed development will	
	2.5.1	result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	The location of the proposed developments is within the existing Sun City Resort Complex. Sun City Resort is located in relatively close proximity to Rustenburg which is the closest regional economic hub (roughly 50km by road). The Community of Ledig is located immediately south-east of Sun City, with a further extension of this community being proposed on Portion 15 of the Farm Ledig (EIA was undertaken by K2M Environmental in 2017). The extension will be immediately adjacent to Sun City Resort to the South and West of the Resort. It is expected that many of the Sun City Employees currently, as well as those additional employees associated with the proposed projects, will be sourced from Ledig (where possible). The proposed projects are aimed at improving and expanding facilities at the existing Sun City Resort and not specifically at
	2.5.2	reduce the need for transport of people and goods	
	2.5.3	result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	
	2.5.4	compliment other uses in the area,	

Theme	No	Specific Questions	Answer related to the Proposed future developments at Sun City
	2.5.5	be in line with the planning for the area,	community upliftment, though the socio-economic implications of further development at Sun City will likely result in induced positive impacts on the surrounding communities. The proposed projects within Sun City do propose to make maximum use of existing infrastructure by tying in to existing services infrastructure of the Resort. The proposed projects are aligned with the development priorities of Sun City and are considered 'infill development' in general terms as they are located within the existing boundaries of the Sun City Resort. These projects do not contribute to the correction of historically distorted spatial patterns. The projects were designed with site sensitivities in mind and therefore can be said to encourage sustainable land development practices. Some of the projects are strategically placed to take advantage of views (E.g. REP1: Eco Lodges) while others were placed mostly due to engineering considerations (e.g. the reservoirs). It is anticipated that some employment opportunities will be generated in the construction phase of the projects over the next ten to fifteen years. Additional employment will also most likely be associated with the operational phase (as presumably more staff will be required for maintenance, cleaning, running of facilities etc.) than the current Resort facilities. With the exception of the construction phase for each project, the proposed projects will not impact on the sense of place of Sun City as they are in keeping with the existing activities at Sun City Resort. The proposed projects are integrated to the existing facilities and infrastructure at Sun City Resort.
	2.5.6	for urban related development, make use of underutilised land available with the urban edge,	
	2.5.7	optimise the use of existing resources and infrastructure,	
	2.5.8	opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	
	2.5.9	discourage "urban sprawl" and contribute to compaction/densification,	
	2.5.10	contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	
	2.5.11	encourage environmentally sustainable land development practices and processes,	
	2.5.12	take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	
	2.5.13	the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	
	2.5.14	impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	
	2.5.15	in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	
	2.6	How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	
	2.6.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	A Socio-Economic Impact Assessment has been undertaken as part of the EIA. The Socio-Economic Impact Assessment identifies impacts and risks associated with the proposed projects and prescribes mitigation and management measures to prevent (where possible) or minimise potential negative impacts, and enhance positive impacts.
	2.6.2	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	
	2.6.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
	2.7	How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
	2.7.1	Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	The Socio-Economic Impact Assessment identifies impacts and risks associated with the proposed projects and prescribes mitigation and management measures to prevent (where possible) or minimise potential negative impacts, and enhance positive impacts.
	2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	
	2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	The socio-economic impacts associated with the existing Sun City Resort have been assessed and described under Section 11. Increased accommodation facilities at Sun City will result in an increased disturbed footprint at the Resort, increased resource use and increased waste generation. It will also lead to increased income for and continued success of the Resort.

Theme	No	Specific Questions	Answer related to the Proposed future developments at Sun City
	2.9	What measures were taken to pursue the selection of the “best practicable environmental option” in terms of socio-economic considerations?	The proposed projects were designed so as to enhance guest experience at the Sun City Resort complex, whilst being responsive to ecological and heritage sensitivities identified on the site.
	2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?Considering the need for social equity and justice, do the alternatives identified, allow the “best practicable environmental option” to be selected, or is there a need for other alternatives to be considered?	The beneficiaries of these projects will in most cases be visitors to the Sun City Resort (Projects like REP8 and USP6 are aimed at improving staff accommodation and facilities at the Resort).
	2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	This project is not aimed at improved access to basic human needs but rather aims to provide world-class entertainment and accommodation facilities at the existing Sun City Resort.
	2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development’s life cycle?	An EMPr has been compiled and included in Part B of this report. The EMPr aims to ensure that management and/ or mitigation measures are prescribed for each impact that is deemed significant (including responsibility and timeframes for implementation).
	2.13	What measures were taken to:	
	2.13.1	ensure the participation of all interested and affected parties,	The Public Participation Process is discussed in detail in Section 9 of this report and is undertaken in accordance with the EIA Regulations of 2014, as amended.
	2.13.2	provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	
	2.13.3	ensure participation by vulnerable and disadvantaged persons,	
	2.13.4	promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	
	2.13.5	ensure openness and transparency, and access to information in terms of the process,	
	2.13.6	ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and	
	2.13.7	ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?	
	2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	Tourism is key component for socio economic development, and a focus area for the local municipality. Sun City supports the local tourism growth, through the influx for tourists to the municipal area. Growth in infrastructure and tourists beds grows the spending capacity thereby increasing support for local business. Additional employment will be associated with the construction and operational phases of the development. Based on the socio-economic assessment undertaken it is estimated that approximately 344 job opportunities could be directly linked to construction activities while 253 indirectly linked job opportunities (e.g. suppliers to construction companies) may be realised.
	2.15	What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the	An environmental awareness plan forms part of the EMPr included in Part B of this report.

Theme	No	Specific Questions	Answer related to the Proposed future developments at Sun City
		environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	
	2.16	Describe how the development will impact on job creation in terms of, amongst other aspects:	
	2.16.1	the number of temporary versus permanent jobs that will be created,	It is anticipated that approximately 344 job opportunities could be directly linked to construction activities while 253 indirectly linked job opportunities (e.g. suppliers to construction companies) may be realised. These figures will be refined during the detailed design phases of each of the individual projects. Temporary jobs will be created for each of the proposed developments over the 15 year implementation period. Permanent jobs will also be created during the projects' operational phases. It is anticipated that much of the labour force will be sourced from Ledig, which is adjacent to the Sun City Resort Complex. The proposed projects will create additional jobs at Sun City, and will not result in any job losses at Sun City.
	2.16.2	whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	
	2.16.3	the distance from where labourers will have to travel,	
	2.16.4	the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and	
	2.16.5	the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	
	2.17	What measures were taken to ensure:	
	2.17.1	that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and	Section 5 of this report discusses the national and local legal and policy frameworks and how the proposed projects and the existing Sun City Resort respond to those documents. It is not anticipated that there would be any conflict of interest as the projects are within the existing Resort.
	2.17.2	that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	
	2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	The EIA Process has been undertaken in terms of the EIA Regulations of 2014 (as amended) to ensure that the proposed developments are assessed in terms of their potential impacts on the environment. Mitigation and management measures have been prescribed to minimise environmental damage as far as possible.
	2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Detailed mitigation and management measures have been prescribed for the identified potential impacts to avoid a long-term adverse environmental legacy. Should the prescribed measure be correctly implemented, it is not anticipated that the proposed developments will have any long-term/residual impacts.
	2.20	What measures were taken to ensure that he costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	Sun City is leasing the land where the Resort is located from the South African Government. It is extremely unlikely that a Resort will be decommissioned in the near future. Sun City Resort will therefore remain responsible for the sound environmental management at the Resort.
	2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Alternatives are discussed in detail in Section 8 of this Report
	2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	The Impact Assessment (including cumulative impacts) is presented in Section 11 of this report, including the findings of the Socio-Economic Impact Assessment.

7 Preferred Development Footprint

The proposed developments are all located within the Sun City Resort Complex and are all linked to existing infrastructure which has ultimately determined the preferred location.

The resort is a well-established national and internationally recognised tourist destination which has necessitated further expansions, upgrades and maintenance at the resort.

A few of the proposed Expansion Projects, namely the VC Phase 3 and 4 (REP4.1 and REP4.2) as well as the Eco-Lodge (REP1) are proposed on undisturbed land.

The proposed VC Phases are directly adjacent to the current VC accommodation as the proposed projects serve as an expansion to the existing facility. The location of the Eco-Lodge has been strategically selected in proximity to the GPGC as well as existing bulk service and road infrastructure that will service the facility. Furthermore, the Eco-Lodge is proposed on a hill slope facing the Pilanesberg National Park which will add to the aesthetic value and experience for guests which further motivates the site preference. The remainder of the Expansion Projects are located within the footprint of existing infrastructure.

Pipeline routes associated with the Utilities and Services Projects are linked to associated infrastructure where the shortest paths of disturbance are preferred. USP3 and USP4 are proposed to run along existing linear infrastructure routes which limits disturbance associated with these developments. The preferred location of the proposed additional reservoirs is adjacent to the existing reservoir within the resort to leverage off existing infrastructure associated with the existing reservoir. The remainder of the Utilities and Service Projects, namely the Generator Park and Stormwater Channels at Golf Course Roads are directly related to existing infrastructure/ previously disturbed land.

To this end, the preferred development footprint for the majority of the planned projects can be characterised as disturbed, cleared land that is associated with existing infrastructure. The location of all projects has been strategically selected based on their link to existing infrastructure and the purpose they serve which was the ultimate qualifying criteria for the preferred site selection. Section 8 below presents alternatives which were considered which take into account potential environmental sensitivities which may hinder the preferred footprints.

The preferred layout is depicted in Figure 7-1 below. An A3 Map of this is also provided as Plan 4 in Appendix 1.

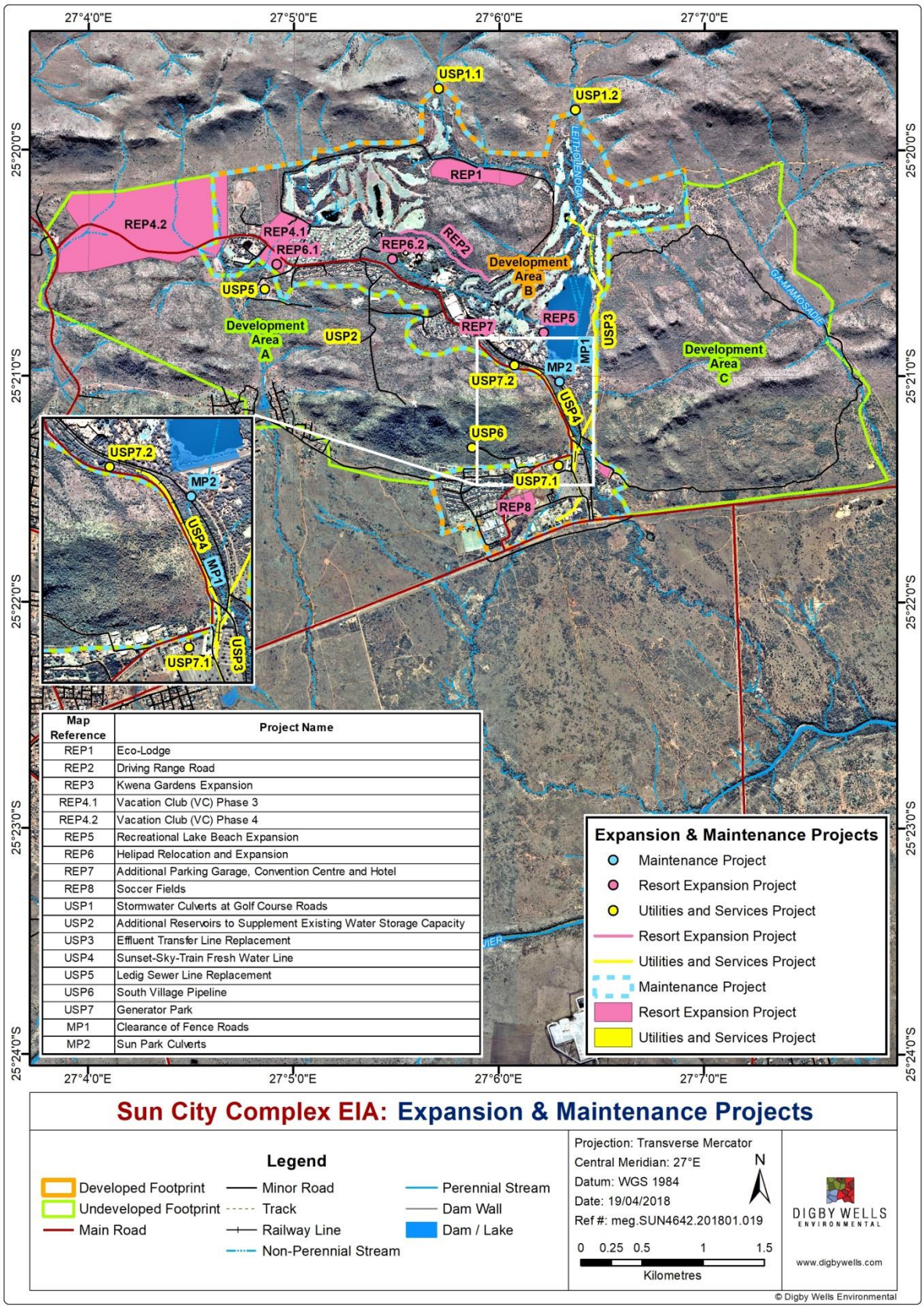


Figure 7-1: Preferred Development Layout

8 Project Alternatives

The role of alternatives is to find the most effective way of meeting the need and purpose of a proposed project, either through enhancing the environmental benefits of the proposed activity, and / or through reducing or avoiding potentially significant negative impacts. According to the DEA Criteria for Determining Alternatives in the EIA Guideline (2004), there are various types or categories of alternatives, including:

- Location alternative – alternative project sites in the same geographic area;
- Process/design alternative – alternative process/design/equipment;
- Activity alternative – consideration of different means to achieve the same project objective;
- Routing alternative – consideration of different routes for linear infrastructure;
- Site layout alternative – consideration of the different options to place project infrastructure;
- No-go alternative – the proposed project/activity does not proceed, implying that the current situation or status quo remains.

The alternatives discussed in the subsections below were identified and presented during the Scoping Phase of the project. Specialist investigations were subsequently undertaken to characterise the environmental sensitivity associated with the preferred project footprints and the identified alternatives were further evaluated. Based on the outcomes of the specialist investigations, preferred alternatives were chosen and recommended for development.

8.1 Alternatives Considered

The following alternatives were considered and are discussed separately below:

- Site Location and Layout;
- Technology Alternatives; and
- No-go Alternative.

8.1.1 Site Location and Layout

The Sun City Resort was officially opened on 7 December 1979. The location of the Sun City Resort therefore remains fixed, however, alternative locations of the proposed projects within the Sun City Property, were considered, and are discussed below.

8.1.1.1 REP1: Development of an Eco-Lodge

Preferred Alternative 1: The preferred location of this project is adjacent to the east of the GPCC Workshop, facilitating easy access to services for the lodges. The area is currently undeveloped but borders on an existing road, facilitating access to the site. An area of approximately 10 hectares is considered necessary for the proposed development, to ensure

that the individual Lodges retain a sense of privacy (the entire 10 ha will not be cleared and existing vegetation will be used to screen the lodges from each other). This site faces the Pilanesberg National Park, adding to the bush/eco-lodge experience.

Alternative 2: The alternative site assessed was located immediately adjacent to the proposed site, however this location will face east or west onto the GPGC or LCGC respectively, or south towards the Valley of the Waves and Palace. These views from the proposed eco-lodges will not be conducive to the type of accommodation the developer is trying to provide, thus reducing the economic viability as resort lodge. Furthermore this alternative is located in close proximity to significant heritage and ecological sensitivities which preclude development.

Alternative 3: Locating the Eco-Lodge development closer to the west gate of the Sun City Resort was also considered. This area is not considered suitable as entirely new services infrastructure (water, electricity, sewer, roads) will have to be constructed to this currently undeveloped location, whereas easy access to existing services infrastructure exists at the proposed preferred site.

8.1.1.2 REP6: Helipad decommissioning and relocation

Decommissioning of the current Helipad is required to accommodate the VC Phase 3 Expansion. Additionally, Sun City Management have indicated that the current Helipad is not of sufficient capacity to provide parking bays for the number of helicopters that often need to be accommodated on the Resort.

Preferred Alternative: The preferred location has been identified on top of the existing underground parking garage at the Palace. The location is ideal in terms of proximity to the Palace, and the existing parking garage providing a foundation for the helipad facility. Furthermore, Resort Management have indicated that the vast majority of guests that use the helipad, reside in the Palace for the duration of their stay at Sun City, and a location in closer proximity to the Palace would therefore be preferable, as VIP guests have complained of the distance between the Helipad and Palace.

Alternative 2: Various alternative locations where suitable space is available were considered. These locations will most likely provide more scope for potential future expansion of the helipad, but would necessitate the removal of established and healthy vegetation. It is also preferable to locate the Helipad west of the Palace, to be close to the entrance to the Palace, rather than east of the palace where the parked helicopters could impact on the views experienced from the Palace.

8.1.1.3 REP7: Additional parking garage, Convention Centre and Hotel (250 rooms)

Additional parking is required at Sun City especially considering the number of day visitors and guests the resort accommodates at any given time. Furthermore, as part of the expansion strategy, additional accommodation capacity has been deemed necessary for the progression of the resort.

Preferred Alternative: The proposed location of the new parking garage, hotel and convention centre is in the current parking lot between the existing Cascades Hotel and Sun City Hotel and Casino. The location is already disturbed footprint and has been deemed most appropriate as it is in proximity to various other amenities within the resort which would not result in extensive further disturbance of natural vegetation. A multi-storey parking garage is also preferred as it requires less land space than convention parking areas. Furthermore, the location is accessible to existing infrastructure and bulk services. With respect to the addition of another hotel and convention centre, this forms part of the strategic expansion objective and it has been deemed most feasible to couple these facilities with parking for greater convenience to guests and efficient utilisation of space within the resort.

Alternative 2: The alternative of new additional parking areas at different locations within the resort was considered to alleviate the current pressure experienced within the resort. However, this has been disregarded to reduce the footprint of new impacted areas compared to a multi-storey parking garage. Similarly, a different location for an additional hotel and convention centre would result in further environmental degradation and not be effective in reaching the project objectives.

8.1.1.4 USP2: Additional Reservoirs

The expansion of facilities at the Sun City Resort Complex necessitates additional water storage capacity to serve the resort demand. Two options, namely the construction of one 20 Mℓ reservoir or two reservoirs of 10 Mℓ capacity each, are being explored. Either option will have similar footprint requirements.

Preferred Alternative: The preferred location of the additional reservoirs is adjacent to the existing reservoir within the resort which is located on higher ground to facilitate effective water flow. Associated infrastructure including access routes to the location exist which would serve the proposed additional reservoirs. The existing reservoir is located within the Itlholanoga heritage site which, as evaluated by the Heritage Specialist Study, is a site of very high Cultural Significance. The site has been previously damaged through the construction of the existing reservoir and a similar risk is posed by the proposed additional reservoirs. The preferred location for the additional reservoirs is approximately 10 m Itlholanoga at the closest point. This necessitated the consideration of additional alternatives.

Alternative 2: Alternative locations were considered within the resort complex but were disregarded as it would result in a larger extent of disturbance. Therefore, the preferred location is still deemed the most suitable, however it is recommended that the footprint be shifted to allow for at least a 30 m buffer from the Itlholanoga site as a precautionary measure against direct disturbance of the heritage site. A comparative map of the preferred location and the alternative location proposed is displayed in Plan 5, Appendix 1. It is noted that due to the slope of the alternative location, more geotechnical workings will be required to adequately level the site for USP2.

Based on the discussion above, Alternative 2 is recommended for this development.

8.1.1.5 USP3: Effluent Transfer Line Replacement

Sun City is proposing to replace the existing effluent transfer line (old asbestos line) through Sunset Drive to the irrigation lake at Hole 2. This line will be decommissioned (shut down) but remain in place. The start and end point of the effluent transfer line are fixed points at the WWTW and the irrigation lake at Hole 2. The Sun City Lake is located between these points, meaning that the effluent transfer line has to pass either east or west of the lake.

Preferred Alternative: The preferred location of the new effluent line is to the east of the lake and installing it against the fence of Letsatsing the adjacent natural area). This location will not result in any disruptions to activities at the resort and will be associated with construction on already impacted areas of the Sun City Resort Complex. Furthermore, the HDPE line will be above ground and therefore no excavation will be required for maintenance and leak detection.

Alternative 2: the alternative of removing the existing asbestos line and replacement of the line on the same footprint was considered. The alternative is associated with numerous legal obligations and increased environmental risk. Maintenance of this line in its current location is also disruptive to Sun City Resort activities, due to its location and proximity to the GPGC.

8.1.1.6 USP5: New WWTW for VC & Palace (and proposed Eco-Lodges)

Currently the sewer line running through Ledig (old asbestos line) is reaching its end of life. The line will be decommissioned (shut down but remain in place). A new WWTW is proposed to be established to manage sewage from VC and The Palace (and proposed Eco-Lodge Development). A new pipeline will also be required to the Lost City Hole 3 Dam to return the treated water for use in irrigation.

Preferred Alternative: The preferred location for the WWTW is on the “old borrow pit” west of the current Vacation Club. This area is already disturbed, and is located in relative proximity to the VC, Palace and Eco-Lodges, also resulting in a shorter pipeline route.

Alternative 2: Alternative locations were considered in proximity to the preferred location, but disregarded as they will either be closer to the drainage line running south and west of the preferred site, or closer to the VC Phase 1 and proposed VC Phase 3, potentially impacting on guest experience.

8.1.1.7 USP7: Generator Park

The aim of this project is to improve management, monitoring and control of generators throughout the resort (which extends to the minimising of visual impacts and noise impacts, and the improved management of diesel).

Preferred Alternative: the preferred alternative is to consolidate all 13 generators into one area, adjacent to the existing primary substation and car park near the Resort Entrance. This location is preferred as it offers adequate space to accommodate the number of generators which are proposed. This would also enable service to a larger number of business units throughout the resort

Alternative 2: an alternative of establishing a smaller generator park which would have the capacity of servicing the east side business units only was considered. This generator park would be located at No 1 Substation, between the Cabanas Bus Stop and the Skytrain on the top road was explored. This option involves re-establishing a diesel storage facility (building existing), trenching and excavation adjacent to the existing sub. This option has been disregarded based on a cost-benefit analysis of establishing this facility and the extent of its service.

8.1.1.8 Projects for which Location Alternatives within the Resort were not assessed

Table 8-1 summarises those projects for which location alternatives were not assessed and provides motivation for not including location alternatives in terms of these projects.

Table 8-1: Projects where Location Alternatives were not assessed

No.	Project Summary	Preferred Location	Reason for not assessing alternatives
REP2	Construct a Road to connect the Driving Range at LCGC to the GPGC	Via the Palace garden road and VOW road.	There is an existing service road extending towards the LCGC from the GPGC for some distance, and an existing golf cart path from LCGC in the direction of GPGC. It is proposed to use these existing disturbed areas, connect them and upgrade the path to a formal golf-cart path to meet the needs of the Project.
REP3	Construct 20 additional Rustic Chalets	At Kwena Gardens	This project is considered an expansion of the existing Rustic Chalet accommodation facilities at Kwena Gardens. Location alternatives are therefore not feasible due to land availability in proximity to the existing chalets.
REP4	Construct an additional 150 simplex units, 2- 3 bed units and associated infrastructure to expand capacity	At the VC. The site identified for the expansion currently houses the Helipad and Nursery.	This project is considered an expansion of the existing Vacation Club and is located on land that has already been impacted. Location alternatives are therefore not feasible due to land availability in proximity to the existing VC Phase 1 and 2.
REP5	Expand the existing artificial beach and construct an additional shallow swimming pool	At the Lake and at Waterworld Beach	This project is regarded expansion of existing facilities and location alternatives are therefore not feasible. The entire site and surroundings have been completely transformed.
REP8	Develop 2 soccer fields	At the Warehouse (old motocross track)	The existing motocross track has become disused due to lack of interest. The Soccer

No.	Project Summary	Preferred Location	Reason for not assessing alternatives
			Fields are proposed to host (primarily) the staff and surrounding businesses partnering with Sun City. No Location alternatives were considered, as the proposed location is deemed optimal.
USP1	Install Stormwater pipes / culverts to allow water to flow under the roads and maintain the road surface for fence inspections.	At Golf Course Roads	The Project is aimed at addressing the existing problem of the roads becoming inaccessible and washing away in storm events. Location alternatives are therefore not relevant.
USP4	Construct a main water line	From the Welcome Centre to Skytrain (pipe will be attached to Skytrain route)	Alternative Locations were not considered as attaching the pipe to the existing Skytrain route is feasible and preferable from an engineering and environmental perspective.
USP6	Construct an additional pipeline for water supply to South Village	From the Complex Reservoirs to South Village	The pipeline will follow the most direct route possible to minimise project footprint (and associated costs and ecological disturbance). No further location alternatives were considered.
MP1	Vegetation Clearance to serve as maintenance roads and Fire Breaks	At perimeter fences (25 km)	This project is considered maintenance of existing infrastructure. Location alternatives are therefore not deemed relevant.
MP2	Clear the Culverts under the road from debris and siltation.	At Sun Park Culverts	This project is considered maintenance of existing infrastructure. Location alternatives are therefore not deemed relevant.

8.1.2 Technology Alternatives

Technology Alternatives are relevant to the development of new accommodation facilities (REP1 and REP7) and expansion of existing accommodation facilities (REP3 and REP4).

These technology alternatives include measures such as water-saving technologies (installation of effective water supply infrastructure to prevent leakages of water, dripping taps etc.) and energy-saving technologies (eco-responsive design, use of energy-efficient lighting, solar electricity and solar geysers etc.).

Most of these technologies are already incorporated into the majority of existing accommodation facilities at Sun City, and the proposed new developments should be no exception.

Alternative materials can be considered for those projects that are associated with paving (REP2 primarily, and all other projects where paving is incorporated). Permeable materials are preferred as this does not lead to reduction in water ingress to subsoil and groundwater, and does not increase the velocity and amount of stormwater runoff, which often leads to erosion. It must also be ensured that the paving materials chosen are manufactured by a sustainable (economically, environmentally and socially responsible) source.

For the projects that include water, wastewater and sewer pipes, technology alternatives are limited as it is preferred that South African Bureau of Standards (SABS) approved materials be used and best practices implemented.

8.1.3 No-go Alternative

The no-development alternative implies that the proposed future projects are not implemented. This would have different implications for different project types.

If Sun City does not proceed with REP1, REP3, REP4 or REP7 (Eco-Lodge, Kwena Gardens Expansion, VC Phase 3 or Parking Garage, Hotel and Convention Centre) capacity for accommodation at the Resort will not be increased. This could have negative economic implications for Sun City as they will not be able to meet increased demand at the Resort for different types of accommodation. It will also have negative implications for guests and potential guests as the accommodation capacity and different accommodation typologies will not be available to enhance or accommodate guest experiences. On the other hand, construction of these facilities could have a negative impact on guest experiences. Additionally, development of these additional accommodation facilities is associated with some degree of ecological disturbance. Vegetation clearance, soil disturbance and pollution risk associated with development of these projects will not occur if the no-go option is implemented.

If REP2 (Driving range road) is not implemented, the status quo will remain and users of GPGC will likely continue to use the existing roads at the Resort if they want to access the driving range at LCGC. The project is associated with minimal vegetation and soil disturbance and will result in optimised guest experience while alleviating golf-cart traffic on the existing roads around the resort to some extent.

REP5 (Recreational Lake Beach Expansion) involves expansion of existing recreational facilities at Sun City, to allow more visitors to interact comfortably at this facility at the same time. Not proceeding with the project will not have any significant ecological effects as the entire area comprises landscaped vegetation and man-made infrastructure. It would also mean the capacity of the recreational lake beach will remain as is.

Not proceeding with the development of REP8 (Soccer Fields) will not have any significant ecological impacts as the site has been completely transformed by the development of the Motocross Track. The Motocross Track is disused due to lack of interest from visitors to Sun City. Not developing the Soccer Fields in this area will mean that the status quo of the Motocross Track will remain, and that Sun City employees and surrounding community will not experience the benefit of this recreational facility.

The USP Projects are aimed at increasing capacity or improving efficiency of services (water provision, sewage management, power) at the Resort. Not proceeding with these projects will lead to insufficient capacity and/or poor management of resources at Sun City, especially if the REPs are implemented. Most of the USP's will be associated with some degree of environmental impact (especially during the construction phase). If the Projects are not implemented, the environmental impacts will be negated.

The Maintenance Projects that are proposed are essential for the continued safe functioning of existing infrastructure at the Resort and the No-Go Option is not considered feasible.

Development of all 17 proposed projects is associated with a degree of job creation during the construction phases, which is expected to have a short-term positive impact.

9 Details of Public Participation Process

A Public Participation Process (PPP) was initiated for the project prior to the commencement of the Scoping Phase. The PPP aims to provide I&APs with information regarding the proposed project as well as obtain input from I&APs to ensure informed decision-making that highlights the concerns and opinions of the surrounding communities are duly considered.

9.1 Stakeholder Consultation during the Project Announcement and Scoping Phase

Table 9-1 provides a summary of the PPP activities undertaken prior to and during the Scoping Phase of this project.

Table 9-1 Public Participation Scoping Phase Activities

Activity	Details
Identification of stakeholders	The existing stakeholder database which includes I&APs from various sectors of society, including directly affected and adjacent landowners, in and around the project area was utilised. Additional I&APs were identified through the project announcement.
Distribution of announcement letter and BID	A BID, announcement letter with Registration and Comment Form was emailed and posted to stakeholders. (12 July 2018).
Placing of newspaper advertisement	An English advert was published on 12 July 2018 in the Rustenburg Herald Newspaper to announce the project.
Putting up of site notices	English site notices were put up at the proposed project site and other public places around the proposed site on 12 July 2018.
Announcement of Scoping Report	Announcement of availability of the Draft Scoping Report was emailed and posted to stakeholders together with the formal project announcement. Copies of the Draft Scoping Report were made available at: ▪ Sun Central; and

Activity	Details
	▪ Bakubung Tribal Hall. A SMS was also sent to stakeholders announcing availability of the Draft Scoping Report. The Scoping Report was also available on www.digbywells.com and at the Public Meeting. (30-day comment period for the Scoping Report: 12 July 2018 until 14 August 2018).
Stakeholder Meeting	A public meeting was held at Cornerstone Academy Primary School (South Village, Sun City, 0316) on 18 July 2018 from 11:00 am – 13:00 pm.
Obtained comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders were captured in the Final Scoping Report which was submitted to North West READ for consideration.

Refer to Appendix 3 for the Public Participation Chapter with proof of documentation sent to I&APs thus far.

9.2 Stakeholder Consultation during the EIA Phase

The Draft EIA and EMPr Report served to provide feedback on the findings of the specialist studies and the determined mitigation measures to avoid adverse environmental impacts as far as possible. All feedback received from I&APs during the public review period of the draft EIA and EMPr Report were incorporated into this Final EIA and EMPr Report.

Table 9-2 provides summary of the PPP activities undertaken to date as well as those still to be undertaken during this EIA Phase of the process. All PPP material has been appended to this report in the Public Participation Chapter, Appendix 3.

Table 9-2: Public Participation Impact Assessment Phase Activities

Impact Assessment Phase	
Announcement of Draft EIA and EMP Reports	Announcement of availability of the Draft EIA and EMP Reports was sent via email and SMS to stakeholders on 27 November 2018. Similar to the Scoping Report, copies of the Draft EIA and EMP Reports were available at: ▪ Sun Central; and ▪ Bakubung Tribal Hall. The Draft EIA and EMPr Report was also made available on www.digbywells.com (under Public Documents). **(Comment period: 28 November 2018 – 18 January 2019)**
Obtaining comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders during the public review period of the draft EIA and EMPr were captured and included in the CRR during the EIA Phase.

Impact Assessment Phase	
Announcement of the Final EIA and EMPr Report	Notification for availability of the Final EIA and EMP Report was emailed and sent via SMS to stakeholders on 23 January 2019. Copies of the reports were also made available Digby Wells Website www.digbywells.com, under Public Documents, for stakeholders to verify that their comments were included and responded to.

9.3 Summary of Issues Raised by I&APs

Views, concerns and objections provided by I&APs to date have been captured in the CRR and includes responses provided to date (please refer to Appendix 3). The key issues raised during the Scoping and EIA Phase pertain to:

- Employment / contract opportunities associated with the construction of the proposed projects (particularly for Small, Medium and Micro Enterprises (SMMEs));
- Projected timeframe for the proposed projects; and
- Potential environmental impacts associated with the proposed Recreational Lake Beach Expansion which may negatively impact surrounding businesses.

10 Environmental Attributes associated with the Alternatives

This section provides a description of the baseline environment associated with the project area and region (where relevant). The purpose of understanding the environmental baseline conditions relates to the potential of the project to impact on the existing environment, and the potential for existing environmental aspects to influence a proposed development in terms of design, location, technology and layout.

A number of specialist studies were undertaken as part of the EIA for the proposed project and are appended to this report, as shown in Table 10-1 below.

Table 10-1: Specialist Reports and Associated Appendices

Specialist Study	Appendix
Soil, Land Use and Land Capability Assessment	Appendix 4
Flora and Fauna Assessment	Appendix 5
Wetland Assessment	Appendix 6
Aquatic Ecology Assessment	Appendix 7
Surface Water and Groundwater Assessment	Appendix 8
Noise Assessment	Appendix 9
Air Quality Assessment	Appendix 10
Visual Assessment	Appendix 11
Heritage Assessment	Appendix 12

Socio-economic Assessment	Appendix 13

The subsection below provides the baseline bio-physical and socio-economic environmental conditions currently present on the project site. The information provided in this section has been obtained from the abovementioned specialist reports.

10.1 Regional Climate

The study area falls within the semi-arid climate region of Southern Africa, where rainfall is sparse with seasonal variations during wet and dry seasons. Wet (or rainy) seasons occur during summer months, October to March and is characterised by short, intense convective storms. Dry seasons occur during winter time (April – September) and are characterised by dry cold weather conditions. The latitudinal movement of the Inter Tropical Convergence Zone (ITCZ) governs the seasonal variations in rainfall.

10.1.1 Temperature

The maximum temperatures were observed from December to January recording the highest temperature of 35°C, followed by October to November and February (33°C). The monthly averages ranged from 11°C between June and July to 25°C from December - February. The annual average temperature for the project site is 19°C.

10.1.2 Rainfall

The total monthly rainfall is presented graphically in Figure 10-1. The highest rainfall of 281 mm was observed in December. The lowest recorded rainfalls (5 mm) were observed during May and August. The annual total and average rainfall reached 1,068 mm and 682 mm respectively. In terms of relative humidity, the monthly average ranged between 53% and 72%. The annual average estimated was 62%.

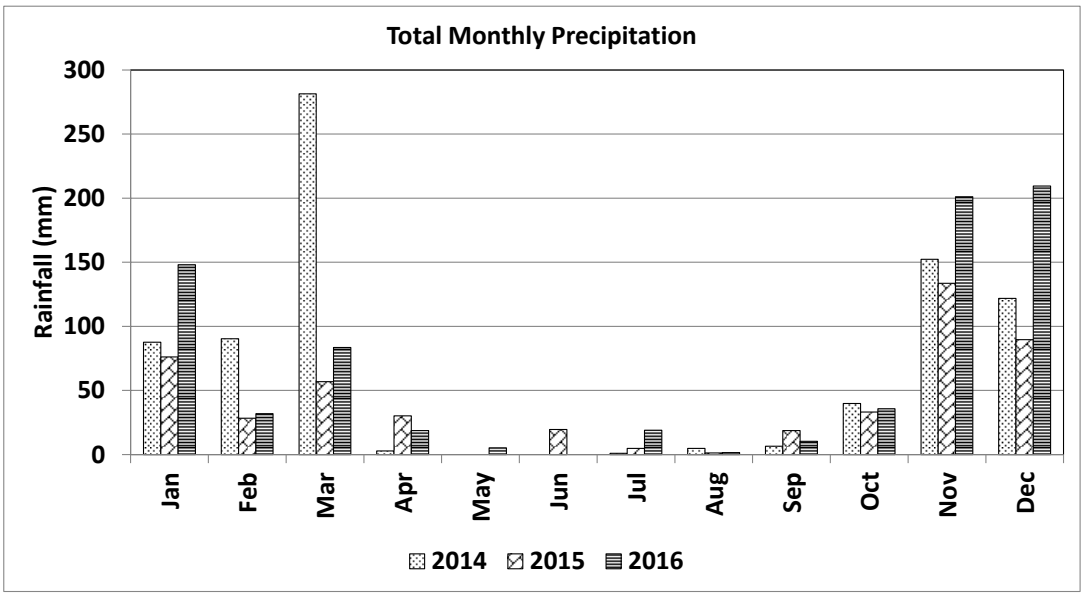


Figure 10-1: Total Monthly Precipitation

10.1.3 Wind

The dominant winds recorded are blowing from east (17.3%) and east northeast (12.1%) respectively. Secondary wind comes from east south east (9.7%), north east (6.7%), north (6.3%) and north northeast (6.2%). Calm conditions (wind speeds <0.5 m/s) occurred 4.60% of the time. The predominant wind direction is east and east southeast with 20.24% and 13.30% respectively in the night, east (24.96%) and east southeast (13.29%) in the morning, east and east northeast in the afternoon (12.63% and 10.75%); and east (11.38%) and east northeast (11%) in the evening.

10.1.3.1 Wind Speed

One of the factors that favour the suspension and resuspension of loose particulates in the atmosphere is the intensity of the wind speed regime. Wind speed greater than 5.4 m/s leads to erosion of loose dust PM and the degree of dispersion across the landscape. Figure 10-2 shows that wind speed greater than 5.4 m/s occur every month with increases observed from the months of January, August and October (10 m/s). Although average wind speed is generally below 5.4 m/s.

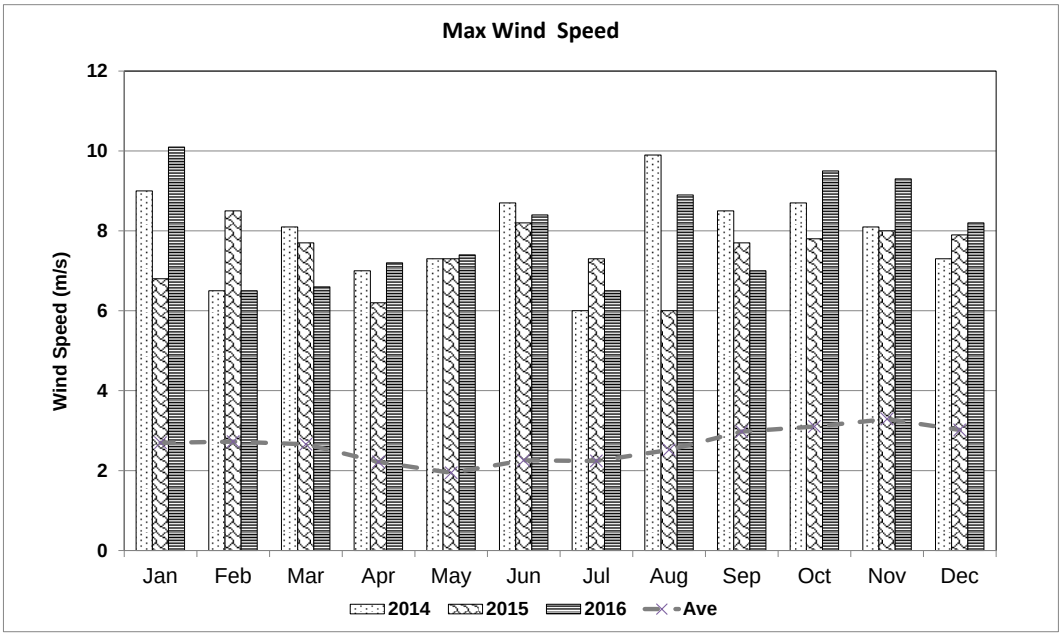


Figure 10-2: Monthly Maximum Wind Speed

10.2 Geology

10.2.1 Regional Geology

The project area is located in the Pilanesberg Ring Complex which is one of the world`s largest and best preserved alkaline ring dykes known as the Pilanesberg Alkaline Complex (PAC). The PAC is located within the western limb of the Bushveld Complex and on the Kaapvaal Craton with the gabbro-norite of the Rusternburg Layered Suite. The regional geology associated with the project area is displayed in Plan 6, Appendix 1.

The Pilanesberg Complex is characterised by alkaline igneous rocks (Abiye, et al., 2018), constructed on a base of intrusive rocks and a cover of volcanic rocks (Pantshi, 2006).

10.2.2 Local Geology

Locally, the study area is virtually covered by slightly moist, orange-brown, silty medium and fine sand with abundant, black, ferruginised gravels (also known as reworked residual foyaite/hillwash (0 m – 3 m)) overlying the residual foyaite. Foyaite is a nepheline syenite with a trachytic texture caused by the platy alkali feldspar (orthoclase) crystals. Syenite is a coarse-grained intrusive igneous rock with a general composition similar to that of granite, but deficient in quartz. Underlying the residual foyaite is slightly moist, light grey, coarse and medium sand with abundant moderately weathered angular fragments (2-5 mm) of foyaite. The moderate to slightly weathered hard rock foyaite represents a transitional zone between the overlying residual material and the bedrock.

Further, underlying the moderate to slightly weathered hard rock is slightly moist, light grey to grey, coarse and medium sand with abundant angular fragments (5 mm-10 mm) of foyaite. This is considered to be slightly weathered to unweathered, fractured, hard rock foyaite representing a fractured rock aquifer. The interval varies from about 7 m – 50 m. Between the interval 23 m to 25 m, slight discolouration of pale brown and material which is moderately weathered is encountered, possibly indicating a water bearing fracture zone.

10.3 Topographical Characteristics

This section describes the results obtained from the analysis of the topographical, slope and aspect models created in ArcGIS.

The topographical model indicates that the elevation of the project area increases from 1,056 metres above mean sea level (mamsl) in the Leitholenoga River valley below the dam to 1,352 mamsl on the hilltops Plan 7, Appendix 1, illustrates the topographical model and features of the project area and surrounds.

The lower-lying areas of the project area have gentle slopes of between 0° and 8.2° while the higher-lying areas have steeper slopes of between 8.3° and 43.6°. The steepest slopes occur on the hilltops. Most of the existing developments are located on the flatter low-lying areas of the project area. Due to the undulating topography, the slope aspect/direction of the project area is not in any specific direction.

The undulating topography of the Pilanesberg is expected to provide moderate screening of the existing and proposed developments; however, if the developments are located on a hill they will be more visible than if they are located on a lower-lying area.

10.4 Soils, Land Use and Land Capability

The Soil, Land Use and Land Capability Assessment undertaken is appended to this report as Appendix 4. To establish the baseline soils and land capability condition the following methodologies were employed:

- **Desktop Assessment and Literature Review** – existing land type data (Land Type Survey Staff, 1972 - 2006) was used to determine the general soil patterns and terrain types.
- **Soil sampling and analysis** – ten soil samples were collected across the proposed project areas. A chemical analysis was undertaken in an accredited laboratory for indicators of acidity, fertility and texture.
- **Land Capability** – the land capability, which is defined as the most sustainable land use under rain-fed conditions, was determined by assessing a combination of soil, terrain and climatic features. The assessment was done in accordance with the approach adopted by Schoeman *et al.* (2000).
- **Land Use** – Land use was mapped using aerial imagery and then ground-truthed during the site visit.

Further detail pertaining to the methodology of the Assessment is provided in the specialist report, Appendix 4.

10.4.1 Land Type

The dominant land type is displayed in Plan 8, Appendix 1. The land type found on site was Ae64 and Ib115. Ae64 represents freely drained, red and yellow-brown and fine sandy soils, these soils are deep and shallow. Figure 10-3 provides pictures taken from the project site of the soil types present. Soils under land type Ib115 are found on steep and rocky areas, and these soils are very shallow in complex association with surface rockiness. The project site is dominated by the presence of soils which are of low agricultural potential.

Figure 10-3: Rocky Outcrops

(A and B and red apedal soils (C) on the proposed development site).

10.4.2 Land Capability

The land capability is determined by assessing a combination of soil, terrain and climate features. Plan 9, Appendix 1, displays the land capability of the project site. The dominant land capability classes in the project site were found to be Class VI (Light cultivation/Intensive grazing) and Class VIII (Wildlife). A breakdown of the limitations for each class is provided in Table 10-2 below.

Table 10-2: Land Capability Classification of the Study Area

Land Type	Land Capability Class	Dominant limitation influencing the physical suitability for agricultural use
Ae64	VI	Limiting soil depth, steepness, climate
Ib115	VIII	Rockiness, steepness

Land in Class VI has severe limitations that make it generally unsuited for cultivation and limits its use largely to pasture, range, woodland or wildlife food and cover. Land in Class VI has continuing limitations that cannot be corrected. While land in Class VIII has limitations that prevent its use for commercial plant production and restrict its use to wildlife, aesthetic purposes or water supply. Similarly, land in Class VIII has continuing limitations that cannot be corrected and is characterised as an erosion hazard.

Based on the land capability classification of the project site, the land consists of factors that can be considered as low potential agriculture, for the following main reasons:

- The proposed site of development is composed of rock outcrops, shallow Mispah resulting in poor effective root depth. Soil is not considered as high potential for agriculture productivity and will not support effective crop production due to potential root zone moisture and stoniness limitation; and
- Available grazing land will not support viable economic crop and livestock production.

10.4.3 Land Use

The land use for the project site is dominated by urban development which includes roads, hotels, gardens, golf courses, natural areas (shrubland/thicket/woodland and grassland) associated with the project site and surrounds. Furthermore, at a local and regional scale, surrounding land uses include Nature Reserves, mines, residential areas and other urban development as well as agriculture (mainly subsistence farming). The land use is depicted in Plan 10, Appendix 1.

10.4.4 Soil Chemical Analysis

A total of seven samples were collected from different areas where proposed developments are located with the objective of characterising the soil physio-chemical properties. The results of the analysis show that the soil pH ranged from 4.6 to 7.6 and thus the soils are classified as acidic to slightly alkaline, therefore deemed unsuitable for agricultural purposes. This is likely due to the acidic nature of the parent rock.

In terms of Calcium, Magnesium and Potassium (exchangeable cations) levels in the soils were generally adequate for crop production and these nutrients were not limiting any production or considered as toxic. Sodium levels in soils are low to high and high levels of sodium could lead to decrease in plant growth and development. The soil phosphorus levels at the sampled sites are very low which may be due to phosphorus fixation and the acidic nature of the soil.

Soil organic carbon provides an indication of organic matter content in a soil. Levels above 2 to 3% organic carbon are considered moderate to high according to du Preez *et al*. (2010). The soil organic carbon content of the soils on the proposed area ranged from 0 to 1.5% and levels below 2% would require an external nutrient input source to be agriculturally viable.

10.5 Fauna and Flora

A Fauna and Flora Assessment was undertaken and is appended to this report as Appendix 5. One wet season in-field survey was carried out to establish the baseline vegetation and faunal environment in the project area. The following methodologies were employed:

- **Desktop Assessment** – available literature was gathered on the regional natural vegetation, species diversity and species composition of the general vegetation. This information was used to gain an understanding of the broad environmental setting of the project area.
- **Vegetation Survey** – the Braun-Blanquette method (Braun-Blanquette, 1964) was utilised during the in-field survey to record trees, shrubs, grasses and herbs within the project area. From this, a species list was compiled of all species occurring within the project area in addition to other previously recorded species in the study area and a list of Species of Special Concern (SSC) was developed.
- **Fauna Survey** – the faunal survey was conducted concurrently with the vegetation survey where all faunal species encountered on site were identified and recorded.

The survey was supported by a desktop assessment of all faunal species previously recorded within the area. The survey included recordings of mammals, avifauna, herpetofauna, macro-invertebrates as well as potential red data faunal species.

Further detail pertaining to the methodology employed for the study is provided in the specialist report, Appendix 5.

10.5.1 Floral Characteristics

10.5.1.1 Regional Vegetation

The Sun City study area is located in the Sun International's Sun City Holiday Resort, within the Pilanesberg National Park Alkaline Ring Complex. According to the vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006), the study area falls within the Zeerust Thornveld vegetation type and is an Endemic Vegetation Type. The distribution of this Vegetation Type is displayed in Plan 11, Appendix 1.

The Zeerust Thornveld is characterised by deciduous, open to dense short thorny woodland, dominated by *Senegalia* and *Vachellia* species (previously known as *Acacia*). The herbaceous layer predominantly consists of grasses, trees, shrubs graminoids and herbs.

The site specific habitat varies between Mountain Bushveld on steep slopes and Mountain Bushveld on the moderate slopes.

10.5.1.2 Species of Special Concern

According to the South African National Biodiversity Institute (SANBI) Plants of Southern Africa (POSA) (2016) no Red Data listed species have been recorded previously in the site specific quarter degree square (QDS) in which the project is located, namely QDS 2527AC. However according to existing information the following species can be expected to occur on site, *Boophane disticha* (Poison bulb), declining under the South African Red Data List and *Sclerocarya birrea* (Maroela) protected according to the list of Protected Tree Species under the National Forest Act, 1998 (Act No. 84 of 1998) and *Spirostachys africana* (Tambotie) protected under Schedule 11 of the Nature Conservation Ordinance of Transvaal, 1983 (Act No. 12 of 1983).

10.5.2 Faunal Characteristics

10.5.2.1 Mammals

A total of 59 mammal species could occur on the site specific area. The study area is not particularly rich in mammal taxa, even though it is spatially located in close proximity to the Pilanesberg National Park. The significantly low species richness can be attributed to the human activity that dominates the study area. In the more natural areas, it is possible that many of these species could be displaced from the study site as a result of persecution, hunting and free-roaming feral dogs and cats.

10.5.2.2 Bats

One bat species (*Miniopterus natalensis,* "Near-threatened") could utilise the study area during nocturnal foraging bouts. However, this species roost and breed in caves or mine adits which are not expected to be present within the Sun City Complex.

10.5.2.3 Data Deficient" Species"

Data Deficient species are defined under the IUCN Red List of Threatened Species as species that cannot be evaluated because of insufficient information that are either close to meeting the threatened thresholds or that would be threatened were it not for an on-going taxon-specific conservation programme. In the study area, shrew species (genera *Crocidura* and *Suncus*), the Single-striped Mouse (*Lemniscomys rosalia*), the Bushveld Gerbil (*Tatera leucogaster*) and the Short-snouted Elephant-shrew (*Elephantulus brachyrhynchus*) are "Data Deficient" which are likely to occur.

10.5.2.4 Avifauna

Birds have been viewed as good ecological indicators, since their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. As the land cover of an area changes, so do the types of birds in that area. The diversity of these habitats should give rise to many different species. A total of 12 bird species were observed during the transect counts undertaken, two of which are Provincially Protected (*Streptopelia capicola* (Turtle Dove) and *Spilopelia senegalensis* (Laughing Dove)).

Generally avifauna diversity was found to be very low, primarily due to the limited amount and diversity of habitat types available in the study area, specifically Mountain Bushveld. Based on historic records, a further 21 Red Data Protected Bird Species could occur in the study area with conservation status' ranging from Critically Endangered (1), Endangered (6), Near-threated (8), Vulnerable, (5), and Least Concern (1) according to the South African National Conservation Status (2016). These species are common in the nearby Pilanesberg National Park and could frequent the proposed project areas in the Sun City Complex.

10.5.2.5 Amphibians

A total of 18 taxa are known to occur in the study area (QDS 2527AC) (Minter, *et al*., 2004), of which 12 could occur on the study site based on the presence of suitable habitat. In addition, five of these are believed to be irregular visitors on passage during exceptionally high precipitation events. Those species with a high probability of occurrence include dispersing individuals of *Amietophrynus gutturalis* (Gutteral Toad), *Schismaderma carens* (Red Toad), *Kassina senegalensis* (Bubbling Kassina), *Tomopterna cryptotis* (Tremolo Sand Frog) and *Cacosternum boettgeri* (Boettger‟s Caco). None of the frog species likely to occur are of any conservation significance (Maesey, 2010).

10.5.2.6 Reptiles

Forty-nine (49) reptile taxa (comprising of two chelonians, 28 snakes, 15 lizards, three gecko species and one chameleon) could occur on the study area. Twenty six (26) species have been recorded from QDG 2527AC that overlaps with the study site (information obtained from the South African Reptile Conservation Assessment (SARCA). The outcrops associated with the Mountain Bushveld provide the highest reptile richness when compared to the other floristic units. None of the species likely to occur are threatened or near-threatened.

10.5.3 Sensitivity of the Site

In terms of ecological sensitivity, the following features are assessed to determine how sensitive the habitat identified within the site is:

- Presence or absence of Red Data Listed or protected plant and animal species;
- Presence or absence of exceptional species diversity;
- Extent of intact habitat in good ecological condition in the absence of disturbance; and
- Presence or absence of important ecosystems such as Important Bird Areas (IBA's), Protected Areas, areas demarcated for future protected area status (NPAES) and wetlands.

The assessed site sensitivity is discussed in more detail in subsequent subsections. Plan 12, Appendix 1, displays the project site's biodiversity sensitivity.

10.5.3.1 Protected Areas

Officially protected areas, either provincially or nationally, that occur within proximity to the project site could have consequences as far as impact on these areas are concerned. The project site falls within and is Nature Reserve Protected Areas in accordance with the South African Protected Areas Database (2017). The Pilanesberg National Park surrounds the project boundary from the north east and west.

10.5.3.2 North West Biodiversity Sector Plan

The areas with the Sun City Complex which are proposed for developments have undergone a small degree of disturbance due to infrastructure construction and livestock grazing, resulting in the establishment of bush encroachment. The project site falls within a Critical Biodiversity Area 2 (CBA 2) as far as regional ecological importance is concerned according to the North West BSP (2014).

Land management objectives of areas classified as CBA 2 are:

- Maintain in a natural or near-natural state that maximizes the retention of biodiversity pattern and ecological process:

- Ecosystems and species fully or largely intact and undisturbed; and
- Areas with intermediate irreplaceability or some flexibility in terms of meeting biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising the ability to achieve biodiversity targets, although loss of these sites would require alternative sites to be added to the portfolio of CBAs.

These are biodiversity features that are approaching but have not passed their limits of acceptable change.

10.5.3.3 Important Bird Areas

An Important Birds Area (IBA) is an area recognised as being globally important habitat for the conservation of bird populations. South Africa has 124 IBAs, covering over 14 million hectares of habitat for our threatened, endemic and congregatory birds. The Pilanesberg National Park IBA borders the project site to the north. More than 300 species occur in the park due to its extensive range of habitats and the fact that it lies in the overlap between the dry western and wet eastern parts of the country.

10.5.3.4 Nationally Threatened Ecosystems

The list of nationally threatened ecosystems has been gazetted by the NEMBA: National List of Ecosystems that are threatened and in need of protection and results in several implications in terms of development within these areas. The Sun City Complex does not fall within a Threaten Ecosystem. The nearest Threatened Ecosystem to the site is the Marikana Thornveld located approximately 18 km to the south east of the project site.

10.5.3.5 Nationally Protected Areas Expansion Strategy

The National Protected Areas Expansion Strategy (NPAES) shows areas designated for future incorporation into existing protected areas (both national and informal protected areas). These areas are large, mostly intact areas required to meet biodiversity targets, and suitable for protection. There are no areas earmarked for conservation within 15 km of the proposed development apart from the Pilanesberg National Park. Notably, the North West/Gauteng Bushveld is located approximately 20 km south east of the Sun City Complex.

10.6 Wetlands

A Wetland Assessment was undertaken and is appended to this report as Appendix 6. One wet season field survey was carried out to delineate the wetlands present within the project area and establish the baseline wetland Present Ecological State (PES). The following methodologies were employed:

- **Desktop Assessment** – existing wetland assessments for the project area were reviewed to understand the area together with a review of applicable legislation. Desktop wetland delineation within the project area was undertaken utilising detailed aerial imagery (Southern Mapping, 2015).

- **Wetland Delineation** –an infield assessment was carried out for site verification of the wetland and riparian delineation in accordance with guidelines established by the Department of Water and Forestry of South Africa (DWAF), 2005 using the terrain unit, soil form, soil wetness and vegetation indicators to delineate the boundaries of the wetland areas.
- **Wetland Integrity Assessment** – the wetland integrity was determined using the WET-Health tool, as prescribed by Kotze *et al*. (2007) to measure the PES of wetlands associated with the project area based on the structure and function of the wetlands. Furthermore, the Ecological Importance and Sensitivity (EIS) was derived using the DWAF, 1999 established methods in conjunction with Rountree and Kotze, (2012).

Further detail pertaining to the methodology of the Assessment is provided in the specialist report, Appendix 6.

10.6.1 Wetland Delineation

A wetland assessment was undertaken to delineate and classify wetlands within the Sun City Resort Complex. The Hydro-geomorphic (HGM) Unit system of classification was utilised to classify the identified wetlands. The HGM Unit system focuses on the hydro-geomorphic setting of wetlands which incorporates geomorphology; water movement into, through and out of the wetland; and landscape / topographic setting. Once wetlands have been identified, they are categorised into HGM Units as shown in Table 10-3 below.

Table 10-3: Description of the various HGM Units for Wetland Classification

Hydromorphic wetland type	Diagram	Description
Floodplain		Valley bottom areas with a well-defined stream channel stream channel, gently sloped and characterised by floodplain features such as oxbow depression and natural levees and the alluvial (by water) transport and deposition of sediment , usually leading to a net accumulation of sediment. Water inputs from main channel (when channel banks overspill) and from adjacent slopes.
Valley bottom with a channel		Valley bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterized by the net accumulation of alluvial deposits or may have steeper slopes and be characterised by the net loss of sediment. Water inputs from the main channel (when channel banks overspill) and from adjacent slopes.
Valley bottom without a channel		Valley bottom areas with no clearly defined stream channel, usually gently sloped and characterised by alluvial sediment deposition, generally leading to a net accumulation of sediment. Water inputs mainly from the channel entering the wetland and also from adjacent slopes.

Hydromorphic wetland type	Diagram	Description
Hillslope seepage linked to a stream channel		Slopes on hillsides, which are characterised by colluvial (transported by gravity) movement of materials. Water inputs are mainly from sub-surface flow and outflow is usually via a well-defined stream channel connecting the area directly to a stream channel.
Isolated hillslope seepage		Slopes on hillsides that are characterised by colluvial transport (transported by gravity) movement of materials. Water inputs are from sub-surface flow and outflow either very limited or through diffuse sub-surface flow but with no direct link to a surface water channel.
Pan/Depression		A basin-shaped area with a closed elevation contour that allows for the accumulation of surface water (i.e. It is inward draining). It may also receive subsurface water. An outlet is usually absent and so this type of wetland is usually isolated from the stream network.

Multiple wetland systems which total 136.5 ha of wetlands fall within Sun City Complex area. This comprises of seven freshwater features which are described in Table 10-4. Plan 13, Appendix 1, displays the delineated wetlands as well as their related buffer zones in accordance with the Zones of Regulation of 32m around each wetland in terms of NEMA.

Table 10-4: Wetland HGM Units

HGM Unit	HGM Unit Type	Area (ha)
1	Un-channelled valley bottom	21.6
2	Un-channelled valley bottom	23.4
3	Channelled and unchannelled valley bottom	71.1
4	Seep	4.8
5	Artificial	0.7
6	Artificial	0.2
7	Channelled valley bottom	14.7

The subsections below provide a description of the HGM Units identified and delineated for the Sun City Resort.

10.6.2 HGM Unit 1

HGM Unit 1 is predominantly an un-channelled valley bottom system which covers approximately 21.6 ha. This wetland is characterised by a dominance of *Setaria* grass sp. and *Searsia lancea* trees. The water has been channelized towards the bottom of the wetland, where *Typha capensis* and *Cyperus sexangularis* are the dominant wetland species. Protected species, *Sclerocarya birrea* (Marula), were noted within the wetland as shown in Figure 10-4. The wetland is intersected by a road which is has impacted the

wetland functioning, however, culverts are present which allow for the free flow of water to take place. Furthermore, slight disturbances occur within the wetland such as excavation in the form of borrow pits and invasive alien species are present in small patches, including *Verbena bonariensis.*

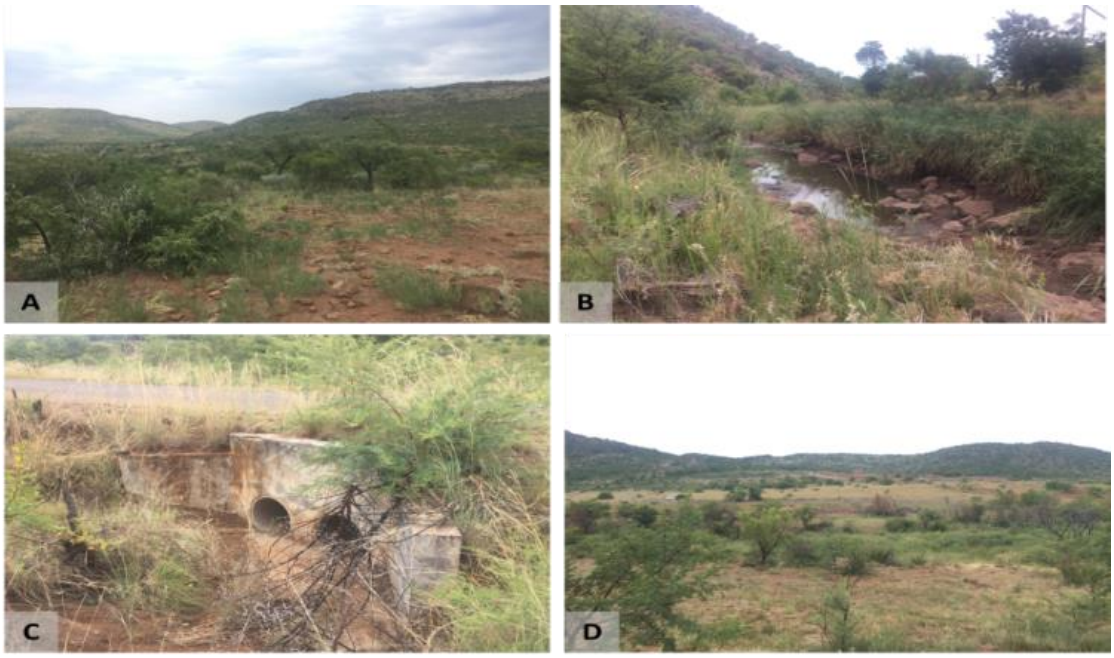


Figure 10-4: HGM unit 1

10.6.3 HGM Unit 2

HGM Unit 2 is a largely un-channelled valley bottom wetland which covers 23.4 ha. Dominant species include *Sporobolus africana*, *Bothriochloa bladhii*, *Cyperus sexangularis, Paspalum sp*, with trees like *Olea europeana* and *Searsia lancea* (Figure 10-5).

Dumping was noted as an existing impact to the wetland, which is particularly prevalent in the southernmost portion. Furthermore, as a result of the golf course, hydrological impacts are evident particularly in the eastern arm of this wetland. Various road crossings resulting in loss of flow and stream connectivity and fragmentation of the system also occur.

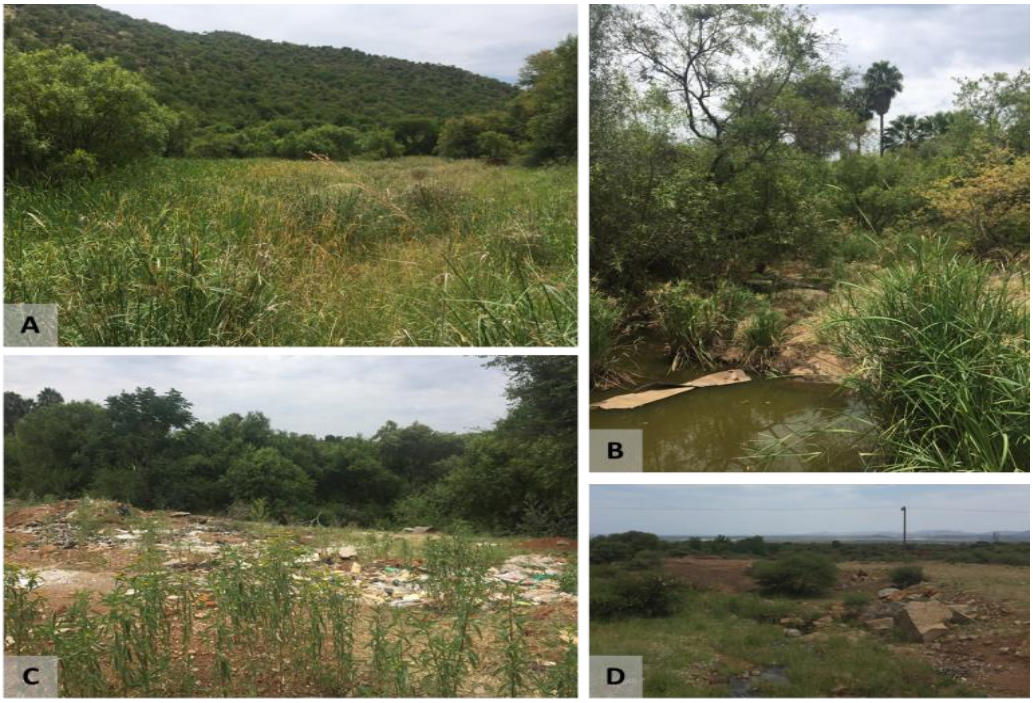


Figure 10-5: HGM unit 2

10.6.4 HGM Unit 3

HGM Unit 3 is a channelled and un-channelled valley bottom wetland which covers 71.1 ha. The wetland is transformed as it flows through the golf course, into a dam and then past the crocodile centre, which discharges dirty water into the wetland. The vegetation is characterised by closed canopy riparian woodland (Figure 10-6).

The dam has impacted on the wetland ecological health and its integrity. Discharges of dirty water from the crocodile sanctuary may negatively affect water quality in the southern portion of the wetland. Furthermore, concrete walkways constructed in the riparian and wetland areas have resulted in fragmentation of the systems in some areas as well as the golf course, its greens and associated infrastructure including concrete drains, channels, canals and pump stations. The disturbance has resulted in high infestation of alien invasive plants including *Solanum mauritiuanum*, *Lantana camara*, *Arundo donax*, *Ricinus communis* and *Melia azedarach.*

Figure 10-6: HGM unit 3

10.6.5 HGM Unit 4

HGM Unit 4 is a seep wetland which covers 4.8 ha. A large portion of this area has been converted to a quad bike track, this area is transformed with alien and invasive vegetation species and disturb soils. Dominant species include *Vachellia karroo*, *Ziziphus mucronata*, *Searsia lancea*, *Dichrostachys cinerea* and *Typha* capensis (Figure 10-7).

The quad bike track has resulted in alterations to the topography, with depressions and slopes created. This has altered the geomorphology and hydrology of the wetland. The extensive disturbance has resulted in invasion by various alien invasive plants such as *Verbena bonariensis* and *Lantana camara*, both categorised as Category 1b species according to NEMBA.

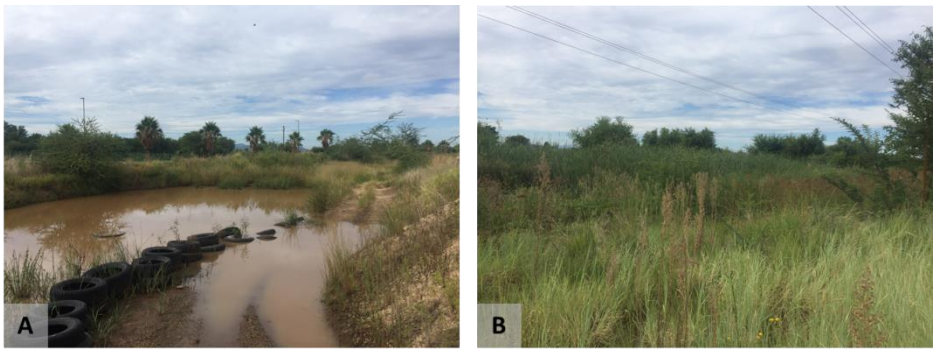


Figure 10-7: HGM unit 4

10.6.6 HGM Unit 5

HGM Unit 5 is an artificial wetland which covers 0.7 ha. This feature has been excavated to serve as a watering hole. A drainage pipe was observed at this point. Banks are bare, increasing the potential for erosion at this point. Some portions are dominated by *Typha capensis* and the invasive species *Arundo donax* (Figure 10-8).

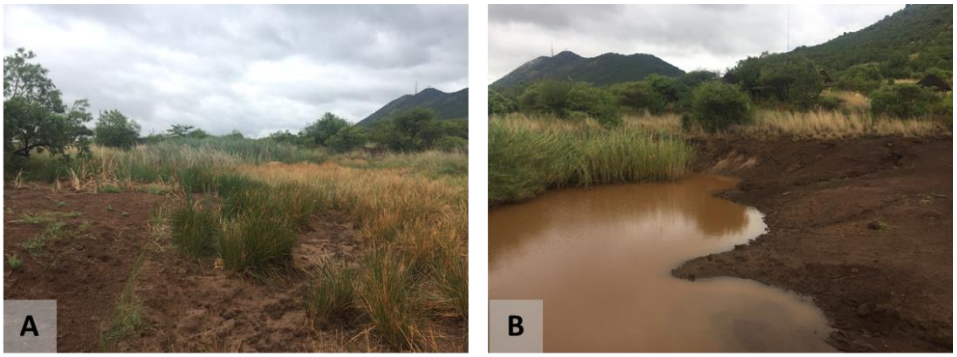


Figure 10-8: HGM unit 5

10.6.7 HGM Unit 6

HGM Unit 6 is an artificial wetland which covers 0.2 ha. Vegetation cover and abundance at this point is good, albeit low species diversity observed. It is dominated by *Typha capensis, Cymbopogon sp, Cyperus sp.* and *Eliocharis sp.* the road is the largest impact on this artificial wetland (Figure 10-9).

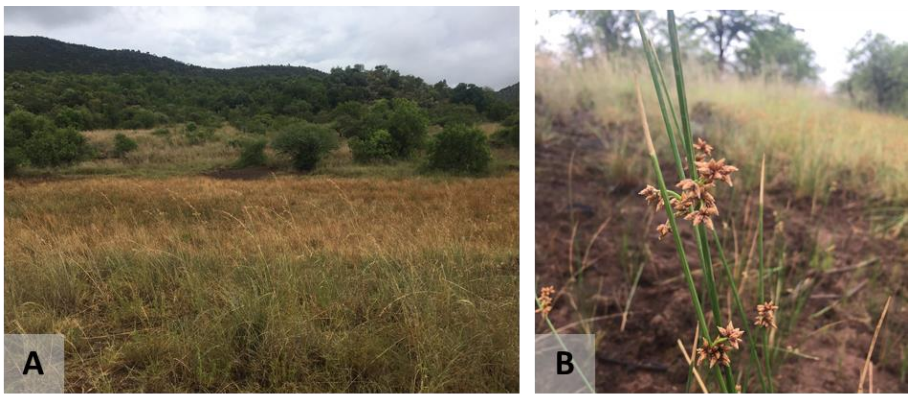


Figure 10-9: HGM unit 6

10.6.8 HGM Unit 7

HGM Unit 7, a channelled valley bottom wetland and is 14.7 ha in size. The wetland is characterised by riparian woodland, dominated by *Olea europea, Searsia lancea, Ziziphus mucronata, Setaria megaphylla and Panicum coloratum* (Figure 10-10). *Typha capensis* and *Cyperus* species occurred where there was inundation.

The wetland has been dammed for recreational purposes, which has impacted on the wetland integrity. Furthermore, road crossings are present, resulting in the compaction of

soils and increasing the potential for inundation and sedimentation, as well as loss of flow connectivity and fragmentation of the system. Trampling and grazing by game stock have resulted in some loss of vegetation integrity of the northern portion of this system.

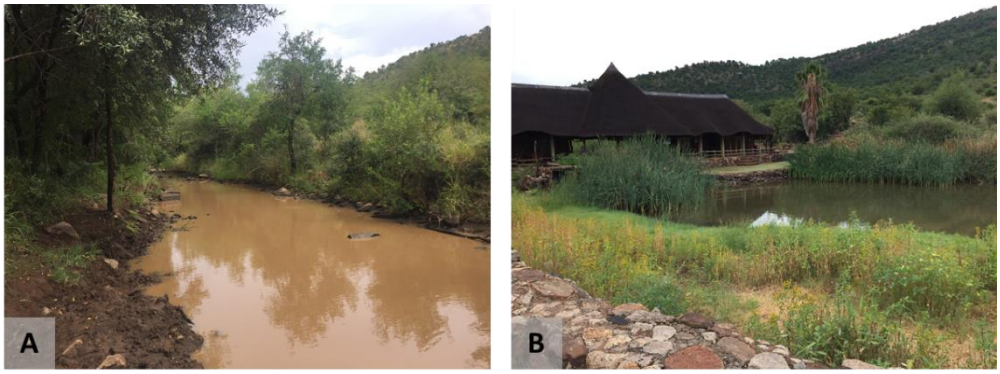


Figure 10-10: HGM unit 7

10.6.9 Sensitivity of the Site

The subsections below discuss the PES and EIS associated with the delineated wetlands. The PES and EIS are also illustrated in Plan 14, Appendix 1.

10.6.9.1 Present Ecological State

The wetlands within the project site exhibit a variety of PES values, ranging from *Largely Natural* (Category B) to *Largely Modified* (Category D) as presented in Table 10-5. HGM Unit 5 may be regarded as *Largely Natural* (Category B), with only minor impacts as a result of the recreational dam and the presence of some alien invasive plant species.

HGM Units 1 and 4 may be regarded as *Moderately Modified* (Category C), with moderate impacts at HGM Unit 1 affecting vegetation and hydrological integrity as a result of the road crossing. Loss of natural vegetation and soil disturbance as well as compromised water quality contributed to the modified state at HGM Unit 4.

Two *Largely Modified (*Category D*)* wetlands are present in the project site (HGM Unit 2 and HGM Unit 3). The *Largely Modified* category is mainly attributed to habitat transformation and hydrological alterations due to the golf course as well as the dam and crocodile sanctuary as in the case of HGM Unit 3.

Table 10-5: Present Ecological Health Scores

HGM Unit	Hydrological Health Score	Geomorphological Health Score	Vegetation Health Score	Final Ecological Health Score	PES Score
1	2.0	0.2	5.2	2.4	C
2	6.5	1.6	6.3	5.0	D

HGM Unit	Hydrological Health Score	Geomorphological Health Score	Vegetation Health Score	Final Ecological Health Score	PES Score
3	7.5	0.3	8.8	5.8	D
4	3.5	0.6	8.1	3.9	C
5	N/A for artificial wetlands				
6	N/A for artificial wetlands				
7	1	0.2	4.6	1.8	B

10.6.9.2 Ecological Importance and Sensitivity

Although the wetlands were found to be modified, they still provide predominantly *Moderate* to *Low* hydrological importance services (ranging between 0.5 and 1.9), such as erosion control and sediment trapping and assimilation of toxicants and nitrates.

The Ecological Importance and Sensitivity category ranges from *Moderate* (1) to *High* (2.4). This is largely due to proximity to the Pilanesberg National Park and the presence of various protected species observed at the time of the assessment (*Sclerocarya birrea, Spirostachys africana)*. In general, the values are *Low* (0.7) to *High* (2.5) for 'Direct Human Benefits'. The wetlands provide tourism services specifically and some provide water and cultural services further downstream. Table 10-6 indicates the EIS scores for the HGM Units with the final EIS scores ranging from *Moderate* (1) to *High* (2.5).

Table 10-6: EIS Scores

HGM Unit	Ecological Importance & Sensitivity	Hydrological/Functional Importance	Direct Human Benefits	Final EIS Score	Final EIS Category
1	2.4	1.9	1.7	2.4	B
2	2.3	1.4	2.5	2.5	B
3	2.4	1.1	1.8	2.4	B
4	1.8	1.1	0.8	1.8	C
5*	1	0.8	1.7	1.7	C
6*	1	0.5	0.7	1	C
7	3	1.1	1.3	3	B

*method is not intended for artificial wetlands, however it was applied as an indicator of functionality

10.7 Aquatic Ecology

The Aquatic Biodiversity Assessment is appended to this report as Appendix 7. The study comprises both a low and high flow survey in November 2017 and January 2018

respectively to characterise the aquatic environment. The locations of the sample points are depicted in Plan 15, Appendix 1. The following methodology was employed for the Assessment:

- **Desktop Assessment** – the aquatic system associated with the project area were identified according to their specific Sub-Quaternary Reach (SQR) as described by DWS. Furthermore, literature pertaining to the SQR was reviewed to aid the understanding of the baseline conditions.
- **Water Quality** – *in situ* water quality variables were to be taken from the selected sampling sites and were assessed for temperature, conductivity, pH, Dissolved Oxygen concentrations and saturation levels.
- **Habitat Integrity** – an Intermediate Habitat Integrity Assessment (IHIA) was completed to assess the integrity of the habitats from a riparian and instream perspective against the criteria and classes prescribed by Kleynhans (2015).
- **Aquatic Macroinvertebrates** – the aquatic macroinvertebrates assessment included the use of the following associated indices:
    - Integrated Habitat Assessment System (IHAS) – IHAS was used to measure the variability aquatic macroinvertebrate biotopes available at the time of the survey. The IHAS score is expressed as a categorised percentage that ultimately describes the quantity, quality and diversity of available macroinvertebrate habitat relative to an “ideal” diversity of available habitat.
    - South Africa Scoring System Version 5 (SASS5) – the SASS5 index was used to assess the status of riverine macroinvertebrates based on the presence of aquatic invertebrates families and their perceived sensitivity to water quality changes. SASS results are expressed both as an index score (SASS Score) and the Average Score per Recorded Taxon (ASPT value).
    - Macroinvertebrates Response Assessment Index (MIRAI) – the MIRAI was used to provide a habitat based cause-and-effect foundation to interpret the deviation of the aquatic invertebrate community from the calculated reference conditions for the Bushveld Basin. The results of the MIRAI provide an indication of the baseline ecological category and subsequently assist in determining the PES.
- **Eco-Status** – based on the assessments above, the PES of tributaries considered in the study is determined utilising the River Eco-status Monitoring Programme (REMP) Ecological Classification manual by Kleynhans and Louw (2007).

The timing of both surveys coincided with a below normal rainfall event experienced during the 2017/2018 period in the North West Province (Figure 10-11). Consequently, the water levels observed during, what was classified as, the high flow survey (January 2018) was lower than the observed water levels during the low flow survey. Therefore, the overall findings and ecological categorisations presented in this report should be interpreted with

caution as they may not be true representations of the aquatic ecology for the assessed area but rather skewed results due to the drought conditions experienced throughout the study.

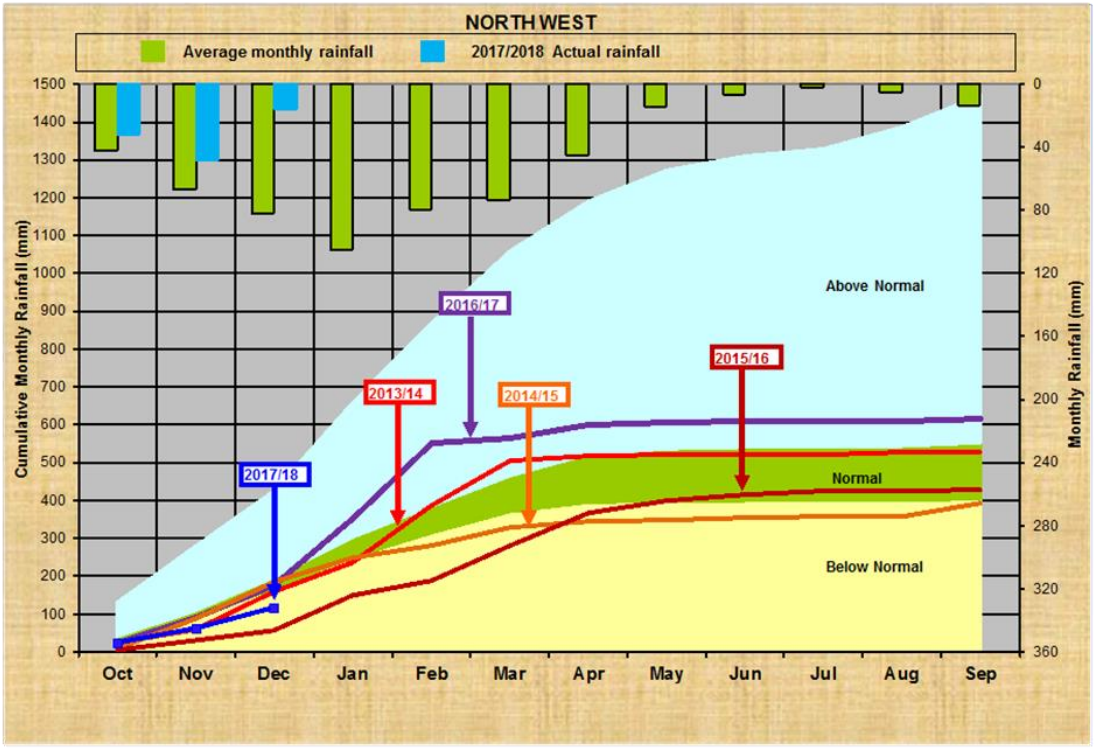


Figure 10-11: Annual Rainfall Trend for the North West Province

(Source: DWS, 2018)

Further detail pertaining to the methodology of the Assessment is provided in the specialist report, Appendix 7.

10.7.1 Intermediate Habitat Integrity Assessment

The IHIA assesses the integrity of the habitats from a riparian and instream perspective. Scores are calculated based on ratings received from the assessment. The estimated impacts of the criteria are summed and expressed as a percentage to arrive at a provisional habitat integrity assessment. The scores are placed into the IHIA categories ranging from A (unmodified, natural: 90-100) to F (modifications which have reached critical level with an almost complete loss of natural habitat and biota: 0-19).

The IHIA was completed on the three SQRs, namely the Western, Central and Eastern Tributary (as indicated on Plan 14, Appendix 1), of concern and populated with observations recorded during the various surveys.

According to the IHIA results for the Western Tributary and Central Tributary, the riparian habitat for the assessed reach was classified as moderately modified (Category C), while the IHIA scores for the Eastern Tributary indicate that the that the riparian habitat is in a largely modified state (Category D).

Instream habitat IHIA were calculated for the Central and Eastern Tributaries which were classified as moderately modified (Category C) and largely modified state (Category D) respectively. No instream habitat assessment was undertaken for the Western Tributary as it was found dry.

10.7.2 Macroinvertebrates Assessment

The subsections below summarise the findings of the various macroinvertebrate assessments utilised in the study. It is important to note that Sites WT1, WT2, CT2, ET1A and ET1B were observed as dry throughout the study. As a result these sites were excluded from the macroinvertebrate assessment.

10.7.2.1 South African Scoring System Version 5 (SASS5)

The South African Scoring System Version 5 (SASS5) is the current index being used to assess the status of riverine macroinvertebrates in South Africa. The index is based on the presence of aquatic invertebrate families and the perceived sensitivity to water quality changes of these families. Only three of the monitoring sites with sufficient water levels, namely Sites CT1, ET2 and ET3, fell within the defined parameters for a SASS5 assessment.

The average sensitivity score of the sampled macroinvertebrates was 3.7. This represents a macroinvertebrate assemblage with low sensitivity, fairly tolerant to modifications.

10.7.2.2 Integrated Habitat Assessment System

An IHAS is utilised in conjunction with the SASS to measure the variability of aquatic macroinvertebrate biotopes available at the time of the survey. The scoring system was traditionally split into two sections, namely the sampling habitat (comprising 55% of the total score) and the general stream characteristics (comprising 45% of the total score), which were summed together to provide a percentage and then categorised according to set values ranging from <55% representing poor to >75% representing excellent.

The available macroinvertebrate habitat at all of the sites applicable for the SASS5 assessment was classified as Poor. This is due to the lack of vegetation observed at Site CT1 possibly as a result from the low rainfall experienced in the North West Province leading up to the study. The monitoring sites along the Eastern Tributary are characterised by slow flowing impounded sections which appear to be severely sedimented, especially noted at Site ET3. This sedimentation appears to result from the potential loss of flow due to the number of weirs built along the tributary. This has resulted in a loss of the stones biotope which acts as a large portion of important macroinvertebrate habitat thus, contributing significantly to the poor classification as presented by the above scores.

10.7.2.3 Macroinvertebrate Response Assessment Index

The MIRAI was used to provide a habitat-based cause-and-effect foundation to interpret the deviation of the aquatic invertebrate community from the calculated reference conditions for

the basin. This does not preclude the calculation of SASS5 scores if required (Thirion, 2007). The four major components of a stream system that determine productivity for aquatic macroinvertebrates are: flow regime, physical habitat structure, water quality and energy inputs from the watershed riparian vegetation assessment. The results of the MIRAI provide an indication of the current ecological category and therefore assist in the determination of the PES.

The MIRAI results indicate that the macroinvertebrate assemblage for the reach (Central Tributary) is largely modified (Ecological Category D). It appears that poor water quality, evident by the high conductivity recorded at Site CT1, is the major driver behind this categorisation. Modifications to flow in the tributary appear to be the second largest driver. However, this factor can be attributed to the low rainfall experienced in the area which also possibly contributed to the dry observation of the monitoring site during the high flow survey. Similarly the macroinvertebrate assemblage for the reach (Eastern Tributary) is largely modified (Ecological Category D) where the major driver is the modification to flow which can be attributed to the construction of the resort's recreation dam and to a lesser extent the low rainfall experienced in the area.

10.7.3 Ichthyofauna Assessment

Fish sampling was conducted by means of various techniques including electroshocking with a Smith and Root LR-24 unit as well as the use of cast nets and conventional angling techniques at applicable sites with sufficient water depth. All fish were captured, identified and counted in the field and released alive at the point of capture. Fish species were identified using the "Complete Guide to the Freshwater Fishes of Southern Africa" (Skelton, 2001). Table 10-7 presents the fish species collected/observed during the study.

Table 10-7: Sampled and Observed Fish Species during the Study

Scientific Name	Common Name	Conservation Status	Total Low Flow	Total High Flow
Enteromius mattozi	Papermouth	Least Concern	0	0
Enteromius paludinosus	Straightfin Barb	Least Concern	47	40
Enteromius trimaculatus	Three spot Barb	Least Concern	0	0
Enteromius unitaeniatus	Longbeard Barb	Least Concern	0	0
Clarias gariepinus	Sharptooth Catfish	Least Concern	40+	30+
Labeo cylindricus	Red Eyed Labeo	Least Concern	0	0
Labeo molybdinus	Leaden Labeo	Least Concern	0	0
LabeoEnteromius marequensis	Largescale Yellowfish	Least Concern	0	0
Mesobola brevianalis	River Sardine	Least Concern	0	0
Oreochromis mossambicus	Mozambique Tilapia	Near Threatened	13	17

Scientific Name	Common Name	Conservation Status	Total Low Flow	Total High Flow
Pseudocrenilabrus philander	Southern Mouth Brooder	Least Concern	30+	24
Tilapia sparmanni	Banded Tilapia	Least Concern	4	19
*Cyprinus carpio**	Common Carp	Least Concern	3	5
*Gambusia affinis**	Mosquito Fish	Least Concern	0	7
Exotic fish species represented with *				

A total of five of the 12 expected indigenous fish species with a total of two exotic species were recorded during the study. All sampled fish species were observed from Site ET3 with the exception of *Cyprinus carpio*. This exotic fish species was only observed in the Resort's recreational dam and as a result is expected in the downstream reach and was included in the Eastern Tributary FRAI assessment below (Table 10-8). It is important to note that the sampled fish species from Site CT3 were included in the Central Tributary FRAI assessment (Table 10-8) despite the impounded nature of the site. The fish species present at this site indicates that the specific species are clearly present in the reach. However, due to the low rainfall experienced in the area, the fish in the reach have been confined to impoundment and are expected to migrate in the reach once rainfall returns to normal levels.

10.7.3.1 Fish Response Assessment Index Assessment

The purpose of the Fish Response Assessment Index (FRAI) is to provide a habitat-based cause-and-effect underpinning to interpret the deviation of the fish assemblages from the identified reference conditions. The information gained using the FRAI provides an indication of the PES of the river based on the fish assemblage structures observed.

The results from the Central Tributary FRAI Assessment are presented in Table 10-8 with the Eastern Tributary findings presented in Table 10-9.

Table 10-8: Central Tributary FRAI Results

Fish Species	Reference Frequency of Occurrence	Observed Frequency of Occurrence
Clarias gariepinus	4	3
Enteromius mattozi	1	0
Enteromius paludinosus	4	4
Enteromius trimaculatus	3	0
Enteromius unitaeniatus	3	0
Labeo cylindricus	1	0
Labeo molybdinus	1	0
Labeobarbus marequensis	1	0
Mesobola brevianalis	1	0

Fish Species	Reference Frequency of Occurrence	Observed Frequency of Occurrence
Oreochromis mossambicus	4	3
Pseudocrenilabrus philander	5	5
Tilapia sparmanni	4	4
FRAI (Adjusted) %		**47.8**
Ecological Category		**D**

According to the FRAI assessment the fish ecological category for the Central Tributary is largely modified (Ecological Category D). This modified classification can be attributed to the lack of fish species sampled during the study due to low water levels observed at the monitoring sites. Impoundments, especially noted at Site CT3, appear to have also contributed to this modified score by contributing to flow modification and the subsequent loss of flow dependent species (i.e. *Labeo molybdinus* and *Labeobarbus marequensis*).

Table 10-9: Eastern Tributary FRAI Results

Fish Species	Reference Frequency of Occurrence	Observed Frequency of Occurrence
Clarias gariepinus	5	5
Enteromius mattozi	1	0
Enteromius paludinosus	4	4
Enteromius trimaculatus	3	0
Enteromius unitaeniatus	3	0
Labeo cylindricus	1	0
Labeo molybdinus	2	0
Labeobarbus marequensis	1	0
Mesobola brevianalis	1	0
Oreochromis mossambicus	4	4
Pseudocrenilabrus philander	5	4
Tilapia sparmanni	4	4
FRAI (Adjusted) %		**44.9**
Ecological Category		**D**

The results from the FRAI assessment for the Eastern Tributary indicate that the fish assemblage for the reach is in a largely modified state (Ecological Category D). It appears that the major driver behind this categorisation can be attributed to flow modifications along the reach in the form of constructed weirs and the recreational dam. The weirs along the reach downstream from Site ET3 are most likely severely impacting on fish migration within the reach and possibly resulting in the loss of species from the study. The presence of two alien invasive fish species, namely *Cyprinus carpio* and *Gambusia affinis* are also impacting

significantly on the modified ecological category. These species compete with indigenous species and are most likely also contributing to the loss of some of the indigenous species.

10.7.4 Ecological Status

The water quality, IHIA, macroinvertebrates assessments and ichthyofaunal assessments discussed above are utilised to determine the overall PES of the assessed SQR's. The results of the ecological classification and PES for the three assessed tributaries are presented in Table 10-10, Table 10-11 and Table 10-12 below. It is important to note that the riparian ecological category for the Western Tributary was the only ecological component used for the PES determination of the assessed reach. Therefore, interpretation of the PES for the reach should be considered with caution.

Table 10-10 below presents the PES findings for the Western Tributary.

Table 10-10: The Present Ecological Status of the Western Tributary

Category	Score	Ecological category
Riparian Habitat Ecological Category	58.0	D
Macroinvertebrate Ecological Category	DRY	-
Fish Ecological Category	DRY	-
Ecostatus	**58.0**	**D (Largely modified)**

The results of the PES determination indicate that the Western Tributary is in a largely modified state (Ecological Category D). This can be attributed to impacts associated with the settlements in the lower section of the assessed reach. Their influence has resulted in vegetation removal and partial encroachment of exotic vegetation in the form of subsistence crops. It is also noted the majority of this area falls outside of the Sun City Complex, refer to Plan 15, Appendix 1.

Table 10-11 below presents the PES findings for the Central Tributary.

Table 10-11: The Present Ecological Status of the Central Tributary

Category	Score	Ecological category
Riparian Habitat Ecological Category	66.0	C
Macroinvertebrate Ecological Category	54.6	D
Fish Ecological Category	47.8	D
Ecostatus	**58.6**	**C/D (Moderately to largely modified)**

The results of the PES determination indicate that the Central Tributary is in a moderately to largely modified state (Ecological Category C/D). It is however expected that the Ecological Category for the Central Tributary will improve to solely category C if the annual rainfall returns to normal levels. This overall Ecological Category for the reach can be attributed

mainly to the poor instream ecological components (i.e. macroinvertebrates and fish as a result of the low rainfall experienced compounded by poor water quality impacts associated mainly with the low water levels and partially due to the observed discharge from the Resort's nursery. The potential anthropogenic activities related to this PES score is associated with all surrounding land uses which includes residential developments, mining and agriculture.

Table 10-12 below presents the PES findings for the Eastern Tributary.

Table 10-12: The Present Ecological Status of the Eastern Tributary

Category	Score	Ecological category
Riparian Habitat Ecological Category	54.0	D
Macroinvertebrate Ecological Category	55.4	D
Fish Ecological Category	44.9	D
Ecostatus	**52.1**	**D (Largely modified)**

The results of the PES determination indicate that the Eastern Tributary is in a largely modified state (Ecological Category D). The major driver behind this modified categorisation appears to be due to equal contributions of both modified riparian habitat and instream biological responses (i.e. macroinvertebrates and fish). Modifications to the reach from reference conditions, in the form of impoundment and weir construction, habitat removal and the presence of exotic plants and fish, have resulted in the subsequent largely modified categorisation of the tributary.

10.8 Surface Water and Groundwater

A combined Surface Water and Groundwater Assessment is appended to this report as Appendix 8. An infield assessment and sampling for both aspects was conducted during November 2017 at strategically selected monitoring points along relevant streams to determine the baseline conditions within the project area. The sampling points are depicted in Plan 16, Appendix 1. The following methodologies were employed in this assessment:

- **Desktop Assessment** – a literature survey was undertaken to gather information on the project area. A desktop assessment of the catchment characteristics (rivers/streams, pans, dams and groundwater).
- **Hydrocensus** – a hydrocensus was conducted which comprised collection of the following information for each sampling site: status of the sampling site/borehole; sampling coordinates; field pH, Electrical Conductivity (EC) and Total Dissolved Solids (TSD) values. A total of three boreholes were planned to be sampled, however one site was found to be dry, and five surface water samples were collected.
- **Water Quality Assessment** – The samples collected during the infield assessment, were sent to a SANS accredited laboratory (Aquatico) for analysis. Water quality

results were compared to various South African Water Quality Guidelines (SAWQGs) as well as the 2015 WUL for Sun International where appropriate.

Further detail pertaining to the methodology of the Assessment is provided in the specialist report, Appendix 8.

10.8.1 Hydrological Setting

The Pilanesberg area is located within the Limpopo River Basin (Primary Catchment A) within the Crocodile West and Marico Water Management Area (WMA). The project site falls within quaternary catchment A22F. The hydrological setting of the project area is displayed in Plan 17, Appendix 1.

The A22F catchment surface area covers approximately 151,423 ha with mean annual run-off 16.3 mm and mean annual recharge of 2.7% of mean annual precipitation (Pachnoda Consulting, 2013). The catchment is characterised by a series of non-perennial and ephemeral rivers with limited surface water resources such as small dams and wetlands. These small dams and wetlands play a significant role to attenuate floods as well as improve water quality and maintain stream flow within the catchment (Department of Water Affairs (DWAF), 2010). All surface flows (including effluent discharge) originate within the region and follow in a radial pattern outward. According to the 1:50,000 topographical maps, the following non-perennial streams drain the development area:

- An unnamed stream to the west that drains the landfill site, LCGC and Vacation Club;
- The Leitholenoga that drains the central areas such as the Lost City, Cascades, Valley of the Waves, Cabanas, GPGC and Kwena Gardens; and
- The Ga-Mamosadie to the east that mostly drains a natural undeveloped area.

The above streams drain into the Elands River located 5 km south of the Sun City Resort Complex. During the in-field assessment conducted in November 2017, the Elands River was found to be dry. The Elands River is a tributary of the Crocodile River, which subsequently flows into the Limpopo River.

10.8.2 Hydrogeological Setting

The project area is characterised by two types of aquifers, namely a shallow near surface weathered zone and a deep unconfined fractured rock aquifer. The shallow weathered zone aquifer is directly recharged by rainfall and as a result is only saturated during rainy seasons. On the other hand, the deep fractured rock aquifer is predominantly associated with secondary porosity such as fractures and joints resulting in low borehole yields of 0.1 to 0.5 ℓ/s (Jones and Wagener, 2017).

According to Vegter, 1995, these two aquifers are classified as both fractured and intergranular and fractured rock aquifer. Therefore, the groundwater table is characterised by steep water gradients due to very low transmissivity of the rock mass. The groundwater flow

mimics the topographic relief due to underlying geological structure, thus, it is understood to flow radially or outward from the centre of the PAC.

10.8.3 Water Uses

Water use within the resort can be divided into water required for potable use and water required for irrigation. Magalies Water provides the required potable water that is mostly used for domestic purposes and for the filling of swimming pools, while purified effluent from the Sun City WWTW is used for irrigation of both golf courses and the gardens.

10.8.4 Water Quality Analysis

As indicated above, a total of two boreholes were sampled within the Sun City Resort Complex while a total of five surface water samples were collected and analysed. Detail pertaining to the sampling site and selected standards for water quality comparison are provided in the specialist report, Appendix 8. The SAWQGs which were chosen for analysis were based on the water use associated with the sampling point i.e. irrigation, livestock watering or recreational water uses.

10.8.4.1 Water Quality Results

Table 10-13 below presents the water quality results for the sampled sites (both surface water and groundwater). Subsequently, an interpretation of these results is provided.

Table 10-13: Water Quality Results

Parameter	Units	WUL 2015	WUL 2015: Wastewater Used for Irrigation	SA Water Quality Guidelines: Recreational Water Use	SA Water Quality Guidelines: Irrigation	SA Water Quality Guidelines: Livestock Watering	Sampling Points & Water Quality						
		Limit/s	Limit/s	Limit/s	Limit/s	Limit/s	Kwena BH (Borehole)	Landfill BH (Borehole)	RL3 (Stream)	LCGC Dam	Ledig Stream	Recreational Dam	GPGC 2 Dam
pH – Value at 25°C	pH Units	≥ 6 to ≤ 8.5	≥ 5.5 to ≤ 7.5	≥ 6.5 to ≤ 8.5	≥ 6.5 to ≤ 8.4	-	7.36	7.02	8.25	8.95	8.19	8.46	8.64
Electrical Conductivity at 25°C	mS/m	< 50	≤ 15	-	≤ 40	-	85.2	178	69.3	70.7	80.7	81	80.6
Total Dissolved Solids (TDS) at 180°C	mg/l	-	-	-	≤ 260	≤ 1000	637	1318	473	460	424	494	496
Turbidity	NTU	< 3	-	-	-	-	0.474	36.2	3.59	10	0.668	1.74	15.7
Free Residual Chlorine as Cl_2	mg/l	-	-	-	-	-	0.1	0.1	0.1	0.2	0.1	0.1	0.1
Chloride as Cl	mg/l	-	-	-	≤ 100	≤ 1500	159	305	82.8	133	93.3	165	155
Sulphate as SO_4	mg/l	-	-	-	-	≤ 1000	50.6	163	79.6	75	75.7	78.7	81.2
Fluoride as F	mg/l	-	-	-	≤ 2	≤ 2	2.92	2.01	0.98	1.11	1.13	1.45	1.28
Nitrate as N	mg/l	< 6	≤ 1.5	-	-	≤ 443	0.735	43.5	2.44	0.273	0.462	0.268	0.488
Nitrite as N	mg/l	< 6	-	-	-	-	0.131	0.346	0.181	0.11	0.11	0.11	0.098
Total Coliform Bacteria	Count/100ml	-	-	-	-	-	18	<1	410	190	2900	2300	6
E. coli	Count/100ml	-	-	≤ 130	-	-	13	<1	190	90	400	1400	6
Heterotrophic Plate Count	Count/1ml	-	-	-	-	-	57	50000	2500	7790	26600	27000	5330
Free & Saline Ammonia as N	mg/l	-	≤ 1	-	-	-	<0.005	<0.005	0.011	0.025	0.005	0.012	0.013
Sodium as Na	mg/l	-	-	-	≤ 70	≤ 2000	136	204	84.1	80.4	64.7	86.8	88.2
Potassium as K	mg/l	-	-	-	-	-	4	12.6	16.6	10.8	6.09	8.01	10
Calcium as Ca	mg/l	-	-	-	-	≤ 1000	74.2	177	53.6	57.9	52.7	54	55.2
Magnesium as Mg	mg/l	-	-	-	-	≤ 500	14.4	38.3	20.8	21.3	21.2	23.3	23.4
Aluminium as Al	mg/l	-	-	-	≤ 5	≤ 5	<0.002	<0.002	<0.002	0.013	<0.002	<0.002	<0.002
Boron as B	mg/l	-	-	-	≤ 0.5	≤ 5	0.04	0.02	0.106	0.057	0.045	0.133	0.06
Cadmium as Cd	mg/l	-	-	-	≤ 0.01	≤ 0.01	<0.002	<0.002	<0.002	0.013	<0.002	<0.002	<0.002
Total Chromium as Cr	mg/l	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Copper as Cu	mg/l	-	-	-	≤ 0.2	≤ 0.5	0.003	0.012	0.01	0.01	<0.002	<0.002	<0.002
Iron as Fe	mg/l	-	-	-	≤ 5	≤ 10	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Lead as Pb	mg/l	-	-	-	≤ 0.2	≤ 0.1	<0.004	<0.004	<0.004	<0.004	<0.004	0.01	<0.004
Manganese as Mn	mg/l	-	-	-	≤ 0.02	≤ 10	0.061	0.082	0.12	<0.001	0.034	<0.001	<0.001
Nickel as Ni	mg/l	-	-	-	≤ 0.2	≤ 1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Parameter	Units	WUL 2015	WUL 2015: Wastewater Used for Irrigation	SA Water Quality Guidelines: Recreational Water Use	SA Water Quality Guidelines: Irrigation	SA Water Quality Guidelines: Livestock Watering	Sampling Points & Water Quality						
		Limit/s	Limit/s	Limit/s	Limit/s	Limit/s	Kwena BH (Borehole)	Landfill BH (Borehole)	RL3 (Stream)	LCGC Dam	Ledig Stream	Recreational Dam	GPGC 2 Dam
Zinc as Zn	mg/l	-	-	-	≤ 1	≤ 20	0.041	0.044	0.003	<0.002	0.009	0.011	0.015
Total Alkalinity	mg CaCO3/l	< 100	-	-	-	-	208	229	171	130	143	118	128
Ammonium (NH_4) as N	mg/l	-	-	-	-	-	0.082	0.165	0.126	0.083	0.065	0.086	0.073
Orthophosphate (PO_4) as P	mg/l	< 0.5	≤ 1	-	-	-	<0.005	0.038	1.83	0.046	<0.005	<0.005	0.206
Hexavalent Chromium as Cr_{6+}	mg/l	-	-	-	≤ 0.1	≤ 1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt as Co	mg/l	-	-	-	≤ 0.05	≤ 1	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Total Hardness	mg CaCO3/l	-	-	-	-	-	245	599	219	232	219	231	234
Chemical Oxygen Demand (COD)	mg/l	-	≤ 30	-	-	-	31.6	36.4	51	45.3	29.2	23.6	23
Total Suspended Solids (TSS)	mg/l	< 25	≤ 10	-	≤ 50	-	<4.5	122	5	<4.5	<4.5	<4.5	25
Dissolved Oxygen (DO)	mg/l	> 6	-	-	-	-	3.78	2.08	5.72	4.7	5.02	5.26	5.05
Bicarbonate Alkalinity	mg CaCO3/l	-	-	-	-	-	208	229	168	120	141	115	123
Carbon Alkalinity	mg CaCO3/l	-	-	-	-	-	0.445	0.225	2.81	10.1	2.03	3.11	5.08
Temperature	°C	-	-	-	-	-	22.9	22.9	22.8	23	22.9	23.3	22.9

- Light green highlighted values/cells indicate concentrations exceeding/below the permissible limits for WUL 2015;
- Light purple highlighted values/cells indicate concentrations exceeding/below the permissible limits for SAWQG: Irrigation;
- Light blue highlighted values/cells indicate concentrations exceeding/below the permissible limits for SAWQG: Recreational Water Use;
- Light orange highlighted values/cells indicate concentrations exceeding/below the permissible limits for SAWQG: Irrigation, light tan highlighted values/cells indicate concentrations exceeding/below the permissible limits for SAWQG: Livestock Watering; and
- In cases where more than one of the above guideline limits applies, the guideline limit with the highest value is taken. Further, the light red highlighted values/cells indicate concentration exceeding the SAWQG for irrigation as well the livestock watering limits.

10.8.4.2 Results Interpretation

10.8.4.2.1 Surface Water

The surface water quality results are summarised as follows:

- RL3 – EC, Turbidity, Ammonium and Dissolved Oxygen (DO) exceeded the WUL 2015 as well as the SAWQG for livestock watering. It is noted that the majority of the runoff from the Sun City Resort Complex is drained to this point. *E.coli*, Total Coliforms and Heterotrophic plate count were fairly high, however, there are no available comparison limits. These parameters are indicators of faecal contamination from both humans and animals. The exceedance of these parameters is most likely to be due to faecal matter from the upstream crocodile farm located at the Kwena Gardens. A further possibility is potential seepage from sewage lines; however, this was not confirmed on site. It is recommended that sewage lines be checked regularly and serviced if required. It is noted that this sampling point is located at the outlet of the Sun City Resort on the Letholenoga stream with various adjoining tributaries, therefore, the observed water quality may also be influenced by other surrounding land uses including mining, residential areas and agricultural activities.
- LCGC Dam – pH, EC, TDS, Turbidity, Cl, Na, Cd, Alkalinity and DO exceeded the WUL 2015 as well as the SAWQG for Irrigation. *E.coli*, total coliforms and heterotrophic plate count were also found to be high. It was noted that a large number of birds use the rocks in the middle of this dam for roosting. The exceedance of these parameters is likely to be due to bird droppings and fish activity. A stormwater culvert was also noted to be draining into this dam. According to the WUL, this dam receives treated effluent from the WWTW which may also be contributing to the elevated levels.
- Ledig Stream – EC, Alkalinity and DO exceeded WUL 2015 limits. It was noted during the site visit that the tributary draining the LCGC and LCGC Dam contained water at the point directly below the nursery. No water was noted in the stream to the north and north-west of the nursery. It is therefore likely that the source of water in this stream is runoff emanating from the nursery and potentially seepage from the LCGC Dam. The Ledig Sewer pipeline runs within close proximity to the stream above the selected sampling point, although unconfirmed, any leaks from this line which is planned to be decommissioned could be a source of contamination. Therefore, the elevated *E.coli*, total coliforms and heterotrophic plate count is likely due to seepage and runoff from the LCGC Dam and nursery area, as well as possibly from the Ledig Sewer pipeline. Furthermore, a large number of livestock were noted along the stream and it is possible that their faeces are also contributing to these elevated levels.
- Recreational Dam – pH, EC, TDS, Cl, *E.coli*, Na, Alkalinity and DO exceeded the WUL 2015 limits for wastewater used for irrigation, SAWQG for Irrigation as well as the SAWQG for Recreational Water Use. The Recreational Dam also contained high

bacterial counts when compared to the other sampling points (especially *E.coli*). This dam receives runoff and seepage from most of the Sun City Resort Complex areas (Lost City, Cascades, Soho, Cabanas and the GPGC). This is assumed to be a major contributing factor to the elevated levels.

- GPGC 2 Dam – pH, EC, TDS, turbidity, Cl, Na, Alkalinity and DO exceeded the limits for WUL 2015, WUL 2015 for the wastewater used for irrigation as well as the SAWQG for Irrigation. Purified effluent is pumped from the WWTW into this dam for irrigation of the GPGC. The exceedance of turbidity is likely to be from the mixing of water that takes place as a result of a water feature in the middle of the dam. This prevents any settling of water and the high TSS levels found confirm this assumption. The high bacterial constituents are possibly from animal sources as well as from the effluent water, although small in comparison to the other sampling points.

10.8.4.2.2 Groundwater

The groundwater quality results for the tested sites were compared with the results from previous studies undertaken within the study area. Furthermore, the results were also compared to the Sun City Water Use Licence 2015, SAWQG for Irrigation, Livestock Watering and Recreational Water Use. The following interpretation of the results can be made:

- The results show that all boreholes contain elevated F concentration above the maximum allowable concentrations for irrigation and livestock watering limits of less than 2 mg/ℓ. The elevated F concentration can be attributed to the Pilanesberg Complex and its intrusions due to its fluorite-rich deposits in its outer ring foyaite (McCaffrey, 1998; Jones and Wagener, 2017).
- Further, both Kwena BH and the Landfill BH showed elevated Cl and Na above the recommended concentrations for irrigation. Attributed to the dissolved constituents Na and Cl is the elevated EC and TDS.

When compared to previously studies undertaken for the study area, it is evident that prior to the landfill site development at GCS1 (downstream from the landfill facility) no elevated Cl, N and Na was detected except for the F concentration. Thus, the elevated Cl, Na and N at Landfill BH are indicative of contamination from the landfill facility. This further suggests that the contaminant plume is migrating downstream from the landfill facility. However, it is expected that such elevated concentration of Cl, N and Na might decrease once landfill rehabilitation programme has been implemented as stipulated by Jones and Wagener (2017). This rehabilitation is subject to a separate approved Environmental Authorisation.

10.9 Noise

The Noise Assessment is appended to this report as Appendix 9. To establish the background noise condition the following methodologies were employed:

- **Desktop Assessment** – a literature review and desktop assessment of the applicable Noise Regulations was undertaken. Furthermore, the guidelines provided by SANS 10103:2008 "The measurement and rating of environmental noise with respect to annoyance and to speech communication" were reviewed for the assessment.
- **Fieldwork** – A site visit was undertaken, where noise measurements were taken at ten locations to assess the current ambient soundscape at the resort complex. The noise measurement locations are depicted on Plan 18, Appendix 1.
- **Noise Quantification** – Predictive modelling was performed for the proposed mining activities through the use of the modelling software SoundPlan. The software specialises in computer simulations of noise pollution dispersion. Estimates of the cumulative mining noise levels from the study were derived from the noise emissions from all the major noise-generating components and activities of the proposed project.

Further detail pertaining to the methodology of the Assessment is provided in the specialist report, Appendix 9.

10.9.1 Baseline Results

The results from the noise meter recordings for all the monitored locations as well as the rating limits according to the SANS 10103:2008 guidelines and a description of the noise sources are presented in Table 10-14. The results indicate that the noise levels in Sun City vary between 48dBA and 63dBA, with the lowest measurement of 45dBA measured at the Township of Ledig (N7).

Table 10-14: Results of Baseline Noise Measurements

Measurement location	Measurement results (L_{Aeqi})	Noise Sources
N1	53	N1 was taken at the South Village and the main sound sources at this location being: ▪ Birdsong; ▪ Vehicle movement; and ▪ Occasional aircraft.
N2	57	N2 was taken at the Kwena Chalets with the main sound sources at this location being: ▪ Birdsong; and ▪ Game viewing vehicles belonging to Mankwe Game Trackers passing to and fro.
N3	60	N3 was taken at the Cabanas with the main sound sources at this location being: ▪ The breaking down of one of the stands that was used for the Nedbank Challenge ▪ Birdsong; and ▪ People socialising at the Cabanas swimming pool

Measurement location	Measurement results (L_{Aeql})	Noise Sources
		and near the dam. With only isolating the common sounds such as the birdsong and people socialising, the level dropped to 55dBA.
N4	60	N4 was taken at the Old Village with the main sound sources at this location being: ▪ High pitched sound from the ventilation system; ▪ Dumping of refuse at the refuse storage area; and ▪ Vehicle movement, especially the coach busses transporting people.
N5	57	N5 was taken at Vacation Club the main sound sources of noise at this location is vehicle movement on the interconnecting roads.
N6	63	N6 was taken at the Palace of the Lost City with the sound sources at this location being: ▪ The water feature at the entrance being the main continuous sound source; ▪ Birdsong; and ▪ Vehicle movement.
N7	45	N7 was taken at the Township of Ledig with the main sound sources at this location being: ▪ Birdsong; and ▪ Vehicle movement.
N8	48	N8 was taken at the Boma with the sound sources at this location being: ▪ Birdsong; and ▪ Vehicle movement.
N9	49	N9 was taken at a location on the northern perimeter fence with the sound sources at this location being: ▪ Birdsong; and ▪ Cicadas.
N10	58	N10 was taken at a location between the Cascades and the Gary Player Golf Club with the sound sources at this location being: ▪ Ventilation systems ▪ Vehicle movement, especially the coach busses transporting people; and ▪ Birdsong.

The baseline ambient noise levels are typical of urban residential zones with vehicle movement (cars and busses) and birdsong being the main sound sources. The central areas of Sun City (Entertainment Centre, Cascades and Soho) are also characterised by sounds from the ventilation systems.

10.10 Air Quality

The Air Quality Assessment is appended to this report as Appendix 10. To establish the background ambient air scenario the following methodologies were employed:

- **Desktop Assessment** – a literature review and desktop assessment of the applicable legal context and health implications of pollutants were reviewed for the assessment, namely: NEMAQA as well as the National Dust Control Regulations, 2013 (NDCR), the National Ambient Air Quality Standards (2009) as well as Standards/Guidelines set by the World Health Organisation (WHO) for Air Quality and health aspects of air pollution.
- **Site Visit** – A site visit was undertaken in January 2018 to set up the Real-Time Particulate Monitor (AQ-Mesh® pod from Air Monitors) to collect background ambient air quality data. The background air quality scenario was monitored continuously over a one month period.
- **Ambient Air Quality Quantification** – The results of the monitoring data were compared to applicable standards to understand the background ambient air quality associated with the project area.

Further detail pertaining to the methodology of the Assessment as well as the applicable legislation and standards is provided in the specialist report, Appendix 10.

10.10.1 Baseline Results

Ambient air quality concentrations measured were compared with the South African standards to confirm if current background levels are conducive for healthy living and within compliance of the South African regulatory standards. The air quality levels measured will serve as reference point, to which future measurements will be compared to ascertain the degree of impacts the proposed construction and operational phases may have on the surrounding air quality of the Project site. The subsections below provide the results obtained for Particulate Matter and Gases which were monitored.

10.10.1.1 Particulate Matter

The ambient particulate matter levels measured are compared against the current South African Standard for daily averaging period. For PM_{10} levels, the ambient concentrations are below 5 µg/m^3 for the period under survey, except on 11 February 2018 with a concentration of ~18 µg/m^3. In general, the area can said to be in a pristine condition and daily averages were very low and within the South African Standard of 75 µg/m^3.

The results for $PM_{2.5}$ concentrations are similar to the PM_{10}. No exceedances were observed during the survey period and the daily averages were below 3 µg/m^3 for the entire sampling period. Therefore the same conclusion can be reached that in terms of $PM_{2.5}$ concentration, the area is in a pristine condition and daily averages were very low and within the South African Standard of 40 µg/m^3.

10.10.1.2 Gases

The ambient concentrations of gases measured within the project area are below the various South African Standards for the individual pollutants. The 1-hour Nitrogen Dioxide (NO_2) concentrations measured in the vicinity of the project are below the South African Standard (106 ppb). Ambient 24-hour Sulphur Dioxide (SO_2) concentrations were below the South African Standard of 48 ppb. The same is true of ambient 1-hour CO concentrations, which were below the South African Standard of 8.7 ppm. A similar trend was observed for the 8-hour O_3 levels in the ambient environment, which was below the standard of 61 ppb.

10.11 Visual

The Visual Impact Assessment (VIA) undertaken is appended to this report as Appendix 11. To establish the status quo of the visual environment on the various project sites, the following methodologies were employed:

- **Desktop Assessment** – A desktop study was conducted to evaluate the topography of the receiving environment and CD: NGI aerial photography of the area was examined to determine the surface features. Vector GIS data was used to determine the relative location of the features surrounding the project area. The topographical model, as detailed in Section 10.3, was determined thereafter; and
- **Viewshed Analysis** – The resultant topographical model was utilised to create a viewshed model using the Viewshed Tool of the ArcGIS 3D Analyst Extension. This viewshed model illustrates the areas from which the proposed Project will potentially be visible, taking into account the estimated height of the proposed infrastructure.

Further detail pertaining to the methodology of the Assessment is provided in the specialist report, Appendix 11.

10.11.1 Sensitive Receptors

The residential areas surrounding the project area are all potential visual receptors of the proposed developments. The closest towns and settlements, as well as their direct distance and direction from the Project area are summarised in Table 10-15. All distances are straight line distances measured from the edge of the Project area to the centre of the towns/settlements.

Table 10-15: Closest Towns and Settlements

Name	Type	Direct Distance	Direction
Sun City/Lost City	Settlement	0 km	-
Ledig	Settlement	2.1 km	SW
Matooster	Settlement	6 km	W
Chaneng	Settlement	6.2 km	SSE

Name	Type	Direct Distance	Direction
Phatsima	Settlement	7.1 km	SW
Frischgewaagd	Settlement	7.9 km	S
Robega	Settlement	7.9 km	SSE
South Village	Settlement	8.1 km	E
Mabele-a-Podi	Settlement	9.4 km	NE
Mahobieskraal	Settlement	9.6 km	W

Oberholzer (2005) defines sense of place as “the unique quality or character of a place, whether natural, rural or urban”. Prior to the development of Sun City Resort in 1979, the project area and surrounds had a largely rural sense of place. The existing Sun City Resort has a tourism–orientated sense of place and the proposed future developments are not expected to change this sense of place.

In addition to the settlements listed above the following other potential receptors have been identified:

- Road users in the surrounds particularly the users of the R565 regional road located 3 km south-west of the Project area;
- Visitors of the numerous heritage sites within and surrounding the project area. Heritage sites include archaeological sites, burial grounds and graves, historical built environment and recent heritage sites (refer to Section 10.12 below); and
- People visiting the area for birdwatching and game viewing are potential visual receptors of the projects. The entire Project area is located adjacent to the Pilanesberg National Park as well as in proximity to other and the Protected Areas, as detailed in Table 10-16 below.

Table 10-16: Protected Areas

Name	Type	Direct Distance	Direction
Pilansberg National Park	Nature Reserve	0.1km	-
Kosmo Private Nature Reserve	Nature Reserve	21.7 km	WSW
Deon Private Nature Reserve	Nature Reserve	27 km	NNE
Matlapeng Private Nature Reserve	Nature Reserve	28.9 km	W

10.11.2 Viewshed Model Analysis

Six viewshed models were run to illustrate the areas from which the proposed projects will potentially be visible, taking into account the estimated height of the proposed infrastructure. The infrastructure heights and categories utilised in the viewshed models are provided in the specialist report, Appendix 11.

10.11.2.1 Existing Environment

Due to the undulating topography and vegetation of the receiving environment, it is noted that the visual impact of the proposed infrastructure is minimal outside of a 10 km zone of influence. Observations during the site visit confirmed very low light emission and pollution at night. This is due to both visual screening in the form of terrain and vegetation screening as well as down-lighting on the existing infrastructure as illustrated in Figure 10-12 (taken 500 m from the largest building, namely the Palace of the Lost City).

Figure 10-12: Photograph illustrating low impact lighting within Sun City resort

Based on this, it was determined that the proposed infrastructure will have similar lighting plans and will therefore have a negligible impact on the surrounding environment and therefore the viewshed models for the proposed developments are restricted to daytime practical viewshed models.

10.11.2.2 Proposed Developments

Daytime viewshed models were carried out for proposed infrastructures that may potential have a visual impact. The models cover an area ranging from approximately 53.94 km^2 to 13.61 km^2 and are depicted in Plan 19 to Plan 23, Appendix 1.

Generally it was found that the visibility of the proposed infrastructure is limited by topographic screening with the majority of visibility confined to the Sun City Complex project area. Notably the proposed VC Phase 3 and 4, Eco-lodge and Additional Parking Garage, Convention Centre and Hotel will be visible from the Pilanesberg National Park boundaries due to the terrain slopes associated with the infrastructure areas.

The most visually intrusive infrastructure based on the viewshed and confirmed during the site visit will be the proposed VC Phase 4.

10.11.3 Sensitivity of the Site

The Project will have a moderate visual impact on the receiving environment. The most significant daytime visual impact will be from the Vacation Club Phase 4 which will have a noticeable change in landscape from the existing landscape. The buildings will stand out against the natural landscape considering the design and colour of the existing Vacation Club developments. The visual impact will be limited to specific receptors, mainly the New Bakubung lodge, residents within Ledig and the Pilanesberg National Park.

The visual impact of the other proposed infrastructure is mainly contained within the project area and the Pilanesberg National Park. Although the National Park is a sensitive receptor, the proposed infrastructure is not envisaged to have a major negative visual impact considering, there are few fixed receptors and the areas within the park where it will be visible already have partial visibility of the existing infrastructure within the Sun City Resort. It must also be noted that the design of Sun City is generally low impact as the resort serves as a major tourism hub for the region. The resort in general is well screened and vegetated, and particular attention is made to keep lighting to a minimum.

10.12 Heritage

A Heritage Resource Management (HRM) Process was undertaken which included the identification of heritage resources within the vicinity of the proposed projects as well as an assessment of their Cultural Significance as part of the baseline investigation. To establish the baseline cultural heritage environment the following methodologies were employed:

- **Secondary data collection** – qualitative secondary data sources including reports obtained from the South African Heritage Resources Information System (SAHRIS) database as well as online/electronic journals and platforms, and certain internet sources were consulted to gain an understanding of the cultural landscape, known/possible tangible heritage resources as well as identify any potential sensitive areas/current social complexities or fatal flaws.
- **Primary data collection** – a pre-disturbance survey of the footprints of the proposed developments was undertaken during January 2018. The survey was non-intrusive and identified heritage resources were documented through written and photographic records. The identified heritage resources were named in accordance with the SAHRIS case identification system accordingly.

10.12.1 Historical Cultural Context of the Study Area

The greater study area is underlain by the Pilanesberg Alkaline Province which is interlinked with the Quaternary Aged Sands. These layers are associated with the interglacial and glacial cycles which occurred from ~2.6 million years ago (Mya). The Quaternary Age Sands have the potential to include fossil remains, but these are rare (Groenewald, 2016). Known fossil remains from these layers include: mammalian bones, tortoise remains, non-marine mollusc shells, ostracods, microfossils, trace fossils and plant material.

10.12.2 Regional Cultural Heritage Baseline

A total of 177 heritage resources were recorded within the district municipality across the three socially-constructed periods, namely: the Stone Age period, The Farming Community period and the Historical period. Heritage resources representing all three of these periods are known to occur within the greater study area.

Figure 10-13 below illustrates a summary of the heritage resources as identified within the greater study area.

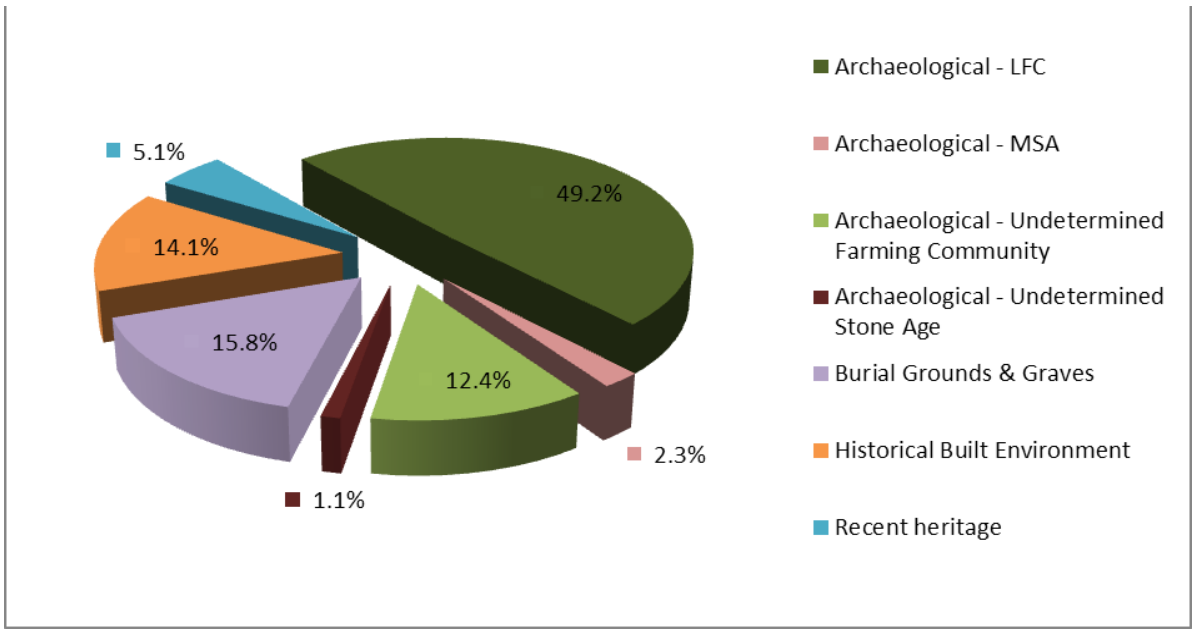


Figure 10-13: Heritage Resources Identified

The cultural heritage baseline description is focussed on the Late Farming Communities (LFC) period within the study area.

10.12.2.1 The Stone Age

A review of the available literature demonstrated that the study area contains few expressions of the Stone Age (3.4% of the recorded heritage resources). No Early Stone Age (ESA) or Later Stone Age (LSA) accumulations are known to occur within the regional study area. High proportions of minimally-modified blades characterise the early MSA. Furthermore, the use of good quality raw material and bone tools, ochre, beads and pendants appear in the archaeological record at this time (Clark, 1982) and (Deacon & Deacon, 1999).

10.12.2.2 Farming Community Period

The Farming Community Period correlates with the movements of agro-pastoralists, including ancestors of modern Sotho-Tswana and Nguni peoples, moving into southern Africa (Makhura, 2007). This period is divided into two stages to distinguish between

widespread events, namely the Early Farming Communities (EFC) between 200 Common Era (CE) and 1000 CE and the LFC between 1000 and 1840 CE.

Within the regional study area, no instances of EFC heritage resources were recorded in the surveyed literature. Stonewalling is the most visible indicator of LFC settlement. Several types of stonewalling are known to occur within South Africa within the regional study area under consideration, Type N and Molokwane are the most dominant types.

Type N walling is associated with the ancestral origin of the Fokeng in the Free State (Huffman, 2007). Type N walling includes one or multiple cattle kraals in the centre of the settlement; these kraals are linked to other walls. Type N walling occurred between the 1400s and 1600s in the Free State, but dates in other provinces are more tentative. The Molokwane walling is associated with western Sotho-Tswana groups, such as the Hurutshe and the Kwena. These settlements comprise of individual households surrounding the core cattle kraal, which are surrounded by a back wall with multiple arcs demarcating back courtyards. Houses were made of daga (clay) and included verandas.

10.12.2.3 The Difaqane and Recent Heritage

The period between approximately 1817 and 1826 CE is a period of violence and unrest known as the Difaqane (in Sotho and Mfecane in Nguni languages) (Anderson, 2009) and (Landau, 2010). During this time, escalating violence and competition for resources resulted in settlements being abandoned or destroyed. The previous occupants of the abandoned or destroyed settlements were scattered in the landscape including settlers into the Pilanesberg area.

European settlers, traders, missionaries and travellers also moved into the interior and had been recording the stonewalled settlements they came across during their movements across the interior since the early 1800s, in varying levels of detail. With the influx and settlement of Europeans in the regional study area came the development of towns marked by the built environment. Through the review of available literature, recorded recent heritage is associated with the historical built environment and burial grounds and graves. These were reported as follows:

- Structural remains: (Pistorius, 2007; Pistorius, 2006a; Pistorius, 2006b; Birkholtz, 2016; Milo & Bandama, 2016; Mngomezulu, 2017; Van Schalkwyk, 2017);
- Sites of low and medium complexity (Van der Walt, 2007; Kruger, 2012; Birkholtz, 2016; Van Vollenhoven & Pelser, 2008);
- An ash deposit or midden (Van Vollenhoven & Pelser, 2008);
- Remains of industrial structures (Pistorius, 2007; Matenga, 2017); and
- Burial grounds and graves ranging from single burials to graveyards including as many as one hundred graves, although the sizes of some burial grounds were not reported (Pistorius 2007a, 2007b, 2012, 2013; Van der Walt 2007; Kruger 2012;

Muller & Pistorius 2014; Mngomezulu 2015, 2017; Birkholtz 2016; Pelser 2016; Matenga 2017).

10.12.3 Site-Specific Cultural Baseline

Within the Sun City Resort Complex, a total of 15 heritage resources were identified through the review of available literature and the pre-disturbance survey conducted. The identified heritage resources with the resort project area are displayed on Plan 19, Appendix 1.

The identified resources are primarily associated with the LFC, as represented by the stonewalled settlement complexes recorded within the project area. A preliminary visual assessment of the stonewalled complexes suggests they may be Molokwane settlements. This requires confirmation through detailed mapping of the sites.

The site Wits/2527 AC1 has been attributed to a capital site named Itlholanoga by several authors. The site has been subjected to limited excavations (Mason, 1986) and mapping activities (Huffman, 2007; du Piesanie & Nel, 2016). The excavation completed by Mason (1986) resulted in the recovery of ceramics from the Uitkomst and Buispoort facies. Based on the results of his mapping, Huffman (2007) suggested that the settlement included both Molokwane and Type N walling.

Huffman (2007) has argued that the archaeological evidence represents two occupations at the site: an original Tlokwa occupation followed by second, baKgatla occupation. This interpretation notwithstanding, Itlholanoga is generally associated with the Tlokwa in the literature (Morton, 2008; Anderson, 2009). Further research is necessary to draw meaningful conclusions regarding the occupation of Itlholanoga and any connections with the baKgatla, baFokeng and baKgafela. Such research currently falls outside the scope of this assessment.

10.13 Socio-economic

The Socio-economic Assessment is appended to this report as Appendix 13. To describe the socio-economic characteristics of the baseline environment of the project area, a desktop assessment was undertaken. Information was collated from various secondary sources including, Wazimap (2017), census data (2011), applicable Integrated Development Plans (IDP) and Spatial Development Frameworks (SDF).

The socio-economic baseline profile presented here focuses on the primary and secondary study areas; this is summarised in Table 10-17. The Sun City Resort Complex is located within Ward 14 of MKLM in the BPDM.

Table 10-17: Primary and Secondary Study Areas

Primary Study Area	Secondary Study Area	
Ward 13	Moses Kotane Local Municipality (MKLM)	Bojanala Platinum District Municipality (BPDM)
Ward 14		
Ward 28		

Primary Study Area	Secondary Study Area	
Ward 30		
Ward 2	Rustenburg Local Municipality (RLM)	
Ward 25		

The primary and secondary study areas are depicted in Plan 20, Appendix 1.

10.13.1 Land Tenure and Ownership

The land tenure and ownership around the study area is reflected in Plan 3, Appendix 1. A large portion of land directly to the east, south and west of the Sun City complex is owned by a traditional authority, the Bakubung Ba Ratheo. This is also the proponent of the mixed land use development in Ledig.

Within RLM, there are 24 identified informal settlements on land owned by the municipality, the Royal Bafokeng Administration, Impala Platinum Mines and a variety of private landowners (RLM, 2017). Combined, these settlements cover approximately 731 ha (21.2% of the land area in the municipality).

10.13.2 Population Demographics

The North West Province includes 3,509,953 people, roughly 6.78% of South Africa's population (Statistics South Africa, 2011; Wazimap, 2017). The province includes nineteen local municipalities grouped into four district municipalities. BPDM is the largest of the district municipalities, including 1,507,506 people (42.95% of the province's population). Local municipalities within BPDM include: MKLM, RLM, Kgetetleng Rivier, Madibeng and Moretele. RLM is the largest local municipality (36.46% of the population of BPDM) and Moses Kotane is the third largest (242,554 people or 16.09%), behind the Madibeng Local Municipality. The annual growth rate of the population of BPDM has continuously decreased between 1997 and 2010 (BPDM, 2012). Table 10-18 presents the total population of the study area.

Table 10-18: Populations of MKLM (Statistics South Africa (2011) and Wazimap (2017))

MKLM		RLM	
Total Population	242 554	Total Population	549 575
Ward 13	7 226	Ward 2	12 171
Ward 14	6 030	Ward 25	14 221
Ward 28	9 579		
Ward 30	7 363		

The BPDM IDP classifies the majority of the district population as rural with low population densities (BPDM, 2012). Within the MKLM, 7.4% of the population live in an urban environment: 0.3% lives on farms and 92.4% of the population live on "Traditional" land (Statistics South Africa, 2011). In the RLM however, the majority of the population live in

urban environments (68%); the minority reside on farms (2%) and “Traditional” land (30%). Figure 10-14 presents a summary of the population densities for the primary and secondary study area.

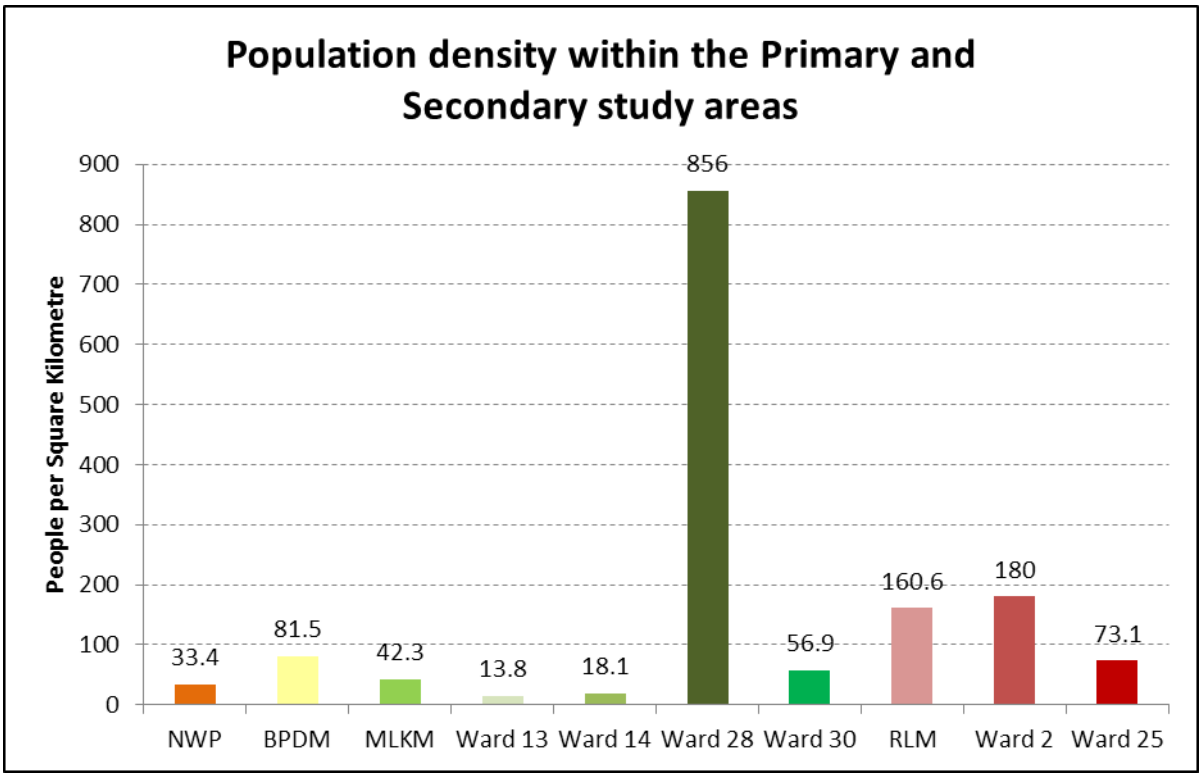


Figure 10-14: Population density within the greater study area adapted from Statistics South Africa (Statistics by Place, 2011) and Wazimap (Wazimap, 2017)

Table 10-19 presents an overview of the number of households within the study area. Some of the statics in the following sections will be presented according to households, and not per capita.

Table 10-19: Total number of households within the greater study area, adapted from Wazimap (2017)

NWP		1 104 553	
BPDM		527 624 (47.8% of NWP)	
MKLM		**RLM**	
Total Population	77 439 (14.7% of BPDM)	Total Population	216 774 (41.1% of BPDM)
Ward 13	3 018	Ward 2	4 569
Ward 14	1 862	Ward 25	4 729
Ward 28	3 039		
Ward 30	2 374		

Table 10-20 summarises the racial distribution of the greater study area. The trend within the greater study region shows a predominantly Black African population but with other races represented in each of the wards and the local and district municipalities. Ward 13 includes a significantly higher population of Indian and Asian people.

Table 10-20: Distribution of the population of the greater study area by race, adapted from Wazimap (2017)

Race	NWP	BPDM	MLKM	Ward 13	Ward 14	Ward 28	Ward 30	RLM	Ward 2	Ward 25
Black African	89.9%	91.4%	98.3%	81.7%	86.8%	99.0%	99.1%	88.5%	99.3%	99.1%
Coloured	2.0%	0.7%	0.3%	1.9%	1.7%	0.3%	0.2%	0.9%	0.1%	0.3%
Indian or Asian	0.6%	0.6%	0.5%	5.9%	3.0%	0.4%	0.2%	0.8%	0.1%	0.3%
White	7.3%	7.0%	0.8%	10.0%	8.0%	0.1%	0.2%	9.4%	0.1%	0.1%
Other	0.3%	0.3%	0.2%	0.5%	0.5%	0.3%	0.2%	0.4%	0.4%	0.2%

The majority of the population within the study areas is of economically-active age (i.e. between 18 and 64). A very small portion of the population is of retirement age (i.e. over the age of 65). A small, but still significant, portion of the population is younger than 18 and is generally quite evenly distributed across the ages. The population across the greater study area is generally evenly spread between male and female. The largest difference between the genders is seen in Ward 13, where males out-number females (57% to 43%). Females just out-number males in MKLM (50.3 % to 49.7%) but this trend is not reflected in the other areas under consideration.

10.13.3 Education

Figure 10-15 presents the highest level of education completed by people within the greater study area who are older than twenty years of age. The majority of the population completed some high school (Grade 10 or Grade 11). Table 10-21 below summarises the proportion of the same population (i.e. those older than the age of twenty) who completed their matric.

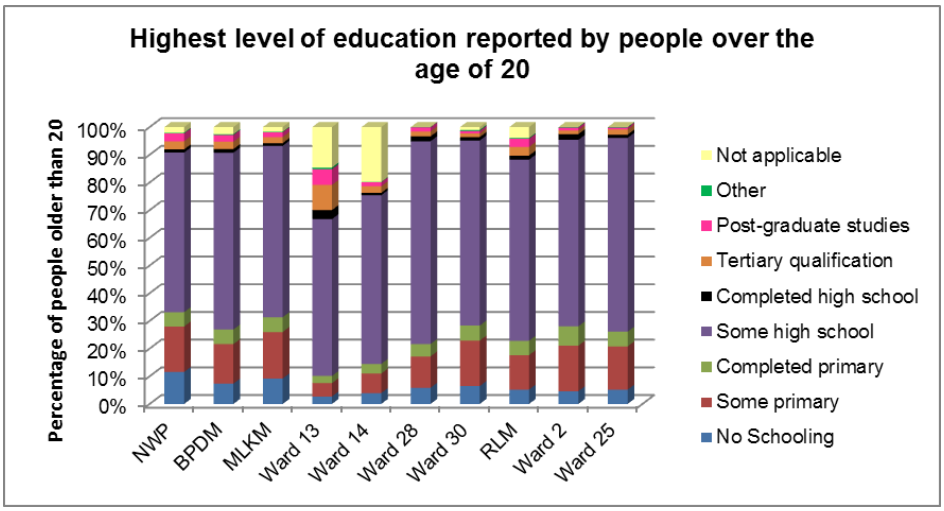


Figure 10-15: Education levels within the Primary and Secondary study areas, adapted from Wazimap (Wazimap, 2017)

Table 10-21: Percentage of all people older than 20 years old that have completed Matric, adapted from Wazimap (2017)

NWP		6.90%	
BPDM		6.42%	
MKLM		**RLM**	
Total Population	4.89%	Total Population	7.53%
Ward 13	18.03%	Ward 2	4.45%
Ward 14	4.67%	Ward 25	3.72%
Ward 28	5.03%		
Ward 30	3.43%		

According to the most recent IDP for BPDM, the education level of the population is increasing (BPDM, 2012). In 2010, the functional literacy level of the population was 73.8%. In the same year, RLM boasted the highest literacy level for the district (78.3%) and the lowest literacy rate was reported in Kgetleng (56.7%).

10.13.4 Household Services

10.13.4.1 Electricity

The predominant source of household energy for cooking, heating and lighting in RLM and MKLM is on-the-grid electricity. Where electricity is not used, paraffin and wood are the most commonly-used alternatives although having no alternative is common in terms of energy for heating. Candles are a common alternative for lighting. Of the households that do have access to electricity, 24,348 (roughly 11.1%) reported outages lasting longer than twelve hours (RLM, 2017).

Electricity in Ledig (the closest settlement to Sun City at approximately 3 km southwest of its main entrance) is supplied by Eskom; primarily through rural overhead connections with limited capacity (Bechan, 2017). These connections are now at capacity and will not be able to supply any new developments. An investigation lodged by the proposed Bakubung Ledig Housing development resulted in the following projects to supply the new development as proposed by Eskom (Bechan, 2017):

- A temporary power supply constructed in phases between 2017 and 2023; will connect to the Sun City substation via 22 kV overhead power lines. This will supply only some of the units and will put severe constraints on the Sun City substation which will need to be upgraded; or
- A permanent supply, including a new substation which will be required within the Bakubung Ledig Housing development (and which is referred to as the "Bale Substation") and will also include the construction of a 132 kV line to the existing Bakubung Substation, 3.5 km away.

10.13.4.2 Water

Figure 10-16 presents an overview of the sources of water used by the population within the greater study area. The vast majority of the people within the greater study area obtain water from a regional or local scheme which is provided by municipal or private suppliers. The MKLM region (including the Sun City Resort) receives its water from Magalies Water, next to the Vaalkop Dam (Boshoff, 2015). Bulk water is currently abstracted from the Vaalkop Dam and is treated at the Vaalkop Water Treatment Works (WTW) to supply the eastern part of MKLM, which includes the community of Ledig (Bechan, 2017). As of 2017, RLM included four WWTWs: Rustenburg, Boitekong, Monnakato and Lethabong (RLM, 2017).

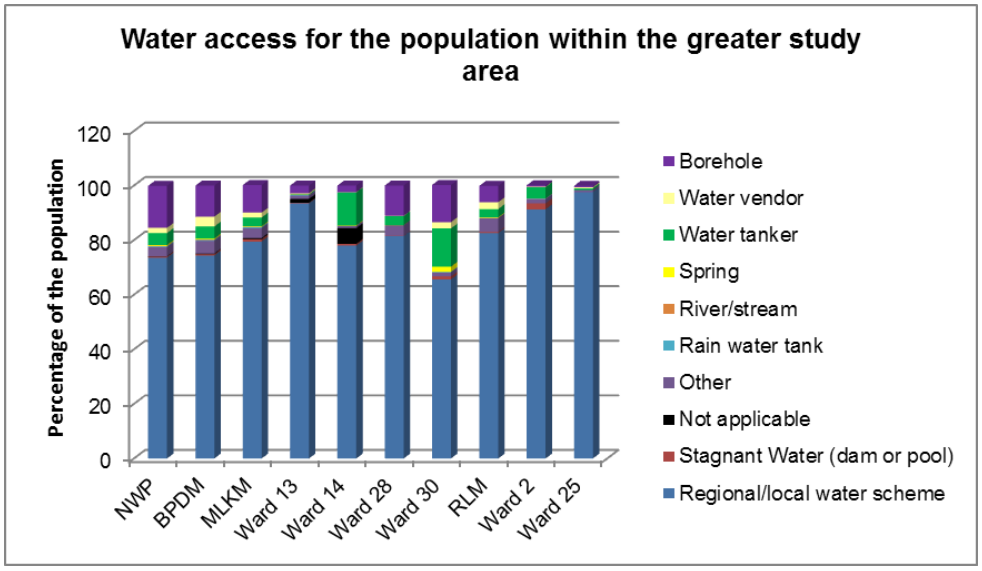


Figure 10-16: Water resources for the population of the greater study area, adapted from Wazimap (2017)

As of 2015, the water requirements from the area surrounding the Crocodile River System exceed the available supply, from the surface and groundwater resources, by more than 400% (Boshoff, 2015). The two main contributors to the increase in demand are an increase in mining activities and increases in the rural population in the district. To meet this demand, large amounts of potable water are transferred to the catchment from the Vaal River system.

Water shortages have affected MKLM in the recent past (Boshoff, 2015). The North West Province was declared a National Disaster area in 2013 during the winter after a long absence of rain, and the chief operating officer of MKLM imposed water restrictions to conserve water supplies. Magalies Water also implemented the Pilanesberg Scheme to increase the bulk supply of water to the MKLM and the RLM in 2013 and proposed a future upgrade of the Bospoort Water Scheme, owned by the MKLM. RLM implemented several short- and medium-term measures in response to the drought conditions. Water restrictions were again imposed in October and November 2014. These restrictions were imposed as the result of upgrades to the Magalies water purification plant and the resultant temporary decrease in fresh water yields. As of 2017, the Vaalkop Dam and WTW did not have enough capacity to supply Ledig's current and future requirements (Bechan, 2017).

Water analyses undertaken in 2011 resulted in concerning amounts of phosphate, which is usually the indication of raw sewerage disposal in fresh water river systems (Boshoff, 2015). This is most likely from faulty water treatment works or illegal sewerage disposal in Johannesburg, Midrand and/or Krugersdorp which travels through the Crocodile West (River) System, which includes Hartebeespoort Dam, Rooikoppies Dam and Vaalkop Dam.

In 2011 it was reported that 'good-to-moderate' quality groundwater is available in BPDM (Boshoff, 2015). The groundwater quality is affected by the use of fertilisers (increasing nitrate concentration) and inadequate and poor sanitation (which increases TDS, total coliforms and e-coli, and could increase chlorine). Magalies Water is still compliant with South African National Standard (SANS) 41, which regulates the standards water must meet when being supplied to consumers.

Sun City also receives its water from Magalies Water (Boshoff, 2015). To decrease its demand on the municipal water supply, Sun City recovers some of its waste water through the WWTW, which purifies and disinfects its waste water which is then pumped to the golf courses for irrigation (Boshoff, 2015). As of 2013, 84% of waste water was treated and used for irrigation and refilling the water features around the hotels. Sun City's water policy ensures that Sun City will not contaminate watercourses or groundwater adjacent to the property through resort operations and will minimise the risk of pollution and environmental damage (Boshoff, 2015).

The South Pilanesberg Water Scheme is currently being initiated to create the possibility for the MKLM to provide a sustainable water source to the Ledig community (Bechan, 2017). The scheme includes a Magalies bulk water supply pipeline that has already been constructed. The South Pilanesberg Water Scheme will also include the construction of a 20 Mℓ reservoir and a pump station next to the reservoir. A proposed housing development, Bakubung Ledig Housing, has been requested by MKLM to provide a 48-hour storage

reservoir. This will be constructed next to the existing Ledig reservoir but will be supplied by the new reservoir built through the South Pilanesberg Water Scheme.

10.13.4.3 Toilet Facilities and Sanitation

Figure 10-17 presents the toilet facilities that people have access to across the greater study area. Pit latrines (without ventilation) and flush toilets that are connected to the municipal sewerage system are the most common types of facilities available. In 2016, RLM included 7 815 people with no access to toilet facilities (approximately 3% of the population).

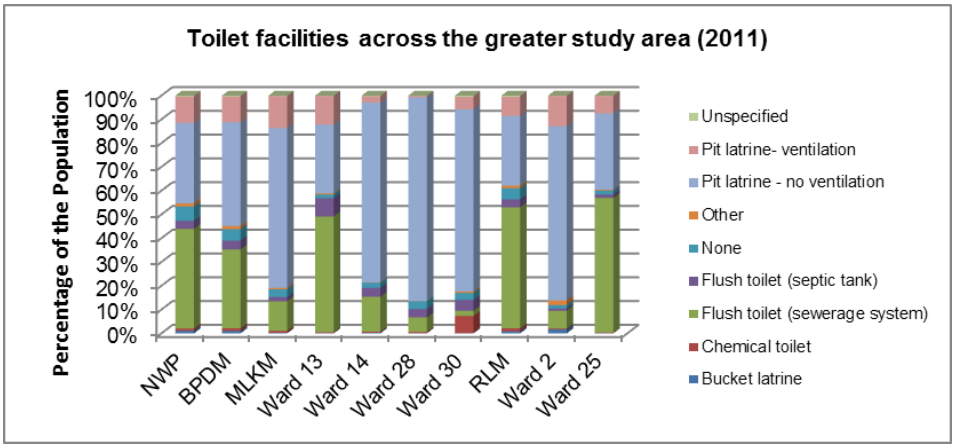


Figure 10-17: Access to toilet facilities within the greater study area, adapted from Wazimap (2017)

10.13.5 Housing

10.13.5.1 Type of dwelling

Figure 10-18 shows the various types of dwellings owned, rented or occupied by the people within the greater study area. In this figure, the category labelled “dwelling in association with a larger dwelling” refers to a room or a flatlet on a property included in a larger dwelling; servants quarters; or a granny flat. Across the greater study area, most of the population reside in dwellings on a separate stand (i.e. a house or block structure on a separate stand, yard or farm). Flats or apartments and informal dwellings, both in backyards and in other locations, are significant types of dwellings as well.

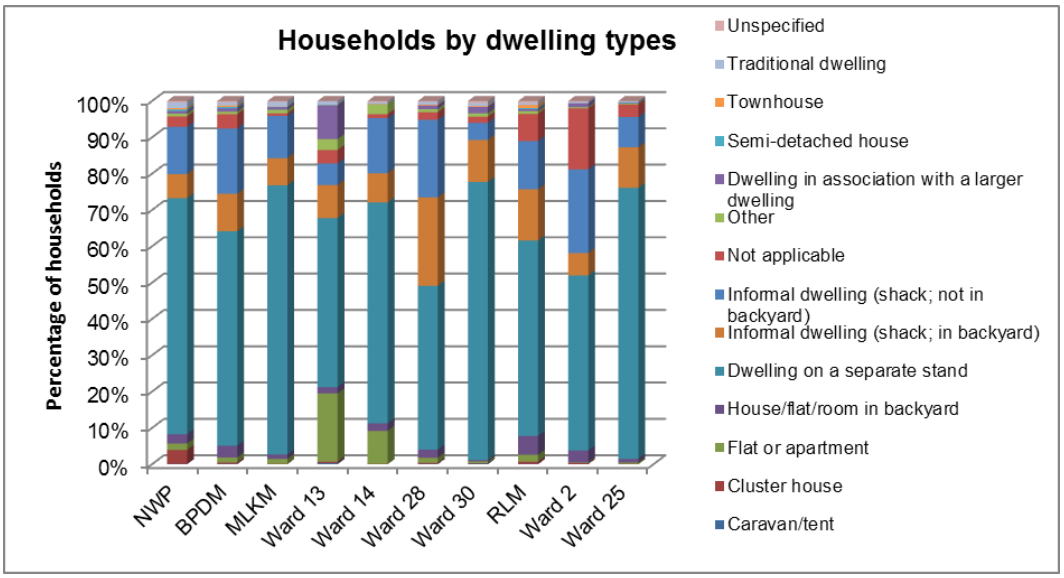


Figure 10-18: Types of dwellings of the households within the greater study area, adapted from Wazimap (2017)

10.13.5.2 Home ownership

Renting, occupying a dwelling rent-free and owning a house which is paid off are the three most common forms of home ownership across the greater study area. The dominant form of ownership differs across the various areas within the primary and secondary study areas; this data is presented in Figure 10-19.

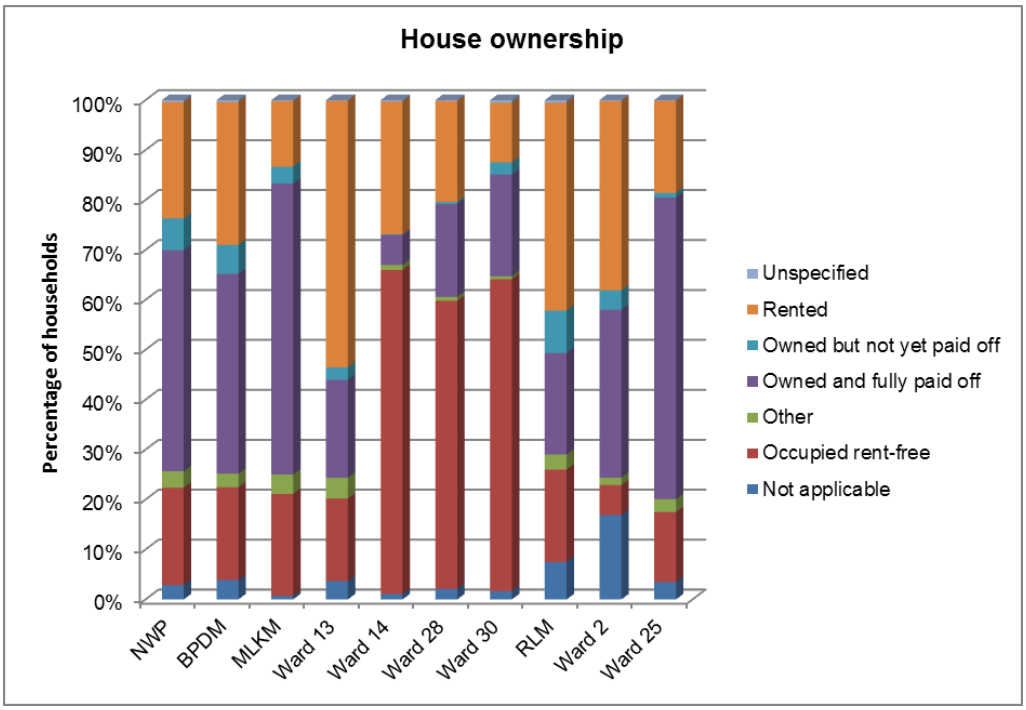


Figure 10-19: Ownership of households within the greater study area, adapted from Wazimap (2017)

10.13.5.3 Planned Residential Developments

The process for the above-mentioned proposed Bakubung Ledig Housing development has been initiated by the Bakubung Ba Ratheo Community and Kubu Property Investments (Bechan, 2017). The project is proposed to include housing for high and low income residents across 4 608 units including: subsidised units, institutional units, bonded units and security villages. The project will be implemented on Portion 15 of the farm Ledig 909 and will cover 364.73 hectares (ha). The project will also entail the construction of internal roads and bridges, bulk storm water outlets, sewerage infrastructure and other supporting infrastructure and social facilities.

Safari Investments Rustenburg (Pty) Ltd was recently awarded a tender for development near the Rustenburg Central Business District (CBD) (RLM, 2017). This development is intended to be a “mixed and integrated development” which will include residential, medium-density residential, residential/commercial and social/residential components across part of the 300.7 ha land earmarked for the total project.

Residential structures will also be included as a component of the CBD Upgrade project recently awarded to Fox Power North West (RLM, 2017). Single and multiple residential developments are planned in Boitekong, according to a Precinct Plan approved in 2012.

The Presidential Priority Project: Thusaneng Project is a proposed development which will include up to 20 000 houses (RLM, 2017). Anglo American Platinum, RLM and the Provincial Housing Department signed a Memorandum of Understanding during 2013. Anglo-American Platinum and the Rustenburg Platinum Mine agreed to provide heavy subsidies for the project. The project does not appear to have been completed to date.

10.13.6 Road Infrastructure and Traffic

The bulk road infrastructure of BPDM includes the R556 (a provincial and Class 2 Road which is under the custodianship of the South African National Road Agency Limited (SANRAL) and the R565 (Bechan, 2017).Table 10-22 presents the characteristics of the existing road network.

Table 10-22: Total road length (km) included in the district and municipalities as of 2012

Municipality	Gravel (Unpaved)	Tarred (Paved)	Total	Poor/very poor condition
MKLM	832	200	1 032	10
RLM	367	497	864	51
BPDM	2 490	1 703	4 193	151

Within BPDM in 2012, the three largest transport-related problems according to the community were (BPDM, 2012):

- Lack of public transport;
- Long waiting times; and
- Poor quality of the public transport.

The three most important transport priorities reported in BPDM in 2012 were (BPDM, 2012):

- Improving the roads;
- Increasing or improving the public transport facilities; and
- Increasing or improving the public transport services.

These priorities were reflected in MKLM, but improving the public transport services was of higher priority than improving the facilities. Improving the roads and improving the public transport facilities were prioritised in RLM, but the second highest priority here was to improve road infrastructure.

10.13.7 Economy

Figure 10-20 shows the contribution of each broad economic sector to the economy of each of the municipalities within BPDM, with contributions made to the national and provincial economies for comparison as of 2010 (BPDM, 2012). This information has been summarised in Table 10-23 to highlight the three largest contributors for the secondary study area.

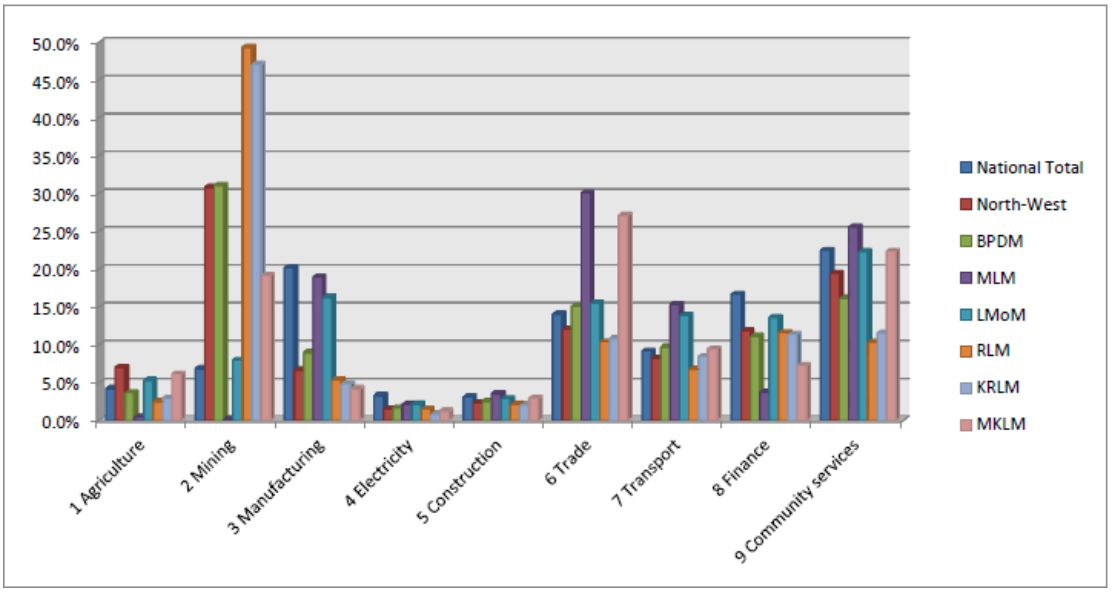


Figure 10-20: Economic structure of each district by Broad Economic Sectors in 2010

(Source: BPDM, 2012)

Table 10-23: Economic structure of each district by Broad Economic Sectors in 2010 (adapted from BPDM 2012)

Economic Contributors	NWP	BPDM	MKLM	RLM
Largest	Mining	Mining	Trade	Mining
Second largest	Community Services	Community Services	Community Services	Finance
Third largest	Trade	Trade	Mining	Trade

The economy of the North West Province is largely dependent on the mining sector (BPDM, 2012; RLM, 2017). Small, Medium and Micro Enterprises (SMMEs) also play a large role in the economy of the province (RLM, 2017). The North West Province plans to diversify its economy and increase the non-mining sector, specifically in tourism and non-mining manufacturing industries.

In terms of the Gross Value Added (GVA), BPDM makes a considerable contribution to the North West Province, in terms of employment opportunities and production output (BPDM, 2012). The RLM contributes the largest GVA to BPDM, far exceeding the other local municipalities.

10.13.8 Employment

Employment figures across the greater study area are relatively consistent across the ward, municipality, district and province levels. The percentage of the population as a whole that are employed range between 19.1% in MKLM and 36.6% in Ward 13 (in MKLM). The rate of unemployment amongst the economically active (i.e. those between the ages of 15 and 64) accounts for between 9.3% and 15.4% of the total population in the different regions. Figure 10-21 summarises the employment status within study areas.

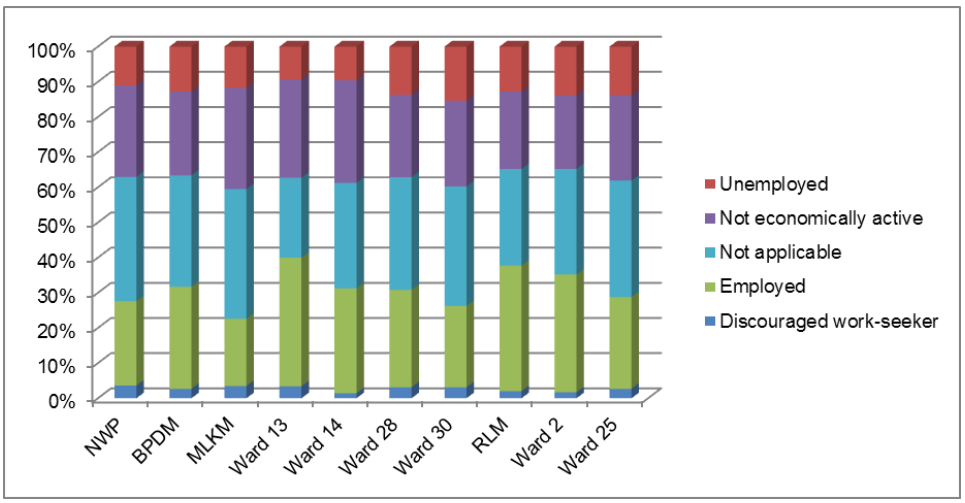


Figure 10-21: Employment status within the population of the greater study area, adapted from Wazimap (2017)

The annual incomes for those who are employed are presented in Figure 10-22. This data reflects the salaries in the year 2011. Although the annual income does vary slightly across the areas of the primary and secondary study areas, most of those employed earned between R 9 601.00 and R 76 800.00 annually, or between approximately R 1,200.00 and R 6,400.00 per month. This means that a fairly significant portion of the project community (10% on average) live in absolute poverty, i.e. a monthly household income of R 1,600.00 or less for a family of 4, leaving the family unable to meet their basic food needs with no money left for non-food items.

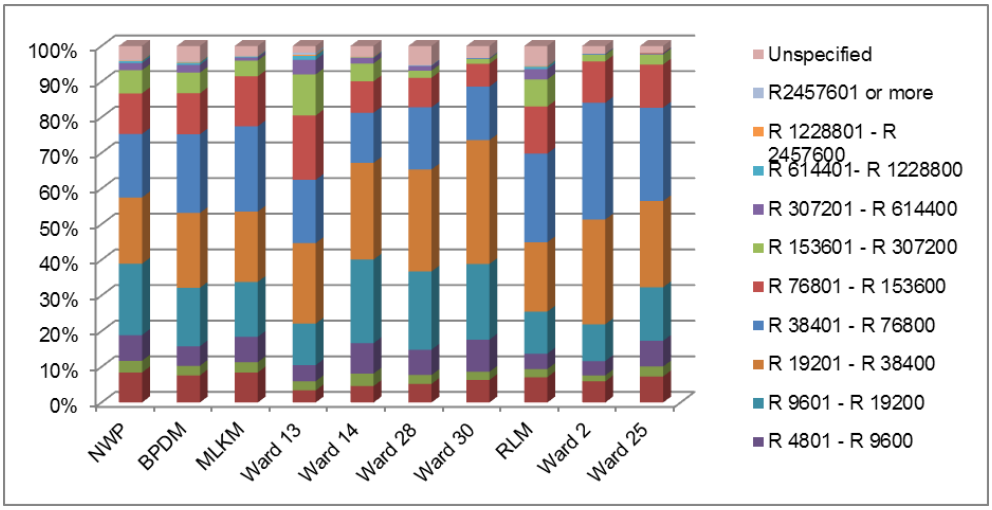


Figure 10-22: Annual income for employed individuals within the greater study area, adapted from Wazimap (2017)

Within the BPDM, the three industries that employed the largest portion of the employed population in 2010 were (from highest to lowest) (BPDM, 2012):

- Mining;
- Trade; and
- Community services.

The three sectors which provide the highest average salary for those employed are community services, the financial sector and the real estate sector.

10.13.9 Health

The most recent IDP of BPDM identifies several issues within the municipal health services (BPDM, 2012). These issues include a lack of ambulance services, long travel distances to healthcare centres and problems with service delivery at the healthcare centres (including insufficient equipment and shortages of staff). The prevalence of HIV/AIDS is also a challenge within the district. HIV/AIDS and other communicable diseases were highlighted during community consultations undertaken to complete the 2016/2017 IDP (MKLM, 2016). In Ward 13, this was considered a “quick win” but no details on the intervention or current or past statistics were included in the IDP.

Table 10-24 presents the health care facilities that are operational in MKLM as of 2016 (MKLM, 2016). The mobile clinics visit the relevant wards regularly, either once a week, once every two weeks or once a month. Clinics which follow business hours are usually open eight hours a day from Monday to Friday or from Monday to Sunday. The clinics that are open for twelve hours a day operate from Monday to Friday or Saturday. Ward 13 has no medical facilities and residents must use the facilities in other wards; four other such cases occur within MKLM.

Table 10-24: Health Care facilities available in MKLM

Health Post	MKLM	Ward 13	Ward 14	Ward 28	Ward 30
Clinic (business hours)	35	None	None	None	None
Health Centre (12 hours a day)	3		None	None	None
24-hour clinic / health care centre	10		1	1	1
Hospital	1		1	1	None
Mobile clinic	21		1	None	1

(Source: MKLM, 2016)

10.13.10 Poverty, Vulnerability and Crime

There was a reported drop in poverty rates in BPDM between 2002 and 2010, from approximately 44% to 37% (BPDM, 2012). In 2010, MKLM reported the highest poverty rate in the district (52.7%) and Rustenburg the lowest (25.2%). This latter figure increased in 2016 to 27.9% (RLM, 2017). During 2016, households encountered the following challenges:

- Running out of money to buy food within the last twelve months (15.7% of households);
- Running out of money to buy food for five or more days within the last thirty days (9.9%);
- Skipping a meal in the past twelve months (11.6%); and
- Skipping a meal for five or more days within the last thirty days (6.6%).

The youth within BPDM and those older than 60 years old (38.8% and 7.5% of the total population in 2010) require special attention in the provision of facilities and social support (BPDM, 2012). While the BPDM IDP of 2012 to 2017 (BPDM, 2012) indicated that the district would embark on programmes to improve the poverty rate, especially amongst these vulnerable groups, no such programmes were described.

The district is divided into three policing clusters: Rustenburg, Brits and Mmakau. Within the RLM, assault with the intent to do bodily harm, common assault and burglaries (on residential properties) are the most common crimes (RLM, 2017). There is a Sun City South African Police Services (SAPS) station at Sun City (SAPS, 2014). Residents of Ward 28 in MKLM have reported that they feel this police station does not assist the community (MKLM,

2016). Mogwase Police Station is the police station servicing the primary study area (approximately 15 km away from the Project site). The crimes reported at this station between the financial year 2011/2012 to the financial year 2015/2016 are presented in Figure 10-23 (adapted from SAPS website).

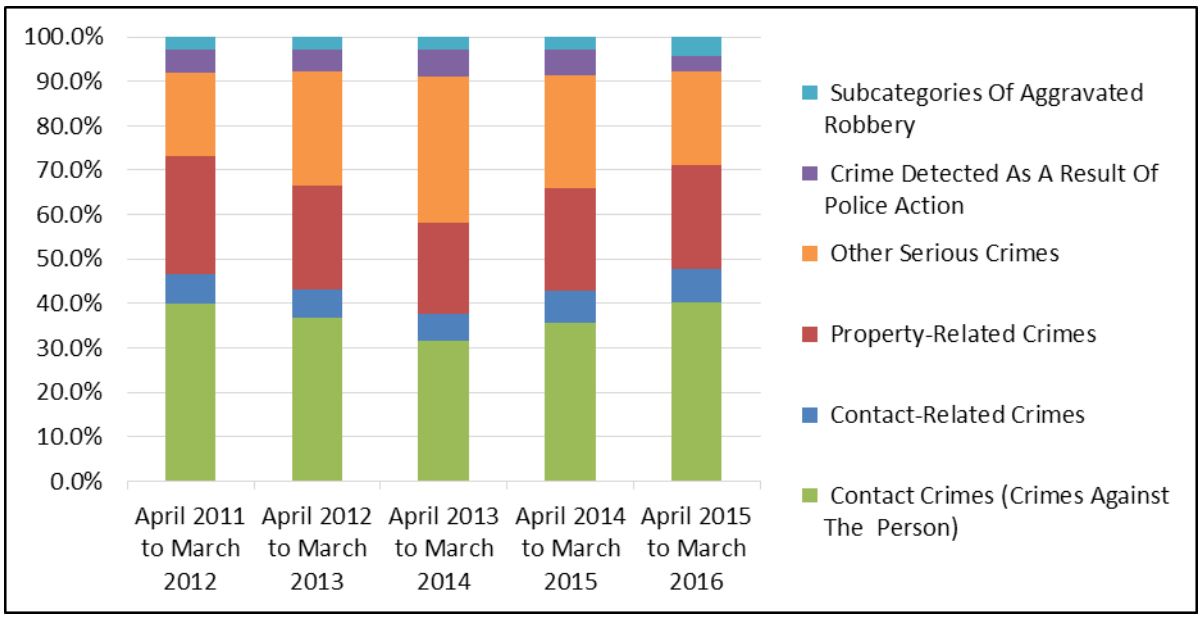


Figure 10-23: Crimes reported at Mogwase Police Station (2011 to 2016)

BPDM is implementing their Disaster Management Plan and the National Policy Framework on Disaster Risk Management through the District Disaster Centre (BPDM, 2012). The fire and emergency services within the district face some serious challenges which must be addressed to ensure the safety of the population. According to the BDPM IDP, one fire station is required to cover approximately 5 700 km^2 in MKLM. Travel times for emergency vehicles are very high across the district.

10.13.11 Attitudes, perceptions and concerns

Stakeholders' attitudes, perceptions and concerns will be determined through the public participation process and will be reflected in the SIA's impact assessment report.

11 Impact Assessment

This section aims to rate the significance of the identified potential impacts pre-mitigation and post-mitigation. The potential impacts identified in this section are informed by the baseline investigations presented in Section 10 above and are a result of both the environment in which the project activity takes place, as well as the activity itself.

The Impact Assessment focuses on two phases, namely; Construction Phase and Operational Phase. The general activities which may result in environmental impacts which have been considered across all of the proposed developments are summarised in the table below.

Table 11-1: General Project Activities

Phase of Project	Activity
Construction phase	▪ Site Clearing and topsoil removal; ▪ Storage and handling of hazardous and non-hazardous waste and chemicals; ▪ Operation of machinery (including vehicles); ▪ Demolition and removal of some old infrastructure; and ▪ Establishment of infrastructure (including pipelines).
Operational phase	▪ Operation of infrastructure and pipelines; ▪ Storage, handling and disposal of hazardous and non-hazardous waste and chemicals; ▪ Operation of machinery (including vehicles); and ▪ Maintenance of infrastructure.

11.1 Impact Assessment Methodology

Details of the impact assessment methodology used to determine the significance of physical, bio-physical and socio-economic impacts are provided below.

The significance rating process follows the established impact/risk assessment formula:

Significance = CONSEQUENCE X PROBABILITY

Where

Consequence = intensity + extent + duration

And

Probability = likelihood of an impact occurring

And

Nature = positive (+1) or negative (-1) impact

The matrix calculates the rating out of 147, whereby intensity, extent, duration and probability are each rated out of seven as indicated in Table 11-2. The weight assigned to the various parameters is then multiplied by +1 for positive and -1 for negative impacts.

Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in this EIA report. The significance of an impact is then determined and

categorised into one of eight categories (The descriptions of the significance ratings are presented in Table 11-4).

It is important to note that the pre-mitigation rating takes into consideration the activity as proposed, (i.e., there may already be some mitigation included in the engineering design). If the specialist determines the potential impact is still too high, additional mitigation measures are proposed.

Table 11-2: Impact assessment parameter ratings

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
7	Irreplaceable loss or damage to biological or physical resources or **highly** sensitive environments. Irreplaceable damage to **highly sensitive** cultural/social resources.	Noticeable, on-going natural and / or social benefits which have improved the overall conditions of the baseline.	International The effect will occur across international borders.	Permanent: The impact is irreversible, even with management, and will remain after the life of the project.	Definite: There are sound scientific reasons to expect that the impact will definitely occur. >80% probability.
6	Irreplaceable loss or damage to biological or physical resources or **moderate to highly** sensitive environments. Irreplaceable damage to cultural/social resources of **moderate to highly** sensitivity.	Great improvement to the overall conditions of a large percentage of the baseline.	National Will affect the entire country.	Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management.	Almost certain / Highly probable: It is most likely that the impact will occur. <80% probability.

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
5	Serious loss and/or damage to physical or biological resources or **highly** sensitive environments, limiting ecosystem function. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread benefits to local communities and natural features of the landscape.	Province/ Region Will affect the entire province or region.	Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Likely: The impact may occur. <65% probability.
4	Serious loss and/or damage to physical or biological resources or **moderately** sensitive environments, limiting ecosystem function. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense natural and / or social benefits to some elements of the baseline.	Municipal Area Will affect the whole municipal area.	Long term: 6-15 years and impact can be reversed with management.	Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
3	Moderate loss and/or damage to biological or physical resources of **low to moderately** sensitive environments and, limiting ecosystem function. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	Local Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	Unlikely: Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.
2	**Minor loss and/or effects** to biological or physical resources or low sensitive environments, not affecting ecosystem functioning. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by a small percentage of the baseline.	Limited Limited to the site and its immediate surroundings.	Short term: Less than 1 year and is reversible.	Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
1	**Minimal to no loss** and/or effect to biological or physical resources, not affecting ecosystem functioning. Minimal social impacts, low-level repairable damage to commonplace structures.	Some low-level natural and / or social benefits felt by a very small percentage of the baseline.	Very limited/Isolated Limited to specific isolated parts of the site.	Immediate: Less than 1 month and is completely reversible without management.	Highly unlikely / None: Expected never to happen. <1% probability.

Table 11-3: Probability/consequence matrix

Significance																																				
-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Consequence

Table 11-4: Significance rating description

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change	Major (positive) (+)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and / or social) environment	Moderate (positive) (+)
36 to 72	A positive impact. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive) (+)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive) (+)
-3 to -35	An acceptable negative impact for which mitigation is desirable. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and / or social environment	Negligible (negative) (-)
-36 to -72	A minor negative impact requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and / or social environment	Minor (negative) (-)
-73 to -108	A moderate negative impact may prevent the implementation of the project. These impacts would be considered as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe changes.	Moderate (negative) (-)
-109 to -147	A major negative impact may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts are likely to be irreversible and/or irreplaceable.	Major (negative) (-)

11.2 Identified Potential Impacts and Proposed Mitigation Measures

The subsections below provide the identified potential for the environmental aspects investigated in this EIA for each project phase. Furthermore the significance, extend, duration and probability of the potential impact are detailed and possible mitigation measures that could applied are provided for each potential impact. It is noted that only direct impacts are assessed in this section, potential risks are detailed subsequently in Section 11.3 below.

11.2.1 Soils, Land Use and Land Capability

11.2.1.1 Construction Phase

The construction of some of the proposed developments on site including REP1, REP4.1 and 4.2, USP2 as well as footprints associated with the pipeline routes and fence roads will result in land clearing and disturbance of soil, particularly valuable topsoil resource. This may lead to impacts that include loss of soil directly from vegetation clearing activities as well as from wind and/or water related erosion from bare surfaces. Soil compaction is also anticipated as a result of vehicle movement on soil surfaces during the construction phase. The compaction of soil may potentially lead to reduced infiltration rates and ability for plant roots to penetrate the soil.

The land capability within the project area is low due to the rock outcrops and shallow Mispah soils, therefore there will be no loss to land capability. The land use for the project area is characterised as urban development, therefore the proposed developments will not result in a change in land use.

11.2.1.1.1 Impacts Ratings and Proposed Mitigation Measures

The construction phase impacts on Soils are rated Table 11-5.

Table 11-5: Potential Impacts for the Loss of Topsoil as a Resource

Dimension	Rating	Motivation	Significance
Activity and Interaction: Site clearance			
Impact Description: Loss of topsoil due to land clearing leading to possible erosion as well as compaction resulting from vehicle movement.			
Prior to Mitigation/Management			
Duration	3	Topsoil will be removed in preparation of the foundations for proposed expansions and impact is not more than 10 years	Minor (negative) - 32
Extent	3	Impact is limited to the development site area	
Intensity	2	Moderate loss of topsoil and damage of physical resources during construction	
Probability	4	Loss of topsoil will probably occur during construction	

Dimension	Rating	Motivation	Significance
Activity and Interaction: Site clearance			
Nature	Negative		
Mitigation/Management Actions			
▪ Only clear vegetation when and where necessary; ▪ Only remove topsoil when and where necessary; ▪ Only the designated access routes are to be used; ▪ Topsoil to be stockpiled separately on piles not higher that 2 – 3m; ▪ Topsoil to be dumped in a single pile to avoid disturbance; ▪ Topsoil should be used for rehabilitation of disturbed area; ▪ Re-vegetation must take place immediately once construction is complete to minimise soil loss due to erosion; ▪ Erosion must be controlled by appropriate erosion control techniques including the use of sand bags, organic material; ▪ If erosion occurs, corrective actions must be taken to minimise any further erosion from taking place; and ▪ Ensure proper storm water management designs are in place.			
Post-Mitigation			
Duration	2	Impact will be less than 5 years if mitigation measures are implemented	Negligible (negative) - 18
Extent	2	Loss of topsoil will occur within and around the project site	
Intensity	2	Loss of topsoil may result in degradation	
Probability	3	If mitigation measures are followed the impact will be lower	
Nature	Negative		

11.2.1.2 Operational Phase

No further new impacts are anticipated during the operational phase, however, erosion and compaction of all exposed areas is expected to persist. This will particularly be as a result of maintenance and inspection activities of pipeline routes.

11.2.1.2.1 Impact Ratings and Proposed Mitigation Measures

The operational phase impact on soil resources are rated Table 11-6.

Table 11-6: Maintenance of the Pipeline Route

Dimension	Rating	Motivation	Significance
Activity and Interaction: Pipeline routes			
Impact Description: The maintenance and inspections of the pipeline routes will cause a loss of topsoil as a resource through erosion as well as compaction resulting from vehicle movement.			
Prior to Mitigation/Management			

Dimension	Rating	Motivation	Significance
Duration	5	When the soil has eroded the impact will be permanent and is potentially irreversible	Minor (negative) - 30
Extent	2	Compaction and erosion will occur on a limited scale	
Intensity	3	Impact will be reduced if mitigation measures are implemented	
Probability	3	Impact is unlikely to occur if mitigation measures are implemented	
Nature	Negative		
Mitigation/Management Actions			
▪ Maintenance and inspections along the pipeline routes must be done to minimise compaction and erosion			
Post-Mitigation			
Duration	2	Impact on soil can be less than a year if mitigation measures are implemented	Negligible (negative) - 14
Extent	2	Compaction and erosion will occur on a very limited scale	
Intensity	3	Intensity of the impact on soils will be reduced if mitigation measures are implemented	
Probability	2	Impact will rarely occur if mitigation measures are followed	
Nature	Negative		

11.2.2 Fauna and Flora

11.2.2.1 Construction Phase

The construction of some of the proposed developments on site including REP1, REP4.1 and 4.2, USP2 as well as footprints associated with the pipeline routes and fence roads will result in land clearing of the identified vegetation. Table 11-7 presents the present and predicted loss of habitat due to site clearance.

Table 11-7: Present and Predicted Loss of Habitat due to site clearance

Vegetation/Habitat Type	Development Area A Disturbed/Total (ha)	Development Area B Disturbed/Total (ha)	Development Area C Disturbed/Total (ha)
Mountain Bushveld	13/358	9/127	0/331
Plains Bushveld	43/90	9/61	0/119
Riparian Bushveld	0/0	1.2/144	0/1
Wetlands	19/38	8/94	0/18

Vegetation/Habitat Type	Development Area A Disturbed/Total (ha)	Development Area B Disturbed/Total (ha)	Development Area C Disturbed/Total (ha)
Riverine Forest	0/0	1/41	0/0
Disturbed	0/6	4/129	0/0
Totals	**75/492**	**32/596**	**0/468**

As provided in the baseline description in Section 10.5 above, the project area coincides with CBA 1 and 2 as well as ESA1. These designations further coincide with delineated vegetation types recorded and delineated on site, these were, Mountain Bushveld – CBA 2, Plains Bushveld – CBA 2, Riparian areas (Wetlands) – CBA 1, and Riparian Bushveld – ESA 1. The three Development Areas that make up the Sun City Resort Complex all coincide with vegetation types, CBA and ESA, however the actual impacts will only occur in Development A and B, with no infrastructure planned in Development Area C.

The vegetation types assigned medium-high sensitivity are displayed below in Table 11-7, apart from the disturbed delineation all other vegetation types are sensitive and any loss of them are seen as negative for biodiversity. It is not anticipated that any plant SSC will be lost, though they may be encountered.

Furthermore, as a result of land clearing, alien plant species invasion may occur where natural habitats are fragmented. It is noted that alien plant species have already been recorded on site, their presence may intensify as a result of further disturbance of natural areas.

In terms of faunal species, site clearance as well as vehicular movement during construction activities may disturb or scare away faunal species including breeding species.

Overall, the ecosystem functioning, which comprises the combined functioning of the vegetation and associated faunal habitats and wetlands that make up the ecosystem health, will be interrupted as a result of construction activities, particularly in undisturbed areas.

11.2.2.1.1 Impacts Ratings and Mitigation Measures

The impacts on fauna and flora during the construction phase are rated in Table 11-8 to Table 11-13 below.

Table 11-8: Loss of Habitat/Vegetation Types - Mountain Bushveld

Dimension	Rating	Motivation	Significance
Impact Description: Loss of 22ha of *Mountain Bushveld* as a result of site clearing			
Prior to Mitigation/Management			
Duration	Permanent (7)	Sensitive native vegetation/ fauna habitat will be removed (22ha) for surface infrastructure and the impact	Moderate (negative) 84

Dimension	Rating	Motivation	Significance
		will be permanent. Fauna species will move away with no permanent impact on them. Occasional and accidental moralities may occur.	
Extent	Very limited (2)	The area to be cleared is minor in comparison to the extent of the vegetation unit, as well as the extent of the total study area. Flora SSC was encountered. No faunal SSC was encountered in the area of disturbance; therefore no direct impact is expected.	
Intensity t	Moderate (-3)	Since the vegetation unit has been assigned moderate ecological sensitivity, is widespread, and as CBA 1 and 2 areas are present, but only 22 ha will be impacted on, the impact is not regarded as particularly significant for terrestrial biodiversity.	
Probability	Certain (7)	Clearing of vegetation will definitely take place for the establishment of infrastructure. SSC plant species do occur, and is expected to be impacted on.	
Nature	Negative	The impact will be negative.	
Mitigation/Management Actions			
▪ Pre-disturbance survey to mark and identify all SSC. ▪ AIP management strategy must be in place. ▪ Rehabilitation of the disturbed area should take place after construction, whereby a mixture of native grass species harvested from climax Themeda grassland and native grass species (such as *Cynodon dactylon*) are planted immediately to prevent erosion; and ▪ The footprint area should be limited as far as possible.			
Post-Mitigation			
Duration	Beyond Project Life (6)	The areas that are disturbed cannot be returned to prior state, footprints have been kept to a minimum though.	Minor (negative) 36
Extent	Very limited (1)	The area to be cleared is minor in extent.	
Intensity	Minor Loss (2)	Loss of limited areas of medium high sensitivity areas has a moderate impact on flora and fauna.	
Probability	Probable (4)	This impact could happen.	
Nature	negative	The impact will be negative.	

Table 11-9: Loss of Habitat/Vegetation Types - Plains Bushveld

Dimension	Rating	Motivation	Significance
Impact Description: Loss of 52ha of *Plains Bushveld* as a result of site clearing			
Prior to Mitigation/Management			
Duration	Permanent (7)	Native vegetation/ fauna habitat will be removed for surface infrastructure and the impact will be permanent. Fauna species will move away with no permanent impact on them. Occasional and accidental moralities may occur.	Moderate (negative) 98
Extent	Limited (2)	The area to be cleared is minor in comparison to the extent of the vegetation unit, as well as the extent of the total study area. No faunal SSC was encountered in this project area it is still regarded as CBA 2; impacts are regarded as negative to biodiversity.	
Intensity	Moderate (-5)	Since the vegetation unit has been assigned moderate ecological sensitivity, and CBA 2 category, and is earmarked for destruction, the impact is regarded as negative for biodiversity.	
Probability	Certain (7)	Clearing of vegetation in this vegetation type will definitely take place for the establishment of infrastructure.	
Nature	Negative	The impact will be negative.	
Mitigation/Management Actions			
▪ Pre-disturbance survey to mark and identify all SSC. ▪ AIP management strategy must be in place. ▪ Rehabilitation of the disturbed area should take place after construction, whereby a mixture of native grass species harvested from climax Themeda grassland and native grass species (such as *Cynodon dactylon*) are planted immediately to prevent erosion; and ▪ The footprint area should be limited as far as possible.			
Post-Mitigation			
Duration	Project Life (5)	Loss of 52ha is permanent, but with limited footprint after mitigation.	Minor (negative) 49
Extent	Very limited (1)	The area to be cleared is 52 ha in extent. The vegetation type is not limited to the project area.	
Intensity	Minimal (1)	Loss of this vegetation type has a negligible impact on flora and fauna.	
Probability	Likely (7)	This is impact will probably	

Dimension	Rating	Motivation	Significance
Nature	negative	The impact will be negative.	

Table 11-10: Loss of Habitat/Vegetation Types - Riparian Bushveld

Dimension	Rating	Motivation	Significance
Impact Description: Loss of 22 ha of *Riparian Bushveld and Wetlands* as a result of site clearing			
Prior to Mitigation/Management			
Duration	Permanent (7)	Sensitive native vegetation/ fauna habitat will be removed for surface infrastructure and the impact will be permanent. Fauna species will move away with no permanent impact on them. Occasional and accidental moralities may occur.	Moderate (negative) 98
Extent	Very limited (2)	The area to be cleared is minor in comparison to the extent of the vegetation unit, as well as the extent of the total study area. Flora SSC was encountered in the area of disturbance; therefore direct impacts is expected.	
Intensity	Moderate (-5)	Since the vegetation unit has been assigned CBA1 ecological sensitivity, and is earmarked for destruction, the impact is regarded as particularly significant for riparian and wetlands biodiversity.	
Probability	Certain (7)	Clearing of vegetation these vegetation types will definitely take place for the establishment of infrastructure.	
Nature	Negative	The impact will be negative.	
Mitigation/Management Actions			
▪ Pre-disturbance survey to mark and identify all SSC. ▪ AIP management strategy must be in place. ▪ Rehabilitation of the disturbed area should take place after construction, whereby a mixture of native grass species harvested from climax Themeda grassland and native grass species (such as *Cynodon dactylon*) are planted immediately to prevent erosion; and ▪ The footprint area should be limited as far as possible.			
Post-Mitigation			
Duration	Beyond Project Life (6)	The areas that are disturbed cannot be returned to prior state, footprints have been kept to a minimum though.	Minor (negative) 49
Extent	Very limited	The area to be cleared is minor in extent.	

Dimension	Rating	Motivation	Significance
	(1)		
Intensity	Minor Loss (2)	Loss of limited areas of medium high sensitivity areas has a moderate impact on flora and fauna.	
Probability	Probable (4)	This impact could happen.	
Nature	Negative	The impact will be negative.	

Table 11-11: Loss of Habitat/Vegetation Types - Riverine Forest

Dimension	Rating	Motivation	Significance
Impact Description: Loss of 0.5 ha of *Riverine Forest* as a result of site clearing			
Prior to Mitigation/Management			
Duration	Permanent (7)	Non-Native vegetation/ fauna habitat will be removed for surface infrastructure and the impact will be permanent. Fauna species will move away with no permanent impact on them. Occasional and accidental moralities may occur.	Moderate (negative) 91
Extent	Very limited (2)	The area to be cleared is minor in comparison to the extent of the vegetation unit, as well as the extent of the total study area. No faunal SSC was encountered in the area of disturbance; therefore no direct impact is expected.	
Intensity	Moderate (-4)	Since the vegetation unit has been assigned moderate ecological sensitivity, and ESA 1, and is earmarked for destruction, the impact is regarded as not significant for the biodiversity of this vegetation type.	
Probability	Certain (7)	Clearing of vegetation will definitely take place for the establishment of infrastructure.	
Nature	Negative	The impact will be negative.	
Mitigation/Management Actions			
▪ Pre-disturbance survey to mark and identify all SSC. ▪ AIP management strategy must be in place. ▪ Rehabilitation of the disturbed area should take place after construction, whereby a mixture of native grass species harvested from climax Themeda grassland and native grass species (such as *Cynodon dactylon*) are planted immediately to prevent erosion; and ▪ The footprint area should be limited as far as possible.			

Dimension	Rating	Motivation	Significance
Post-Mitigation			
Duration	Beyond Project Life (6)	The areas that are disturbed cannot be returned to prior state, footprints have been kept to a minimum though.	Minor (negative) 49
Extent	Very limited (1)	The area to be cleared is minor in extent.	
Intensity	Minor Loss (2)	Loss of limited areas of medium high sensitivity areas has a moderate impact on flora and fauna.	
Probability	Probable (4)	This impact could happen.	
Nature	Negative	The impact will be negative.	

Table 11-12: Habitat Fragmentation facilitating Alien plant Invasion

Dimension	Rating	Motivation	Significance
Impact Description: Habitat fragmentation and edge effects resulting in alien plant invasion.			
Prior to Mitigation/Management			
Duration	Medium-term (3)	Habitat fragmentation and alien plant invasion will take place for a period of 2 – 5 years.	Minor (negative) 54
Extent	Limited (2)	Alien plants will establish around disturbed areas associated with the construction phase.	
Intensity	Serious (4)	Alien plant invasion is a serious problem with significant ecological consequences; hence its reference in the NEMBA and CARA legislation.	
Probability	Highly probable (6)	Since alien plants have already been recorded on site, the spread of these species due to disturbance will invariably take place. The seedbank in the soil will contain alien species.	
Nature	negative	The impact will be negative	
Mitigation/Management Actions			
▪ An alien plant species management plan should be compiled and implemented.			
Post-Mitigation			

Dimension	Rating	Motivation	Significance
Duration	Medium-term (3)	As seedlings emerge, they will be removed bi-annually as part of an alien management plan.	Minor (negative) 42
Extent	Limited (2)	Alien plants will establish around disturbed areas associated with the construction phase.	
Intensity	Minimal (1)	Alien plant invasion is serious for terrestrial biodiversity; however, if these species are controlled timeously, the impact will be reduced.	
Probability	Likely (7)	Since alien plants have already been recorded on site, the spread of these species due to disturbance will invariably take place. The seedbank in the soil will contain alien species.	
Nature	Negative	The impact will be negative	

Table 11-13: Disturbance to fauna due to increased vehicular movement on site

Dimension	Rating	Motivation	Significance
Impact Description: Disturbance to fauna due to increased vehicular movement on site			
Prior to Mitigation/Management			
Duration	Medium-term (3)	Construction vehicles will be active on site, thereafter guests will be using roads.	Minor (negative) 54
Extent	Limited (2)	This impact will be limited to areas lose to natural vegetation and habitat.	
Intensity	Serious (4)	Most animals would have moved away however SSC is present on site and could be affected.	
Probability	Highly probable (6)	This impact has occurred in other locations and is likely to occur here.	
Nature	negative	The impact will be negative	
Mitigation/Management Actions			
▪ Sensitising road users. ▪ Signage to advise on sensitive areas where animals could cross the road. ▪ No hunting or snares should be permitted. ▪ Strict speed limits during construction.			
Post-Mitigation			

Dimension	Rating	Motivation	Significance
Duration	Medium-term (3)	Construction vehicles will still be active on site, however road users such as guests will be cautioned.	Minor (negative) 42
Extent	Limited (2)	This impact will be limited to areas lose to natural vegetation and habitat.	
Intensity t	Minimal (1)	Most animals would have moved away however SSC is present on site and could be affected.	
Probability	Likely (7)	This impact has occurred in other locations and could occur here.	
Nature	Negative	The impact will be negative	

11.2.2.2 Operational Phase

During the operational phase of the development, no further site clearance will take place. Expected impacts include alien invasive plant species invasion, as open areas around newly established infrastructure will create a favourable environmental for alien plant species infestation. Increased vehicular movement on site may result in disturbance to faunal species due to noise and dust. Roadkill of smaller fauna and bird species may also occur.

11.2.2.2.1 Impacts Ratings and Proposed Mitigation Measures

The impacts on fauna and flora during the operational phase are rated in the Table 11-14 and Table 11-15 below.

Table 11-14: Increased Vehicular Movement on Site

Dimension	Rating	Motivation	Significance
Impact Description: Disturbance to fauna on site (noise, road kills) as a result of increased vehicular movement			
Prior to Mitigation/Management			
Duration	Project life (5)	The impact will last for the project life.	Minor (negative) 40
Extent	Very limited (2)	The extent is limited since surface infrastructure is minimal.	
Intensity	Moderate (3)	No Red Data fauna species are expected to be at risk and the impact will not be frequent.	
Probability	Probable (4)	This is a commonly observed impact but it is not definite.	

Dimension	Rating	Motivation	Significance
Nature	negative	The impact will be negative.	
Mitigation/Management Actions			
▪ Erect signage on site; ▪ Adhere to speed limits; ▪ Make use of internal fencing; and ▪ Avoid vehicle movement at night.			
Post-Mitigation			
Duration	Project Life (5)	The impact will last for the project life.	Negligible(negative) 14
Extent	Very limited (1)	The extent is limited since surface infrastructure is minimal.	
Intensity	Minimal (1)	No Red Data fauna species are expected to be at risk and the impact will not be frequent.	
Probability	Rare (2)	Roadkills will be minimal if the speed limit is adhered to and activity is restricted to daylight hours.	
Nature	negative	The impact will be negative.	

Table 11-15: Habitat Fragmentation and edge effects resulting in alien plant invasion

Dimension	Rating	Motivation	Significance
Site Clearing			
Impact Description: Habitat fragmentation and edge effects resulting in alien plant invasion			
Prior to Mitigation/Management			
Duration	Medium-term (3)	Habitat fragmentation and alien plant invasion will take place for a period of 2 – 5 years.	Minor (negative) 54
Extent	Limited (2)	Alien plants will establish around disturbed areas associated with the construction phase.	
Intensity	Serious (4)	Alien plant invasion is a serious problem with significant ecological consequences; hence its reference in the NEMBA and CARA legislation.	
Probability	Highly probable (6)	Since alien plants have already been recorded on site, the spread of these species due to disturbance will invariably take place. The seedbank in the soil will contain alien species.	

Dimension	Rating	Motivation	Significance
Nature	negative	The impact will be negative	
Mitigation/Management Actions			
▪ An alien plant species management plan should be compiled and implemented.			
Post-Mitigation			
Duration	Medium-term (3)	As seedlings emerge, they will be removed bi-annually as part of an alien management plan.	Minor (negative) 42
Extent	Limited (2)	Alien plants will establish around disturbed areas associated with the construction phase.	
Intensity	Minimal (1)	Alien plant invasion is serious for terrestrial biodiversity; however, if these species are controlled timeously, the impact will be reduced.	
Probability	Likely (7)	Since alien plants have already been recorded on site, the spread of these species due to disturbance will invariably take place. The seedbank in the soil will contain alien species.	
Nature	Negative	The impact will be negative	

11.2.3 Wetlands

11.2.3.1 Construction Phase

The main activities during the construction phase that could result in impacts to wetlands are associated with the site clearing and construction of the various proposed expansion projects. Activities include site clearing, soil disturbance, storage and dumping of building materials, compaction of soils and crossing of the wetland and river systems.

Associated impacts include erosion and sedimentation, the potential loss of biodiversity and habitat, fragmentation of the systems present and potential loss of catchment yields and surface water recharge to the systems further downstream. Among the impacts associated with the proposed construction phase are minor potential impacts to soil and water quality as a result of the ingress of hydrocarbons. Larger impacts include compaction of soils, potential loss of vegetation and the increased potential for erosion and sedimentation in the vicinity of any cleared areas and resulting in impacts further downstream. Removal of vegetation and disturbance of soils in the vicinity of the construction footprint is likely to give rise to an increased potential for encroachment of alien invasive plant species, further altering the natural vegetation profiles (PES and EIS) of wetlands encountered in the vicinity of the proposed development footprints.

11.2.3.1.1 Impact Ratings and Proposed Mitigation Measures

The impacts on wetlands during the construction phase are rated in Table 11-16 to Table 11-19 below. The impacts have been assessed for construction activities in Development Area A and Development Area B separately. No developments are currently planned in Development Area C of the Sun City Resort Complex.

Table 11-16: Site Clearance resulting in Wetland Fragmentation in Development Area A

Dimension	Rating	Motivation	Significance
Site clearing and excavation activities			
Impact Description: Direct loss of wetland habitat for infrastructure establishment as well as fragmentation of riverine corridors. Site clearance may also result in erosion which may result in the sedimentation of wetlands and the potential for alien plant species invasion which will ultimately result in the deterioration of wetland PES and provision of ecosystem services.			
Prior to Mitigation/Management			
Duration	Beyond project life (6)	The impact will remain for some time after the life of the project and is potentially irreversible even with management.	Minor (negative) 56
Extent	Greater municipal area (4)	General scouring from sedimentation, erosion, as well as degraded habitat due to water quality deterioration will affect entire watercourse and river reaches.	
Intensity	Serious medium term (4)	Due to the sensitivity of wetland systems in this portion of Development Area A, should no management or mitigation measures be employed, activities could result in serious long term impacts.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		
Mitigation/Management Actions			
▪ Ensure soil management programme is implemented and maintained to minimise erosion and sedimentation; ▪ Active rehabilitation, re-sloping, and re-vegetation of disturbed areas immediately after construction; ▪ Implement and maintain an alien vegetation management programme; ▪ Limit the footprint area of the construction activities to what is absolutely essential; ▪ If it is absolutely unavoidable that any of the freshwater areas present will be affected, disturbance must be minimised and suitably rehabilitated; ▪ Ensure that no incision and canalisation of the ephemeral drainage lines present takes place; ▪ Permit only essential personnel within the 32 m zone of regulation for all wetland areas; ▪ All areas of increased ecological sensitivity should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel;			

Dimension	Rating	Motivation	Significance
▪ No unnecessary crossing of the wetlands and their associated buffers should take place and the substrate conditions of the ephemeral drainage lines and downstream stream connectivity must be maintained; ▪ No material may be dumped or stockpiled within any wetland habitat; ▪ All vehicles must be regularly inspected for leaks; ▪ Re-fuelling must take place on a sealed surface area away from freshwater features to prevent ingress of hydrocarbons into topsoil; ▪ All spillages should be cleaned up immediately and treated accordingly; ▪ Appropriate sanitary facilities must be provided for the duration of the construction activities; and ▪ All waste must be removed to an appropriate waste facility.			
Post-Mitigation			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Negligible (negative) 32
Extent	Local (3)	Local extending only as far as the development site area.	
Intensity	Minor medium term (2)	Should management or mitigation measures be employed, impacts can reduced to minor impacts	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		

Table 11-17: Site Clearance resulting in Wetland Fragmentation in Development Area B

Dimension	Rating	Motivation	Significance
Site clearing and excavation activities			
Impact Description: Direct loss of wetland habitation for infrastructure establishment as well as fragmentation of riverine corridors. Site clearance may also result in erosion which may result in the sedimentation of wetlands and the potential for alien plant species invasion which will ultimately result in the deterioration of wetland PES and provision of ecosystem services.			
Prior to Mitigation/Management			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Negligible (negative) 32
Extent	Local (3)	The degree of modifications of the systems present within this portion of the project area, as well as the modifications to the surrounding land use, will reduce the extent of further impacts to the wetland and aquatic systems present.	

Dimension	Rating	Motivation	Significance
Intensity	Minor medium term (2)	Due to the sensitivity of wetland systems in general and the already degraded nature of the systems present, should no management or mitigation measures be employed, activities are likely to impact the systems to a lesser extent than the relatively intact systems observed in Development Area B.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		
Mitigation/Management Actions			
▪ Ensure soil management programme is implemented and maintained to minimise erosion and sedimentation; ▪ Active rehabilitation, re-sloping, and re-vegetation of disturbed areas immediately after construction; ▪ Implement and maintain an alien vegetation management programme; ▪ Limit the footprint area of the construction activities to what is absolutely essential; ▪ If it is absolutely unavoidable that any of the freshwater areas present will be affected, disturbance must be minimised and suitably rehabilitated; ▪ Ensure that no incision and canalisation of the ephemeral drainage lines present takes place; ▪ Permit only essential personnel within the 32 m zone of regulation for all wetland areas; ▪ All areas of increased ecological sensitivity should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel; ▪ No unnecessary crossing of the wetlands and their associated buffers should take place and the substrate conditions of the ephemeral drainage lines and downstream stream connectivity must be maintained; ▪ No material may be dumped or stockpiled within any wetland habitat; ▪ All vehicles must be regularly inspected for leaks; ▪ Re-fuelling must take place on a sealed surface area away from freshwater features to prevent ingress of hydrocarbons into topsoil; ▪ All spillages should be cleaned up immediately and treated accordingly; ▪ Appropriate sanitary facilities must be provided for the duration of the construction activities; and ▪ all waste must be removed to an appropriate waste facility.			
Post-Mitigation			
Duration	Short term (2)	Less than 1 year and is reversible.	Negligible (negative) 24
Extent	Limited (2)	Limited to the immediate development site and its immediate surroundings.	
Intensity	Minor medium term (2)	Activities are likely to impact the systems to a lesser extent than the relatively intact systems observed in Development Area B. With mitigation measures, minor medium terms impacts remain anticipated.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are	

Dimension	Rating	Motivation	Significance
		considered probable.	
Nature	Negative		

Table 11-18: Stockpiling and Storage of Construction Materials resulting in Wetland Fragmentation in Development Area A

Dimension	Rating	Motivation	Significance
Stockpiling and storage of building materials			
Impact Description: Storage of building material may result in the fragmentation of riverine corridors depending on the proximity to freshwater features. The potential for erosion exists as a result of disturbance of the natural habitat for the storage of building materials which in turn may result in the deterioration of wetlands and the potential for alien plant species invasion. This would ultimately result in the deterioration of wetland PES and provision of ecosystem services.			
Prior to Mitigation/Management			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Negligible (negative) 36
Extent	Local (3)	The degree of modifications of the systems present within this portion of the project area, as well as the modifications to the surrounding land use, will reduce the extent of further impacts to the wetland and aquatic systems present.	
Intensity	Moderate medium term (3)	Due to the sensitivity of wetland systems in this portion of Development Area A, should no management or mitigation measures be employed, activities could result in moderate medium term impacts.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		
Mitigation/Management Actions			
▪ Ensure soil management programme is implemented and maintained to minimise erosion and sedimentation; ▪ Active rehabilitation, re-sloping, and re-vegetation of disturbed areas immediately after construction; ▪ Implement and maintain an alien vegetation management programme; ▪ Limit the footprint area of the construction activities to what is absolutely essential; ▪ If it is absolutely unavoidable that any of the freshwater areas present will be affected, disturbance must be minimised and suitably rehabilitated; ▪ Ensure that no incision and canalisation of the ephemeral drainage lines present takes place; ▪ Permit only essential personnel within the 32 m zone of regulation for all wetland areas;			

Dimension	Rating	Motivation	Significance
▪ All areas of increased ecological sensitivity should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel; ▪ No unnecessary crossing of the wetlands and their associated buffers should take place and the substrate conditions of the ephemeral drainage lines and downstream stream connectivity must be maintained; ▪ No material may be dumped or stockpiled within any wetland habitat; ▪ All vehicles must be regularly inspected for leaks; ▪ Re-fuelling must take place on a sealed surface area away from freshwater features to prevent ingress of hydrocarbons into topsoil; ▪ All spillages should be cleaned up immediately and treated accordingly; ▪ Appropriate sanitary facilities must be provided for the duration of the construction activities; and ▪ All waste must be removed to an appropriate waste facility.			
Post-Mitigation			
Duration	Short term (2)	Less than 1 year and is reversible.	Negligible (negative) 15
Extent	Very limited (1)	Limited to specific isolated parts of the site.	
Intensity	Minor medium term environmental effects (2)	Should management or mitigation measures be employed, impacts can reduced to minor impacts	
Probability	Unlikely (3)	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.	
Nature	Negative		

Table 11-19: Stockpiling and Storage of Construction Materials resulting in Wetland Fragmentation in Development Area B

Dimension	Rating	Motivation	Significance
Stockpiling and storage of building materials			
Impact Description: Storage of building material may result in the fragmentation of riverine corridors depending on the proximity to freshwater features. The potential for erosion exists as a result of disturbance of the natural habitat for the storage of building materials which in turn may result in of wetlands and the potential for alien plant species invasion. This would ultimately result in the deterioration of wetland PES and provision of ecosystem services.			
Prior to Mitigation/Management			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Negligible

Dimension	Rating	Motivation	Significance
Extent	Local (3)	The degree of modifications of the systems present within this portion of the project area, as well as the modifications to the surrounding land use, will reduce the extent of further impacts to the wetland and aquatic systems present.	(negative) 32
Intensity	Minor medium term (2)	Due to the sensitivity of wetland systems in general and the already degraded nature of the systems present, should no management or mitigation measures be employed, activities are likely to impact the systems to a lesser extent than the relatively intact systems observed in Development Area B.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		
Mitigation/Management Actions			
▪ Ensure soil management programme is implemented and maintained to minimise erosion and sedimentation; ▪ Active rehabilitation, re-sloping, and re-vegetation of disturbed areas immediately after construction; ▪ Implement and maintain an alien vegetation management programme; ▪ Limit the footprint area of the construction activities to what is absolutely essential; ▪ If it is absolutely unavoidable that any of the freshwater areas present will be affected, disturbance must be minimised and suitably rehabilitated; ▪ Ensure that no incision and canalisation of the ephemeral drainage lines present takes place; ▪ Permit only essential personnel within the 32 m zone of regulation for all wetland areas; ▪ All areas of increased ecological sensitivity should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel; ▪ No unnecessary crossing of the wetlands and their associated buffers should take place and the substrate conditions of the ephemeral drainage lines and downstream stream connectivity must be maintained; ▪ No material may be dumped or stockpiled within any wetland habitat; ▪ All vehicles must be regularly inspected for leaks; ▪ Re-fuelling must take place on a sealed surface area away from freshwater features to prevent ingress of hydrocarbons into topsoil; ▪ All spills should be immediately cleaned up and treated accordingly; ▪ Appropriate sanitary facilities must be provided for the duration of the construction activities; and ▪ All waste must be removed to an appropriate waste facility.			
Post-Mitigation			
Duration	Short term (2)	Less than 1 year and is reversible.	Negligible (negative) 15
Extent	Very limited (1)	Limited to specific isolated parts of the site.	

Dimension	Rating	Motivation	Significance
Intensity	Minor medium term environmental effects (2)	Activities are likely to impact the systems to a lesser extent than the relatively intact systems observed in Development Area B. With mitigation measures, minor medium terms impacts remain anticipated.	
Probability	Unlikely (3)	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.	
Nature	Negative		

11.2.3.2 Operational Phase

The main activities during the operational phase that could result in impacts to the wetland habitat of the area are associated with the storm water management systems, maintenance and operational activities, gardening services, hardening of surfaces and management of soils as well as crossing of the wetland and river systems.

Associated impacts include loss of catchment yield and surface water recharge, erosion and sedimentation, the potential loss of biodiversity and habitat, further fragmentation of the systems present. Further to this, the potential for ongoing contamination of the wetland systems and other freshwater resources present are deemed likely based on the ingress of hydrocarbons associated with increased vehicular activity, as well as water for domestic use. Removal of indigenous vegetation is likely to give rise to an increased potential for encroachment by alien invasive plant species, further altering the natural vegetation profiles of the freshwater resources encountered in the vicinity of the project footprint. Hardened surfaces have the potential to result in sheet runoff and there is likely to be a loss in wetland service provision in terms of flood attenuation, sediment trapping and assimilation of toxicants and other pollutants. Storage of water, which is an important service, provided by wetlands in this area, will be compromised. Further alterations to the natural flow regimes will take place and is likely to result in the creation of preferential flow paths over time.

11.2.3.2.1 Impact Ratings and Proposed Mitigation Measures

The impacts on wetlands during the operational phase are rated in Table 11-20 to Table 11-23 below. The impacts have been assessed for construction activities in Development Area A and Development Area B separately. No developments are currently planned in Development Area C of the Sun City Resort Complex.

Table 11-20: Wetland Fragmentation as a result of operation and maintenance of infrastructure in Development Area A

Dimension	Rating	Motivation	Significance
Management and maintenance activities, Influx of people to the general area			
Impact Description: Increased vehicular movement along wetlands and riparian zones may result in increased sedimentation and potential for onset of erosion. Furthermore, physical disturbance of soil in wetlands may result in erosion and sedimentation as a result of recreational activities.			
Prior to Mitigation/Management			
Duration	Project life (5)	The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Minor (negative) 44
Extent	Local (3)	The degree of modifications of the systems present within this portion of the project area, as well as the modifications to the surrounding land use, will reduce the extent of further impacts to the wetland and aquatic systems present.	
Intensity	Moderate medium term (3)	Due to the sensitivity of wetland systems in this portion of Development Area A, should no management or mitigation measures be employed, activities could result in moderate medium term impacts.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		
Mitigation/Management Actions			
▪ Clean and dirty water separation systems to be implemented prior to the commencement of activities and to be maintained throughout the life of the proposed projects; ▪ Ensure that as far as possible all operational infrastructures are placed outside of freshwater areas and their associated 32 m zone of regulation; ▪ Limit the footprint area of the operational activities to what is necessary; ▪ Ensure that no incision and canalisation of the freshwater features present takes place as a result of the proposed operational activities; ▪ During the operational phase, erosion berms should be installed on roadways and downstream of stockpiles to prevent gully formation and siltation of the freshwater resources; ▪ A suitable AIP must be put in place so as to prevent further encroachment as a result of disturbance to the surrounding terrestrial zones; ▪ Permit only essential personnel within the 32 m zone of regulation for all freshwater features identified; ▪ All areas of increased ecological sensitivity should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel;			

Dimension	Rating	Motivation	Significance
▪ No material may be dumped or stockpiled within any of the ephemeral drainage lines in the vicinity of the proposed operational footprint; ▪ No vehicles or heavy machinery may be allowed to drive indiscriminately within any freshwater areas and their associated zones of regulation. All vehicles must remain on demarcated roads; ▪ All vehicles must be regularly inspected for leaks; ▪ Re-fuelling must take place on a sealed surface area away from freshwater features to prevent ingress of hydrocarbons into topsoil; ▪ All spillages should be cleaned up immediately and treated accordingly; ▪ Appropriate sanitary facilities must be provided for the duration of the operational activities and all waste must be removed to an appropriate waste facility; and ▪ Monitor all systems for erosion and incision.			
Post-Mitigation			
Duration	Permanent (7)	The impact is irreversible, even with management, and will remain after the life of the project.	Minor (negative) 48
Extent	Local (3)	Local extending only as far as the development site area.	
Intensity	Minor medium term (2)	Should management or mitigation measures be employed, impacts can reduced to minor impacts	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		

Table 11-21: Wetland Fragmentation as a result of operation and maintenance of infrastructure in Development Area B

Dimension	Rating	Motivation	Significance
Management and maintenance activities, Influx of people to the general area			
Impact Description: Increased vehicular movement along wetlands and riparian zones may result in increased sedimentation and potential for onset of erosion. Furthermore, physical disturbance of soil in wetlands may result in erosion and sedimentation as a result of recreational activities.			
Prior to Mitigation/Management			
Duration	Project life (5)	The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Minor (negative) 40
Extent	Local (3)	The degree of modifications of the systems present within this portion of the project area, as well as the modifications to the surrounding land use, will reduce the extent of further impacts to the wetland and aquatic systems present.	

Dimension	Rating	Motivation	Significance
Intensity	Minor medium term (2)	Due to the sensitivity of wetland systems in general and the already degraded nature of the systems present, should no management or mitigation measures be employed, activities are likely to impact the systems to a lesser extent than the relatively intact systems observed in Development Area B.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		
Mitigation/Management Actions			
▪ Clean and dirty water separation systems to be implemented prior to the commencement of activities and to be maintained throughout the life of the proposed projects; ▪ Ensure that as far as possible all operational infrastructures are placed outside of freshwater areas and their associated 32 m zone of regulation; ▪ Limit the footprint area of the operational activities to what is absolutely; ▪ Ensure that no incision and canalisation of the freshwater features present takes place as a result of the proposed operational activities; ▪ During the operational phase, erosion berms should be installed on roadways and downstream of stockpiles to prevent gully formation and siltation of the freshwater resources. ▪ A suitable alien invasive plant control programme must be put in place so as to prevent further encroachment as a result of disturbance to the surrounding terrestrial zones; ▪ Permit only essential personnel within the 32 m zone of regulation for all freshwater features identified; ▪ All areas of increased ecological sensitivity should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel; ▪ No material may be dumped or stockpiled within any of the ephemeral drainage lines in the vicinity of the proposed operational footprint; ▪ No vehicles or heavy machinery may be allowed to drive indiscriminately within any freshwater areas and their associated zones of regulation. All vehicles must remain on demarcated roads; ▪ All vehicles must be regularly inspected for leaks; ▪ Re-fuelling must take place on a sealed surface area away from freshwater features to prevent ingress of hydrocarbons into topsoil; ▪ All spills should be immediately cleaned up and treated accordingly; ▪ Appropriate sanitary facilities must be provided for the duration of the operational activities and all waste must be removed to an appropriate waste facility; and ▪ Monitor all systems for erosion and incision.			
Post-Mitigation			
Duration	Permanent (7)	The impact is irreversible, even with management, and will remain after the life of the project.	Negligible (negative) 33
Extent	Limited (2)	Limited to the immediate development site and its immediate surroundings.	
Intensity	Minor medium	Activities are likely to impact the systems to a lesser extent than the relatively intact systems observed in Development Area B. With mitigation measures,	

Dimension	Rating	Motivation	Significance
	term (2)	minor medium terms impacts remain anticipated.	
Probability	Unlikely (3)	Should precautionary measures be implemented, further impacts to the wetlands present are considered unlikely.	
Nature	Negative		

Table 11-22: Wetland Fragmentation as a result of vehicular movement and clean and dirty water separation in Development Area A

Dimension	Rating	Motivation	Significance
Vehicular movement, recreational activities and separation of clean and dirty water			
Impact Description: Vehicular movement and general recreational activities will result in the hardening of soil surfaces which in turn will result in sheet runoff, affecting water flow into freshwater features. Vehicular movement may also facilitate erosion and fragmentation of riverine corridors. In additional, clean and dirty water separation is required to prevent contamination of freshwater features, this however may result in loss of catchment yields and surface water recharge as dirty water will be contained.			
Prior to Mitigation/Management			
Duration	Project life (7)	The impact is irreversible, even with management, and will remain after the life of the project.	Minor (negative) 52
Extent	Local (3)	The degree of modifications of the systems present within this portion of the project area, as well as the modifications to the surrounding land use, will reduce the extent of further impacts to the wetland and aquatic systems present.	
Intensity	Moderate medium term (3)	Due to the sensitivity of wetland systems in this portion of Development Area A, should no management or mitigation measures be employed, activities could result in moderate medium term impacts.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		
Mitigation/Management Actions			
▪ Clean and dirty water separation systems to be implemented prior to the commencement of activities and to be maintained throughout the life of the proposed projects; ▪ Ensure that as far as possible all operational infrastructures are placed outside of freshwater areas and their associated 32 m zone of regulation; ▪ Limit the footprint area of the operational activities to what is absolutely; ▪ Ensure that no incision and canalisation of the freshwater features present takes place as a result			

Dimension	Rating	Motivation	Significance
of the proposed operational activities; ▪ During the operational phase, erosion berms should be installed on roadways and downstream of stockpiles to prevent gully formation and siltation of the freshwater resources. ▪ A suitable alien invasive plant control programme must be put in place so as to prevent further encroachment as a result of disturbance to the surrounding terrestrial zones; ▪ Permit only essential personnel within the 32 m zone of regulation for all freshwater features identified; ▪ All areas of increased ecological sensitivity should be designated as "No-Go" areas and be off limits to all unauthorised vehicles and personnel; ▪ No material may be dumped or stockpiled within any of the ephemeral drainage lines in the vicinity of the proposed operational footprint; ▪ No vehicles or heavy machinery may be allowed to drive indiscriminately within any freshwater areas and their associated zones of regulation. All vehicles must remain on demarcated roads; ▪ All vehicles must be regularly inspected for leaks; ▪ Re-fuelling must take place on a sealed surface area away from freshwater features to prevent ingress of hydrocarbons into topsoil; ▪ All spills should be immediately cleaned up and treated accordingly; ▪ Appropriate sanitary facilities must be provided for the duration of the operational activities and all waste must be removed to an appropriate waste facility; and ▪ Monitor all systems for erosion and incision.			
Post-Mitigation			
Duration	Permanent (7)	The impact is irreversible, even with management, and will remain after the life of the project.	Negligible (negative) 30
Extent	Very limited (1)	Limited to specific isolated parts of the site	
Intensity	Minor medium term (2)	Should management or mitigation measures be employed, impacts can reduced to minor impacts	
Probability	Unlikely (3)	Should precautionary measures be implemented, further impacts to the wetlands present are considered unlikely.	
Nature	Negative		

Table 11-23: Wetland Fragmentation as a result of vehicular movement and clean and dirty water separation in Development Area B

Dimension	Rating	Motivation	Significance
Vehicular movement, recreational activities and separation of clean and dirty water			
Impact Description: Vehicular movement and general recreational activities will result in the hardening of soil surfaces which in turn will result in sheet runoff, affecting water flow into freshwater features. Vehicular movement may also facilitate erosion and fragmentation of riverine corridors. In additional, clean and dirty water separation is required prevent contamination of freshwater features, this however may result in loss of catchment yields and surface water recharge as dirty water will be contained.			

Dimension	Rating	Motivation	Significance
Prior to Mitigation/Management			
Duration	Project life (7)	The impact is irreversible, even with management, and will remain after the life of the project.	Minor (negative) 44
Extent	Limited (2)	Limited extending only as far as the development site area.	
Intensity	Minor medium term (2)	Due to the sensitivity of wetland systems in general and the already degraded nature of the systems present, should no management or mitigation measures be employed, activities are likely to impact the systems to a lesser extent than the relatively intact systems observed in Development Area B.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands present are considered probable.	
Nature	Negative		
Mitigation/Management Actions			
▪ Clean and dirty water separation systems to be implemented prior to the commencement of activities and to be maintained throughout the life of the proposed projects; ▪ Ensure that as far as possible all operational infrastructures are placed outside of freshwater areas and their associated 32 m zone of regulation; ▪ Limit the footprint area of the operational activities to what is absolutely; ▪ Ensure that no incision and canalisation of the freshwater features present takes place as a result of the proposed operational activities; ▪ During the operational phase, erosion berms should be installed on roadways and downstream of stockpiles to prevent gully formation and siltation of the freshwater resources. ▪ A suitable alien invasive plant control programme must be put in place so as to prevent further encroachment as a result of disturbance to the surrounding terrestrial zones; ▪ Permit only essential personnel within the 32 m zone of regulation for all freshwater features identified; ▪ All areas of increased ecological sensitivity should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel; ▪ No material may be dumped or stockpiled within any of the ephemeral drainage lines in the vicinity of the proposed operational footprint; ▪ No vehicles or heavy machinery may be allowed to drive indiscriminately within any freshwater areas and their associated zones of regulation. All vehicles must remain on demarcated roads; ▪ All vehicles must be regularly inspected for leaks; ▪ Re-fuelling must take place on a sealed surface area away from freshwater features to prevent ingress of hydrocarbons into topsoil; ▪ All spills should be immediately cleaned up and treated accordingly; ▪ Appropriate sanitary facilities must be provided for the duration of the operational activities and all waste must be removed to an appropriate waste facility; and ▪ Monitor all systems for erosion and incision.			
Post-Mitigation			

Dimension	Rating	Motivation	Significance
Duration	Permanent (7)	The impact is irreversible, even with management, and will remain after the life of the project.	Negligible (negative) 30
Extent	Very limited (1)	Limited to specific isolated parts of the site	
Intensity	Minor medium term (2)	Activities are likely to impact the systems to a lesser extent than the relatively intact systems observed in Development Area B. With mitigation measures, minor medium terms impacts remain anticipated.	
Probability	Unlikely (3)	Should precautionary measures be implemented, further impacts to the wetlands present are considered unlikely.	
Nature	Negative		

11.2.4 Aquatic Ecology

11.2.4.1 Construction Phase

Clearing of vegetation for the establishment of infrastructure will most likely increase surface runoff, erosion and subsequently the amount of suspended and dissolved solids as well as pollutants (i.e. hazardous substances from the actual construction areas such as hydrocarbons, organic waste from lack of ablutions and domestic litter) entering the associated watercourses. These impacts will alter the water chemistry of the affected watercourses due to the possible increase in contaminant, dissolved salt and suspended solids concentrations and will negatively impact aquatic ecology. The main impacts to aquatic ecology anticipated are additional stress on aquatic biota as a result of potential increased toxicity of water; loss of certain taxa should there be an increase in dissolved solids concentration which exceeds their salinity tolerance; increase in suspended solids resulting in direct alteration of aquatic habitat which in turn will also negatively impact biotic community structure; and general habitat deterioration resulting from sedimentation.

11.2.4.1.1 Impact Ratings and Proposed Mitigation Measures

Table 11-24 and

Table 11-25 below present the impact ratings associated with aquatic biota for the construction phase.

Table 11-24: Potential Surface Runoff Impacts of the Construction Phase

Dimension	Rating	Motivation	Significance
Activity and Interaction: Site clearance and construction of proposed infrastructure			

Dimension	Rating	Motivation	Significance
Impact Description: Vegetation removal resulting in increased runoff and erosion in associated watercourses.			
Prior to Mitigation/Management			
Duration	Project life (5)	Once vegetation is cleared for infrastructure, no revegetation will occur until removal of infrastructure or project closure.	Minor (negative) – 44
Extent	Local (3)	Due to the usual dry nature of the project area runoff is already expected to be limited. However, downstream sections of the associated flowing systems may be affected extending past the project area.	
Intensity	Moderate - Negative (-3)	Due to the dry nature of the project area, the intensity of runoff is already expected to be limited In the already modified and sedimented systems.	
Probability	Probable (4)	The impact is likely to occur more than once during construction but limited due to periodic rainfall events.	
Nature	Negative		
Mitigation/Management Actions ▪ Limit vegetation removal to the infrastructure footprint area only where removed or damaged vegetation areas (riparian or aquatic related) should be revegetated as soon as possible; ▪ Bare land surfaces downstream of construction activities should be vegetated; ▪ Environmentally friendly barrier systems, such as silt nets or in severe cases the use of trenches, can be used downstream from construction sites; ▪ Storm water must be diverted from construction activities and managed in such a manner to disperse runoff and prevent the concentration of storm water flow (i.e. use of baffles at the end of canals or trenches); ▪ Water used for construction should be kept at the construction sites and not be allowed to freely flow into nearby watercourses; and ▪ High rainfall periods (usually December to March) should be avoided during construction.			
Post-Mitigation			
Duration	Project Life (5)	Once vegetation is cleared for infrastructure, no revegetation will occur until the closure phase of the project or removal.	Negligible (negative) – 18
Extent	Limited (2)	Runoff will most likely be restricted after mitigation actions and if high rainfall periods are avoided for construction.	
Intensity	Minor - Negative (-2)	If mitigation measures are all incorporated for the construction phase, the intensity of the impact should decrease significantly, especially due to the dry nature observed throughout the study.	
Probability	Improbable (2)	The likelihood of the impact occurring is reduced by the mitigation actions and should only result in extreme cases or unexpected rainfall events.	

Dimension	Rating	Motivation	Significance
Nature	Negative		

Table 11-25: Potential Chemical Impacts of the Construction Phase

Dimension	Rating	Motivation	Significance
Activity and Interaction: Contaminants from construction sites entering associated watercourses			
Impact Description: Water quality deterioration in the various aquatic systems			
Prior to Mitigation/Management			
Duration	Medium Term (3)	It is predicted that the entry of construction related contaminants will only enter nearby watercourses during high rainfall events throughout the construction phase.	Minor (negative) – 36
Extent	Local (3)	Due to the usual dry nature of the project area runoff is already expected to be limited. However, downstream sections of the associated systems will most likely be affected when flowing and extend outside of the project area.	
Intensity	Moderate - Negative (-3)	Due to the dry nature of the project area, the intensity of runoff is already expected to be limited. However, aquatic systems are regarded as sensitive and the entry of contaminants will result in serious aquatic related impacts.	
Probability	Probable (4)	The impact is likely to occur more than once during construction.	
Nature	Negative		
Mitigation/Management Actions ▪ Bare land surfaces downstream of construction activities should be vegetated; ▪ Environmentally friendly barrier systems, such as silt nets or in severe cases the use of trenches, can be used downstream from construction sites; ▪ Storm water must be diverted from construction activities and managed in such a manner to disperse runoff and prevent the concentration of storm water flow (i.e. use of baffles at the end of canals or trenches) which may carry contaminants from construction sites if flowing through them; ▪ Water used for construction should be kept at the construction sites and not be allowed to freely flow into nearby watercourses; ▪ Construction chemicals, such as paints and hydrocarbons, should be used in an environmentally safe manner with correct storage as per each chemical's specific storage descriptions; and ▪ High rainfall periods (usually December to March) should be avoided during construction.			
Post-Mitigation			
Duration	Medium Term	Duration will remain the same throughout construction.	Negligible

Dimension	Rating	Motivation	Significance
	(3)		(negative) – 14
Extent	Limited (2)	Runoff will most likely be restricted to only impact the immediate water bodies after mitigation actions.	
Intensity	Minor - Negative (-2)	If mitigation measures are all incorporated for the construction phase, the intensity of the impact should decrease significantly, especially due to the dry nature observed throughout the study.	
Probability	Improbable (2)	The likelihood of the impact occurring is reduced by the mitigation actions and should only result in extreme cases or unexpected significant rainfall events.	
Nature	Negative		

11.2.4.2 Operational Phase

A major foreseeable impact associated with the operational phase of the project is increased runoff possibly resulting in erosion and sedimentation as a consequence of constructed impermeable surfaces, culverts and storm water pipelines. The use of chemicals, such as fertilisers and maintenance chemicals (i.e. toxic paint), in order to maintain operations might also enter into nearby watercourses throughout the operation phase of the project.

11.2.4.2.1 Impact Ratings and Proposed Mitigation Measures

Table 11-26 to Table **11-28** below present the impact ratings associated with aquatic biota for the operational phase.

Table 11-26: Increased Runoff and Erosion from Impermeable Surfaces and Beach Expansion

Dimension	Rating	Motivation	Significance
Activity and Interaction: Increased runoff and sedimentation of watercourses			
Impact Description: Increasing the erosion and turbidity in associated watercourses			
Prior to Mitigation/Management			
Duration	Project Life (5)	It is predicted that increased runoff will continue throughout the life of the project whenever rainfall events occur.	Minor (negative) – 48
Extent	Local (3)	Due to the usual dry nature of the project area runoff is already expected to be limited. However, downstream sections of the associated systems will most likely be affected when flowing and extend outside of the project area.	

Dimension	Rating	Motivation	Significance
Intensity	Serious - Negative (-4)	Due to the dry nature of the project area, the intensity of runoff is already expected to be limited. However, aquatic systems are regarded as sensitive and the entry of more solid particles will result in serious aquatic related impacts.	
Probability	Probable (4)	The impact is likely to occur throughout the life of the Project but limited due to periodic rainfall events.	
Nature	Negative		
Mitigation/Management Actions ▪ SWMP should be implemented and take into account all drainage lines associated with the new developments which should convey storm water to silt traps; ▪ Bare surfaces downstream from the developments where silt traps are not an option should be vegetated; ▪ Sediment / sand from the beach expansion should be restricted to the beach area with the use of barrier systems to restrict the sand from entering the recreational dam; and ▪ Monitoring of the pipeline and its service routes should be done by a surface water or aquatic specialist biannually during aforementioned survey in order to determine localities of areas subjected to erosion and increased runoff where after new mitigation actions should be implemented as per the specialist's recommendations.			
Post-Mitigation			
Duration	Project Life (5)	Increased runoff will continue throughout the life of the Project as long as impermeable / hardened surfaces remain	Negligible (negative) – 18
Extent	Limited (2)	Runoff will most likely be restricted and captured after mitigation.	
Intensity	Minor - Negative (-2)	If mitigation measures are all incorporated for the Project, the intensity of the impact should decrease significantly, especially due to the dry nature observed throughout the study.	
Probability	Improbable (2)	The likelihood of the impact occurring is reduced by the mitigation actions and should only result in extreme rainfall events or if mitigation structures aren't maintained.	
Nature	Negative		

Table 11-27: Potential Chemical Impacts associated with the Operational Phase

Dimension	Rating	Motivation	Significance
Activity and Interaction: Increased contaminant input in watercourses			
Impact Description: Water quality deterioration			
Prior to Mitigation/Management			
Duration	Project Life (5)	It is predicted that contaminant input will continue throughout the life of the Project whenever rainfall	Minor

Dimension	Rating	Motivation	Significance
		events occur.	(negative) – 48
Extent	Local (3)	Due to the usual dry nature of the project area runoff is already expected to be limited which should result in limited contaminant input. However, downstream sections of the associated systems will most likely be affected when rainfall events lead to contaminant input.	
Intensity	Serious - Negative (-4)	Due to the dry nature of the project area, the intensity of runoff is already expected to be limited. However, aquatic systems are regarded as sensitive and the entry of contaminants will result in serious aquatic related impacts	
Probability	Probable (4)	The impact is likely to occur throughout the life of the Project but limited due to periodic rainfall events.	
Nature	Negative		
Mitigation/Management Actions ▪ Bare surfaces downstream from the developments where silt traps are not an option should be vegetated in order to attempt to limit erosion and runoff that might be carrying contaminants; ▪ Limited and correct chemical use (as per each chemical's environmental guidelines), such as fertilisers or toxic paint, should take place between the new developments, especially the constructed facilities (e.g. Vacation Club expansions), and associated watercourses; and ▪ All chemicals in storage at the new developments should be stored correctly (i.e. in correct storage containers for each specific chemical).			
Post-Mitigation			
Duration	Long Term (5)	Contaminant runoff will continue throughout the Project life as long as chemicals are continued to be used or needed.	Negligible (negative) – 30
Extent	Limited (2)	Runoff containing contaminants will most likely be restricted and captured after mitigation.	
Intensity	Moderate - Negative (-3)	If mitigation measures are all incorporated for the Project, the intensity of the impact should decrease. However, contaminants are more difficult to manage compared to solid particles and are predicted to enter associated aquatic systems resulting in	
Probability	Unlikely (3)	The likelihood of the impact occurring is reduced by the mitigation actions and should only result in extreme rainfall events or if mitigation structures aren't maintained.	
Nature	Negative		

Table 11-28: Potential Erosion Impacts associated with the Culverts

Dimension	Rating	Motivation	Significance
Activity and Interaction: Increased flow associated with the proposed culverts			

Dimension	Rating	Motivation	Significance
Impact Description: Increasing the erosion and turbidity in associated watercourses			
Prior to Mitigation/Management			
Duration	Project Life (5)	It is predicted that erosion will continue throughout the life of the Project whenever rainfall events occur.	Minor (negative) – 55
Extent	Local (3)	Due to the usual dry nature of the project area flow in the upper reaches of the Central Tributary is already expected to be low where the impact will most likely be further limited due to the recreational dam situated downstream.	
Intensity	Moderate - Negative (-3)	Due to the dry nature of the project area, the intensity of the impact caused by increased flow is already expected to be limited. The reach is also already sedimented where it is suspected that present aquatic biota is tolerant to these conditions.	
Probability	Likely (5)	The impact is likely to occur throughout the life of the Project whenever rainfall events occur due to the general nature of culverts.	
Nature	Negative		
Mitigation/Management Actions ▪ Culverts and storm water pipelines should already be designed and built with large enough diameters to limit blockages (i.e. able to manage 50-year peak flows). Monitoring and maintenance of these structures should be an ongoing process where excess debris in the structures to be removed when noticed; ▪ The culverts should be designed to facilitate the movement of aquatic species up and downstream (i.e. pipe culverts should be avoided and a “stream simulation approach” should be followed); and ▪ The outlets of the proposed culverts should be armoured with naturally occurring structures (i.e. rocks) in order to dissipate the predicted increase flow rates in order to limit erosion.			
Post-Mitigation			
Duration	Long Term (5)	Increased flow will continue throughout the life of the Project caused by the impermeable surfaces of the culverts.	Negligible (negative) – 30
Extent	Local (3)	The impact will still be localised to the upper reaches of the Eastern Tributary.	
Intensity	Minor - Negative (-2)	If mitigation measures are incorporated, the intensity of the impact will be minor and limited to extreme rainfall events.	
Probability	Unlikely (3)	The likelihood of the impact occurring is reduced by the mitigation actions and should only result in extreme rainfall events or if mitigation structures aren’t maintained.	
Nature	Negative		

11.2.5 Surface Water and Groundwater

11.2.5.1 Construction Phase

No impacts are expects to groundwater during the construction phase as site clearance and infrastructure establishment are expected to take place above the water table. In terms of surface water resources within the vicinity of proposed developments, site clearance and topsoil removal during the construction phase is likely to result in erosion which in turn may result in the sedimentation of watercourses (i.e. Total Suspended Solids). Increased sedimentation would result in a deterioration of water quality of nearby surface water resources.

Furthermore, dirty or contaminated runoff emanating from construction activities, such as the cement mixing areas, fuels storage areas, other liquid waste and general waste have the potential to contaminate the nearby water courses.

11.2.5.1.1 Impact Ratings and Proposed Mitigation Measures

Table 11-29 and Table 11-30 below present the impact ratings associated with surface water for the construction phase.

Table 11-29: Siltation of Surface Water Resources

Dimension	Rating	Motivation	Significance
Impact Description: Siltation of surface water resources leading to deteriorated water quality			
Prior to Mitigation/Management			
Duration	2	The impact may only occur during construction of infrastructure	Negligible (negative) - 32
Intensity	3	This will have minor to medium-term intensity resulting in reduction of proximal watercourse flow capacity and poor water quality for immediate downstream users and the aquatic life	
Spatial scale	3	The impacts will be localised to the nearby watercourses from where the silt is being generated to the immediate downstream	
Probability	4	Without appropriate mitigation, it is probable that this impact will occur	
Nature	Negative		
Mitigation/Management Actions			
▪ Clearing of vegetation must be limited to the development footprint; ▪ Dust suppression measures must be undertaken on the cleared areas during construction; and ▪ If possible, construction activities should be prioritized during dry seasons to avoid potential erosion during high rainfall events.			
Post-Mitigation			
Duration	2	The impact will likely occur during the construction phase only	Negligible (negative) - 16

Dimension	Rating	Motivation	Significance
Intensity	3	Should the impact occur, it will have minor medium-term impacts resulting in a reduction in water quality for downstream users and the aquatic life	
Spatial scale	3	The impacts will be localised to the nearby water resources from where the silt is being generated to the immediate downstream	
Probability	2	With mitigation measures in place. It will be rare/improbable for this impact to occur.	
Nature	Negative		

Table 11-30: Water Contamination from Dirty Water Runoff

Dimension	Rating	Motivation	Significance
Impact Description: Water Contamination as a result of dirty water runoff emanating from construction areas.			
Prior to Mitigation/Management			
Duration	2	The impact will likely only occur during the construction phase	Minor (negative) - 40
Intensity	4	This will moderately impact the water quality and the ecosystem functionality for downstream users	
Spatial scale	4	The impacts may extend in the greater surrounding area from where the impact occurred	
Probability	4	Without appropriate mitigation, it is probable that this impact will occur	
Nature	Negative		
Mitigation/Management Actions			
▪ Where clearing of vegetation and excavation is required, this should be limited as far as possible to avoid unnecessary soil exposure; ▪ Ensure that all dirty water emanating from construction area is adequately contained within the construction area; ▪ For any required soil stockpiles, these should be compacted and the slopes should be kept at minimal/low to avoid erosion by high runoff velocity from the stockpile and hence siltation of the streams; ▪ All storage areas (fuels, paints, chemicals etc.) should be appropriately bunded and spill kits should be in place, and construction workers trained in the use of spill kits, to contain and immediately clean up any potential leakages or spills ▪ Surface water monitoring must be undertaken as prescribed in the specialist report, Appendix 8.			
Post-Mitigation			
Duration	2	The impact will likely only occur during the construction phase	Negligible (negative) - 20
Intensity	4	This will moderately impact the water quality and the ecosystem functionality for downstream users	
Spatial scale	4	The impacts may extend in the greater surrounding area from where the impact occurred	
Probability	2	With the existing measures already in place. It will be rare/improbable for this impact to occur.	
Nature	Negative		

11.2.5.2 Operational Phase

The establishment of infrastructure will result in increased hard surface areas which will result in increased quantity and velocity of stormwater runoff. During the operational phase, this may result in an alteration of surface water flows.

11.2.5.2.1 Impact Ratings and Proposed Mitigation Measures

Table 11-31 below presents the impact ratings associated with surface water for the operational phase.

Table 11-31: Alteration of Natural Hydrology

Dimension	Rating	Motivation	Significance
Impact Description: Increased surface runoff velocity as a result of additional hard surfaces which may lead to an alternation of the natural hydrology of nearby surface water resources.			
Prior to Mitigation/Management			
Duration	7	The impact will likely occur for as long as the project life	Minor (negative) - 60
Intensity	4	This will moderately impact the water quality and the ecosystem functionality for downstream users	
Spatial scale	4	The impacts may extend in the greater surrounding area from where the impact occurred	
Probability	4	Without appropriate mitigation, it is probable that this impact will occur	
Nature	Negative		
Mitigation/Management Actions			
▪ It is recommended that the construction of attenuation infrastructure (gabion, rock or rubble surfaces, etc.) be considered at the outlet of the runoff or storm water drain. This will attenuate the flows and prevent the identified high flows impact on the natural water course.			
Post-Mitigation			
Duration	7	The impact will likely only occur during the construction phase	Negligible (negative) - 30
Intensity	4	This will moderately impact the water quality and the ecosystem functionality for downstream users	
Spatial scale	4	The impacts may extend in the greater surrounding area from where the impact occurred	
Probability	2	With mitigation measures place. It will be rare/improbable for this impact to occur.	
Nature	Negative		

11.2.6 Noise

11.2.6.1 Construction Phase

The construction noise dispersion model is indicated on Plan 21, Appendix 1. The results indicate that the expected noises during the construction activities will not likely cause a

noise disturbance in terms of the National Noise Control Regulations at any area outside of the construction zones within the resort.

The reason for this is that the construction noise is not likely to increase the ambient noise levels by more than 7 dBA at any surrounding area of residence or where visitors may be moving to and from entertainment areas.

11.2.6.1.1 Impact Ratings and Proposed Mitigation Measures

Table 11-32 summarises the impact significance and proposed mitigation measures for noise disturbance during the construction phase.

Table 11-32: Impacts on noise during the Construction Phase

Dimension	Rating	Motivation	Significance
Activity and Interaction (Site clearance and construction of infrastructure)			
Impact Description: Noise will emanate from Plant and Machinery during the construction phase			
Prior to mitigation/ management			
Duration	Medium term (3)	Noise will be produced for the duration of the construction phase	Negligible (negative) – 14
Extent	Local (3)	It is expected that during construction noise will extend as far as development site area.	
Intensity	Minimal - negative (-1)	It is expected that during construction noise will have a minimal impact	
Probability	Improbable (2)	It is improbable that noise will impact on the surrounding receptors.	
Nature	Negative		
Mitigation/ Management action			
▪ Restrict construction activities to daylight hours; ▪ Construction machinery and vehicles must be serviced to the designed requirements regularly to avoid nuisance noise generation; and ▪ Switch off equipment when not in use.			
Post- mitigation			
Duration	Medium term (3)	Noise will be produced for the duration of the construction phase	Negligible (negative) – 12
Extent	Limited (2)	It is expected that during construction noise will be limited to site with above mentioned mitigation measures further reducing the extent	
Intensity	Minimal - negative (-1)	It is expected that during construction noise will have a minimal noise impact	
Probability	Rare (2)	It is improbable that noise will impact on the surrounding receptors.	
Nature	Negative		

11.2.6.2 Operational Phase

The operational activities of especially the expansion projects will result in an increase of visitors and subsequently an increase in vehicle activity. The noise levels associated with the operational activities are not likely to increase the existing baseline by 7dBA or more. Even though the expansion projects may result in an increase in vehicle activity inside the resort, it is difficult to quantify in terms of amount of vehicles.

Even if the amount of vehicles double to what is currently experienced throughout the year (which is likely an overestimation) it would only result in a 3dBA overall increase. Due to the nature of noise levels measured in decibels being logarithmic units, when doubling a specific noise source it would only increase by 3dBA.

It is therefore assessed that the impact of the operational activities of the various projects will be negligible.

11.2.7 Air Quality

11.2.7.1 Construction Phase

Construction activities (namely site clearing, roadworks and paving, earthworks, and construction of infrastructure) will result in the release of particulates and gaseous emissions into the ambient atmosphere from machinery (including vehicles). As mentioned earlier, construction will occur in phases (over a ten to fifteen year period) and emissions are expected to be intermittent, with minimal impacts on ambient air quality.

11.2.7.1.1 Impact Ratings and Proposed Mitigation Measures

Table 11-33 presents the impact significance and proposed mitigation measures for air quality during the construction phase.

Table 11-33: Site Clearing, Earthworks and Construction of Infrastructure

Dimension	Rating	Motivation	Significance
Activity and Interaction (Site Clearing, Earthworks and Construction of Infrastructure)			
Impact Description: Poor air quality and nuisance due to dust fallout			
Prior to mitigation/ management			
Duration	Medium term (3)	Dust will be generated during each activity for the duration construction.	Negligible (negative) – 28
Extent	Limited (2)	Limited to site and immediate surroundings.	
Intensity	Minor (2)	Minor effect on surrounding area is anticipated	
Probability	Probable (4)	It probable that that impact may occur.	
Nature	Negative		
Mitigation/ Management actions			

Dimension	Rating	Motivation	Significance
Activity and Interaction (Site Clearing, Earthworks and Construction of Infrastructure)			
▪ Application dust suppressant on exposed areas and dirt roads; ▪ Conduct dusty activities judiciously during windy days (wind speed ≥5.4 m/s); ▪ Set maximum travel speed on dirt roads, and to have these limits enforced; ▪ The area of disturbance at all times must be kept to a minimum and no unnecessary clearing, digging or scraping must occur, especially on windy days (with wind speed ≥ 5.4 m/s); and ▪ The drop heights when loading onto trucks and at tipping points should be minimised (preferably 0.5 m).			
Post- mitigation			
Duration	Medium term (3)	Dust will be generated in the medium term from each activity duration the construction phase	Negligible (negative) – 15
Extent	Very Limited (1)	After mitigation measures are implemented, it is expected that dust impacts will be limited to isolated parts of the site.	
Intensity	Minimal (1)	Dust will have minimal impacts on air quality after mitigation	
Probability	Unlikely (3)	It is unlikely that impact will occur after mitigation measures are applied.	
Nature	Negative		

11.2.7.2 Operational Phase

During the operational phase, emissions will be mostly associated with gaseous tailpipe emissions from vehicles. Emissions will be mainly gaseous in nature, i.e. CO, O_3, NO_2 and SO_2 in the vicinity of each activity. Since the Sun City Report Complex will be relying on power from the national grid, the generator sets will be used intermittently, resulting in minimal impacts on the ambient air quality.

11.2.7.2.1 Impact Ratings and Proposed Mitigation Measures

Table 11-34 presents the impact significance and proposed mitigation measures for air quality during the operational phase.

Table 11-34: Operation of vehicle fleet and generator set

Dimension	Rating	Motivation	Significance
Activity and Interaction (Site Clearing, Earthworks and Construction of Infrastructure)			
Impact Description: Poor air quality and nuisance due to dust fallout			
Prior to mitigation/ management			
Duration	Short term (2)	Gaseous emissions will be generated intermittently duration the operational phase.	Negligible (negative) – 18
Extent	Limited (2)	Limited to the site of the activity and immediate surroundings.	

Dimension	Rating	Motivation	Significance
Activity and Interaction (Site Clearing, Earthworks and Construction of Infrastructure)			
Intensity	Minor (2)	Minor effect on surrounding area is anticipated	
Probability	Unlikely (3)	It is definite that that impact may occur.	
Nature	Negative		
Mitigation/ Management actions			
▪ Use of low sulphur fuel by Sun International within the resort; and ▪ Regular maintenance to ensure the generators burn fuel efficiently.			
Post- mitigation			
Duration	Short term (2)	Gaseous emissions will be generated intermittently duration the operational phase.	Negligible (negative) – 12
Extent	Very Limited (1)	After mitigation measures are implemented, it is expected that impacts will be very limited.	
Intensity	Minimal (1)	Gaseous emissions will have minimal impacts on air quality after mitigation	
Probability	Unlikely (3)	It is unlikely that impact will occur after mitigation measures are applied.	
Nature	Negative		

11.2.8 Visual

11.2.8.1 Construction Phase

The establishment of infrastructure and the related site clearing and construction activities will draw attention to the Project area making receptors aware of the Project. The construction phase, mainly site clearing activities, will therefore generally have negative visual impacts on the receiving environment. Considering the footprint areas and phased construction of the developments however, this impact is not expected to be significant.

11.2.8.1.1 Impact Ratings and Proposed Mitigation Measures

Table 11-35 summarises the impact significance and proposed mitigation measures for of site clearing during the construction phase.

Table 11-35: Potential Visual Impact of Site Clearance

Dimension	Rating	Motivation	Significance
Activity and Interaction: Site clearance			
Impact Description: Visual intrusion caused by site clearing activities			
PRE-MITIGATION			

Duration	Short term (2)	The impact will occur during the construction phase.	Minor (negative) (-42)
Extent	Local (3)	Site clearing activities will be visible from the area surrounding the construction site.	
Intensity	Low - negative (-2)	Site clearing is expected to cause a moderate visual disturbance. The natural vegetation will be cleared to make way for the Project. The Project area will become noticeable to the nearby receptors as it will contrast the surrounding areas.	
Probability	Highly probable (6)	The impact will most probably occur.	
Nature	Negative		
MITIGATION:			
▪ Only remove vegetation within the infrastructure areas; ▪ Only remove topsoil within the infrastructure areas; ▪ Vegetate the topsoil spoils so that they blend into the surrounding landscape; ▪ Limit the footprint area and height of any topsoil spoils; and ▪ Apply dust suppression techniques to limit dust generated from the topsoil spoils.			
POST-MITIGATION			
Duration	Short-term term (2)	The impact will occur during the construction phase.	Negligible negative (-30)
Extent	Limited (2)	The extent of the impact will be reduced by implementing the mitigation actions listed above.	
Intensity	Low - negative (-2)	The visual disturbance will be reduced by implementing the mitigation measures above.	
Probability	Likely (5)	It is most likely that the impact will occur.	
Nature	Negative		

11.2.8.2 Operational Phase

The construction and expansion of infrastructure until the infrastructure reaches its full extent have been combined into the operational phase as the impacts that have been rated are based on a worst-case scenario that will occur when the proposed infrastructure reaches its maximum vertical extent and becomes operational.

As indicated in the viewshed models carried out, the following infrastructure is likely to have a visual impact:

- VC Phase 3 and VC Phase 4;
- Eco-Lodge; and
- Additional Parking Garage, Convention Centre and Hotel.

The construction and operation of the above-mentioned infrastructure are expected to have a moderate negative visual impact on sensitive receptors considering the proposed footprint

areas and infrastructure specifications. Furthermore, the presence of the structures will contribute to the cumulative impacts of the development on the regional environment.

The construction and operation of the other associated infrastructure is expected to have a minor negative visual impact on sensitive receptors considering the proposed footprint areas infrastructure specifications.

11.2.8.2.1 Impact Ratings and Proposed Mitigation Measures

The tables below summarise the impact significance and proposed mitigation measures for the operation of infrastructure that is likely to contribute to visual intrusion to nearby receptors. Subsequently Table 11-40 summarises the impacts associated with the remainder of the infrastructure.

Table 11-36: Potential Impacts of Construction and Operation of the VC Phase 4

Dimension	Rating	Motivation	Significance
Activity and Interaction: Construction and Operation of infrastructure			
Impact Description: Visual intrusion caused by the construction and operation of VC Phase 4			
PRE-MITIGATION			
Duration	Permanent (7)	There will be a negative impact during the construction and expansion of the vacation club. The impact is like to remain indefinitely	Significance: Moderate - negative (-98)
Extent	Municipal Area (4)	The daytime practical viewshed model indicates that the Project will be visible from a distance of up to 10 km during the day.	
Intensity	Moderate - negative (-3)	Construction and operation of the vacation club will have a moderate visual disturbance on potential receptors.	
Probability	Certain (7)	The impact will definitely occur.	
Nature	Negative		
MITIGATION:			
▪ Ensure the vacation club buildings do not exceed the proposed heights by limiting them to single storey buildings; ▪ Where possible, surface infrastructure must be painted natural hues so that it blends into the surrounding landscape; ▪ Limit the footprint area of the surface infrastructure; ▪ The planting of natural vegetation amongst the buildings of the vacation club will assist in screening the buildings and unnatural structures; ▪ Associated infrastructure such as street lights must be galvanised so as to weather to a matt grey finish rather than be painted silver. If the pylons and metal structures are painted, a neutral matt finish must be used; and ▪ Avoid construction activities at night. If construction activities take place at night then down lighting must be implemented to minimise light pollution. Down lighting must also be implemented for any permanent lights installed during the construction phase.			

POST-MITIGATION			
Duration	Beyond project life (6)	There will be a long-term negative visual impact on the receiving environment. The buildings and associated infrastructure will remain for an indefinite duration.	Minor negative (-72)
Extent	Municipal Area (4)	The extent of the impact will be reduced by implementing the mitigation actions listed above.	
Intensity	Low - negative (-2)	The visual disturbance will be reduced by implementing the mitigation measures above.	
Probability	Highly probable (6)	It is most likely that the impact will occur.	
Nature	Negative		

Table 11-37: Potential Impacts of Construction and Operation of the VC Phase 3

Dimension	Rating	Motivation	Significance
Activity and Interaction: Construction and Operation of infrastructure			
Impact Description: Visual intrusion caused by the construction and operation of VC Phase 3			
PRE-MITIGATION			
Duration	Permanent (7)	There will be a negative impact during the construction an expansion of the vacation club. The impact is like to remain indefinitely	Moderate negative (-91)
Extent	Municipal Area (4)	The daytime practical viewshed model indicates that the Project will be visible from a distance of up to 10 km during the day.	
Intensity	Low - negative (-2)	Construction and operation of the large vacation club will have a moderate - negative visual disturbance on potential receptors.	
Probability	Certain (7)	The impact will definitely occur.	
Nature	Negative		
MITIGATION:			
▪ Ensure the vacation club buildings do not exceed the proposed heights by limiting them to single storey buildings; ▪ Where possible, surface infrastructure must be painted natural hues so that it blends into the surrounding landscape; ▪ Limit the footprint area of the surface infrastructure; ▪ The planting of natural vegetation amongst the buildings of the vacation club will assist in screening the buildings and unnatural structures; ▪ Associate infrastructure such as street lights must be galvanised so as to weather to a matt grey finish rather than be painted silver. If the pylons and metal structures are painted, a neutral matt finish must be used; and ▪ Avoid construction activities at night. If construction activities take place at night then down lighting must be implemented to minimise light pollution. Down lighting must also be implemented for any permanent lights installed during the construction phase.			

POST-MITIGATION			
Duration	Beyond project life (6)	There will be a long-term negative visual impact on the receiving environment. The buildings and associated infrastructure will remain for an indefinite duration.	Minor - negative (-72)
Extent	Municipal Area (4)	The extent of the impact will be reduced by implementing the mitigation actions listed above.	
Intensity	Low - negative (-2)	The visual disturbance will be reduced by implementing the mitigation measures above.	
Probability	Highly probable (6)	It is most likely that the impact will occur.	
Nature	Negative		

Table 11-38: Potential Impacts of Construction and Operation of the Eco-Lodge

Dimension	Rating	Motivation	Significance
Activity and Interaction: Construction and Operation of infrastructure			
Impact Description: Visual intrusion caused by the construction and operation of the Eco-Lodge			
PRE-MITIGATION			
Duration	Permanent (7)	There will be a negative impact during the construction an expansion of the eco-lodge. The impact is like to remain indefinitely	Moderate - negative (-84)
Extent	Local (3)	The daytime practical viewshed model indicates that the Project will be visible from a distance of up to 5 km during the day.	
Intensity	Low - negative (-2)	Construction and operation of the large eco-lodge will have a moderate - negative visual disturbance on potential receptors.	
Probability	Certain (7)	The impact will definitely occur.	
Nature	Negative		
MITIGATION:			
▪ Ensure the eco-lodge buildings do not exceed the proposed heights by limiting them to signgle story buildings; ▪ Where possible, surface infrastructure must be painted natural hues so that it blends into the surrounding landscape; ▪ Limit the footprint area of the surface infrastructure; ▪ The planting of natural vegetation amongst the buildings of the eco-lodge will assist in screening the buildings and unnatural structures; ▪ Associate infrastructure such as street lights must be galvanised so as to weather to a matt grey finish rather than be painted silver. If the pylons and metal structures are painted, a neutral matt finish must be used; and ▪ Avoid construction activities at night. If construction activities take place at night then down lighting must be implemented to minimise light pollution. Down lighting must also be implemented for any permanent lights installed during the construction phase.			

POST-MITIGATION			
Duration	Beyond project life (6)	There will be a negative impact during the construction an expansion of the eco-lodge. The impact is like to remain indefinitely	Minor - negative (-55)
Extent	Local (3)	The daytime practical viewshed model indicates that the Project will be visible from a distance of up to 5 km during the day.	
Intensity	Low - negative (-2)	Construction and operation of the large eco-lodge will have a moderate - negative visual disturbance on potential receptors.	
Probability	Likely (5)	It is most likely that the impact will occur.	
Nature	Negative		

Table 11-39: Potential Impacts of Construction and Operation of the Hotel

Dimension	Rating	Motivation	Significance
Activity and Interaction: Construction and Operation of infrastructure			
Impact Description: Visual intrusion caused by the construction and operation of the Hotel			
PRE-MITIGATION			
Duration	Permanent (7)	There will be a negative impact during the construction an expansion of the hotel. The impact is like to remain indefinitely	Moderate - negative (-91)
Extent	Municipal Area (4)	The daytime practical viewshed model indicates that the Project will be visible from a distance of up to 10 km during the day.	
Intensity	Low - negative (-2)	Construction and operation of the hotel will have a moderate - negative visual disturbance on potential receptors.	
Probability	Certain (7)	The impact will definitely occur.	
Nature	Negative		
MITIGATION:			
▪ Ensure the hotel does not exceed the proposed height; ▪ Where possible, the hotel must be painted natural hues so that it blends into the surrounding landscape; ▪ Limit the footprint area of the surface infrastructure; ▪ Associate infrastructure such as street lights must be galvanised so as to weather to a matt grey finish rather than be painted silver. If the pylons and metal structures are painted, a neutral matt finish must be used; and ▪ Avoid construction activities at night. If construction activities take place at night then down lighting must be implemented to minimise light pollution. Down lighting must also be implemented for any permanent lights installed during the operation phase.			
POST-MITIGATION			

Duration	Beyond project life (6)	There will be a long-term negative visual impact on the receiving environment. The hotel and associated infrastructure will remain for an indefinite duration.	Minor - negative (-72)
Extent	Municipal Area (4)	The extent of the impact will be reduced by implementing the mitigation actions listed above.	
Intensity	Low - negative (-2)	The visual disturbance will be reduced by implementing the mitigation measures above.	
Probability	Highly probable (6)	It is most likely that the impact will occur.	
Nature	Negative		

Table 11-40: Potential Impacts of Construction and Operation of the Associated Infrastructure

Dimension	Rating	Motivation	Significance
Activity and Interaction: Construction and Operation of infrastructure			
Impact Description: Visual intrusion caused by the construction and operation of associated infrastructure			
PRE-MITIGATION			
Duration	Permanent (7)	There will be a permanent and irreversible negative visual impact on the receiving environment. The alternative infrastructure will remain for an indefinite period.	Minor - negative (-66)
Extent	Local (3)	The alternative infrastructure will be visible from the surrounding area.	
Intensity	Very low - negative (-1)	Construction and operation of the alternative infrastructure minor visual disturbance.	
Probability	Highly probable (6)	The impact will definitely occur.	
Nature	Negative		
MITIGATION:			
▪ Ensure the alternative infrastructure does not exceed the proposed heights; ▪ Where possible, the infrastructure must be painted natural hues so that it blends into the surrounding landscape; ▪ Limit the footprint area of the surface infrastructure; ▪ If any metal structures such as pipelines and generators are painted, a neutral matt finish must be used; and ▪ Avoid construction activities at night. If construction activities take place at night then down lighting must be implemented to minimise light pollution. Down lighting must also be implemented for any permanent lights installed during the operation phase.			
POST-MITIGATION			
Duration	Beyond project life (6)	There will be a long-term negative visual impact on the receiving environment. The associated and infrastructure will remain for an indefinite duration.	Minor - negative (-50)

Extent	Local (3)	The extent of the impact will be reduced by implementing the mitigation actions listed above.	
Intensity	Very low - negative (-1)	The visual disturbance will be reduced by implementing the mitigation measures above.	
Probability	Likely (5)	It is most likely that the impact will occur.	
Nature	Negative		

11.2.9 Heritage

Table 11-41 presents a summary of the Cultural Significance (CS) assigned to the identified heritage resources as well as the mitigation measures as per the SAHRA Minimum Standards (2007) within the vicinity of the proposed developments in the Sun City Resort Complex (refer to Plan 19, Appendix 1 for a display of the identified heritage resources).

Table 11-41: Summary of the CS Assessment of the Identified Heritage Resources

Resource ID	Description	Designation (Recommended Field Rating)	Recommended Mitigation based on SAHRA Minimum Standards (2007)
Itlholanoga	Wits/252 AC 1	Very High (Grade II)	Project design must change to avoid all change to resource; Conserved in entirety, Conservation Management Plan (CMP). The CMP should be completed in support of a Grade II Site Nomination
STW-002	Wits/2527AC 2 and Wits/2527AC 10	Medium (Grade III A)	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. Shovel Test Pits (STPs).
STW-003	Wits/2527AC 8		
STW-004	Wits/252 AC 13	Medium (Grade III B)	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
STW-005	Wits/252 AC 11	Low (General Protection IV A)	Resource must be recorded before destruction, including detailed site mapping, surface sampling may be required.
STW-001	1193/Site 1 to 1193/Site 4; 2372/Site 1 to 2372/Site 4; and LFC 1 and LFC 2	Negligible (General Protection IV C)	Sufficiently recorded, no mitigation required.
STW-006	Wits/252 AC 9		
STW-007	Wits/252 AC 12		
STW-008	Wits/252 AC 14		
STW-009	Wits/252 AC 21		

There are no direct impacts from Project-related activities foreseen to STW-003, STW-004, STW-005, STW-007, STW-008 and STW-009. These heritage resources will therefore not be considered in the present impact assessment. Furthermore, the SAHRA Minimum Standards recommend that the inclusion of heritage resources with negligible CS into an HIA report is sufficient in terms of recording these resources with no further mitigation required. To this effect, STW-001 and STW-006 will not be considered further.

The risks and potential impacts to Itlholanoga and STW-002 are discussed separately in the subsections below. These impacts are applicable to both the construction and operational phases of the project.

11.2.9.1 Itlholanoga

Itlholanoga is a site with very high CS, as it represents an important feature on the landscape in the past and in the histories of peoples within the greater study area. *Itlholanoga* has previously been damaged through the construction of the reservoir that exists next to the site.

Itlholanoga is now at risk of further damage from the proposed construction of one 20 ML or two 10 ML reservoirs within the previously-disturbed area of the site. Figure 11-1 illustrates the distance between *Itlholanoga* and the proposed footprint for USP2. The extent of the site *Itlholanoga* is illustrated in three blue polygons. The proposed footprint for USP2 is indicated in yellow. Two other projects, REP7 (pink filled polygon) and MP1 (indicated by the blue/red dotted line) are planned near to the site; however, they are not expected to present a risk or negative impact to the site, based on the project description.

Subsequently, Table 11-42 below presents a summary of the potential impact to this resource.

An alternative site for the proposed additional reservoirs has since been identified based on the findings of this assessment which presents as a key mitigation measure to the avoidance of this posed negative impact.

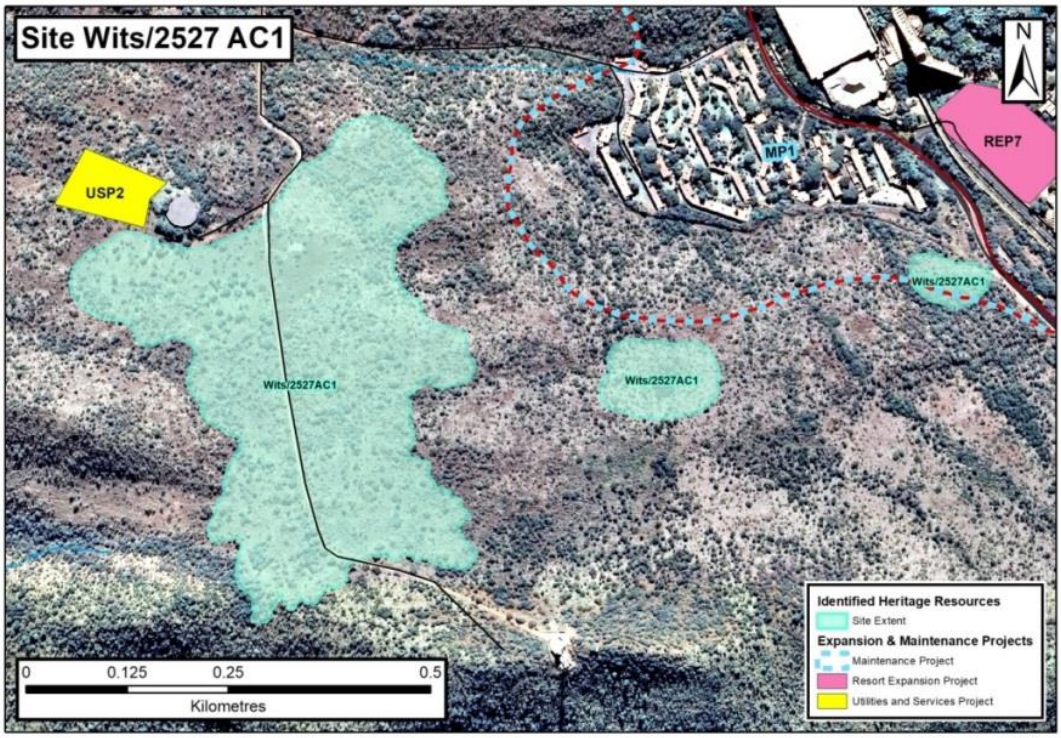


Figure 11-1: Itlholanoga in Relation to the Proposed Project USP2

Table 11-42: Summary of the Potential Direct Impact to Itlholanoga

IMPACT DESCRIPTION: Damage to *Itlholanoga*				
Dimension	**Rating**	**Motivation**		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated change will result in the permanent damage to the heritage resource.	Consequence: Extremely detrimental (-19)	Significance: Major – negative (-114)
Extent	International (7)	The associated living community groups affiliated with the site residing within South Africa and abroad will be affected by the loss of components of traditional homesteads that are degrading the CS of the site and landscape. Damage to this resource could potentially have an international effect in terms of the scientific community who are conducting research on the stonewalled settlements of the Rustenburg-Pilanesberg area. Sun International's reputation may further be effected, which may affect patronage from national and		

IMPACT DESCRIPTION: Damage to *Itlholanoga*				
Dimension	**Rating**	**Motivation**		
		international tourists and businesses.		
Intensity	High - negative (-5)	Damage would constitute a negative minor change to a resources with a very high CS.		
Probability	Highly probable (6)	Without the implementation of mitigation or management measures, it is highly probable that the heritage resource will be damaged by the construction of the proposed reservoir.		
MITIGATION:				
The Project design must be altered to avoid, or at the very least limit the potential negative impact to this resource during construction. Sun International will be required to apply for a Section 35 Permit prior to construction to obtain authorisation for any partial destruction of the site. No work on the reservoir is permitted without a Section 35 Permit. Sun International must enlist the services of a qualified archaeologist to complete detailed mapping of the site prior to any construction activities, and undertake a Watching Brief during earth moving activities associated with the construction phase. Sun International must develop and implement an CMP as a condition of authorisation and for approval by SAHRA and NWPHRA, which considers this heritage resource in its entirety and includes *inter alia*: ▪ Descriptions of the site within the context of the greater cultural landscape; ▪ Defines the CS of the site in accordance with criteria encapsulated in the NHRA; ▪ Outlines the objectives, targets and strategies for the continued maintenance of the CS; ▪ Details the ownership and management structures, responsibilities matrices and monitoring procedures; ▪ Defines the regulatory requirements as detailed in the NHRA Regulations (GNR 548); and ▪ Defines reporting requirements.				
POST-MITIGATION				
Duration	Beyond project life (6)	The effects of the impact will reduce after the Project life and the reservoirs are decommissioned and removed, and the site can be rehabilitated. Any further damage to the site during rehabilitation activities must be avoided.	Consequence: Moderately beneficial (14)	Significance: Moderate - positive (84)
Extent	Limited (2)	Mitigation measures will reduce the extent of the impacts to limited components of the site.		
Intensity	Very high - positive (6)	The conservation of this resource through the implementation on an appropriate CMP will be considered a positive moderate change to a resource of very high CS.		
Probability	Certain (7)	Should an appropriate CMP be implemented and the site be managed appropriately, it is certain the site and its CS will be conserved.		

11.2.9.2 STW-002

STW-002 is a stonewalled settlement with a low CS and has strong affiliations to multiple cultural groups and their histories in the region. Project USP3, the construction of an effluent transfer pipeline, presents a risk to this resource. The clearing of fence roads, project MP1, may also impact this resource as the stonewalling occurs on both sides of the fence. A road currently runs through the site. Figure 11-2 presents site STW-002 in relation to projects USP3 and MP1. The extent of STW-002 (which includes Wits/2527 AC 2 and Wits/2527 AC 10) is illustrated in purple in the image. MP1 is indicated by the blue/red dotted line and USP3 is shown in yellow. Both these projects run through the site extent.

Subsequently, Table 11-43 below presents a summary of the impact assessment.

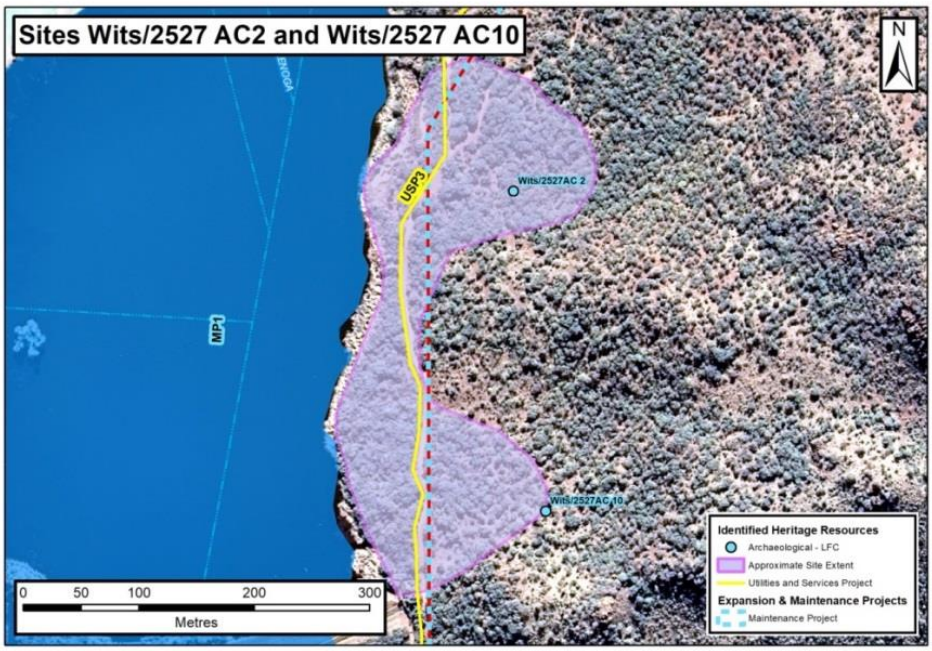


Figure 11-2: STW-002 in relation to the Proposed Projects USP3 and MP1

Table 11-43: Summary of the Potential Direct Impact to STW-002

IMPACT DESCRIPTION: Damage to or destruction of STW-002			
Dimension	**Rating**	**Motivation**	
PRE-MITIGATION			
Duration	Permanent (7)	Unmitigated change will result in the permanent damage to the heritage resource.	Significance: Moderate – negative (-85)
Extent	International (7)	The associated living community groups affiliated with the site residing within South Africa and abroad will be affected by the loss of components of traditional homesteads that are degrading the CS of the site and landscape. Damage to this resource could potentially have an	

IMPACT DESCRIPTION: Damage to or destruction of STW-002			
Dimension	**Rating**	**Motivation**	
		international effect in terms of the scientific community who are conducting research on the stonewalled settlements of the Rustenburg-Pilanesberg area. Sun International's reputation may further be effected, which may affect patronage from national and international tourists and businesses.	
Intensity	Moderate-negative (-3)	Damage would be considered a major change to a heritage resource of medium CS.	
Probability	Likely (5)	Without the implementation of mitigation or management strategies, it is likely that the heritage resource will be damaged through the construction of the proposed transfer pipeline.	
MITIGATION:			
The Project design must be amended to avoid, or at the very least limit the potential negative impact to the heritage resource. This can be achieved through routing the pipeline within the existing road. Sun International will be required to apply for a Section 35 Permit prior to construction to obtain authorisation for any partial destruction of the site. No work on the pipeline is permitted without a Section 35 Permit. Sun International must enlist the services of a qualified archaeologist to complete detailed mapping of the site prior to any construction activities, and undertake a Watching Brief during earth moving activities associated with the construction phase. This heritage resource must be included in the aforementioned CMP.			
POST-MITIGATION			
Duration	Beyond Project life (6)	The effects of the impact will reduce after the Project life and the pipeline is decommissioned and removed, and the site can be rehabilitated.	Significance: Negligible - positive (33)
Extent	Limited (2)	Mitigation measures will reduce the extent of the impacts to limited components of the site.	
Intensity	Moderate – positive (3)	The conservation of this resource through the implementation on an appropriate CMP will be considered a positive moderate change to a resource of medium CS.	
Probability	Unlikely (3)	The implementation of the recommended mitigation measures will reduce the likelihood of the unmitigated impacts from manifesting	

11.2.10 Socio-economic

Socio-economic impacts are to a large extent based on and responsive to people's perceptions and therefore the intensity and significance could change over time as new perceptions are formed. The assessment of socio-economic impacts was categorised as per the following change processes:

- **Demographic processes**: changes and impacts related to the composition of local communities;
- **Economic processes**: changes and impacts on the way in which the local people make a living and the economic activities in the society;
- **Geographical processes**: changes and impacts on land use patterns;
- **Institutional and Legal processes**: changes and impacts that affect the efficiency and effectiveness of local authorities; and
- **Socio-cultural processes**: changes and impacts that affect the culture of the local society, i.e. the way that people live together.

The potential impacts associated with these change processes are discussed in the subsections below.

11.2.10.1 Demographic Processes

Demographic processes within the realm of the proposed developments at the Sun City Resort Complex consider in-migration to the local area, difference between local communities and newcomers as well as the presence of temporary residents (namely construction works) to the local area which impacts social cohesion locally. These impacts are discussed for the construction phase and operational phase separately below.

11.2.10.1.1 Construction Phase

The years between 2001 and 2016 BDM as a whole, saw a drastic increase in population size which is likely a result of in-migration to the various mines in this local municipality. MKLM in comparison has had a minor steady increase in population size, largely attributable to normal population growth with little evidence of large-scale in-migration of job seekers. Although Sun City has undertaken various developments projects within the resort in the past, there is no evidence of projects within the resort attracting job seekers. Therefore it is unlikely that the proposed developments will result in significant project-induced in-migration, this will be limited to formally appointed construction workforce that may not be locally sourced as a result of limited skill availability in the surround communities (estimated at around 344 people). Given that the projects are phased however, the **peak** of the influx period is expected to last for approximately 5 years, starting with the construction of the various utilities and services projects towards the end of 2019, and ending with the completion of the resort expansion projects in 2023 (possibly with some extension into the start of 2024). Thereafter, in-migration is expected to start again during mid 2032 when construction on the Eco-Lodge (REP1) is set to start.

Impact Ratings and Proposed Mitigation Measures

The potential impacts demographic change process for the construction phase are deemed to be of very low significance as there is likely to be a limited in-migration and any in-

migration experienced will likely be short-term. Therefore no rating of this impact was undertaken.

11.2.10.1.2 Operational Phase

It is expected that with an increased overnight capacity able to accommodate another estimated 2,705 guests, additional operational staff will be required on a full-time and part-time basis. This does not account for the expansion of other facilities at the resort that do not cater for overnight guests, e.g. Waterworld. The routine use of casual labour creates and maintains hope of employment at the resort, resulting in job seekers staying on in the area rather than leaving if they were initially unable to secure a position.

On the contrary, construction teams will vacate the site and leave the area. Depending on the size of the construction teams, the sudden out-migration of a segment of the (temporary) population could have a ripple effect on certain aspects of the socio-economic environment, e.g. the local economy when clientele is lost to the local supermarket.

This will have an economic impact, as assessed in in the subsection below.

11.2.10.2 Economic Processes

11.2.10.2.1 Construction Phase

The economic processes impacts anticipated during the construction phase pertain to the following:

- Labour draw-down from the agricultural sector;
- Negative impact on other surrounding businesses;
- Positive impact on employment and income; and
- Positive impact as a result of ta income contribution.

These impacts are described separately below.

Labour draw-down from the agricultural sector

The project could potentially divert semi-skilled and unskilled labour away from other sectors (especially agriculture) and thereby negatively influence recruitment and wage costs within those sectors. Despite the large pool of unemployed workers in the local wards directly adjacent to the project, recruiting local labour at market prices higher than the adjacent agricultural sector could cause labour ‘draw down’ from the agricultural sector, placing the burden of recruiting and re-training the unemployed for employment in this sector.

Negative Impact on surrounding businesses

Sun City Water World (SCWW), an independent operator, occupying the recreational lake and surrounding land facilities, could potentially be negatively affected during the construction phase. SCWW employs approximately 45 full time employees and operate a number of facilities in proximity to the proposed Lake Beach Expansion Project including the

Kazooma Raceway, boat jetties, mini golf, restaurant, boat launching facilities and beach shop. The Recreational Lake Beach Expansion construction is expected to last 6 months and is scheduled for 2023.

Employment and income creation

Based on high-level estimates provided by Sun International, the total construction costs are estimated to be close to R 1 billion (constant 2018 prices) over a 15 year period, with an estimated 90% spent within the first 5 years and the remaining 10% spent the last two years of the 15 year construction period. Based on these assumptions the total Gross Value Added (GVA) (profit, salaries and wages) generated from construction at Sun City could be close to R 144 million per year for the first 5 years of construction with close to 600 full time job opportunities created during this period. Of these job opportunities around 344 could be directly linked to the construction activities in the Sun City Resort Complex while 253 jobs would be linked to either suppliers to the construction companies or jobs related to higher spending from the increased number of jobs and income, namely in the wider Bojanala Region. Close to 30% of the jobs could be unskilled while 15% of the income generated could potentially flow to low income households of the surrounding communities.

Tax Income Contribution

Increased economic activity during the construction phase will increase central government revenues due to increased income taxes, value added taxes and taxes on contractors' profits. The general tax income per R1 of GVA generated in the country is about 0.32c implying that the total GVA generated per annum during the construction phase could increase central government tax income by an estimated R 46 million on average per annum during the first five years and R5 million per annum during the last two years of construction activities.

Impact Ratings and Proposed Mitigation Measures

The quantification of the economic processes during the construction phase is detailed in the tables below.

Table 11-44: Labour Draw Down of other Economic Sectors

Dimension	Rating	Motivation	Significance
Activity: Labour employed in the adjacent agricultural sectors are employed in Sun City construction activities			
Impact Description: Costs to the adjacent agricultural sector to retrain unskilled workers after their labour force has been drawn to construction work at Sun City			
Prior to Mitigation/Management			

Dimension	Rating	Motivation	Significance
Duration	Long term (4)	Expected to last for the duration of the construction phase. Due to phasing of activities, this can be between 6-15 years.	Minor (negative) (-44)
Extent	Municipal (4)	Within the local agricultural sector	
Intensity	Moderate (3)	On-going social issues to occur over a prolonged time period.	
Probability	Probable (4)	More opportunities and upward mobility could attract unskilled workers in the agricultural sector	
Nature	Negative (-)	Negative impact on agriculture sector – increased cost to recruit and re-train new workers	
Mitigation/Management Actions			
▪ Formulate a labour recruitment strategy that would minimise impact on other sectors (e.g. do not recruit unskilled labour at wage levels above the wages paid in the agricultural sector) ▪ Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force			
Post-Mitigation			
Duration	Medium term (3)	Duration reduced as impacts are managed by contractors	Negligible (negative) (-27)
Extent	Municipal (4)	Still possible within local municipal area	
Intensity	Minor (2)	Minor ad-hoc social issues can still occur	
Probability	Unlikely (3)	Even through recruitment strategy is followed and impacts are monitored some workers might still get employed due to limited information supplied	
Nature	Negative (-)	Negative impact on agriculture sector – increased cost to recruit and re-train new workers	

Table 11-45: Potential Negative Impact on surrounding Businesses

Dimension	Rating	Motivation	Significance
Activity: Negative impact on other business activities			
Impact Description: Potential job and income losses to SCWW (independent operator) due to the construction activities			
Prior to Mitigation/Management			
Duration	Medium (3)	The recreational lake beach expansion is expected to last 6 months. Larger construction works in other areas could also disrupt activities over a 4 year period	Minor (negative) (-40)
Extent	Limited (2)	Within the Sun City area	
Intensity	Moderate	The activities could potentially impact negatively on 45	

Dimension	Rating	Motivation	Significance
	(3)	jobs	
Probability	Likely (5)	There is a likelihood given the proximity and disruptive nature of the intervention	
Nature	Negative (-)	Potential income and job losses	
Mitigation/Management Actions			
▪ Sun City EXCO should collaborate with business such as SCWW in the planning of the construction phasing and timing to ensure minimum disruption in business activities ▪ Sun City EXCO should facilitate the establishment of a communication channel between contractors and SCWW and other businesses (if relevant)			
Post-Mitigation			
Duration	Medium term (3)	Incidents can still occur over the medium term	Negligible (negative) (-24)
Extent	Isolated (1)	Within the Sun City area	
Intensity	Minor (2)	Minor disruptions could still occur	
Probability	Probable (4)	Minor disruptions could still occur	
Nature	Negative (-)	Potential income and job losses	

Table 11-46: Employment and Income Generation

Dimension	Rating	Motivation	Significance
Jobs and income during the construction phase			
Impact Description: Employment and income generation for 7 years spread over the total construction period of 15 years			
Prior to Mitigation/Management			
Duration	Medium term (3)	Jobs and income for 7 years over 15 years	Minor (positive) (+66)
Extent	Municipal area (4)	Direct jobs to local community (unskilled) and flow-on jobs to larger region	
Intensity	Moderate (4)	Noticeable impact on local low income households	
Probability	Highly probable (6)	There is availability of unskilled and unemployed labour in local area. The municipal area has construction suppliers	
Nature	Positive (+)		
Mitigation/Management Actions			

Dimension	Rating	Motivation	Significance
▪ Prioritise local labour in the recruitment process as part of the company's own recruitment policy or as part of contractor management plan ▪ Unskilled construction workers are recruited from the local village and up-skilled during construction works ▪ Medium skilled construction workers should where possible be recruited from the local villages surrounding the site ▪ Locals should also be allowed an opportunity to be included in a list of possible local suppliers and service providers for e.g. security services			
Post-Mitigation			
Duration	Long term (4)	Up-skilling of local labour force could have longer term positive impacts on local community	Moderate (positive) (+72)
Extent	Municipal area (4)	Direct jobs to local community (unskilled) and flow-on jobs to larger region	
Intensity	Moderate (4)	Noticeable impact on local low income households	
Probability	Highly probable (6)	There is availability of unskilled and unemployed labour in local area. The municipal area has construction suppliers	
Nature	Positive (+)		

Table 11-47: Tax Income Contribution

Dimension	Rating	Motivation	Significance
Increase in government tax income due to increase in income and spending levels during construction			
Impact Description: Increase in central government revenues during the construction phase due to increased income taxes, value added taxes and taxes on contractors' profits.			
Prior to Mitigation/Management			
Duration	Medium term (3)	Tax income due to increase in jobs and income for 7 years over 15 years	Moderate (positive) (+84)
Extent	National (6)	Tax income to central government	
Intensity	Average (3)	Depending where funds are spent	
Probability	Certain (7)	Highly probable - certain due to legal requirements	
Nature	Positive +		
Mitigation/Management Actions			
▪ No further enhancement measures are proposed.			

11.2.10.2.2 Operational Phase

During the operational phase, Economic Processes related impacts pertain to the following:

- Employment and income creation; and
- Tax Income.

These impacts are discussed separately below.

Employment and income creation

It is expected that with an increased overnight capacity to accommodate approximately 2,705 additional guests, facilities at the resort will generate additional income, GVA, increased maintenance and require operational staff on a full-time and part-time basis.

Based on current occupancy rates (Hasenfuss, 2018) and the rates for different establishments at the Resort, a high level estimate is that the proposed developments could increase direct and flow-on GVA with R 763 million per annum and create in total of 4,600 full time jobs.

The direct impact of the proposed developments could be an annual income (profit and salaries and wages) increase of R 390 million with approximately R 63 million (16%) of this flowing to low income households. If all the unskilled labour in the operations of the new facilities (an estimated 686) are recruited from the adjacent Wards 13 and 14 of MKLM, the project could increase the total household income generate in these wards with more than 20%[4]. It should however be noted that while the net impact on employment creation will be positive, there is a risk that some activities at SCWW could experience negative impacts depending on the construction design of the new facilities. The expansion of the recreation beach area could have potential negative impacts on the current infrastructure (e.g. jetties) that SCWW uses in its operations.

Tax income contribution

Based on the same tax income contribution calculation (R0.32 per R1 GVA), the operational phase could increase central government tax income by an estimated R 244 million on average per annum after completion of all the income generation projects within the next 5 years (2023).

Impact Ratings and Proposed Enhancement Measures

The quantification of the economic processes during the operational phase are detailed in the tables below.

Table 11-48: Employment and Income Generation during the Operational Phase

Dimension	Rating	Motivation	Significance
Jobs and income during operations			
Impact Description: Employment and income generation during operations (after 5 years construction)			

[4] This calculation was based the average annual household income of approximately R 50,000 (Census 2011) x 5,200 households (total number of households in two affected wards) = R 260m total income. R 63m as a portion of R 260m = 24%.

Dimension	Rating	Motivation	Significance
Prior to Mitigation/Management			
Duration	Project Life (5)	Jobs and income during the life the project	Moderate (positive) (+84)
Extent	Municipal area (4)	Direct jobs to local community (unskilled) and flow-on jobs to larger region	
Intensity	Widespread benefits (5)	Noticeable impact on local low income households	
Probability	Highly probable (6)	There is availability of unskilled and unemployed labour in local area. The municipal area has construction suppliers	
Nature	Positive (+)		
Mitigation/Management Actions			
▪ Prioritise local labour in the recruitment process – this will also limit project-induced in-migration to some extent. ▪ Unskilled workers are recruited from the local village and should be developed (up-skilled) during operations. ▪ Medium skilled workers should where possible be recruited from the local villages surrounding Sun City (e.g. Ledig and South Village). ▪ Locals should also be allowed an opportunity to be included in a list of possible local suppliers and service providers for e.g. security services. ▪ Sun City EXCO should involve SCWW in the planning of its recreational beach area to ensure that the company incurs to long terms losses.			
Post-Mitigation			
Duration	Project Life (5)	Jobs and income during the life the project	Moderate (positive) (+90)
Extent	Municipal area (4)	Direct jobs to local community (unskilled) and flow-on jobs to larger region	
Intensity	Great improvement for large % of local community (6)	Up-skilling of local labour force could have higher positive impacts on local community	
Probability	Highly probable (6)	There is availability of unskilled and unemployed labour in local area. The municipal area has construction suppliers	
Nature	Positive (+)		

Table 11-49: Tax Income Contribution during the Operational Phase

Dimension	Rating	Motivation	Significance
Increase in government tax income due to increase in income and spending levels during operations			
Impact Description: Increase in central government revenues during the operational phase to increased income taxes, value added taxes and taxes on profits.			
Prior to Mitigation/Management			

Dimension	Rating	Motivation	Significance
Duration	Project Life (5))	Tax income due to increase in jobs and income over lifetime o project	Moderate (positive) (+98)
Extent	National (6)	Tax income to central government	
Intensity	Average (3)	Depending where funds are spent	
Probability	Certain (7)	Highly probable - certain due to legal requirements	
Nature	Positive +		
Mitigation/Management Actions			
▪ No further enhancement measures are proposed.			

11.2.10.3 Geographical Processes

Geographical processes refer to those activities that affect the land use pattern of the local communities (and region as a whole). The potential impacts associated with geographical processes for the construction and operational phases are discussed separately in subsections below.

11.2.10.3.1 Construction Phase

One impact pertaining to geographic processes during the construction phase has been identified, namely the conversion and diversification of land use.

All of the proposed projects at the Sun City Resort Complex will lead to a change from vacant land to built-up land (with the exception of developments on already developed footprints). However, the change in land use is consistent with the directly surrounding land use and within the resort, therefore this change will be of low significance.

Notably, REP4.2 (Vacation Club Phase 4) and USP2 (additional water reservoirs) are located in the resort's undeveloped area. REP4.2 will be located within 1 km of the Bakubung Bush Lodge within the Pilanesberg National Park. This could result in some nuisance impacts for land users of Pilanesberg National Park during the construction phase as well as users of nearby Bakubung Bush Lodge, which would detract from their tourist experience.

Impact Ratings and Proposed Mitigation Measures

The quantification of the geographic processes during the construction phase is detailed in the table below.

Table 11-50: Conversion and Diversification of Land Use

Dimension	Rating	Motivation	Significance
Conversion and diversification of land use			

Dimension	Rating	Motivation	Significance
Impact Description: The process of converting greenfield land use with little ambient noise could cause visual and noise intrusion during construction and detract from the land use experience at nearby attractions not associated with the resort (specifically the Bakubung Bush Lodge and other nearby attractions within the Pilanesberg National Park).			
Prior to Mitigation/Management			
Duration	Medium term (3)	The construction phase of VEP4.2 will last for at least 2 years.	Minor (negative) (-66)
Extent	Local (3)	Parts of the Bakubung Bush Lodge are located in an open plain within 500m of the REP4.2 construction area.	
Intensity	High (5)	Pilanesberg National Park in general and the Bakubung Bush Lodge specifically, are regarded as highly sensitive environs due to the exclusivity of the lodge and the pristine natural environment.	
Probability	Almost certain (6)	Parts of the bush lodge are located on an open plain with direct views on the REP4.2 construction area. Unmitigated it is almost certain that visitors to this part of the lodge would be able to see and hear construction activities and possibly be affected by dust emissions from the construction site.	
Nature	Negative (-1)		
Mitigation/Management Actions			
▪ Implement mitigation measures as described in the Visual and Noise Impact Assessment specialist reports.			
Post-Mitigation			
Duration	Medium term (3)	The construction phase of VEP4.2 will last for at least 2 years.	Negligible (negative) (-32)
Extent	Limited (2)	With the implementation of mitigation measures, the extent of the impact could be mostly limited to the construction site itself.	
Intensity	Moderate (3)	It is expected that the noise and visual impact would continue to cause ongoing social issues, but that the sensitivity of the receptors could be lowered through the implementation of mitigation measures.	
Probability	Probable (4)		
Nature	Negative (-1)		

11.2.10.3.2 Operational Phase

No further impacts are anticipated for geographic processes during the operational phase.

11.2.10.4 Institutional and Empowerment Processes

Institutional and legal processes consider changes that affect the efficacy of local organisations to supply essential goods and services. The potential impacts associated with institutional and empowerment processes for the construction and operational phase are discussed separately in subsections below.

11.2.10.4.1 Construction Phase

As mentioned in Section 11.2.10.1 above, in-migration to a limited extent may occur as an induced project impact. In terms of institutional and legal change process, this potential impact is related to the local municipality's ability to continue to deliver services such as health and safety facilities, education, municipal services, etc. as there will be an increased demand of municipal services for newcomers in the local area.

An influx of an estimated 344 people to the area would bring about an additional demand for housing and associated municipal services. However, construction team members who are not from the local area will likely be accommodated on-site. This will negate the need for the local authority to provide municipal services to an off-site construction camp and therefore it is not foreseen that the construction of the proposed projects would cause a widespread or significant increased demand for housing or municipal services.

Impact Ratings and Proposed Mitigation Measures

The quantification of the institutional and empowerment processes during the construction phase is detailed in the table below.

Table 11-51: Increased Demand for Municipal Services

Dimension	Rating	Motivation	Significance
Increased demand for housing and other municipal services			
Impact Description: Construction activities will require construction teams and in turn will attract job seekers. Arrival of newcomers can disrupt social cohesion of local communities and place additional strain on local resources.			
Prior to Mitigation/Management			
Duration	Long term (4)	Expected to last for the duration of the construction phase. Due to phasing of activities, this can be between 6-15 years.	Minor (negative) (-44)
Extent	Local (3)	Construction teams based at site, might be accommodated in local area. Job seekers may loiter at site in hope of securing employment but live and impact mostly on local area.	
Intensity	Moderate (3)	Ongoing social issues to occur over a prolonged time period.	
Probability	Probable (4)	Project-induced in-migration occurs on almost every visible development.	

Dimension	Rating	Motivation	Significance
Nature	Negative (-1)		
Mitigation/Management Actions			
▪ Open a skills registration desk/service prior to construction to allow members of the local labour pool and local SMMEs to register their interest, skills and experience. This will assist in determining the availability of local talent. ▪ Ensure future project information leaflets include workforce estimates, skills required and Sun City's recruitment policy for labour, goods and services. This can also be communicated to local communities through newsletters or placing an advert in the local newspaper. ▪ Include local content requirements in contractor BIDs and tenders and ensure a certain percentage of local hire is a condition of contract. ▪ Accommodate construction team members on-site in business units as far as possible to avoid the need for additional housing or a temporary construction camp. ▪ Avoid hiring at the gate practices.			
Post-Mitigation			
Duration	Medium term (3)	Duration reduced as impacts are managed by contractors	Negligible (negative) -21
Extent	Limited (2)	Area of impact reduced to site as job seekers are proactive discouraged from travelling to the area	
Intensity	Minor (2)	Minor ad-hoc social issues can still occur	
Probability	Unlikely (3)	Job seekers will be discouraged from traveling to site if they are aware of labour hiring practices upfront	
Nature	Negative (-1)		

11.2.10.4.2 Operational Phase

The operational phase, particularly for the Resort Expansion Project, will result in an increased need for service delivery within the resort itself as well as enable contribution to building capacity of the local area through its Corporate Social Investment (CSI) initiatives. The institutional and empowerment processes related impacts anticipated during the operational phase pertain to the following:

- Increased demand for local municipal services; and
- Corporate Social Investment.

These impacts are discussed separately below.

<u>Increased demand for local municipal services</u>

Sun City currently obtains its electricity directly from Eskom and its water from Magalies Water. To ensure an uninterrupted service to its visitors and residents and to support the various service providers. Although various Utility and Services Projects are proposed, the proposed developments will result in increased demand for municipal services as the primary source of services.

Corporate Social Investment

The Sun International group view community investment as an integral part of their Social License to Operate. The group has an existing Socio-economic Development (SED) strategy in the form of a "Creating Shared Value" model that aims to align the group's operational needs with that of the local communities in which they operate. The group's SED objectives and focus areas including: education, sports development as well as arts and culture. It is expected that Sun City will continue with the implementation of their CSI programmes and possibly expand such programmes in their area of operation to match their increase in revenue.

Impact Ratings and Proposed Mitigation Measures

The quantification of the institutional and empowerment processes during the construction phase is detailed in the table below.

Table 11-52: Increased Demand on Municipal Services

Dimension	Rating	Motivation	Significance
Increased demand for municipal services			
Impact Description: The facilities under the REPs would require additional services (electricity, water, waste and sewerage removal) – these services would need to accommodate an additional 596 units (345 free standing, 250 rooms in the hotel and the convention centre), which could place strain on the local system.			
Prior to Mitigation/Management			
Duration	Project life (5)	The impact will remain for as long as the resort requires municipal services, i.e. the operational lifespan of the complex.	Minor (negative) (-36)
Extent	Municipal area (4)	A disruption in services due to too a high strain placed on the system could affect the whole municipal system.	
Intensity	Moderate (3)	Ongoing social issues to occur over a prolonged time period.	
Probability	Unlikely (3)	Sun City has implemented measures to support the local authority and therefore services have not been disrupted in the past as a sole result of the resort overburdening the system.	
Nature	Negative (-1)		
Mitigation/Management Actions			
▪ Consider and implement mitigation measures suggested in various other specialist studies, including: o The Basic Assessment for the Waste-to-Energy project (EAP unknown) o The groundwater and surface water impact assessment reports (Digby Wells, 2018) o The EIA for the closure of the Sun City landfill site (Jones & Wagener, 2017) ▪ USPs must be implemented in close coordination with the local municipality to ensure that local systems are able to accommodate an increase in discharge from the resort – this is especially relevant during high season when the resort is operating at full (or near full) capacity.			

Dimension	Rating	Motivation	Significance
▪ Where local municipal services are under strain, consider supporting the local authority with upgrades through the Sun International's CSI (e.g. as is planned with the South Village water pipeline [USP6]).			
Post-Mitigation			
Duration	Project life (5)	The impact will remain for as long as the resort requires municipal services, i.e. the operational lifespan of the complex.	Negligible (negative) (-20)
Extent	Local (3)	Impacts can be contained to the resort complex itself and the immediate area	
Intensity	Minor (2)	Because the extent of the impact can be contained, social impacts will be minor and potential damages to the system are repairable.	
Probability	Improbable (2)	With the implementation of mitigation measures, the possibility of the impact materialising is extremely low.	
Nature	Negative (-1)		

Table 11-53: Corporate Social Investment

Dimension	Rating	Motivation	Significance
Corporate Social Investment			
Impact Description: The expanded version of Sun City will generate more income, which will allow the group to extend their investment in local communities.			
Prior to Mitigation/Management			
Duration	Project life (5)	The impact will remain for as long as the resort requires municipal services, i.e. the operational lifespan of the complex.	Minor (positive) (+55)
Extent	Local (3)	The CSI programs will mostly benefit the directly affected communities.	
Intensity	Low (3)	The extent of investment will enhance local development initiatives.	
Probability	Likely (5)	Sun City is committed to invest in local communities.	
Nature	Positive (+1)		
Mitigation/Management Actions			

Dimension	Rating	Motivation	Significance
▪ Consult with local community leadership to determine actual needs in local community to determine if there is scope within the CSI to address these. ▪ Consult with local and district authorities to determine their development needs and how Sun City CSI can comply with development needs in the local and district IDPs. ▪ Consider regional development programs that are aimed at CSI in the province but do not focus investment solely on local communities – this will also help address the issue of project-induced in-migration to an extent if Sun City aids communities further than their immediate area of impact (e.g. assistance to communities at the N4 turn-off could help minimise the risk for protests).			
Post-Mitigation			
Duration	Project life (5)	The impact will remain for as long as the resort requires municipal services, i.e. the operational lifespan of the complex.	Moderate (positive) (+80)
Extent	Province / region (5)	The impact could be extended to the region through consultation with the appropriate authorities to determine development needs.	
Intensity	High (6)	Great improvement to the overall condition of a large percentage of the region/province. .	
Probability	Likely (5)	Sun City are committed to invest in local communities.	
Nature	Positive (+1)		

11.2.10.5 Socio-Cultural Processes

Socio-cultural processes consider how changes at the resort will affect the lifestyle of neighbouring communities and the more micro cosmos of residents and visitors to the resort. The potential impacts associated with socio-cultural processes for the Construction and operational phase are discussed separately in subsections below.

11.2.10.5.1 Construction Phase

The socio-cultural processes impacts anticipated during the construction phase pertain to the following:

- Risk of social disintegration and conflict; and
- Nuisance factors.

These impacts are described separately below.

Risk of social disintegration and conflict

The arrival of newcomers can create social difference within a community. Local cultures usually have well-developed systems that allow them to cope with a certain degree of change, but when change is too rapid, a disregard for local social norms could be experienced leading to social disintegration. An additional risk is if local communities perceive new comers/construction workers as a threat to their own ability to secure employment on the project.

Furthermore, although this assessment focuses primarily on the risk for social disintegration and conflict in the immediate study area, it should be noted that protests further afield at Bapong and Modderfontein (villages at the N4 turn-off to Sun City) could also threaten Sun City's operations as protests at these areas block visitors main access road to the resort.

Nuisance Factors

Interviews with guests to the resort indicated that the key attractions to the resort include: safety, excellent service, family oriented environment, quiet environment and cleanliness.

Given these reasons, nuisance factors during the construction phase would be prominent as it is likely to create dust and noise. In addition, people often feel unsafe in an area where construction takes place. Even if this is only a perception, it does impact on people's sense of security – more so if they feel that a space they previously regarded as "extremely safe" is now "invaded".

Impact Ratings and Mitigation Measures

The quantification of the socio-cultural processes during the construction phase is detailed in the tables below.

Table 11-54: Risk for Social Disintegration and Conflict

Dimension	Rating	Motivation	Significance
Risk for Social Disintegration and Conflict			
Impact Description: Differences in social and cultural background can heighten conflict situations, more so if local perceive newcomers as taking away their opportunities and adding to their hardship.			
Prior to Mitigation/Management			
Duration	Medium (3)	The risk for conflict will last for the full 5 years as the various projects have different starting times and timeframes.	Minor (negative) (-40)
Extent	Local (3)	The impact is not expected to go wider than the immediate area where job seekers and construction workers are likely to spend some of their time.	
Intensity	Moderate (4)	Protests in SA over the past few years were characterised by violence and destruction of property.	
Probability	Probable (4)	Protests are an almost common day occurrence for frustrated community members to make themselves heard.	
Nature	Negative (-1)		
Mitigation/Management Actions			

Dimension	Rating	Motivation	Significance
▪ Continuous stakeholder engagement is required to keep local communities (and visitors to the resort) informed of progress, upcoming activities and job opportunities available. ▪ Discourage job seekers from travelling to the area by publishing the Project's employment policy upfront and referring job seekers to the relevant contractors. Make it clear that no persons will be hired at the gate and that casual day labour is not available. ▪ Keep housekeeping and maintenance staff informed of project progress and any available job opportunities – they often relay information to friends and family members at home, so factual information would help to curb rumours and hearsay. ▪ Identify development projects through the group's CSI and in consultation with the local authority that could benefit the community as a whole. ▪ Establish a grievance platform for local residents to lodge complaints and address these within a reasonable timeframe.			
Post-Mitigation			
Duration	Medium (3)	The risk for conflict will remain throughout the construction period of 5 years.	Negligible (negative) (-21)
Extent	Limited (2)	The extent could be contained to the Sun City area by preventing job seekers to travel to site.	
Intensity	Minor (2)	If large-scale protests are avoided, continuous social problems are unlikely.	
Probability	Unlikely (3)	The risk would be reduced significantly through timely information sharing.	
Nature	Negative (-1)		

Table 11-55: Nuisance Factors

Dimension	Rating	Motivation	Significance
Nuisance Factors			
Impact Description: Construction activities can cause noise and dust, which will affect visitors' experience at Sun City. They might choose not to return until construction activities cease.			
Prior to Mitigation/Management			
Duration	Medium (3)	Nuisance factors will be present in varying degrees for the duration of construction activities (up to 5 years)	Minor (negative) (-40)
Extent	Limited (2)	Nuisance factors not expected to extend very far beyond the boundary site and be contained within the resort complex.	
Intensity	Low (3)	Could affect tourist experience (ongoing social issues)	
Probability	Likely (5)	Nuisance factors in itself will likely occur, but experience of these depend on the individual	
Nature	Negative (-1)		

Dimension	Rating	Motivation	Significance
Mitigation/Management Actions			
▪ Erect a wall between existing VC units and construction activities to shield visitors from dust and noise. This will also create a sense that construction work and workers are 'contained' and enhance visitors' sense of safety and security. ▪ Access to construction activities must be access controlled. Construction workers must be identifiable when they move around in the resort. ▪ Erect notice boards to inform visitors of types and duration of construction activities. Include a hotline number where they can lodge complaints if activities occur that are outside those displayed. ▪ Where possible, only book visitors into units that are far away from construction activities.			
Post-Mitigation			
Duration	Medium (3)	Nuisance factors will be present in varying degrees for the duration of construction activities (up to 5 years)	Negligible (negative) (-18)
Extent	Isolated (1)	Impacts can be contained to the actual construction site. Visitors will be free to enjoy other amenities without interruption.	
Intensity	Minor (2)	Social impacts will be minor and medium-term and restricted to individuals.	
Probability	Unlikely (3)	Widespread impacts are restricted to the site and individuals in close proximity to the site.	
Nature	Negative (-1)		

11.2.10.5.2 Operational Phase

As all of the proposed projects will take place within the confines of the Sun City Resort Complex, it is not expected that the projects will have any significant impacts on the socio-cultural interaction of local communities during the operational phase.

11.3 Unplanned Events and Low Risks

Unplanned events may occur during the project that may have potential impacts which will need mitigation and management. Table 11-56 below is a summary of the identified project activities that may pose a risk (an impact at low probabilities). Not all potential unplanned events may be captured herein and this must therefore be managed by Sun City throughout the construction and operational phases.

Table 11-56: Unplanned Events, Low Risks and their Management Measures

Potential Project Risk (Unplanned Occurrences)	Aspect Potentially Impacted	Mitigation / Management / Monitoring
Hydrocarbon spills from vehicles and heavy machinery, hazardous materials or waste storage facilities.	Surface water; Groundwater; Wetlands; and Soil contamination.	▪ Hydrocarbons and hazardous materials must be stored in bunded areas and refuelling should take place in contained areas; ▪ Ensure that oil traps are well maintained; and ▪ Vehicles and heavy machinery should be serviced and checked on a regularly basis to prevent leakages and spills.
Spills/leaks from pipelines.	Surface water; Groundwater; Wetlands; and Soil contamination.	▪ Regular inspections of the pipeline for any leaks; and ▪ Ensure that storm water management structures are put in place to capture all spills.
Uncontrolled erosion	Wetland Surface water; and Soils.	▪ Erosion control measures must be put in place and if necessary a wetland specialist must investigate the extent of the impact and provide rehabilitation recommendations.
Accidental exposure of previously unidentified heritage resources during the construction of the project.	Heritage	▪ Project specific Chance Find Protocols (CFPs) must be developed and included in the EMPr as a condition of authorisation. ▪ The CFPs must be defined and established prior to the construction phase of the proposed projects.

11.4 Cumulative Impacts

Cumulative effects are caused by the accumulation and interaction of multiple stresses affecting the parts and the functions of ecosystems. Of particular concern is the knowledge that ecological systems sometimes change abruptly and unexpectedly in response to apparently small incremental stresses. For purposes of this report, cumulative impacts have been defined as “the changes to the environment caused by an activity in combination with other past, present, and reasonably foreseeable human activities”.

The subsections below generally discuss cumulative impacts associated with the environmental impacts assessed.

Table 11-57: Cumulative Impacts

Aspect	Potential Cumulative Impacts
Fauna and Flora	Cumulative impacts are assessed by considering past, present and anticipated changes to biodiversity. The impacts on the ecology of the general area will not be significant, as large areas of this vegetation type is currently conserved, Pilanesberg National Park is such as area. It is expected that there will be losses of vegetation and flora along with associated faunal habitat. The primary impacts will be loss of vegetation types and fragmentation with a reduction in movement of remaining naturally occurring wildlife and isolation of pockets of vegetation. Secondary cumulative impacts will include increased accessibility to the site and the resulting increase in development and resource dependence. Ideally, a strategic environmental plan for the area should be developed and adhered to. This should include the conservation of important areas as well as the provision of corridors for faunal movement.
Wetlands	The freshwater resources of this catchment feed largely into the Elands River Catchment, which drains into the Crocodile River further downstream. Cumulative impacts include loss of catchment yields and surface water recharge to this system as a result of the hardening of surfaces as well as the loss of the ingress of water to the groundwater resources present. In addition, the freshwater resources in this area are increasingly subjected to water quality impacts as a result of mining activities and increasing pressure as a result of rural settlements and agriculture (livestock watering) activities within the greater catchment. Further losses to habitat and biodiversity as a result of the proposed development activities, with special mention of Development Area A, are deemed likely.
Surface water and groundwater	Observing the project area and its surroundings (within 5 km radius of the project area) the area consists of mixed land uses ranging from undeveloped rural areas, protected areas, mining activities as well as agricultural activities. The potential cumulative impacts include: ▪ Possible depletion of natural water resources, or contamination of groundwater and surface water should the development not be managed properly (such as if wastewater treatment plant plan and monitoring programme is not implemented); ▪ The proposed project is known to attract tourist thus it is likely to increase the water usage which has a potential to increase the water demand to the Magalies water board; ▪ Increased waste generation (including wastewater generation) which could result on groundwater and surface water contamination; and ▪ Water usage at the project site can have a potential negative drawdown and quality impacts on existing water supplies.

Aspect	Potential Cumulative Impacts
Heritage	As described above, Itlholanoga has already been disturbed through developments close to the site. The existing disturbance includes the concrete road which runs through the site and the existing reservoir which removed a portion of the site. In addition to the second reservoir included in this assessment, Sun International plans to develop a chair-lift and a pipeline in close proximity to Itlholanoga. The chair lift will include ablution facilities on top of the mountain which will provide for 200 guests and a maximum of 400. This additional infrastructure is subject to a separate Basic Assessment process. Individually, these developments do not constitute a major impact on Itlholanoga. Considered in combination, however, these projects will be encroaching on the site and present a risk to the integrity of site as a whole. This Project, in conjunction with other planned developments, including mining operations and developments in line with strategic development plans for the North West Province, requires consideration to identify the possible in-combination effects of various impacts to known heritage resources.
Socio-economic	Sun City and other tourist attractions in the area (e.g. lodges within Pilansberg National Park), already employ substantial numbers of people. Other developments (e.g. the expansion at the Bakubung Bush Lodge and the Bakubung/Ledig mixed use housing development) will potentially add to the number of people employed in the tourist and construction sectors. It is therefore expected that job creation in the area will be enhanced through these projects, albeit of a temporary nature (1-5 years). In terms of population influx, the area is likely to experience some influx of people in the form of various construction teams as an induced project impact. This could place additional strain on existing infrastructure and services. Although the developments at Sun City itself are unlikely to cause large-scale influx, it coincides with other developments in the local municipal area (e.g. the expansion of the Bakubung Bush Lodge, the Ledig housing development and mining operations), which cumulatively could attract people to the area. As is the case with job creation, the influx of people to the area is not expected to last beyond the construction phases of the various projects.

12 Summary of Identified Impacts

The proposed projects which are planned at the Sun City Resort Complex may potentially result in various environmental and social impacts. The projects constitute expansion, upgrade and maintenance projects therefore the majority of the projects will occur on already disturbed footprints influencing the significance of potential impacts.

During the construction phase, site clearing and the establishment of infrastructure will result in the exposure of soils which may result in erosion and the loss of topsoil resource. This impact may subsequently also result in the sedimentation of nearby surface water resources and wetlands, unless mitigation measures are implemented, resulting in a deterioration of these freshwater systems and associated aquatic biota. In additional the use of vehicles and machinery during construction may result in soil compaction which in turn could result in sheet run-off and reduced water infiltration capability. It is noted however that the planned projects will not all be undertaken at once but rather over a ten to fifteen year period. Therefore, the extent of these construction related activities will be limited in extent for each individual project. In terms of biodiversity, some planned projects (namely expansion projects) require the clearing of undisturbed natural habitat for the establishment of infrastructure which will result in a loss of biodiversity. Furthermore related impacts including the potential infestation of alien plant species as a result of habitat fragmentation may occur. The spread of alien plant species may also potentially reach wetlands resulting in a reduced PES and capability of the systems in terms of ecosystem services they occur. With respect to faunal species, construction activities are likely to result in the disturbance of faunal habitat causing migration as well as potential roadkills of smaller faunal species. These abovementioned impacts for the construction phase have however all been rated to of Minor to Negligible Negative significance.

Nuisance impacts (noise, air quality and visual) are also expected to be of Minor to Negligible Significance although it is noted that nuisance impacts would be more extensive for guests and staff within the resort for the duration of the construction activities.

The most significant impact expected during the construction phase relates to the potential direct impact to heritage resources, namely the Itlholanoga site and the STW-002 Stonewall settlement which have been rated to be of Major to Moderate Negative Significance respectively. Construction activities within the vicinity of these sites may result in direct impacts to the heritage sites and in the case of the Itlholanoga site direct impacts have already occurred from previous developments within the resort.

During the operational phase, some impacts are expected to occur as a result of the operation of infrastructure and the required maintenance activities. Similar to the construction phase, impacts such as soil erosion and compaction, infestation of alien plant species as well as disturbance and restrictions of faunal species may occur. In addition, once additional hard surfaces are established (upon completion of developments), this may result in increased surface water run-off which may influence stream flows of nearby

watercourses. These impacts are expected to be of Minor to Negligible Negative significance.

Both positive and negative socio-economic impacts are expected to occur as a result if the planned projects. Expected negative impacts during the construction phase include: draw down of other economic sectors (mainly the agricultural sector) as people may be attracted to construction work at Sun City; disruption of other surrounding business which may experience revenue loss; nuisance impacts affecting tourist's experience at the resort; and social disintegration and conflict as a result of newcomers. These impacts have been deemed to be of Minor to Negligible Negative significance mostly due to the phased nature of the proposed project which reduces the intensity of the impacts.

During the operational phase the key negative socio-economic impact anticipated is the increased demand on municipal services as a result of the increased accommodation and recreational capacity at the resort that will result from the planned developments. The key positive impacts that will result from the construction and operation of the proposed developments include employment and income creation both at local and region level; tax income contributions; and the extension of Sun City's Corporate Social Investment which will result in further socio-economic development within the surrounding local communities. The positive socio-economic impacts are expected to be of Minor to Moderate Positive significance.

To this end, negative and positive impacts have been identified for the proposed developments within the Sun City Resort Complex. With the exception of potential direct impacts related to heritage resources, the negative impacts have all been assessed to be of Minor to Negligible significance. Mitigation measures have also been proposed, which if correctly implemented, may further lower the significance of the negative impacts for both the construction and operational phases.

In terms of the alternatives, the proposed alternative for USP2 (additional reservoirs) would significantly reduce the likelihood of direct impact to the Itlholanoga site and is therefore strongly recommended. Based on the low significance of the other identified potential impacts which were assessed based on the preferred alternative it has not been deemed necessary to implement other alternatives.

13 Summary of the Findings and Recommendations of the Specialist Reports

Numerous specialist impact assessments were undertaken for the proposed project. Separate specialist reports were compiled and have been attached as appendices to this report (refer to Table 10-1 above). The specialist input included the baseline environment, potential impacts and the recommended mitigation measures. Table 13-1 provides a summary of the key recommendations of the studies.

Table 13-1: Specialist Studies undertaken for the proposed project

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included
Soils, Land Use and Land Capability Impact Assessment	▪ Fuel and oil spills are common risks. If they occur, hydrocarbon spills should be remediate using commercially available emergency clean up kits; and ▪ Clearing and removal of soils should be done during dry moths (May to September) to reduce erosion and compaction on soils.	X - All recommendations have been considered and included in the EIA report.	Mitigation and management measures included in this report were recommended by the Soil Specialist, as well as the monitoring programmes. This includes the impact assessment and mitigation measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.
Flora and Fauna Impact Assessment	The Sun City development areas offers a high Biodiversity Value owing to the presence of intact savanna woodland habitat as well as Riparian and wetland habitat. Loss of these components will result in loss of biodiversity for the area. The opportunity exists however, for the proposed Development Areas to contribute significantly to conservation of biodiversity within the area. Conservation of as much of the natural land in the area within the site as possible, and the creation of corridors linking other natural areas would aid in conservation of ecosystems, flora and fauna. If efforts are made to initiate conservation of this habitat, and conservation is maintained, the net impacts on biodiversity could be positive	X - All recommendations have been considered and included in the EIA report.	Mitigation and management measures included in this report were recommended by the Ecologist, as well as the monitoring programmes. This includes the impact assessment and mitigation measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.
Surface Water and Groundwater Impact Assessment	Further hydrogeological assessments are recommended to gain site specific rock permeability values through borehole drilling and aquifer testing. The drilling of additional boreholes will also enable to collect more groundwater samples for a more accurate groundwater quality analysis as well as to	X - All recommendations have been considered and included in the EIA report.	Mitigation and management measures included in this report were recommended by the Hydrologist, as well as the monitoring programmes. This includes the impact assessment and mitigation

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included
	collect groundwater level measurement to construct a potentiometric surface map. These will assist in improving the baseline hydrogeological characteristics (hydrogeological conceptualization)		measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.
Wetlands Impact Assessment	▪ The proposed project is not expected to result in a direct loss of wetland habitat. Associated impacts such as soil erosion which could subsequently result in sedimentation of wetlands and river systems is however possible. It is therefore imperative that a soil management programme is implemented and maintained to minimise erosion and sedimentation; and ▪ Access must be restricted within the 100m zone of regulation for all freshwater features identified; ▪ If it is absolutely unavoidable that any of the wetland areas present will be affected, disturbance must be minimised and suitably rehabilitated.	X - All recommendations have been considered and included in the EIA report.	Mitigation and management measures included in this report were recommended by the Wetland Specialist, as well as the monitoring programmes. This includes the impact assessment and mitigation measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.
Aquatic Ecology Impact Assessment	▪ Potential sedimentation of river systems may adversely impact aquatic biota. Therefore it is imperative that soil erosion measures are in place to the potential for sedimentation; and ▪ High rainfall periods (i.e. usually December to March) should be avoided during construction and decommissioning to possibly avoid increased surface runoff.	X - All recommendations have been considered and included in the EIA report.	Mitigation and management measures included in this report were recommended by the Aquatics Specialist, as well as the monitoring programmes. This includes the impact assessment and mitigation measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.
Noise Impact Assessment	The predictive model generated to quantify the expected noise levels associated with the project show that there will	X - All recommendations have been considered and	Mitigation and management measures included in this report were recommended

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included
	be a negligible impact and noise disturbance will not impact any nearby receptors. Due to the negligible nature of the potential noise impact, it is not recommended that a noise monitoring programme be implemented from the onset. In the event of a complaint being received however, it is recommended to monitor the noise levels.	included in the EIA report.	by the Soil Specialist, as well as the monitoring programmes. This includes the impact assessment and mitigation measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.
Visual Impact Assessment	The Project will have a moderate visual impact on the receiving environment and will be visible for a distance of 10km during the day. This visual impact will remain indefinitely or until such time that the proposed infrastructure is decommissioned and removed. In the opinion of the specialist, the majority of the proposed infrastructure will not have a highly intrusive impact on surrounding receptors. This is given in part to the existing presence of the resort and its well-known buildings such as the Palace and Lost City. It is however noted that the proposed Vacation Club 4 is likely to have specific negative visual impacts on the neighbouring Bakubung luxury lodge that is currently under construction. Due to the impact on the lodge and the staff residents in the Pilanesberg National Park, it is advised that specific attention to paid to the mitigation of the visual impact of the Vacation Club.	X - All recommendations have been considered and included in the EIA report.	Mitigation and management measures included in this report were recommended by the GIS Specialist, as well as the monitoring programmes. This includes the impact assessment and mitigation measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.
Air Quality	Based on the results of the Air Quality Assessment, it is not anticipate that significant air quality related impacts will occur. The following is however recommended as a precautionary measure::	X - All recommendations have been considered and included in the EIA report.	Mitigation and management measures included in this report were recommended by the Air Quality Specialist, as well as the

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included
	▪ Establish codes of practice for good housekeeping with respect to air quality management and mitigation; and ▪ Monitor the air quality management measures and information to ensure that adopted measures are sufficient to achieve current air quality standards.		monitoring programmes. This includes the impact assessment and mitigation measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.
Social Impact Assessment	It is recommended that any unskilled job opportunities be offered to community members from nearby surrounding communities. This could include labour intensive activities such as site clearance and fencing off the construction area, etc. The use of local labour will be in support of the resort's intention of showing goodwill to neighbouring communities and, at the same time, reduce the risk for conflict between newcomers and residents (often local feel 'foreigners' take away their opportunities).	X - All recommendations have been considered and included in the EIA report.	Mitigation and management measures included in this report were recommended by the Social Specialist, as well as the monitoring programmes. This includes the impact assessment and mitigation measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.
Heritage	The proposed projects present risks of damage or destruction to two heritage resources of very-high and low CS. The following recommendations: ▪ The Project design must be altered to avoid, or at the very least limit, the identified potential direct negative impacts to the heritage resources; ▪ Sun International appoint a qualified archaeologist to undertake detailed mapping of the affected sites prior to the commencement of construction activities; ▪ No work on the developments proposed near the site Itlholanoga and/or STW-002 may be undertaken without a permit issued in respect of Section 35 of the NHRA and	X - All recommendations have been considered and included in the EIA report.	Mitigation and management measures included in this report were recommended by the Heritage Specialist, as well as the monitoring programmes. This includes the impact assessment and mitigation measures as discussed in Section 11, as well as the recommendations provided in Part B Sections 5 and 6 and the monitoring provided in Section 7.

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included
	Chapters II and IV of the NHRA Regulations, 2000 (GN R 548; ▪ Sun International must develop and implement a Conservation Management Plan (CMP) as a condition of authorisation and for approval by SAHRA and NWPHRA.		

14 Environmental Impact Statement

Due to the disturbed nature of the majority of the proposed development footprints, the significance of most of the identified impacts associated with the construction and operation activities specifically associated with this application would be of minor to negligible negative significance. The most significant negative impacts identified (Major to Moderate Negative Impacts) are associated with potential direct impacts to heritage resources of very high to low CS during the construction phase. No negative impacts of high significance (rated Moderate and Major Negative significance) were identified for the operational phase of the proposed projects.

The key risks associated with the proposed developments include hydrocarbon spills associated with the storage of chemicals and waste, spills/leaks from pipeline infrastructure, uncontrolled erosion and accidental exposure of unidentified heritage resources during construction activities.

The project will also result in various positive impacts, the most significant (rated Moderate Positive significance) being tax income contribution that would result from the construction and operation of the proposed developments as well as employment and income generation associated with the operational phase.

Mitigation and management measures have been proposed for each identified impact. Should these be correctly implemented the significance of all impacts can be reduced to negligible or minor. In terms of the positive implications, enhancement measures have been proposed to ensure that these impacts are realised.

14.1 Final Site Map

The final proposed infrastructure layout plan is provided in Plan 3, Appendix 1. A composite map has also been generated which superimposes the infrastructure and environmental sensitives assessed in the project area (refer to Plan 22, Appendix 1).

15 Description of Assumptions, Uncertainties and Gap in Knowledge

The following general assumptions are applicable to this EIA study:

- The areas surveyed for various studies conducted were based on the preliminary infrastructure layout presented by Sun International;
- The findings presented are based on professional experience, supported by a literature review, and extrapolated from the data collected at the time of field surveys conducted; and
- Representative sampling methods were employed for the studies conducted and therefore the possibility of gaps in the data gathered exists.

Table 15-1 below presents the assumptions, uncertainties, limitations and knowledge gaps relevant to the various specialist studies undertaken.

Table 15-1: Specialist Studies Assumptions, Uncertainties and Gaps

Specialist Study	Assumptions, uncertainties and gaps
Soils, Land Use and Land Capability	▪ A total of 10 soil samples were collected on the proposed infrastructure areas; and ▪ The information contained in the assessment is based on auger points taken and observations on site.
Flora and Fauna	Whilst every effort is made to cover as much of the site as possible, representative sampling is done and it is possible that some plant and animal species that are present on site were not recorded during the field investigations, due to seasonality.
Wetlands	▪ Due to the large nature of the site, ground-truthing was focussed predominantly in the proposed infrastructure areas; ▪ Large portions of this project area may be regarded as severely modified from natural conditions, with completely altered hydrology and geomorphology in places due to the altered flow of water in the golf course areas and historical construction and placement of infrastructures; and ▪ The composition of the flora and freshwater resources in the project area prior to major disturbance is unknown. For this reason, reference conditions are hypothetical, and are based on professional judgement and/or inferred from limited data available.
Aquatic Ecology	▪ The timing of both surveys coincided with a below normal rainfall events experienced during the 2017/2018 period in the North West Province. As a result, water courses associated with the study area were uncharacteristically low with a majority of the monitoring sites observed as dry throughout the study. Thus, limited aquatic data could be recorded where only selected parameters could subsequently be measured and a limited number of assessment indices could be applied in the study. ▪ The dry conditions experienced throughout the study have most likely negatively influenced the aquatic baseline data presented in this report. Consequently, the findings expressed in this report should not be considered as conclusive baseline representations of the overall aquatic ecology in the associated watercourses. Rather, the atypical dry nature of the water courses should be taken into account when interpreting the baseline findings which are most likely below the normal aquatic conditions for the area. ▪ Additionally, as described in Dickens and Graham (2002), the SASS5 assessment is not suitable for non-perennial systems. Therefore, more attention should be paid to the ecological categories from the MIRAI assessment instead of those determined from the SASS5 scores.
Surface Water and Groundwater	The following gaps were identified which presented as limitations to the study: ▪ Surface water quality monitoring is required particularly downstream at recreational dam as well as LG2 (Ledig stream) and RL4 downstream from the development area; and ▪ Groundwater monitoring boreholes are required, particularly downstream or at the Lost City Golf Course as well as upstream and downstream from the recreational dam.
Noise	▪ The construction phase is assumed to be carried out during daylight hours (06:00-18:00), therefore only a daytime scenario was modelled for the construction phase and the subsequent impact of the construction phase refers only to the daytime; ▪ The resulting noise contours represent worst case LAeq at any receiver located 360 degrees in the horizontal plane around the noise sources. The noise modelling

Specialist Study	Assumptions, uncertainties and gaps
	software is limited to calculating the predominant wind direction (or downwind conditions of propagation) per single receptor only. Calm wind conditions have therefore been included in the model due to the number of surrounding receptors. Thus, the noise dispersion plots do not represent a typical seasonal scenario in the predominant wind direction but rather a yearly average of the area's meteorological conditions in all directions; ▪ In essence the modelling follows a conservative worst case scenario approach assuming all activities for each phase are being carried out simultaneously; and ▪ Only a desktop assessment of the operational phase was undertaken as the expected noise during this phase would be negligible.
Visual	A VIA is open to subjectivity. This subjectivity is due to the different opinions / responses receptors may have of a proposed project. A major limitation to this study was the lack of detailed design drawings and vertical heights of proposed infrastructure. The expansion activities are still mainly in a conceptual phase with no detailed engineering or lighting plans. The models predicting the likely impact are therefore subject to change and the resulting impacts and significance of these impacts may change in the future.
Socio-economic	▪ The SIA is based on available information obtained from Sun International, secondary sources, other specialists and stakeholders consulted during fieldwork. The sources consulted are not exhaustive but is deemed sufficient to meet the scope of work for the current phase of the study. No information has been deliberately excluded from the report, and it is assumed that no party withheld relevant information from the specialists. ▪ The economic impact model was based on high-level information supplied by Sun International. Total construction costs of R1bn was assumed with 90% spread evenly over the first 5 years of the 15 year construction period while the remaining 10% is spread evenly over the last 2 years of the 15 year construction period. The operational impacts were based on the number of new accommodation units; and income based on current occupancy rates at Sun City's hotels and lodge. ▪ The study acknowledges the importance and value of local knowledge obtained through consultations with a variety of local stakeholders. As such, efforts were made during the consultation process to elicit the relevant knowledge required for a comprehensive and accurate impact assessment of the socio-economic environment. It should, however, be noted that although several interviews were planned for the data collection phase, some of these interviews did not materialise as stakeholders were not available. Despite this, the authors are confident that sufficient information was obtained to complete the scope of work ▪ Economic multipliers, average salaries, sectoral skills compositions, wages and value added as a percentage of total income were based on provincial and national averages.

16 Reasoned Opinion as to whether the Proposed Activity should or should not be authorised

16.1 Reasons why the activity should be authorised or not

Various specialist studies were undertaken as part of the EIA for the project with the objective of identifying and weighing anticipated impacts and risks associated with the proposed project activities.

The findings of the impact assessment have shown that the proposed developments within the Sun City Resort Complex will mostly have Negligible to Minor negative impacts on the receiving environment. The majority of the proposed projects are planned on already disturbed footprints. Furthermore, the projects will be phased over a ten to fifteen year period and therefore reducing the intensity of the impacts. Positive socio-economic impacts are expected to occur at local, regional and national level as a result of the expansion and upgrade of the resort.

Based on the assessment of potential negative and positive impacts, it is concluded that the proposed developments should be authorised. No significant long-term negative impacts are expected to arise from the project-specific activities should the proposed mitigation measures be correctly implemented.

16.2 Conditions that must be included in the authorisation

The following specific conditions are proposed:

- All mitigation measures proposed in this report and attached specialist reports should be implemented;
- An environmental monitoring programme must be implemented at Sun City to ensure that environmental aspects are managed responsibly;
- Unskilled employment opportunities should first be provided to members of surrounding communities. This could include labour intensive activities such as site clearance and fencing activities;
- Given the duration associated with the construction of the proposed projects, the relevance of the EIA and EMPr must be reviewed periodically (at least once every 5 years);
- Any amendments or specific project designs at the time of the construction of any of the proposed development that trigger Listed Activities or could result in a change in the impacts assessed in this report must be applied for/ agreed upon with READ; and
- The proposed USP2: Additional Reservoirs project must be relocated for the preferred location to allow for at least a 30 m buffer from the Itlholanoga heritage site.

17 Period for which the Environmental Authorisation is required

The construction of the proposed projects will be undertaken over a ten to fifteen year period while the operational phase is long-term over an unspecified period. It is therefore recommended that the Environmental Authorisation be valid for fifteen years.

18 Concluding Statement

Based on an assessment of the potential negative and positive impacts associated with the proposed expansion, upgrade and maintenance projects at the Sun City Resort it is concluded that the project should be authorised as it is likely to have a net positive impact.

Should the proposed mitigation measures and specialist recommendations be correctly implemented it is not anticipated that any long-term impacts will be experienced.

Based on the outcomes of the specialist studies, the preferred alternatives for the proposed developments (in terms of location, layout, process, and technology) are deemed acceptable and management as the Impact Assessment based on the preferred alternatives did not yield a detrimental result. This is with the exception of the location of USP2 (additional reservoirs) however where Major negative impacts could be experienced based on the current preferred location.

The final site layout of the proposed developments is provided as Plan 3, Appendix 1.

Part B: Environmental Management Programme Report

1 Introduction

The purpose of this EMPr is to provide the appropriate methods and procedures for mitigation/ enhancing and monitoring impacts associated with the proposed development at the Sun City Resort Complex.

The EMPr has been prepared in accordance with Appendix 4 of the NEMA EIA Regulations, 2014 (as amended). Table 1-1 identifies the required contents of an EMPr Report including cross-references the requirements to the relevant sections in this Report.

Table 1-1: Structure of the EMPr

Regulatory Requirement for Scoping Reports	Relevant Section of this report
(1) An EMPr must comply with section 24N of the Act and include-	
(a) details of- (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Please refer to Section 2: Details of the EAP
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Please refer to Section 3: Proposed Project Activities
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Please refer to Section 4: Composite Map
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities	Please refer to Section 5: a Description of the impact management outcomes, including management statements
(e) *Excluded from the EIA Regulations, 2014 (as amended)*	
(f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraph (d) and (e) will be achieved, and must, where applicable, include actions to- (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for	Please refer to Section 6: Impact Management Outcomes

Regulatory Requirement for Scoping Reports	Relevant Section of this report
rehabilitation, where applicable;	
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Please refer to Section 7: Monitoring Plan
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	
(m) an environmental awareness plan describing the manner in which- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Please refer to Section 8: Environmental Awareness Plan
(n) any specific information that may be required by the competent authority.	Not applicable.

2 Details of the EAP

Please refer to Section 2, Part A, for the details of the EAP.

3 Proposed Project Activities

The project entails the expansion, upgrade and maintenance of facilities within the Sun City Resort Complex which are aimed at increasing the capacity and performance of facilities within the resort. A total of 18 projects are proposed which are planned to the carried out over a ten to fifteen year period.

The project will comprise of the following activities over two project phases:

- Construction Phase:
  - Site Clearing and topsoil removal;
  - Storage and handling of hazardous and non-hazardous waste and chemicals;
  - Operation of machinery (including vehicles);
  - Demolition and removal of some old infrastructure; and
  - Establishment of infrastructure (including pipelines).
- Operational Phase:

- Operation of infrastructure and pipelines;
- Storage, handling and disposal of hazardous and non-hazardous waste and chemicals;
- Operation of machinery (including vehicles); and
- Maintenance of infrastructure.

These activities are generally applicable to all proposed projects. It is however noted that the majority of proposed projects are planned on already disturbed areas therefore site clearing of natural vegetation is limited to certain projects as discussed in Section 11, Part A.

4 Composite Map

The Composite Map is attached as Plan 22, Appendix 1.

5 Description of Impact management objectives including management statements

The project activities have been divided into construction and operational phase as detailed in Section 3 above. Potential impacts associated with each project phase as well as possible mitigation measures have been detailed in the Impact Assessment under Section 11, Part A. The Impact Assessment also includes identified unplanned events and low risks as well as cumulative impacts associated with the proposed project activities at the resort.

The proposed mitigation measures are aimed at avoiding the occurrence of impacts. Where impacts cannot be avoided, mitigation measure are proposed to reduce the significance of the impact as far as possible.

Table 5-1 below provides the environmental and socio-economic management objectives for the potential impacts identified for each phase of the project.

Table 5-1: Environmental Management Objectives and Outcomes

Activities	Potential Impact	Aspects Affected	Phase	Mitigation Type	Objective to be achieved
1. Site clearing and vegetation removal; and 2. Establishment of infrastructure.	Soil erosion, dust generation and soil compaction.	Soil, Land Use and Land Capability	Construction	▪ Minimise through site clearing procedures; ▪ Minimise through storm-water management plan; and ▪ Minimise through dust Monitoring Programme.	To prevent the loss of top soil as a resource and uncontrolled erosion
	Loss of topsoil resources as a result of construction of pipelines may occur as land is cleared along the pipeline routes.	Soil, Land Use and Land Capability	Construction	▪ Minimise through site clearing procedures; and ▪ Minimise through soil management programme.	
	Direct loss of floral species/vegetation types and biodiversity	Flora and Fauna	Construction	▪ Control through Alien Management Plan; and ▪ Control through Concurrent Rehabilitation Plan	To minimise the loss of habitat
	Alien vegetation establishment	Flora and Fauna	Construction	▪ Control through Alien Management Plan; and ▪ Control through Concurrent Rehabilitation Plan	To prevent further encroachment of alien plant species and limit fragmentation
	Disturbance of faunal species as a result of habitat destruction and movement of machinery	Flora and Fauna	Construction	▪ Avoid through awareness training	To prevent the disturbance of faunal species and roadkills
	Soil erosion and subsequent sedimentation of wetland and river systems;	Wetlands	Construction	▪ Minimise through soil management programme; and ▪ Minimise through Storm Water Management Plan	To prevent unnecessary impacts on wetlands
	Increased runoff, erosion, sedimentation and possible increase in contaminants / chemicals in the downstream watercourses.	Aquatic Ecology	Construction	▪ Minimise through soil management programme; and ▪ Minimise through Storm Water Management Plan	To prevent loss of aquatic habitats
	Siltation of surface water resources due to increased suspended solids resulting from soil erosion.	Surface Water	Construction	▪ Minimise through Storm Water Management Plan ▪ Control through Dust Management Plan	To prevent siltation of surface water resources
	The impact of siltation resulting in the deterioration of water quality and adverse impacts on aquatic life and downstream water users.	Surface Water	Construction	▪ Minimise through Storm Water Management Plan ▪ Control through Dust Management Plan	To prevent water contamination caused by siltation of surface water resources
	Lowering of groundwater table.	Groundwater	Construction	▪ Avoid through project designs	To prevent excavation below the water table
	Noise disturbance from construction machinery and vehicles	Noise	Construction	▪ Avoid through Vehicle and Machinery Maintenance Plan	To minimise noise levels
	Site clearance resulting in visual impact on the receiving environment.	Visual	Construction	▪ Minimise through project designs; and ▪ Control through Dust Management Plan	To minimise the negative visual impacts caused by site clearance
	Potential job losses to surrounding businesses as a result of construction activities in close proximity	Social	Construction	▪ Minimise through project designs; and ▪ Control through grievance mechanism	To minimise impacts to surrounding businesses.
	Employment opportunity and income generation	Social	Construction	▪ Enhance through recruitment strategy; ▪ Enhance through skills development programmes	To recruit and upskill people from the surrounding communities as far as possible
3. Storage and handling of	Contamination resulting from spills into the natural environment	Soils Surface water	Construction and Operational	▪ Avoid through project designs; ▪ Minimise through emergency response and spill	To prevent contamination from storage areas

Activities	Potential Impact	Aspects Affected	Phase	Mitigation Type	Objective to be achieved
hazardous and non-hazardous waste and chemicals		Groundwater Wetlands Aquatic Ecology		procedures	
4. Operation of infrastructure and pipelines; and 5.Maintenance of infrastructure	Soil erosion, soil compaction and soil compaction	Soils, Land Use and Land Capability	Operational	▪ Minimise through storm-water management plan; and ▪ Minimise through Dust Monitoring Programme.	To prevent the loss of top soil as a resource and uncontrolled erosion and compaction
	Disturbance of faunal species as a result of habitat destruction and movement of machinery	Flora and Fauna	Operational	▪ Avoid through awareness training	To prevent the disturbance of faunal species and roadkills
	Reduced ecological integrity and functioning of wetlands	Wetlands	Operational	▪ Minimise through soil management programme; ▪ Control through Alien Management Plan and ▪ Minimise through Storm Water Management Plan	To prevent unnecessary impacts on wetlands
	Water quality deterioration as a result of sedimentation	Aquatic Ecology Surface water	Operational	▪ Minimise through soil management programme; ▪ Minimise through Storm Water Management Plan ▪ Avoid through maintenance programme	To prevent unnecessary impacts water resources and aquatic biota
	Poor air quality and nuisance dust fallout	Air quality	Operational	▪ Avoid through maintenance programme for machinery	To prevent unnecessary air pollution from generator park and other machinery
	Employment and income generation	Social	Operational	▪ Enhance through recruitment strategy; ▪ Enhance through skills development programmes	To recruit and upskill people from the surrounding communities as far as possible
	Increased demand for local municipal services	Social	Operational	▪ Minimise through collaborative consultation with municipal service providers	To prevent unmanageable pressure of existing municipal services
	Extension of Corporate Social Investment	Social	Operational	▪ Enhance through skills development programmes ▪ Enhance through CSI programmes	To enhance socio-economic development within surrounding communities

6 Impact Management Outcomes

Table 6-1 below provides the detailed EMPr for the proposed developments subject to this application at the Sun City Resort Complex. The EMPr identifies potential impacts and associated mitigation/ management measures for the impact for the Construction and operational phase of the project. The EMPr serves as a tool with practical actions which should be carried out to avoid, modify, remedy, control or stop any activity which may cause pollution or detrimental environmental degradation.

In accordance with Appendix 4 (f)(ii) of the EIA Regulations, 2014 (as amended), the applicable prescribed environmental standards or practices associated with the identified impacts have been reflected in the EMPr.

Due to the nature of the projects, no provisions, as required by the Regulations, related to financial provision for rehabilitation and closure has been included. It is however noted that mitigation measures for concurrent rehabilitation (namely re-vegetation of any open spaces following the completion of construction) has been included to prevent the persistence of certain impacts.

Table 6-1: Environmental Management Programme

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Measures	Compliance with standards
1.Site clearing and vegetation removal; and 2. Establishment of infrastructure.	Soil erosion, dust generation and soil compaction.	Soil, Land Use and Land Capability	Construction	▪ Only clear vegetation when and where necessary; ▪ Only remove topsoil when and where necessary ; ▪ Only the designated access routes are to be used; ▪ Topsoil to be stockpiled separately on piles not higher that 2 – 3m; ▪ Topsoil to be dumped in a single pile to avoid disturbance; ▪ Topsoil should be used for rehabilitation of disturbed area; ▪ Erosion must be controlled by appropriate erosion control techniques including the use of sand bags, organic material; ▪ If erosion occurs, appropriate corrective actions must be investigated and implemented to minimise any further erosion from taking place; and ▪ Ensure proper storm water management designs are in place.	NEMA CARA
	Loss of topsoil resources as a result of site clearance for the establishment of infrastructure	Soil, Land Use and Land Capability	Construction		NEMA CARA
	Direct loss of floral species/vegetation types and biodiversity	Flora and Fauna	Construction	▪ Prior to site clearing associated with any projects proposed to be construction in natural areas, a pre-disturbance survey must be carried out by a qualified Ecologist to mark and identify all SSC; ▪ The degradation and destruction of natural environment must be limited to designated project areas; ▪ Re-vegetate open areas remaining after construction to limit erosion, which will also aid in water infiltration and flood attenuation; and ▪ An alien invasive plant management programme must be developed and implement throughout the construction phase.	NEMA; and NEMBA.
	Alien vegetation establishment as a result of habitat fragmentation	Flora and Fauna	Construction	▪ Any open areas that remain following construction should be re-vegetated immediately; ▪ If alien vegetation is encountered, these species should be removed in the correct way and timeously; ▪ An alien invasive plant management plan must be developed which includes measures for inspection and removal of alien species at the project sites.	NEMA; and NEMBA.
	Disturbance of faunal species as a result of habitat destruction and movement of machinery	Flora and Fauna	Construction	▪ Strict speed limits must be implemented on site; ▪ Construction personnel must be trained on sensitive areas and movement of faunal species; ▪ Signage advising of areas where faunal species may occur must be erected; and ▪ Noise disturbance must be limited as far as possible i.e. machinery must be turned off when not in use and where excess noise is experience noise suppressant mechanisms must be investigated.	NEMA; and NEMBA.
	Direct loss of wetland habitat for the establishment of infrastructure and fragmentation of riverine corridors and sedimentation resulting from site clearing activities	Wetlands	Construction	▪ Berms must be erected around the construction sites to prevent sediment enter freshwater features; ▪ Construction footprints must be limited as far as possible to what is absolutely essential; ▪ The 32 m zone of regulation must be demarcated around the delineated wetlands and strict access control measure within this zone must be enforced; ▪ An alien invasive plant management plan must be developed which includes measures for inspection and removal of alien species at the project sites; ▪ Concurrent rehabilitation, namely re-sloping and re-vegetation of open areas	Section 19 of the NWA; NEMBA; NEMA; and DWAF guidelines for the delineation of wetlands (2005).

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Measures	Compliance with standards
				following construction, must be undertaken throughout the construction phase of each proposed development; and ▪ Ensure a soil management programme is implemented and maintained to minimise erosion and sedimentation.	
	Vegetation removal resulting in increased runoff and erosion in associated watercourses, negatively impacting aquatic ecology	Aquatic Ecology	Construction	▪ Construction footprints must be limited as far as possible to what is absolutely essential; ▪ Berms must be erected around the construction sites to prevent sediment enter freshwater features; ▪ Environmentally friendly barrier systems, such as silt nets or in severe cases the use of trenches, can be used downstream from construction sites; ▪ Concurrent rehabilitation, namely re-sloping and re-vegetation of open areas following construction, must be undertaken throughout the construction phase of each proposed development; and ▪ High rainfall periods (usually December to March) should be avoided during construction. ▪ Culverts and storm water pipelines should be designed and built with large enough diameters to limit blockages (i.e. able to manage 50-year peak flows). Monitoring and maintenance of these structures should be an ongoing process where excess debris in the structures to be removed when noticed; ▪ The culverts should be designed to facilitating the movement of aquatic species up and downstream (i.e. pipe culverts should be avoided and a “stream simulation approach” should be followed); and ▪ The outlets of the proposed culverts should be armoured with naturally occurring structures (i.e. rocks) in order to dissipate the predicted increase flow rates in order to limit erosion.	NWA
	Site clearance resulting in increased runoff facilitating the mobilisation of sediments which contribute to reduced water quality	Surface water	Construction	▪ Berms must be erected around the construction sites to prevent sediment enter freshwater features; ▪ Any soil stockpile during necessary excavation should be moderately compacted to prevent erosion of the soils into the nearby water resources; ▪ Construction footprints must be limited as far as possible to what is absolutely essential; ▪ If possible, construction activities should be prioritized during dry seasons to avoid potential erosion during high rainfall events and ▪ Concurrent rehabilitation, namely re-sloping and re-vegetation of open areas following construction, must be undertaken throughout the construction phase of each proposed development.	Section 19 of the NWA
	Nosie generation as a result of construction activities	Noise	Construction	▪ Construction activities should be restricted to daylight hours; and ▪ Machinery and vehicles must be switched off when not in use.	National Noise Control Regulations
	Poor air quality and nuisance dust fallout as a result of construction activities	Air quality	Construction	▪ Dust suppression should be implemented on exposed areas and dirt roads, if dust is identified as an issue during construction; ▪ Speed limits must be enforced in the project area; and ▪ The drop heights when loading onto trucks and at tipping points should be minimised.	National Dust Control Regulations, 2013; National Ambient Air Quality Standards (2009)

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Measures	Compliance with standards
	Visual intrusion caused by site clearing activities.	Visual	Construction	▪ Limit the footprint area of the surface infrastructure; ▪ Apply dust suppression techniques to limit dust generated from clearing activities; and ▪ Avoid construction activities at night. If required, down lighting and low-pressure sodium light sources must be implemented to minimise light pollution.	NEMA
	Direct disturbance of heritage resources of CS	Heritage	Construction	▪ It is recommended that USP2 is relocated to avoid impacts to the heritage site; ▪ Sun International will be required to apply for a Section 35 Permit prior to construction to obtain authorisation for any partial destruction of the site. No work on the reservoir is permitted without a Section 35 Permit; ▪ A CFP must be developed and implemented; ▪ The construction workforce must trained on the CFP and known heritage resources with the site as part of inductions.	NHRA
	Potential job and income losses to SCWW	Social	Construction	▪ Sun City Exco should collaborate with business such as SSWW in the planning of the construction phasing and timing to ensure minimum disruption in business activities ▪ Sun City Exco should facilitate the establishment of a communication channel between contractors and SSWW and other businesses (if relevant)	NEMA
	Employment and income generation	Social	Construction	▪ A recruitment strategy must be developed which prioritises local labour in the recruitment process as far as possible ▪ Unskilled construction workers are recruited from the local village and up-skilled during construction works ▪ Medium skilled construction workers should where possible be recruited from the local villages surrounding the site ▪ Locals should also be allowed an opportunity to be included in a list of possible local suppliers and service providers for e.g. security services	NEMA
3. Storage and handling of hazardous and non-hazardous waste and chemicals	Contamination resulting from spills into the natural environment	Soils Surface water Groundwater Wetlands Aquatic Ecology	Construction and Operational	▪ All storage of hazardous and non-hazardous chemicals and waste must be in a bunded area with sufficient capacity to contain stored products; ▪ Berms must be erected around the construction sites to prevent contamination; ▪ Spill kits should be placed at all construction site and used according; ▪ Any contaminated soils must be disposed of in an appropriate manner; ▪ Construction chemicals, such as paints and hydrocarbons, should be used in an environmentally safe manner with correct storage as per each chemical's specific storage descriptions; ▪ Ensure that all oil changes, refuelling and lubrication of equipment's is done away from the waterbody and in a manner such that any spillage will not enter the waterbody ▪ Vehicles must be inspected regularly for leaks; ▪ Drip trays must be placed under vehicles and machinery that is being services; ▪ Appropriate sanitary facilities must be provided and all waste must be removed to an appropriate waste facility.	NEMA NWA
4. Operation of infrastructure and pipelines; and	Soil erosion, soil compaction and soil contamination	Soils, Land Use and Land Capability	Operational	▪ Erosion must be controlled by appropriate erosion control techniques including the use of sand bags, organic material; ▪ If erosion occurs, appropriate corrective actions must be investigated and implemented to minimise any further erosion from taking place; and	NEMA CARA

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Measures	Compliance with standards
5.Maintenance of infrastructure				▪ Ensure proper storm water management designs are in place. ▪ Maintenance and inspections of pipelines must be done to minimise compaction and erosion; and ▪ Check leakages on the pipelines regularly to avoid major contamination.	
	Disturbance of faunal species as a result of increased vehicular movement	Fauna and Flora	Operational	▪ Strict speed limits must be implemented on site; ▪ Signage advising of areas where faunal species may occur must be erected; and ▪ Noise disturbance must be limited as far as possible.	NEMA NEMBA
	Reduced ecological integrity and functioning of wetlands	Wetlands	Operational	▪ Ensure that as far as possible all operational infrastructures are placed outside of freshwater areas and their associated 32 m zones of regulation; ▪ Ensure that no incision and canalisation of the freshwater features present takes place as a result of the proposed operational activities; ▪ All erosion noted within the operational footprint should be remedied immediately and included as part of the ongoing rehabilitation plan; ▪ Erosion berms should be installed on roadways and downstream of stockpiles to prevent gully formation and siltation of the freshwater resources. ▪ An alien invasive plan control programme must be put in place so as to prevent further encroachment to the surrounding terrestrial zones; ▪ No unnecessary crossing of the wetland features and their associated buffers should take place and the substrate conditions of the wetlands and downstream stream connectivity must be maintained; ▪ All soils compacted as a result of construction activities should be ripped/scarified (<300mm) and profiled; and ▪ Permit only essential personnel within the 32 m zones of regulation for all freshwater features identified.	Section 19 of the NWA NEMBA NEMA DWAF guidelines for the delineation of wetlands (2005)
	Water quality deterioration as a result of sedimentation	Aquatic Ecology Surface water	Operational	▪ SWMP should be implemented and take into account all drainage lines associated with the new developments which should convey storm water to silt traps; ▪ Bare surfaces downstream from the developments where silt traps are not an option should be vegetated; ▪ Sediment / sand from the beach expansion should be restricted to the beach area with the use of barrier systems to restrict the sand from entering the recreational dam; and ▪ Monitoring of the pipeline and its service routes should be done by a surface water or aquatic specialist biannually during aforementioned survey in order to determine localities of areas subjected to erosion and increased runoff where after new mitigation actions should be implemented as per the specialist's recommendations.	NEMA NWA
	Increase of hard surfaces resulting in increased runoff	Aquatic Ecology Surface water	Operational	▪ Minimise introduction of hard surface while also maintaining the natural vegetation conditions. ▪ The storm water management plan (SWMP) should be designed and maintained appropriately.	NEMA NWA

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Measures	Compliance with standards
	Poor air quality and nuisance dust fallout as a result of construction activities	Air quality	Operational	▪ Low sulphur fuel must be utilised as far as possible; and ▪ Generators must be checked regularly to ensure they burn fuel efficiently	National Ambient Air Quality Standards (2009)
	Visual intrusion caused by established infrastructure	Visual	Operational	▪ Ensure that infrastructure does not exceed the proposed heights as detailed in the specialist report (Appendix 11); ▪ Where possible, surface infrastructure must be painted natural hues so that it blends into the surrounding landscape; ▪ Limit the footprint area of the surface infrastructure; ▪ Where possible, natural vegetation must be re-established around the developments; and ▪ Down lighting must also be implemented for any permanent lights installed during the operation phase.	NEMA
	Employment and income generation	Social	Operational	▪ Prioritise local labour in the recruitment process – this will also limit project-induced in-migration to some extent. ▪ Unskilled workers are recruited from the local village and should be developed (up-skilled) during operations. ▪ Medium skilled workers should where possible be recruited from the local villages surrounding Sun City (e.g. Ledig and South Village). ▪ Locals should also be allowed an opportunity to be included in a list of possible local suppliers and service providers for e.g. security services. ▪ Sun City EXCO should involve SCWW in the planning of its recreational beach area to ensure that the company incurs to long terms losses.	NEMA
	Increased demand for local municipal services	Social	Operational	▪ USPs must be implemented in close coordination with the local municipality to ensure that local systems are able to accommodate an increase capacity of the resort – this is especially relevant during high season when the resort is operating at full (or near full) capacity. ▪ Where local municipal services are under strain, consider supporting the local authority with upgrades through the Sun International's CSI (e.g. as is planned with the South Village water pipeline [USP6]).	NEMA
	Extension of Corporate Social Investment	Social	Operational	▪ Consult with local community leadership to determine actual needs in local community to determine if there is scope within the CSI to address these. ▪ Consult with local and district authorities to determine their development needs and how Sun City CSI can comply with development needs in the local and district IDPs. ▪ Consider regional development programs that are aimed at CSI in the province but do not focus investment solely on local communities – this will also help address the issue of project-induced in-migration to an extent if Sun City aids communities further than their immediate area of impact (e.g. assistance to communities at the N4 turn-off could help minimise the risk for protests).	NEMA

7 Monitoring Plan

Sun City will be responsible for the implementation of all monitoring, mitigation and management measures, as well as compliance with the EMPr. The specific recommended environmental monitoring for the identified impacts associated with the proposed project is detailed below and subsequently summarised in Table 7-1 below.

7.1 Monitoring of impact management actions

The following key environmental aspects for which potential impacts have been identified need to be monitored for the proposed developments:

- Soil erosion, compaction and erosion;
- Vegetation cover;
- Alien vegetation establishment and weed management;
- Water quality and sedimentation of wetlands;
- Surface water quality;
- Groundwater quality;
- Aquatic biomonitoring; and
- Noise levels (if complaints are received).

Further detail of the monitoring requirements is provided in Table 7-1 below.

7.2 Monitoring and reporting frequency

Table 7-1, below, discusses the monitoring and reporting frequency in detail.

7.3 Responsible persons

The roles and responsibilities associated with the monitoring programme are set out in Table 7-1, below.

7.4 Time period for implementing impact management actions

Table 7-1 below captures the time period for implementing impact management actions.

7.5 Program for Reporting n Compliance

Regulation 26(e) of the EIA Regulation, 2014 (as amended) stipulates that the frequency of auditing of compliance with the conditions of the Environmental Authorisation and compliance with the approved EMPr may not exceed intervals of five years. It is recommended that an external independent Environmental Audit should be undertaken every three years. The Environmental Audit will present an opportunity to re-evaluate the

relevance of the EMPr as the construction of the proposed projects progresses as well as an opportunity to make amendment where they may be deemed necessary. The Environmental Audit Report must be submitted to the North West READ and other relevant authorities where required.

7.6 Mechanism for monitoring compliance

Table 7-1 sets out the monitoring and management programme of environmental impacts for the proposed developments at the Sun City Resort Complex.

Table 7-1: Monitoring and Management of Environmental Impacts

Source Activity	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and responsibilities (For the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions
All activities throughout the project	Flora	Vegetation clearing at the project areas must be monitored to ensure no unnecessary disturbance is taking place. This should be done on a weekly basis during the construction phase.	Environmental Manager	Monthly
		The encroachment of alien invasive plant species should be monitored within the project area on a monthly basis and appropriate corrective measures must be undertaken on a monthly basis.	Environmental manager	Monthly
	Fauna	Fauna monitoring should be closely linked to flora monitoring. Small mammals should be monitored using live traps while tracks and ecological indicators should be used to assess the presence of larger mammals. Simultaneous monitoring of birds, reptiles and amphibians as well as invertebrates should be undertaken annually by a registered ecologist using appropriate techniques. Guidelines are provided in the specialist report, Appendix 5.	Ecologist	Annually
	Soil erosion	Daily site inspection will be undertaken by the site manager to ensure that all soil erosion mitigation measures are in place and implemented adequately.	Environmental Manager	Daily
	Surface Water	Sun City has an established surface water quality monitoring programme associated with its current activities and WUL at the resort. Water quality monitoring should continue at these points, however additional points associated with activities applicable to this application are proposed. This includes the Recreational Dam, Ledig Stream2, RL4 in addition to the existing monitoring points. The coordinates of all recommended surface water quality monitoring points are provided in the specialist report, Appendix 8. Surface water quality is recommended to be monitored monthly during the construction phase and the frequency can be reduced to quality post-construction. The parameters to be monitored are detailed in the specialist report, Appendix 8. All samples must be analysed through a SANS accredited laboratory.	Environmental Manager	Monthly
	Groundwater	Groundwater level and groundwater quality should be monitored on a quarterly basis. Similar to surface water, Sun City has an established groundwater monitoring programme. The recommended monitoring boreholes are detailed in the specialist report, Appendix 8 and comprise existing boreholes within the vicinity of the proposed development. No new boreholes have been deemed necessary. The parameters to be monitored are detailed in the specialist report, Appendix 8. All samples must be analysed through a SANS accredited laboratory.	Environmental Manager	Quarterly
	Wetlands	The WET-health tool is to be used to re-evaluate PES of delineated wetlands on an annual basis by a suitably qualified wetland specialist for 3 years after construction. Thereafter, biannual monitoring is recommended for the life of the proposed development. It is recommended that the Environmental Manger be present on site during construction and must ensure that the wetland areas and their associated zones of regulation are clearly demarcated and that no unnecessary clearing of vegetation takes place.	Environmental Manager	Annually (during construction) Bi-annual biomonitoring (3 years after construction)
	Aquatic Ecology	Bi-annual aquatic monitoring must be undertaken at the sampled aquatic monitoring points (refer to specialist report, Appendix 7) to enable the detection of potential negative impacts brought about by the project. This programme should include the following aspects: ▪ Water Quality; ▪ Habitat Quality; ▪ Macroinvertebrate assemblages; and ▪ Fish assemblages	Qualified Aquatic Ecologist	Bi-annually

Source Activity	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and responsibilities (For the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions
	Dust, visual and noise	Dust suppression must be implemented and a dust monitoring network must be established outside of the construction area. Furthermore, heavy machinery and vehicles must be maintained and serviced regularly and, if possible, a silencing system should be fitted. The project activities must only take place during daylight hours. Should any complaints regarding nuisance impacts be received, appropriate monitoring measures must be established to quantify impacts which will inform corrective action plans.	Environmental Manager	As and when required
	Use of hydrocarbons	Daily inspections of machinery must be undertaken and spill trays will be placed under the machinery to collect any hydrocarbon leaks and spillages in the event it is required. Should spillages occur, the soil must be cleared and treated utilising bioremediation techniques. Should the soil not be adequately treated on site, the soil must be removed from the sites and disposed of at a waste handling facility.	Environmental Manager	Daily
	Ablution facilities	The contents of the chemical toilets must be emptied on a regular basis, at least weekly, to prevent spillages	Environmental Manager	Weekly
	Domestic waste	Bins will be placed at various places around the project area to collect the domestic waste and will be disposed of at a registered waste handling facility.	Environmental Manager	Weekly

8 Environmental Awareness Plan

The purpose of an Environmental Awareness Plan is to outline the methodology that will be used to inform employees of any environmental risks which may result from their work and the manner in which the risks must be dealt with to avoid contamination or the degradation of the environment.

8.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

The environmental awareness plan is primarily a tool to introduce and describe the requirements of the range of environmental and social plans for the proposed project during the life of the project.

The environmental awareness plan ensures that training needs are identified and appropriate training is provided. The environmental awareness plan should communicate:

- Importance of conformance with the environmental policy, procedures and other requirements of good environmental management;
- The significant environmental impacts and risks of an individual's work activities and the environmental benefits of improved performance;
- Individual's roles and responsibilities in achieving the aims and objectives of the environmental policy; and
- The potential consequences of not complying with environmental procedures.

The objective of this Environmental Awareness Plan is to:

- Inform employees and contractors of any environmental risks which may result from their work; and
- Inform employees and contractors of the manner in which the identified possible risks must be dealt with to prevent degradation of the environment.

In general, the purpose of implementing an Environmental Awareness Plan is to optimise the awareness of those partaking in all project activities which have the potential to impact negatively on the environment and in doing so, promote the global goal of sustainable development.

Sun City must establish methods of environmental awareness training of its employees and contractors. Health, Safety and Environmental training should be carried out and applicable for all personnel partaking in the project to achieve the objectives set out above.

8.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

Management shall establish and maintain procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to relevant communication from external I&APs. The organisation shall consider processes for external communication on its significant environmental aspects and record its decision.

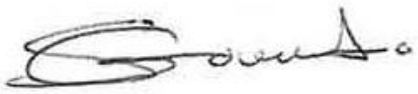
Communication is a management responsibility. All line supervisors are responsible for effective communication within their own sections. Environmental risks will be dealt with through training and communication to ensure minimal degradation of the environment.

9 Undertaking

I, **Sanusha Govender**, herewith undertake that the information provided in this report is to the best of my knowledge correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.

I further undertake that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

Signature of the EAP:



Date: 23 January 2019

Appendix 1: Plans

Appendix 2: EAP CV and Qualifications

Appendix 3: PP Chapter

Appendix 4: Soils, Land Use and Land Capability Impact Assessment

Appendix 5: Fauna and Flora Impact Assessment

Appendix 6: Wetlands Impact Assessment

Appendix 7: Aquatic Ecology Impact Assessment

Appendix 8: Surface Water and Groundwater Impact Assessment

Appendix 9: Noise Impact Assessment

Appendix 10: Air Quality Impact Assessment

Appendix 11: Visual Impact Assessment

Appendix 12: Heritage Impact Assessment

Appendix 13: Socio-economic Impact Assessment