

Draft Basic Assessment Report

Proposed God's Window Skywalk Project

Mapulana Canyon (Pty) Ltd

Submission date: 2022/08/19

Document number: 1001604
Revision: 1

Document control record

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Document Control						
Project name		Proposed God's Window Skywalk Project				
Document number		1001604	Project number		1001604	
Client		Mapulana Canyon (Pty) Ltd				
Client contact			Client reference			
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
0	2022/08/16	Draft BAR for internal review	CD	NW	SvdL	NW
1	2022/08/18	Draft BAR for PPP	CD	NW	SvdL	NW
Current revision		1				

Approval			
Author signature		Approver signature	
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EXECUTIVE SUMMARY

Mapulana Canyon (Pty) Ltd, the Applicant, in partnership with the Mpumalanga Tourism and Parks Agency (MTPA) through a Public Private Partnership (PPP) Agreement intends to develop a new state of the art tourist facility at the already established God's Window located on the Remaining Extent of the Farm De Houtbosch 503 KT and Portion 2 of the Farm Lisbon 531 KT, in Thaba Chweu Local Municipality of Mpumalanga Province.

The God's Window lies on land owned by the State. A land claim was instituted by the surrounding local communities of Pilgrim's Rest Development Trust, Moletele Communal Property Association, Setlhare Communal Property Association and Mahubahuba Bokone Communal Property Association. Development of this area is to allow these communities and residents of nearby areas to derive economic benefits from this portion of land.

The God's Window Skywalk Project has been proposed, to be managed by a Consortium involving the local communities surrounding God's Window in partnership with the MTPA and other project developers. A business ownership model for the project has been developed and a PPP Agreement has been formed with Motsamayi Tourism Group (Pty) Ltd for the design, finance, build, operate and transfer of the God's Window Skywalk at The Blyde River Canyon Nature Reserve, Mpumalanga.

Zutari (Pty) Ltd was appointed by Mapulana Canyon (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to manage the new application for an Environmental Authorisation (EA) and Water Use License (WUL) for this project.

The MTPA was granted an EA by the Department of Forestry, Fisheries and the Environment (DFFE¹) to develop the God's Window Skywalk project on 5 June 2015, with reference number 14/12/16/3/3/3/88.

Due to various delays in the start of construction, including the finalisation of the PPP Agreement and change in architectural designs, and since the Environmental Impact Assessment (EIA) Regulations were amended during this period, the project needs to undergo a new EIA process to ensure the EA is valid, applicable and addresses all current impacts and aspects related to the proposed development.

This report identifies the legal requirements related to obtaining an EA for this project, the predicted and identified impacts (negative and positive) that a project of this nature might have on the affected and surrounding natural and social environment and provides recommendations and mitigation measures aimed at increasing the positive impacts and reducing the negative impacts.

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¹ The DFFE was referred to as the Department of Environmental Affairs (DEA) at that time.

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GLOSSARY

BA	Basic Assessment
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs (previously DEAT)
DFFE	Department of Forestry, Fisheries and the Environment
DRT	Department of Roads and Transport
DWS	Department of Water Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ECO	Environmental Control Officer
EIR	Environmental Impact Reporting
EMPr	Environmental Management Programme
FEPAs	Freshwater Ecosystem Priority Areas
GIS	Geographic Information System
GN	Government Notice
ha	Hectares
HGM	Hydro Geomorphic Management
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IRP	Integrated Resource Plan
LSU	Landscape Unit
MTPA	Mpumalanga Tourism and Parks Agency
NFEPA	National Freshwater Ecosystem Priority Areas
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act, 1998 (Act No. 59 of 2008)
NWA	National Water Act, 1998 (Act No. 36 of 1998)

GLOSSARY

PPP	Public Private Partnership
SAHRA	South African Heritage Resources Agency
SAIAB	South African Institute of Aquatic Biodiversity
SANBI	South African Botanical Institute
SANParks	South African National Parks
TCLM	Thaba Chweu Local Municipality
TIA	Traffic Impact Assessment
VAC	Visual Absorption Capacity
VC	Visual Contrast
VIA	Visual Impact Assessment
WRC	Water Research Commission
WUL	Water Use License
WULA	Water Use Licence Application
WWTPP	Wastewater Treatment Package Plant

Appendix 1	Content as required by NEMA	Section/Chapter
3(a)	(i) details of the EAP who prepared the report; and (ii) details of the expertise of the EAP, including a curriculum vitae.	Control sheet, Section 1.4, Annexure A
(b)	the location of the activity, 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;	Section 1.3, Chapter 4. N/A
(c)	a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Chapters 1 and 4 N/A NA
(d)	a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Chapter 4 Section 2.2 Chapter 4.
(e)	a description of the policy and legislative context within which the development is proposed including i. an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process; ii. how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Chapter 2
(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 location;	Section 4.4
(g)	a motivation for the preferred site, activity and technology alternative;	Chapter 5
(h)	a full description of the process followed to reach the proposed preferred alternative within the site, including - (i) details of all the alternatives considered;	Chapter 5

Appendix 1	Content as required by NEMA	Section/Chapter
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 3.3, and Annexure C
	(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;	Section 3.3, and Annexure C
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 6
	(v) the impacts and risks identified for each alternative, 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;	Chapter 6.
	(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;	Chapter 3
	(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;	Chapter 6
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Chapter 6
	(ix) the outcome of the site selection matrix;	Chapter 5
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	Chapter 5
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Chapter 5,
(i)	a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including— (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Chapter 6

Appendix 1	Content as required by NEMA	Section/Chapter
	(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;	
(j)	an assessment of each identified potentially significant impact and risk, including— <ul style="list-style-type: none"> (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 resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated; 	Chapter 6
(k)	where applicable, a summary of the findings and impact management measures identified in 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 report;	Chapter 6 Annexure G
(l)	an environmental impact statement which contains— <ul style="list-style-type: none"> a summary of the key findings of the environmental impact assessment; a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives; 	Chapter 7
(m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Chapter 6 Annexure G
(n)	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;	Chapter 6

Appendix 1	Content as required by NEMA	Section/Chapter
(o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.5
(p)	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;	Chapter 7
(q)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	NA.
(r)	an undertaking under oath or affirmation by the EAP in relation to- (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (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;	Annexure A
(s)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	NA
(t)	any specific information required by the competent authority; and	Annexure B.
(2)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

1 INTRODUCTION

Mapulana Canyon (Pty) Ltd (hereafter referred to as Mapulana Canyon), in partnership with the Mpumalanga Tourism and Parks Agency (MTPA) via a Public Private Partnership (PPP) Agreement proposes the development of a new tourism facility at God's Window on the farms De Houtbosch 503 KT and Potion 2 of the farm Lisbon 531 KT, in the Thaba Chweu Local Municipality in the Mpumalanga Province.

Zutari (Pty) Ltd (hereafter referred to as Zutari) was appointed by Mapulana Canyon as the independent Environmental Assessment Practitioner (EAP) to manage the new application for an Environmental Authorisation (EA) and Water Use License (WUL) for this project. The proposed project requires an EA in terms of the National Environmental Management Act (Act No 107 of 1998) (NEMA) and its Environmental Impact Assessment (EIA) Regulations (2014 as amended in 2017).

1.1 Background to the Project

The MTPA was granted an EA by the Department of Forestry, Fisheries and the Environment (DFFE²) to develop the God's Window Skywalk project on 5 June 2015, with reference number 14/12/16/3/3/3/88.

Due to various delays in the start of construction, including the finalisation of the PPP and change in architectural designs, and since the EIA regulations were amended during this period, the project needs to undergo a new EIA process to ensure the EA is valid, applicable and addresses all current impacts and aspects related to the proposed development.

In addition to the existing EA, three amendment applications were authorised as detailed in Table 1-1. The first two amendments related to the extension of the validity of the EA. The third amendment authorises the change in the details of the holder of the EA, from the MTPA to Mapulana Canyon.

Table 1-1: Details of authorised amendments to the EA

	Date of amended EA	Details of amendment	Reference number
1st Amendment	2 May 2018	Extension of validity of the EA to 5 June 2021.	14/12/16/3/3/3/88/AM1
2nd Amendment	23 June 2021	Extension of validity of the EA to 5 June 2025.	14/12/16/3/3/3/88/AM2
3rd Amendment	16 March 2022	Change of holder of the EA from MTPA to Mapulana Canyon.	14/12/16/3/3/3/88/AM3

The change of the holder of EA resulted in a change of competent authority from the National Department (the DFFE) to the Provincial Department. Therefore, this new application for environmental authorisation is made to the Mpumalanga Department of Agriculture, Rural Development, Land Reform and Environmental Affairs (DARDLEA).

In terms of the NEMA, the proposed project triggers a suite of listed activities which require authorisation from the competent environmental authority via a Basic Assessment (BA) process before they can be undertaken. The competent authority has been determined to be DARDLEA. DARDLEA's decision will

² The DFFE was referred to as the Department of Environmental Affairs (DEA) at that time.

be based on the outcome of this BA process. The BA process entails a number of phases which are further detailed in Section 3.1.

The purpose of this Basic Assessment Report (BAR³) is to set out and assess the environmental outcomes, impacts and residual risks of the proposed activity. Accordingly, the BAR includes the following chapters:

- Chapter 1 introduces the project and provides a description of the project. It also introduces the EIA project team and provides a summary of the main assumptions and limitations.
- Chapter 2 outlines an analysis of the legal framework relevant to the project.
- Chapter 3 focuses on the EIA methodology, detailing the phases of the BA process as well as the public participation process.
- Chapter 4 provides a project description specific to the proposed transmission line.
- Chapter 5 provides the alternatives that have been considered.
- Chapter 6 describes the baseline environment i.e., current state of the environment, on site and surrounds, and assesses the potential impacts on the environment that may be caused by the project.
- Chapter 7 provides an Environmental Impact Statement summarising the outcomes of the impact assessment and key issues.
- Chapter 8 provides a conclusion and way forward in terms of the application for EA.

A number of annexures accompany this report and include the following:

- Annexure A, provides details on the EAP who compiled this report;
- Annexure B, provides correspondence with DFFE to date;
- Annexure C, contains a Public Participation Plan which entails a comprehensive description of the public participation process as well as proof of public participation undertaken (full proofs to be submitted to DFFE as part of the Final BAR);
- Annexure D, includes specialist input, where this was submitted in a report format;
- Annexure E, DFFE Screening Tool Report;
- Annexure F, Impact assessment methodology;
- Annexure G, Generic Environmental Management Programme (EMPr);
- Annexure H, Site photographs; and
- Annexure I, Maps.

1.2 Project Description

The project entails the total refurbishment, development, and expansion of the existing tourism development at God's Window. The proposed visitor's centre will consist of a lower and upper level. The tourism facility includes the following infrastructure:

- A visitor's centre including:
 - Restaurants, dining areas, cafes and cocktail bars;
 - A museum area;
 - Reception lobbies, courtyards and foyers;

³ Appendix 1 of amended EIA Regulations (GN R982) of NEMA lists the content required in a Basic Assessment Report.

- An auditorium and conference facilities;
 - Lecture rooms;
 - Formalised craft market area;
 - Ablution facilities for staff and guests;
 - Administrative offices.
- Skywalk viewing area;
 - A skybridge;
 - A possible “zero gravity” room (to be confirmed during detail design phase);
 - Stormwater attenuation pond (to manage stormwater run-off and to prevent erosion);
 - An onsite Wastewater Treatment Package Plant (WWTPP); and
 - Formalised parking area (to accommodate for 160 light vehicles, 6 covered bus bays and 14 taxi shuttle bays); and
 - Upgrading of the existing pathways.

Note that this list is not exhaustive but highlights the main attractions, spaces and infrastructure that are proposed for the tourism facility. The facility will also include technical spaces such as IT server rooms, electrical rooms, and wet services. Final architectural designs for the interior layouts will be done in collaboration with the stakeholders to ensure the project meets the needs of the beneficiaries.

1.3 Project Locality

The proposed God’s Window Skywalk Project will be located on Farms De Houtbosch 503 KT and Portion 2 of Farm Lisbon 531 KT within the Thaba Chweu Local Municipality (TCLM), in the Ehlanzeni District Municipality, near the towns of Graskop and Pilgrim’s Rest. These properties are owned by the National Government of the Republic of South Africa and the Provincial Government of Mpumalanga, respectively. The land is under a land claim. A settlement agreement has been concluded between four Communal Property Associations (CPAs): Maorabjang CPA, Sethlare CPA, Mahubahuba aBakone CPA and Moletele CPA.

God’s Window is located on the rim of the Mpumalanga Escarpment, along the Panorama Route in the Blyde River Canyon, located in the Mpumalanga Province in the north-eastern part of South Africa. The site is situated around 95km north of Mbombela which is the largest city in the area. The project site lies 5km north of Graskop, which together with Sabie and Hazyview, forms a triangle of key tourism towns along a scenic route.

A major factor contributing to the popularity of the area is the presence of the Kruger National Park which is one of the world’s most important nature reserves. The Blyde River Canyon Nature Reserve is the second biggest attraction in Mpumalanga. The 57 km nature reserve belt runs from Graskop along the escarpment. The Reserve, and many of the attractions within it, is operated by the MTPA in association with the many communities along the edges of the Reserve.

The Blyde River Canyon is part of a scenic route. This route starts at the town Graskop and includes God’s Window, the Pinnacle, Bourke’s Luck Potholes and the Three Rondavels. There are several waterfalls in proximity to God’s Window including the Berlin Falls and Lisbon Falls. The canyon viewing points are accessible from the R532 by driving north from Graskop. The southernmost observation points, including God’s Window, are accessible from the R534, that provides some of the most spectacular views of the canyon.

1.4 Details of the EAP

Natanya Whitehorn is as an environmental practitioner at Zutari and the Environmental Assessment Practitioner (EAP) for this project. She specialises in environmental auditing and her expertise consists of risk assessment, environmental monitoring and social impact assessments (SIAs), including the study of human interaction with one another and the natural environment. She has experience in fieldwork for impact assessments, environmental monitoring as well as the public participation process (PPP), where, she has assisted and translated at various landowner, stakeholder and public meetings and also gained experience in environmental compliance monitoring by working on a large construction project. Further significant experience includes integrated environmental management (IEM) processes such as environmental impact assessments (EIAs), basic assessment reports (BARs) and the development of environmental management plans (EMPs). She has previous working experience in geo-informatics and geographic information systems (GIS). She has more than a decade of experience working with GIS, which she has gained whilst working on projects for the government, local authorities as well as the private sector. She has also gained skills in spatial representation and interpretation through her involvement in the engineering environment. Natanya has specialised in spatial analysis, data processing and mapping while her technical responsibilities include inter alia the evaluation of data, digitising, editing and converting spatial data and non-spatial data from various formats and manipulating data in Esri ArcMap with extension (XTools, ET Geowizards, ET Geotools), ArcView 3.2 and Planet GIS. She has research experience on biodiversity, natural resources management, and human developmental issues and tutoring experience at a tertiary institution in the field of Information Science (IS). Natanya obtained a Bachelor's degree (Honours) in Geography, majoring in Geo-Informatics and Strategic Environmental Planning, from the University of Johannesburg, South Africa, in 2002. She has also completed a South African Auditor and Training Certification Authority (SAATCA) Certified ISO 14001 Lead Auditors Course. She is a member of the International Association for Impact Assessment South Africa (IAIASa) as well as the Geo-Information Society of South Africa (GISSA). She is also registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA).

1.5 Assumptions, Limitations and Gaps in Knowledge

In undertaking the investigation and compiling the BAR, the following has been assumed:

- The information provided by the client is accurate and no information that could change the outcome of the BA process has been withheld.
- The scope of this investigation is limited to assessing the environmental impacts associated with the proposed construction of the God's Window Skywalk project.
- The BA process is based on Best Practice Guidelines which were available at the time of writing this report.
- Any requisite permits or authorisations in terms of other legislation will be dealt with by the developer.

Any gaps that have been encountered by the specialists are identified in their respective assessments (Annexure D).

The DARDLEA, and other authorities, will be requested to issue their comments. Undertaking the BA process in parallel with the technical planning process does have a number of benefits, which include integrating environmental aspects into the layout and design and therefore ultimately encouraging a more environmentally responsive and sustainable project. The assumptions, limitations and gaps in knowledge is not expected to affect the EAPs assessment or findings of the proposed development.

2 LEGAL AND PLANNING CONTEXT

There are a host of legal and policy documents and guidelines to consider when undertaking such a project. The South African laws and regulations that are considered applicable to the project are described in the section below.

2.1 Relevant Legislation

The South African Constitution informs and underlies the entire legal system in South Africa and the Bill of Rights includes an explicit provision for environmental rights. The Constitution provides a framework for the administration of environmental laws.

The primary environmental legislation in South Africa is the National Environmental Management Act (No. 107 of 1998) (NEMA), which is based on the principles that everyone has the right to an environment that is not harmful to his or her health or well-being and enabling the administration and enforcement of other environmental management laws. NEMA provides the overarching framework for specific environmental management acts, such as the National Water Act (Act No. 36 of 1998) (NWA), the National Biodiversity Act (Act No. 10 of 2004) (NEM:BA) and National Forests Act (Act No. 84 of 1998), as well as the EIA Regulations, which guide the procedures for identifying and assessing impacts related to development and other identified activities.

The applicable laws and regulations for the proposed project are listed in Table 2-1 below.

Table 2-1: Applicable Laws and Regulations

Act	Regulations	Summary of requirements
National Water Act (Act No. 36 of 1998) (NWA)	GN R 267 of 2017: Regulations for Water Use License procedures GN R 509 of 2016: General Authorisation in terms of Section 39 of the National Water Act, 1998 for Water Uses as defined in Section 21(c) and 21(i) GN R 36 of 1998: Part 3: Existing lawful water uses	The NWA is intended to provide for the equitable use of water in South Africa, to prevent the pollution of water and to protect the rights of people and the environment to water. Section 21 of the NWA prescribes that water users must obtain Water Use Licenses (WULs) prior to making any changes to watercourses and for various other activities deemed to be "Water Uses". These may be in the forms of General Authorisations (GAs) or full WULs. Part 3 defines the existing lawful water use and the process to verify the existing water use.
National Environmental Management Act (Act No. 107 of 1998) (NEMA)	2010 EIA Regulations: Government Notice (GN) R 543 to 546 of 2010 2014 EIA Regulations: Government Notice (GN) R 982 to 984 of 2014	In terms of the EIA Regulations certain types of projects and their associated activities require EA prior to the commencement of construction of the proposed project. Listed activities require the undertaking of a Basic Assessment (BA) process or a Scoping and EIA process to obtain EA. The procedural and reporting requirements for both the BA and Scoping / EIA are set out in the EIA Regulations. Three versions of these Regulations have been gazetted under the NEMA since

Act	Regulations	Summary of requirements
		<p>2006, with the 2014 version being the latest. The project commenced under the 2010 Regulations (GN No. R544 and R546 (those requiring a BA process). Although the project only triggered the need for a BA process, the implementation of an on-site wastewater treatment plant the project initially required a WML by means of a Scoping & EIA process. The application was therefore upgraded (prior to the requirement for a WML being repealed) in order to provide for a comprehensive assessment of the impacts associated with the project.</p> <p>The purpose of the impact assessment process is to identify, assess and report on any potential impacts the proposed project may have on the receiving environment, if implemented. The impact assessment report also needs to describe how impacts on the biophysical and socio-economic environment can be, as far as possible, enhanced or mitigated and managed as the case may be. Impact assessment reports and supporting documents are submitted to the Competent Authority (CA), which may be a provincial or national department of environment who need to decide whether to grant or refuse an application for EA.</p>
	<p>Application form for the regularisation of unlawful commencement or continuation of a listed activity or waste management activity in terms of section 24G of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.</p>	<p>Unauthorised commencement or continuation of activities identified in terms of the EIA Regulations can be rectified by means of an application to the Minister or relevant MEC by means of a Section 24G process.</p> <p>Section 24G of the NEMA, without affecting any criminal liability of a person who has acted in contravention of the law, makes provision for that person to submit an application to the relevant MEC/Minister, which, if successful, will enable that person lawfully to continue with the listed activity and/or legalise an otherwise unlawful structure.</p>
<p>National Forests Act (Act No. 84 of 1998)</p>	<p>GN R 908 of 2014: List of Protected Tree Species under the National Forests Act</p>	<p>The National Forests Act provides protection for forests, woodlands and several specified species of trees, which are protected across South Africa. The latest list of protected trees, dating from 2014, contains a total of 47 species, specimens of which may not be cut or damaged without a permit.</p>
<p>National Heritage Resources Act (Act No. 25 of 1999) (NHRA)</p>	<p>National Heritage Regulations (GN R No. 548 of 2000)</p>	<p>The NHRA provides for the protection and conservation of heritage resources in South Africa and for the establishment of the South African National Heritage Resources Agency (SAHRA) and general principles for heritage resources</p>

Act	Regulations	Summary of requirements
		<p>management. The Act requires Heritage Impact Assessments (Section 38 of the Act) for specified categories of development. Under Section 38(2) of the NHRA, the person intending to undertake such a development must submit a Heritage Impact Assessment (HIA) report to the responsible heritage authority. Section 38(8) of the NHRA provides for an HIA report to be integrated with an EIA process in terms of the NEMA.</p> <p>The National Heritage Regulations provide procedures for permitting various actions that may affect heritage objects, including their destruction, damage, removal and excavation.</p>
<p>National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA)</p>	<p>GN R 921 of 2013: List of Waste Management Activities that have, or are likely to have, a Detrimental Effect on the Environment.</p>	<p>The NEM:WA provides for the regulation of waste and its responsible management and disposal. The List of Waste Management Activities specifies activities that require a WML. These activities, together with the Listed Activities in terms of the EIA regulations, may be authorised through an integrated EIA process.</p>
<p>National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEM:AQA)</p>	<p>GN R 893 of 2013: Listed activities in terms of Chapter 5 of the NEM: AQA</p>	<p>The NEM: AQA regulates ambient air quality and atmospheric emissions from particular point sources. Chapter 4 (Part 2) and Chapter 5 of the NEM: AQA provides for the identification of Listed Activities for which an Atmospheric Emissions License (AEL) is required. These activities, which has been identified in GN R 893 of 2013, together with the Listed Activities in terms of the EIA regulations, may be authorised through an integrated EIA process.</p>
<p>National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM: BA)</p>	<p>GN R 598 of 2014: Alien and Invasive Species Regulations GN R 864 of 2016: Alien and Invasive Species Lists</p>	<p>The NEM: BA, through the Alien and Invasive Species Regulations and the Alien and Invasive Species Lists, identifies alien and invasive species and classifies them into a number of classes, which places obligations on the landowner.</p>
	<p>GN 1002 of 2011: National List of Ecosystems that are Threatened and in Need of Protection GN R 151 of 2007: Lists of Critically Endangered, Vulnerable and Protected Species GN R 152 of 2007: Threatened or Protected Species Regulations</p>	<p>The NEM: BA provides for:</p> <ul style="list-style-type: none"> ■ The management and conservation of biological diversity in South Africa; ■ The uses of indigenous biological resources in a sustainable manner; and ■ The fair and equitable sharing amongst stakeholders of benefits arising from bioprospecting involving indigenous biological resources. <p>The Act provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including prohibition</p>

Act	Regulations	Summary of requirements
		on carrying out a “ <i>restricted activity</i> ” involving a specimen of a listed threatened or protected species in terms of Chapter 7 of the Act. Lists of Critically Endangered, Endangered, Vulnerable and Protected Species have been published and a permit system for restricted activities has been established.
	GN 1150 of 2020: Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species	This protocol provides the criteria for the specialist assessments and minimum report content requirements for impacts on terrestrial plant species for activities requiring environmental authorisation. The assessment and reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool) for terrestrial plant species which may occur on site. The relevant terrestrial plant species data in the screening tool has been provided by the South African National Biodiversity Institute (SANBI).
	GN 320 of 2020: Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity	This protocol provides the criteria for the specialist assessments and minimum report content requirements for impacts on terrestrial biodiversity for activities requiring environmental authorisation. The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool). The requirements for terrestrial biodiversity are for landscapes or sites which support various levels of biodiversity. The relevant terrestrial biodiversity data in the screening tool has been provided by the SANBI.
Environment Conservation Act, 1989 (Act No. 73 of 1989) (ECA)	GN R 154 of 1992: Noise Control Regulations Western Cape Provincial Notice No. 627 of 1998	With some exceptions, most parts of the ECA have been repealed. One of the sections that remain in force is the one that enables noise control regulations. National noise control regulations in terms of the ECA are in force in all provinces that have not enacted their own noise legislation.

2.2 Listed Activities in terms of NEMA

NEMA is the primary legislation tasked with the management of environmental resources and, accordingly, identifies activities that require authorisation prior to commencement. The two alternatives considered in this EIA process trigger different activities listed in the amended 2014 EIA Regulations (GN R982, as amended). These activities are detailed in Table 2-2.

Table 2-2: Table of listed activities

Listing Notice and Activity No:	Description of relevant Listing Notice of the EIA Regulations, 2014 as amended.	Description of how the proposed project is applicable to the listed activity.
GN R983, Activity no 12	<p>The development of –</p> <p>(v) weirs, where the weir, including infrastructure and water surface area, exceeds 100m² in size;</p> <p>(x) buildings exceeding 100m² in size;</p> <p>(xii) infrastructure or structures with a physical footprint of 100m² or more;</p> <p>Where such development occurs-</p> <p>(a) within a watercourse;</p> <p>(c) within 32m of a watercourse.</p>	<p>Various proposed infrastructure, such as weirs, buildings and pipelines are located within a watercourse or within 32m of a watercourse.</p>
GN R983, Activity no 19	<p>The infilling or depositing of any material of more than 5m³ into, or dredging, excavation, removal or moving of soil, sand, pebbles or rock of more than 5m³ from-</p> <p>(i) a watercourse.</p>	<p>Various infrastructure including weirs, stormwater attenuation ponds and pipelines are expected to affect the nearby riparian zones as delineated by the aquatic specialist.</p>
GN R983, Activity no 25	<p>The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2000m³ but less than 15000m³.</p>	<p>An onsite WWTPP is proposed to treat the wastewater and sewage generated on site. The sludge generated within the package plant will be manually removed at regular intervals.</p>
GN R983, Activity no 27	<p>Clearance of an area of 1ha or more, but less than 20ha of indigenous vegetation.</p>	<p>More than 1ha of forest vegetation is expected to be cleared during construction. This is a mixture of indigenous and degraded forest. The clearance will be less than 20ha.</p>
GN R983, Activity no 30	<p>Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004).</p>	<p>This activity is deemed relevant due to the various activities triggered by Listing Notice R985.</p>
GN R985, Activity no 10	<p>The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80m³.</p> <p>(a) In Mpumalanga:</p> <p>ii. Outside urban areas, in:</p>	<p>This activity is expected to be applicable during the construction phase.</p>

Listing Notice and Activity No:	Description of relevant Listing Notice of the EIA Regulations, 2014 as amended.	Description of how the proposed project is applicable to the listed activity.
	(aa) A protected area identified in terms of NEMPAA; (ee) Critical biodiversity areas; (ii) Within 100m from the edge of a watercourse.	
GN R985, Activity no 14	The development of- (v) weirs, where the weir, including infrastructure and water surface area exceeds 10m ² in size; (vi) bulk stormwater outlet structures exceeding 10m ² in size; (x) buildings exceeding 10m ² in size; (xii) infrastructure or structures with a physical footprint of 10m ² or more; Where such development occurs- (a) within a watercourse; (c) within 32m of a watercourse.	Various infrastructure, buildings, structures and the weir related to the stormwater attenuation ponds are proposed to be either within the riparian zone, or within 32m of the watercourse.

2.3 DFFE Screening Tool

Government Notice 960, gazetted on 05 July 2019, in accordance with the NEMA EIA Regulations 2014 (as amended) requires that a National web based environmental screening tool is used to produce a report that should be submitted with an EA application.

This report shows, on a high level, the site's sensitivity to development based on different environmental themes (including, inter alia, terrestrial ecology, avifauna, heritage) and identifies assessment protocols that must be undertaken depending on the environmental theme's sensitivity rating within the development site.

Assessment protocols that set out the "procedures to be followed for the assessment and minimum criteria for reporting of identified environmental themes in terms of section 24(5)(a) and (h) of the national environmental management act, 1998, when applying for environmental authorisation" were Gazetted on 20 March 2020. These protocols in terms of reporting of identified environmental themes were met in terms NEMA.

The Screening Tool report is attached in annexure E.

2.4 Relevant Guidelines

This BA process is informed by the series of national Environmental Guidelines where applicable and relevant:

- Integrated Environmental Information Management (IEIM), Information Series 5: Companion to the NEMA EIA Regulations of 2010 (DEA, 2010).
- IEIM, Information Series 2: Scoping (Department of Environmental Affairs and Tourism (DEAT), 2002).

- IEIM, Information Series 3: Stakeholder Engagement (DEAT, 2002).
- IEIM, Information Series 4: Specialist Studies (DEAT, 2002).
- IEIM, Information Series 11: Criteria for determining Alternatives in EIA (DEAT, 2004).
- IEIM, Information Series 12: Environmental Management Plans (DEAT, 2004).
- IEM Guideline Series 7: Public Participation in the Environmental Impact Assessment Process (DEA, 2012)

3 EIA METHODOLOGY

As outlined in Figure 3-, there are two distinct phases in the BA process, namely Pre-Application Phase, and the BA Phase. A description of the activities which have been, and will be, undertaken during each phase is provided in the following sections. Note that this report covers the second phase, viz. the BA Phase.

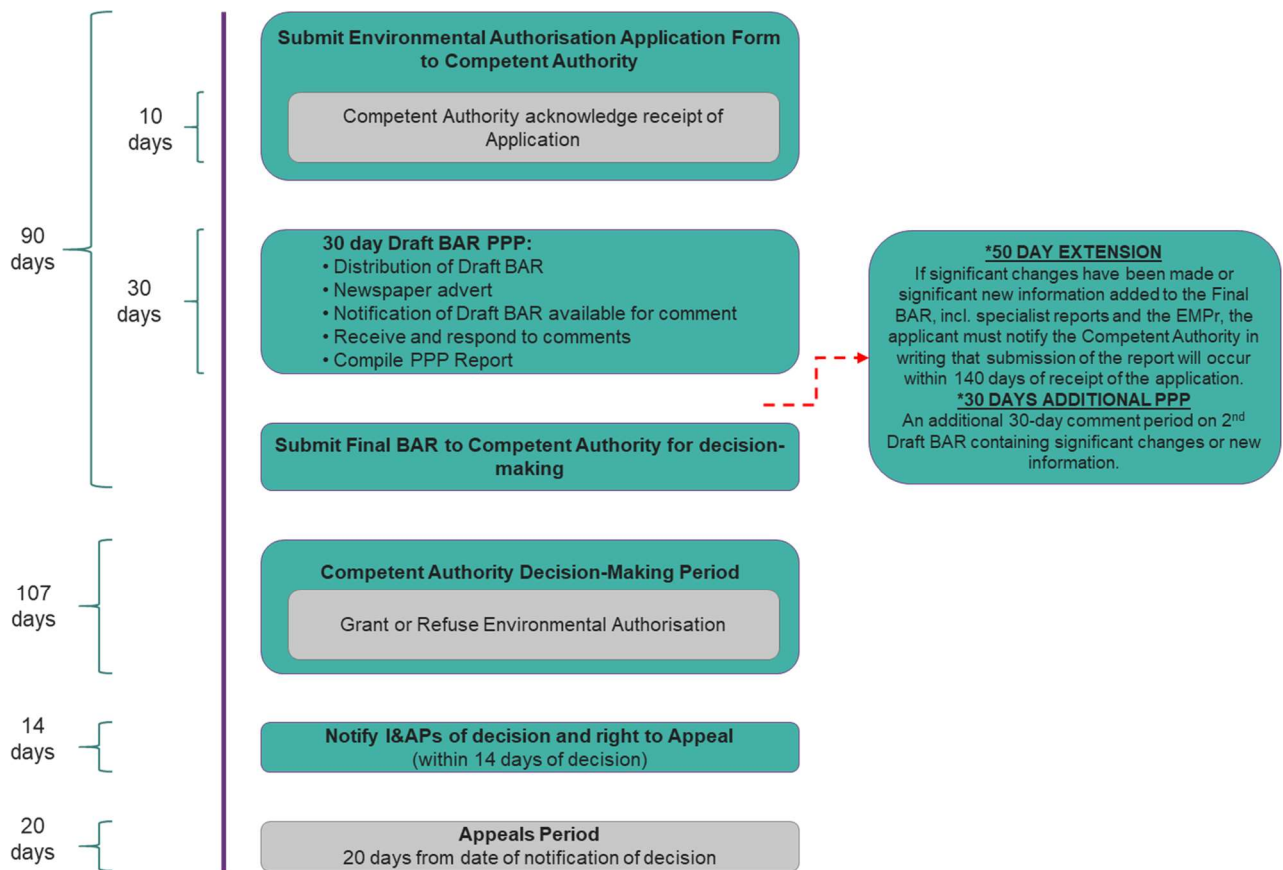


Figure 3-1: The Basic Assessment process flow

As illustrated in Figure 3-, only one stage of public participation is included in a BA process, i.e., comment period on the Draft BAR. More information on the public participation process is included in Section 3.3.

3.1 Phases of the BA process

3.1.1 The Pre-application phase

An official pre-application phase was undertaken to, firstly, confirm the EIA process that is required and, secondly, confirm which listed activities are triggered by the proposed project. An official pre-application meeting with the DARDLEA was not deemed necessary as various discussions regarding the project, the process and the listed activities have already taken place between the EAP, DFFE and DARDLEA. All correspondence with the DARDLEA is attached in Annexure B.

3.1.2 Basic assessment phase

A site visit was undertaken to familiarise the EAP and the specialists with the site and to allow for a site survey, identifying potential areas of concern or opportunity. A site visit by the EAP was undertaken at inception of the BAR phase on 17 March 2022.

The objective of the basic assessment process is to, through a consultative process -

- a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- b) identify the alternatives considered, including the activity, location, and technology alternatives;
- c) describe the need and desirability of the proposed alternatives;
- d) through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine –
 - i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and;
 - ii) 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;
- e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to identify and motivate a preferred site, activity and technology alternative;
 - i) identify suitable measures to avoid, manage or mitigate identified impacts; and
 - ii) identify residual risks that need to be managed and monitored.

Various methods and sources were utilised to identify the potential social and environmental aspects associated with the proposed project and to develop the Terms of References (ToRs) for the specialist studies. The sources of information for the preparation of this report include, inter alia, the following:

- Collection of information specific to the project, as provided by the Applicant;
- Project description;
- Basic methodology for construction of the various project components;
- Basic methodology during operations and decommissioning;
- Expected timeframe for project development;
- Maps and figures, outlining the proposed facilities;
- Technical information relating to design;
- Other relevant BARs/ EIRs prepared for BAs/EIAs undertaken in the area;
- Environmental baseline literature and desktop spatial surveys for this site and surrounding areas;
- Environmental baseline surveys for this site and surrounding areas from site visits by specialists;
- Consultation with the project team (including specialists); and
- Consultation with I&APs, including authorities.

An application form for the project will be submitted to DARDLEA (in order to register the project on the Department's database) along with the BAR for public review, which will be circulated for a 30-day public comment period. All comments received will be recorded and responded to in a Comments and Response Report within the Public Participation Report (Annexure C), and the BAR will be updated to address I&AP comments, where appropriate. The final BAR will be submitted to DARDLEA for decision

making, with the final BAR being submitted no later than 90 days from the receipt of the application form. The competent authority must then, within 107 days of receipt of the final BAR and EMPr, in writing –

- (a) Grant environmental authorisation in respect of all or part of the activity applied for; or
- (b) Refuse environmental authorisation.

Summary of the key dates of the BAR process:

Activity	Date
Site visit	17 March 2022
Placement of site notices in various locations in the Thaba Chweu and Bushbuckridge Local Municipalities	18 & 19 August 2022
Advertisements in English and Sepedi in Mpumalanga News and Hazyview Herald newspapers	24 August 2022 and 31 August 2022, respectively
Lodging of hardcopies of the draft BAR for public review at various locations and on the Zutari website	18 & 19 August 2022
Notification of I&APs and state departments of availability of draft BAR for comment	19 August 2022
Last day to submit comment on draft BAR	19 September 2022
Submit Final BAR to DARDLEA	3 October 2022
DARDLEA to provide decision on application	107 days from date of submission of Final BAR to issue decision.
Notification of registered I&APs of DARDLEA decision and appeal process	upon receipt of DARDLEA decision

3.2 Methodology

3.2.1 Specialist Assessments

To provide a scientific assessment that is transparent and robust, a clear methodology is required. Although each specialist required a methodology that was specific to their investigation (detailed in their reports in Annexure D), they were each given the following ToR:

- Undertake a site investigation to determine the status quo and identify any sensitive features or no-go areas;
- Provide shapefiles of all sensitive features;
- Make use of the Zutari Impact Assessment Methodology (explained below in Section 3.2.2 and appended in Annexure F) when assessing impacts of the proposed project, as well as cumulative impacts (detailed below in Section 3.2.3);
- Provide a detailed description of appropriate mitigation measures that can be adopted to reduce or avoid negative impacts and improve positive impacts for each phase of the project. Indicate the level of significance of impacts pre- and post-mitigation;
- Provide a summary of succinct and practical recommendations based on mitigation measures identified to form the basis of environmental authorisation requirements, should the development be authorised;
- Comply with the content requirements for specialist reports listed in Appendix 6 of the 2014 EIA Regulations (GN R982 of 2014); and

- Comply with procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA, 1998, when applying for environmental authorisation (GN R320, of 20 March 2020).

3.2.2 Assessment methodology

This section summarises the proposed method for assessing the significance of the potential environmental impacts. The detailed impact assessment methodology can be found in Annexure F.

For each predicted impact, criteria are ascribed, and these include the intensity (size or degree scale), which also includes the type of impact, being either a positive or negative impact; the duration (temporal scale); and the extent (spatial scale), as well as the probability (likelihood). The methodology is quantitative, whereby professional judgement is used to identify a rating for each criteria based on a seven-point scale; and the significance is auto-generated using a spreadsheet through application of the calculations in Figure 3-. Specialists can comment where they disagree with the auto-calculated impact significance rating.

Calculations

For each predicted impact, certain criteria are applied to establish the likely **significance** of the impact, firstly in the case of no mitigation being applied and then with the most effective mitigation measure(s) in place.

These criteria include the **intensity** (size or degree scale), which also includes the **type** of impact, being either a positive or negative impact; the **duration** (temporal scale); and the **extent** (spatial scale). These numerical ratings are used in an equation whereby the **consequence** of the impact can be calculated. Consequence is calculated as follows:

Consequence = type x (intensity + duration + extent)

To calculate the significance of an impact, the **probability** (or likelihood) of that impact occurring is applied to the consequence.

Significance = consequence x probability

Depending on the numerical result, the impact would fall into a significance category as negligible, minor, moderate or major, and the type would be either positive or negative.

Figure 3-2: Calculation of significance

Table 3-1: Assessment criteria for the evaluation of impacts

Criteria	Numerical Rating	Category	Description
Duration	1	Immediate	Impact will self-remedy immediately
	2	Brief	Impact will not last longer than 1 year
	3	Short term	Impact will last between 1 and 5 years
	4	Medium term	Impact will last between 5 and 10 years
	5	Long term	Impact will last between 10 and 15 years
	6	On-going	Impact will last between 15 and 20 years
	7	Permanent	Impact may be permanent, or in excess of 20 years
Extent	1	Very limited	Limited to specific isolated parts of the site
	2	Limited	Limited to the site and its immediate surroundings
	3	Local	Extending across the site and to nearby settlements
	4	Municipal area	Impacts felt at a municipal level
	5	Regional	Impacts felt at a regional level
	6	National	Impacts felt at a national level
	7	International	Impacts felt at an international level

Criteria	Numerical Rating	Category	Description
Intensity	1	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
	2	Very low	Natural and/ or social functions and/ or processes are slightly altered
	3	Low	Natural and/ or social functions and/ or processes are somewhat altered
	4	Moderate	Natural and/ or social functions and/ or processes are moderately altered
	5	High	Natural and/ or social functions and/ or processes are notably altered
	6	Very high	Natural and/ or social functions and/ or processes are majorly altered
	7	Extremely high	Natural and/ or social functions and/ or processes are severely altered
Probability	1	Highly unlikely / None	Expected never to happen
	2	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
	3	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
	4	Probable	Has occurred here or elsewhere and could therefore occur
	5	Likely	The impact may occur
	6	Almost certain / Highly probable	It is most likely that the impact will occur
	7	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur

When assessing impacts, broader considerations are also taken into account. These include the level of confidence in the assessment rating; the reversibility of the impact; and the irreplaceability of the resource as set out in Table 3-2, Table 3-3, and Table 3-4, respectively.

Table 3-2: Definition of confidence ratings

Category	Description
Low	Judgement is based on intuition
Medium	Determination is based on common sense and general knowledge
High	Substantive supportive data exists to verify the assessment

Table 3-3: Definition of reversibility ratings

Category	Description
Low	The affected environment will not be able to recover from the impact - permanently modified
Medium	The affected environment will only recover from the impact with significant intervention
High	The affected environmental will be able to recover from the impact

Table 3-4: Definition of irreplaceability ratings

Category	Description
Low	The resource is not damaged irreparably or is not scarce
Medium	The resource is damaged irreparably but is represented elsewhere
High	The resource is irreparably damaged and is not represented elsewhere

3.2.3 Assessment of cumulative impacts

Cumulative effects are commonly understood to be impacts from different projects that combine to result in significant change, which could be larger than the sum of all the individual impacts. This project involves the complete refurbishment of the existing tourism facility at God's Window and is therefore expected to contribute to cumulative impacts when considering developments within a 30km radius. Impacts contributing to such cumulative impacts are predicted to occur within the construction- and operational phases and will be discussed during the impact assessment in Chapter 6 of this BAR.

3.3 Public Participation Process

Stakeholder engagement has been described by the International Finance Corporation (IFC) of the World Bank Group as a broad, inclusive and continuous process of communication between a Proponent (or Applicant) of a project, and those potentially affected by the activities of the proposed development. This can include a wide range of activities that are relevant to the entire life of a project.

The aim of stakeholder engagement differs at different stages of the project lifecycle. During the BA process, the aim is to provide an opportunity for stakeholders to be informed of projects occurring in their area and that may affect them directly or indirectly. It also aims to provide an accessible and meaningful opportunity for people to ask questions, raise concerns or grievances and to ensure that these are used to guide the new development, and ongoing operations, in a responsible manner that complements the local socio-economic environment and enhances the benefit of a given project.

South African legislation and guidelines (refer to Chapter 2) have formalised stakeholder engagement in the BA process and refer to it as the Public Participation Process. The Public Participation Process therefore forms an integral component of this investigation and enables interested and affected parties (I&APs) to identify their issues, concerns, and suggestions during the BA process. This Public Participation Process has been structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to voice any issues of concern throughout the BA process. Although the Public Participation Process is not the same as the Social Impact Assessment (SIA) (which is a specialist report), comments raised during the Public Participation Process will be incorporated into the final SIA where they indicate potential impacts not yet identified during the SIA investigations.

The Public Participation Process stages are described below.

3.3.1 Stages of the Public Participation Process

The stages of the Public Participation Process for this project are described in Table 3-5 below.

Table 3-5: Public participation in the BAR process

Pre-notification phase
Representatives of the Blyde Valley 04 CPAs have been engaged to apprise them of the project and the BA process, and to solicit their views on the proposed PPP approach.
30-day public comment period
The draft BAR will be made available to the public and commenting authorities for 30 days:
All registered I&APs will receive a notification via email and/or SMS of the availability of the draft BAR for comment. The email notification will contain a letter, a copy of the Background Information Document (BID), a link to the website where the draft BAR and its appendices can be perused, and an invitation to comment on the draft BAR and the proposed water uses.
Newspaper advertisements in English and Sepedi will be placed in the Mpumalanga News and Hazyview Herald to notify the public of the project and BA process, inviting them to register as I&APs

as well as to comment on the draft BAR. The adverts will also state where the draft BAR can be accessed.

20 **site notices** will be erected in the Thaba Chweu and Bushbuckridge local municipal areas. These notices will provide information on the proposed project and its location, as well as a link to the draft BAR for comment.

Hardcopies of the draft BAR will be placed at three locations for public viewing.

An **electronic copy** of the draft BAR will be available on the Zutari website. A link to the webpage will be provided in all PPP documents. The webpage will also provide an opportunity for potential I&APs to register as such, and to submit comments on the proposed project or to ask questions about it.

Public meetings will be held during the 30-day comment period.

All comments submitted and questions asked during the comment period will be recorded in a **Comments and Response Report (CRR)** which will be appended to the final BAR for submission to the competent authority. The EAP will respond to all comments (after consultation with the appropriate stakeholder as appropriate, such as specialists and/or the Proponent/Applicant), and these responses will also be captured in the CRR.

BAR finalisation

Following the closure of the comment period, the BAR will be updated where appropriate.

Records of public participation will be appended to the final BAR.

3.3.2 Identification of stakeholders

A database of I&APs has been developed based on the landowner contact details obtained by the Applicant and by Windeed / LexisNexis searches of the affected and neighbouring properties. This includes the applicable CPAs affected by the project.

This database includes the details of the following affected parties:

- Landowners and adjacent landowners;
- Relevant district and local municipal officials and ward councillor/s;
- Relevant national and provincial government officials;
- Neighbouring businesses; and
- Organisations in the area.

This database will be augmented via chain referral during the BA process and will be continually updated as new I&APs are identified throughout the project lifecycle. The list of I&APs is included in Annexure C.

3.3.3 Authority involvement

The following authorities will receive hardcopies of the draft BAR for comment:

- National Department of Water and Sanitation (DWS)
- Mpumalanga Tourism and Parks Agency (MTPA)
- Mpumalanga DARDLEA

Other authorities will be notified that the draft BAR is available for comment, along with a link to the draft BAR.

- Municipalities:

- Thaba Chweu Local Municipality
- Bushbuckridge Local Municipality
- Ehlanzeni District Municipality
- Provincial/regional departments, bodies and parastatals:
 - Mpumalanga Department of Water Affairs
 - Mpumalanga Department of Co-Operative Governance and Traditional Affairs
 - Mpumalanga Regional Land Claims Commission
 - Mpumalanga Department of Public Works, Roads and Transport
 - Mpumalanga Provincial Heritage Resources Authority
 - Inkomati-Usuthu Catchment Management Agency (IUCMA)
 - The South African National Roads Agency Limited (SANRAL) Northern Region
 - Eskom Distribution: Land and Rights Practitioner – Northern Region
- National departments or bodies:
 - Department of Forestry, Fisheries and the Environment;
 - Department of Agriculture, Land Reform and Rural Development;
 - Department of Transport;
 - South African Heritage Resources Agency; and
 - Civil Aviation Authority.
- Other national/ provincial departments, where deemed necessary.

3.4 Summary of Comments and Responses

All comments received during the 30-day comment period on the BAR will be responded to and included in the Final BAR to be submitted for decision-making. All comments and responses will be incorporated into the Comments and Responses Report and will form part of Annexure C after the commenting period is complete.

4 DESCRIPTION OF THE PROPOSED PROJECT

The God's Window Skywalk project centres around the development of a state-of-the-art tourism facility at the existing God's Window viewpoint and craft market to attract visitors from around the world to visit the scenic destination. The following subsections provide more detail on the project context, location, components and activities.

4.1 Project Overview

The God' Window Skywalk project is a one-of-a kind project in South Africa. God's Window is a landmark in South Africa and its pristine natural beauty is what makes this location so special. The design, construction, development, and operation of the God's Window Sky walk will honour this scared, pristine site.

The Skywalk will allow one to physically step off the cliff, onto a glass walkway and walk out into the sky, suspended more than 900m over indigenous forest, with a 360° panoramic view of the Blyde River Canyon, the 3rd largest river canyon in the world. It will be the first sky walk of its kind in South Africa as shown in Figure 4-, and one of the longest in the world, putting God's Window on the bucket list of South African and international tourist destinations. Added to the wonder, the skybridge allows one to walk next to the cliff face suspended over the edge.



Figure 4-1: Rendering of the God's Window Skywalk

The skywalk and skybridge structures will be suspended off the edge of the cliff as shown in Figure 4-. The rock mass coupled with an anchorage-foundation system will be used to tie the skywalk back. The skybridge will be anchored on the cliff face. The skywalk structure is no ordinary structure, and this feat of engineering will be a marvel in itself. In order to deliver a complex engineering project of this nature, the team is made up of a multi-disciplinary technical team with experts covering all specialised requirements – all in South Africa. This project will showcase and be testament to the talent and expertise that South Africa has as it is designed and constructed by South Africans. The technical excellence shown in delivery of this project is potentially award winning in the technical realm. The project will not only be visited for its beauty but the engineering masterpiece that it is will also be the attraction.



Figure 4-2: Image showing proposed skywalk and skybridge

The motivation behind the project is to benefit the local community and land claimants after a settlement agreement was concluded between the four CPAs. Initially, the community will own 10% of the development. However, once the facility is fully operational, ownership will be gradually transferred from the PPP to the community. As such, this development is considered as a major social benefit for the area.

A further benefit is the formalisation of a crafter's market zone within the facility. This will replace the existing dilapidated market area currently in use at God's Window, where local entrepreneurs can exhibit and sell their crafts to tourists, further boosting the local economy and household income of the community.

The successful delivery of the project is driven by four key criteria: technical feasibility, business viability, human desirability, and environmental sustainability. The development of the best solutions for the project will always look for the "sweet spot" between all four criteria as shown in Figure 4-. Environmental sustainability is the encircling factor and solution development will ensure the impact of the project is sustainable and honours this criterion. The creation of solutions and the successful development of the project requires a continual collaboration of all parties throughout the project between contractor, engineers, architect, environmental specialists, quantity surveyor, client, and community. These parties will collaborate and ensure all four criteria are assessed and considered for design and construction. Technical mastery coupled with digital tools will be used to develop and deliver the project. Digital tools such as the detailed drone survey undertaken of the rock face are used to minimise risk and impact to the environment as well as to increase efficiency. The project team is committed to creating the best solutions for the project ensuring successful delivery of the project and honouring the site and the communities it serves.

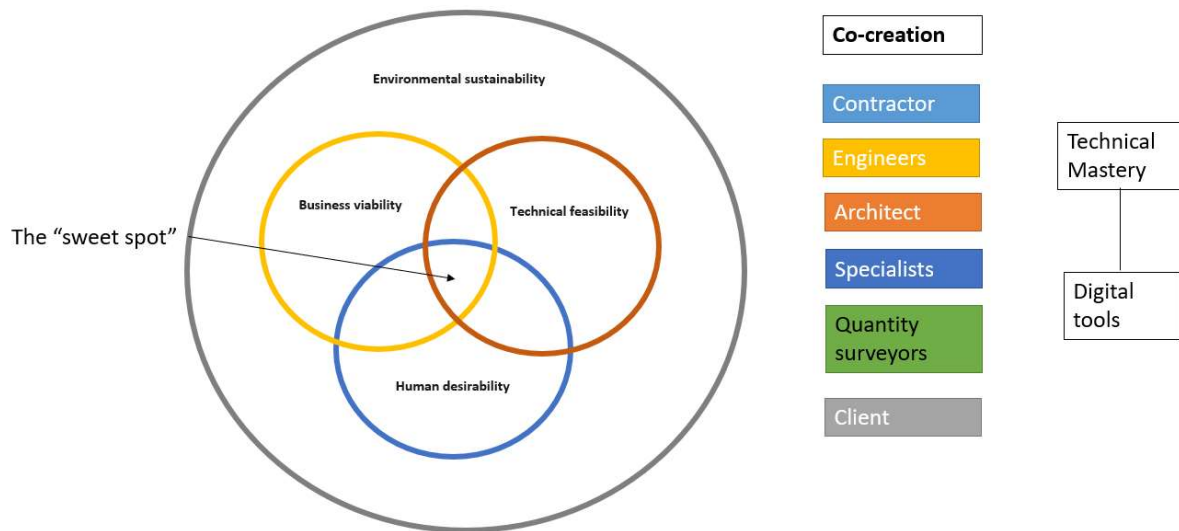


Figure 4-3: Design and construction approach and methodology

The impact of the God’s Window sky walk project is broader. It is an exemplar of engineering that touches the earth lightly. It is showcasing engineering for the future, designing for humans and the environment. The beauty surrounding the local community can be shared at the same time stimulating economic upliftment and the quality of life for the people while respecting and ensuring the natural sanctity of God’s Window. It creates a place where we can take our children and their children.

4.2 Infrastructure details and project extent

The project entails the total refurbishment and development of the existing tourist facility at God’s Window. The visitor’s centre will consist of a lower and upper level. The tourism facility includes (but is not limited to) the following main infrastructure:

- A visitor’s centre, including:
 - Restaurants, dining areas, cafes and cocktail bars;
 - A museum area;
 - Reception lobbies, courtyards and foyers;
 - An auditorium and conference facilities;
 - Lecture rooms;
 - A possible “zero gravity” room (to be finalised during detail design);
 - Formalised craft market area;
 - Ablution facilities for staff and guests; and
 - Administrative offices;
- Skywalk viewing area;
- A skybridge;
- Stormwater attenuation pond (to manage stormwater run-off and to prevent erosion);
- An onsite Wastewater Treatment Package Plant (WWTPP);

- Formalised parking area (to accommodate for 160 light vehicles, 6 covered bus bays and 14 taxi shuttle bays); and
- Upgrading of the existing pathways.

Note that this list is not exhaustive but highlights the main attractions, spaces and infrastructure that are proposed for the tourism facility. The facility will also include technical spaces such as IT server rooms, electrical rooms, and wet services. Final architectural designs for the interior layouts will be done in collaboration with the stakeholders to ensure the project meets the needs of the beneficiaries.

4.2.1 Access and entrance to the facility

Visitors to the facility will be welcomed in from the existing access road off the R532. A parking lot to accommodate cars and busses will be constructed on the northern extent of the development. An arrival court and foyer are proposed from where visitors will be able to access the interior areas of the facility.

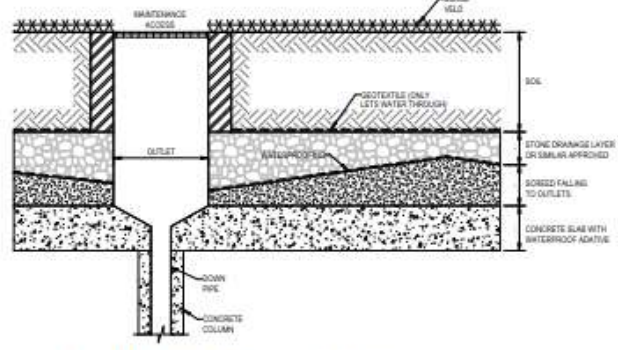
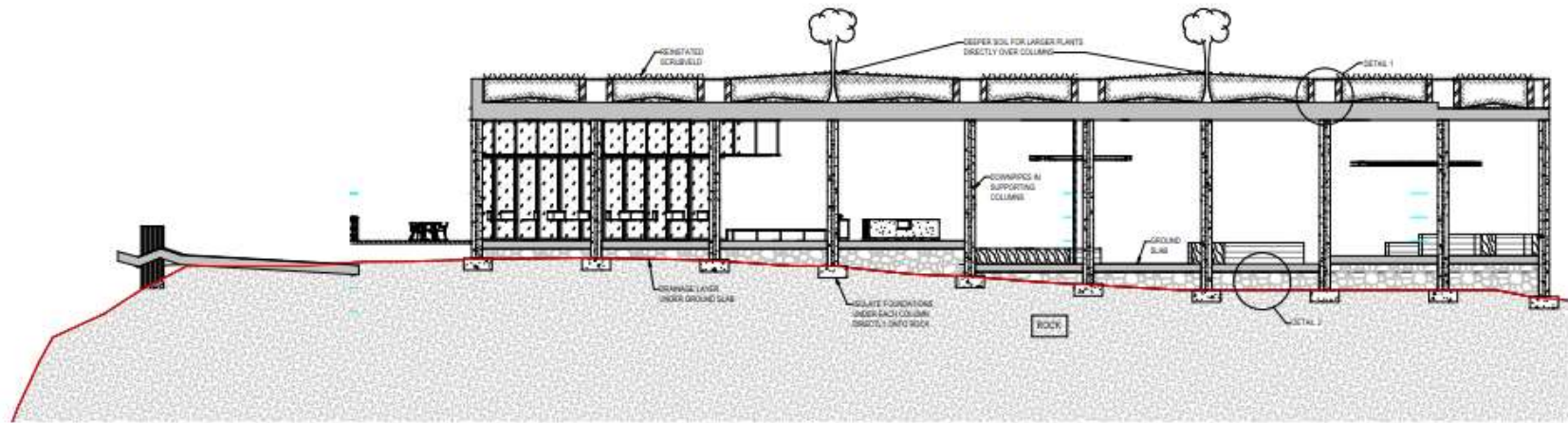
4.2.2 The Visitor's Centre

The Visitor's Centre covers most of the site and will therefore potentially have the largest impact on the area if we do not do what we can to replicate the existing natural environment. In this regard, the concerns from the EIA are essentially split into two components:

- Protecting and maintaining the Scrubveld that supports a host of small mammals, reptiles, and insects. This includes ensuring that movement for fauna across the building is not compromised.
- Maintain the flow of water from the surface through the fissured rock to the cliff face.

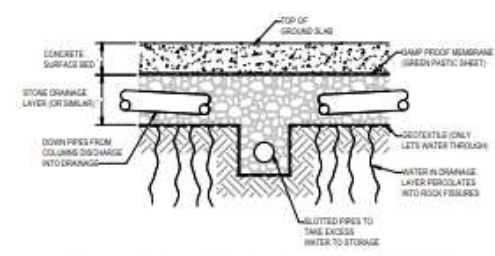
Figure 4- shows a cross-section of the building that describes our proposed interventions to help show how we will address these concerns:

- As far as possible the existing Scrubveld will be preserved by replanting it on top of the roof slab. This helps to replicate the environment for the existing plant and animal life to ensure that they are not displaced or lost.
- The roof slab will be shaped and ramped from West to East so that fauna can easily move across the site through the rooftop Scrubveld as if the building beneath were not in their path.
- There are two components of water to be considered. One is the surface water flow across the site and the second is the flow of water into the rock mass from the surface. The latter is determined by the rock jointing and weathering. The natural balance between surface water and water beneath the ground will be mimicked in the building design. Above the roof slab, water will naturally find its way through the soil for the Scrubveld into an engineered layer below, which will be designed to attenuate the rainwater from above. This will slowly drain to pipes in the supporting columns down into a drainage system below the ground slab. From here the rainwater will either recharge the ground water that naturally percolates into the fissured rocks feeding the escarpment, or it will be stored on site.
- To minimise the impact on the flow of water into the rock mass, the foundations will be designed to allow flow beneath the footprint of the building. Foundations will be single, isolated bases directly beneath each column. A drainage layer will be installed beneath the floor slab and between the single foundations as shown in Figure 4-, minimising the impact on the fissured rock and the natural water flow. An understanding of sub-surface flows based on geotechnical investigation will be used to assess the need for mitigation measures.



DETAIL 1 - DRAINAGE DETAIL AT ROOF SLAB
1:25

VISITORS CENTRE SECTION
1:100



DETAIL 2 - DRAINAGE LAYER UNDER GROUND SLAB
1:25

Figure 4-4: Ecological considerations for the visitor's centre

4.2.3 The Skywalk

The skywalk itself is envisaged to be a glass walkway, extended over the cliff face to offer 360 degrees panoramic view of the Blyde River Canyon. From a structural engineer's perspective, the Skywalk will be the crowning achievement for this project. Cantilevering more than 30 m from the cliff face, it will be one of the longest structures of this type in the world (the Grand Canyon skywalk is only 21 m long!). It is therefore imperative that the team design a world-class structure that is safe and comfortable to use, enhancing the user experience. To this end our local expertise will be complimented by specialists in rock and wind engineering and vibration analysis.

As with all the structures for the project, the engineering design and the construction of the Skywalk must be as sensitive as possible to the natural environment that we aim to share with the visitors. The concept for the Skywalk is explained in Figure 4-. The *bones* of the Skywalk will be a steel structure that will be fabricated and erected in stages moving from the edge out over the canyon. Steel allows the use of relatively light elements, which reduces the foundation requirements at the cliff compared to heavier materials, but still allows for a stiff frame to provide a sense of comfort and safety. As far as possible the steel will be locally sourced from South African mills and merchants. The *skin* around the bones will be sheets of either Corten or C312R steel. Respectively these give a red-rust coating, or a grey-rock look over time, helping to blend into the natural colours of the surroundings.

Rock anchors will need to be drilled into the rock to fix the Skywalk to the cliff face. The fissured nature of the cliff will also require that the rock mass is grouted to form a solid support mass. The impact of grouting will be limited only to the zone of the structure touching the cliff edge and as far as possible any temporary construction works will be incorporated into the final structure. Grouting for the stabilising of the rock mass for the skywalk could potentially impact sub-surface flows, however this is only in localised areas. The goal is therefore that any interference will be localised, reduced, and controlled.

The removal of boulders and large rocks from the cliff edge and cliff face may be required to ensure the safety of users and the structures for the sky bridge and sky walk. Loose boulders and rocks may need to be dislodged during construction. Methods for removal, dislodging and displacement will be agreed with environmental specialists. Loose rocks will be anchored or removed avoiding any displacement downwards during construction.

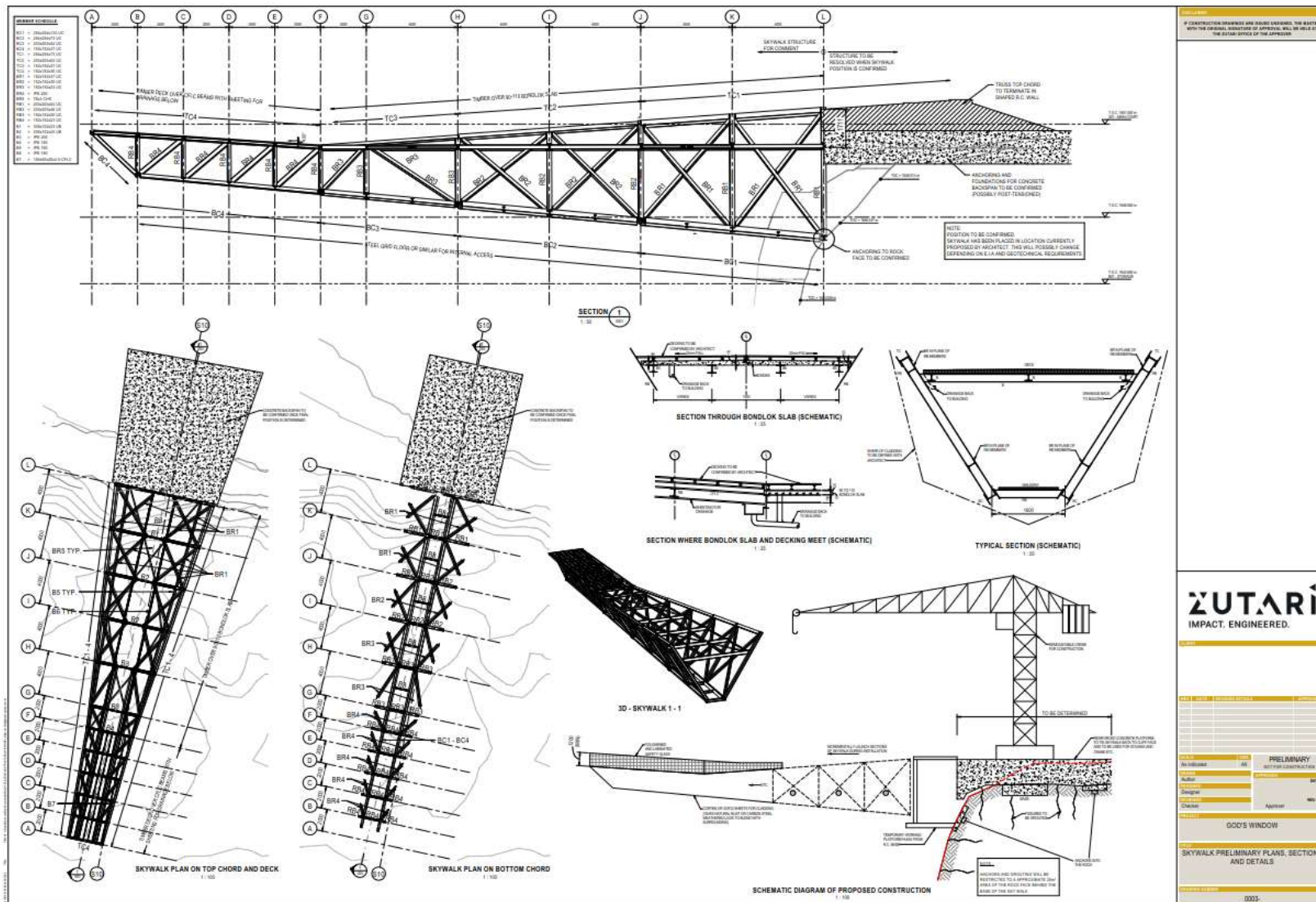


Figure 4-5: Skywalk preliminary plans, sections and details

4.2.4 The Skybridge

The skybridge is the structure hugging the edge of the cliff face along the length of the site. The extent of the Skybridge means that it covers an area supporting a complex habitat of fauna and flora. Flora also receives water from the top ground level through fissures in the rock. The impact on the plant and animal life on the cliff face could therefore be severe, and this impact needs to be treated with as much care and respect as possible. To do this, the design of the sky bridge will ensure that the structure is located away from the cliff face and only connects to the cliff face where the impact is minimised. The design team and environmental specialists will work together to identify where the anchor points along the cliff face should be and limit the connection to the rock to as few of these areas as feasible.

The concept for the Skybridge is shown in Figure 4- and Figure 4-. A series of steel frames carrying a timber and glass walkway will be supported from the rock face. As with the Skywalk, rock anchors or rock bolts will be required to secure the steel frames. Overlapping surveys from the geotechnical engineers and the environmental specialists will be applied to identify where anchors can be installed. These will be assessed to avoid vulnerable fauna and flora and reduce the impact on water flow from the top of the site to the face of the cliff. This will inform the design of the supporting steelwork. The construction of the skybridge will start by installing the first frames on the Eastern side, where the Skybridge starts at natural ground level. Successive frames will be incrementally installed going West, using these as platforms for reaching out to where anchoring the next set can occur. Abseiling will be avoided during this process to protect the plants and wildlife. A drone survey has been undertaken with high quality imagery. This will be used to map the rock face avoiding the requirement for abseiling to map the geology of the rock face and also allows preliminary identification of vegetation species, to be verified during construction. A gap between the rock and the Skybridge deck will be created that will be physically separated from the deck with a balustrade. This will allow water, plants, and animals to freely move along the face of the rock as if the Skybridge were not there. The location of the skybridge and its construction time will consider bat species located on the cliff. The design team will work with the environmental specialists in limiting the impact on any bat species, avoiding interference with roosting spots and sensitivity to roosting and movement times.

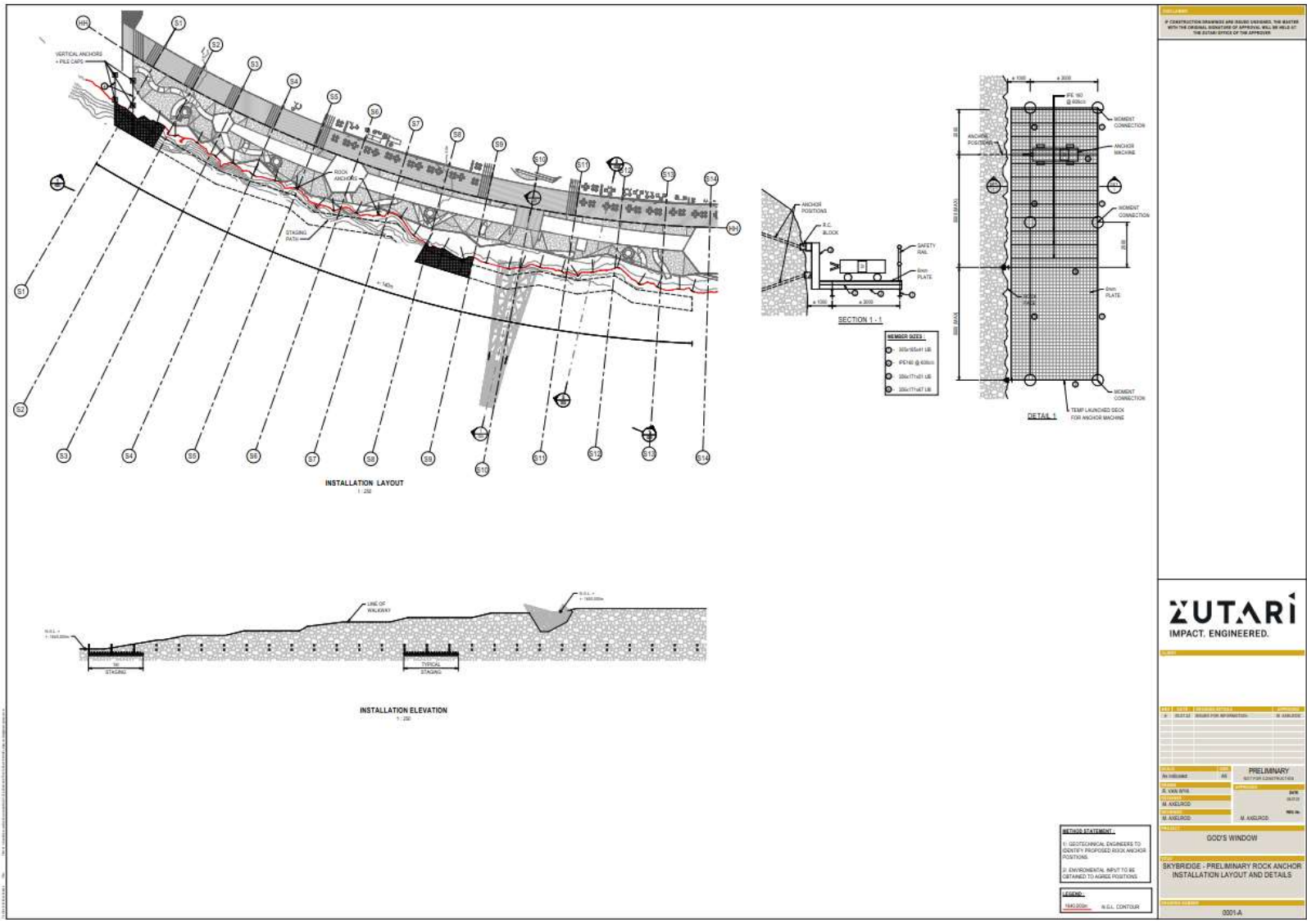


Figure 4-6: Preliminary rock anchor installation layout and details

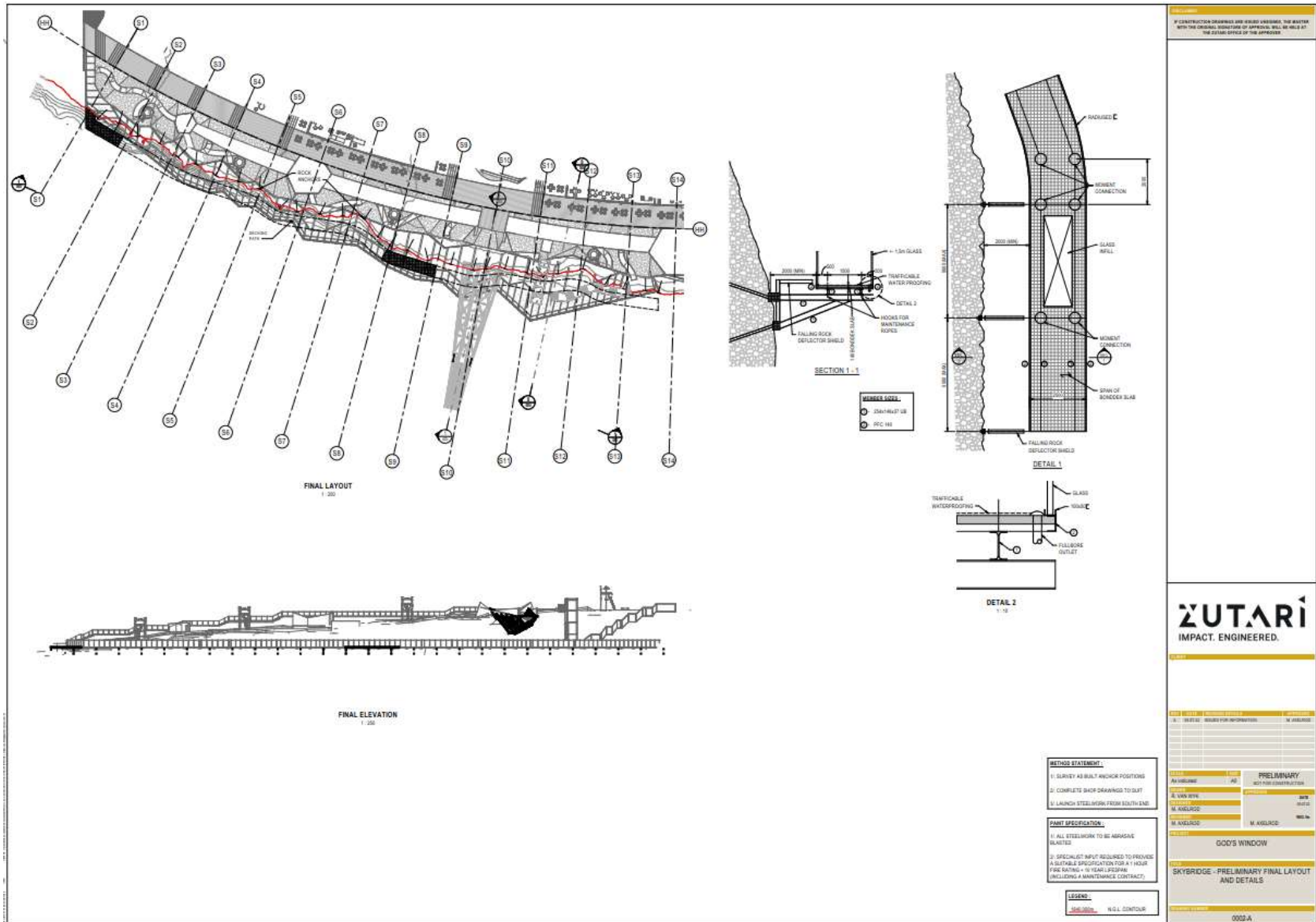


Figure 4-7: Preliminary final layout and details

4.2.5 Stormwater Management

The existing site at God's Window comprises mainly of an existing parking area and an undeveloped portion. The undeveloped portion of the site is covered in *Passerina montana-Scleria transvaalensis* scrubland and the terrain elevations ranges from 1655m to 1647m above mean sea level. The site slopes in the south easterly direction, with typical cross slopes of approximately 5%.

There is an existing 400 mm diameter culvert located north of the site boundary. Stormwater from the northern boundary of the site is directed towards this culvert and discharges into an existing channel on the western side of the existing R543 roadway. The catchment area which discharges into this culvert does not form part of the development site.

The stormwater within the project site boundary is conveyed overland. The stormwater runs over the existing paved parking area in a south-westerly direction and discharges into the natural environment.

The location of the existing stormwater infrastructure is indicated in Figure 4-



Figure 4-8: Existing stormwater infrastructure

To ensure that the runoff from the development does not exceed the pre-development runoff for a particular storm event, a stormwater attenuation pond will be constructed to attenuate the peak runoff before it is discharged and flows downstream into the natural environment.

The stormwater design for the development will be completed in accordance with the "SANRAL Drainage Manual", "Guidelines for Human Settlement Planning and Design" (Red Book), and engineering best practices. The following parameters are proposed to be used in the design:

Table 4-1: Stormwater design parameters

Criteria	Assumption
Flood Routing Method	Rational Method
Mean Annual Precipitation	1,195 mm
Design Recurrence Interval	1 in 50-year
Post-development slope (assumed)	1% or 1:100

The calculated post-development stormwater runoff for a 1 in 50-year storm event is 1.4 m³/s. There is no existing stormwater infrastructure which could accommodate the stormwater runoff from the development. A stormwater management system will therefore need to be implemented. Stormwater from the development site area will predominantly flow overland. Sustainable Urban Drainage Design Systems will be implemented to manage the stormwater runoff from the development.

The development site has been divided into two catchments as illustrated in Figure 4-. The first catchment comprises of the parking area (highlighted in blue), and the second catchment comprises of the roof area for the building (highlighted in green).

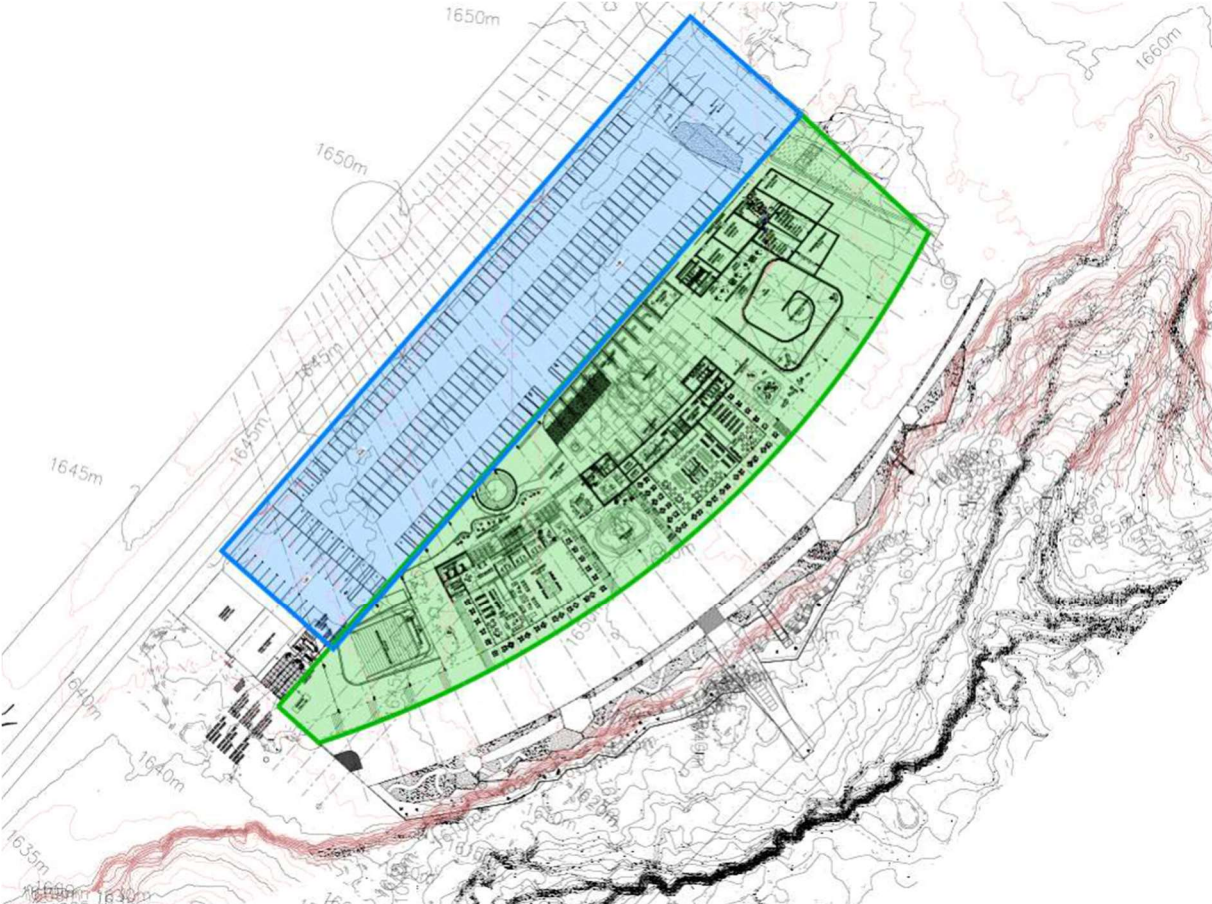


Figure 4-9: Stormwater catchments proposed for the new development

The parking area will be constructed using permeable paving blocks. Rain within this portion of the site will infiltrate through the permeable paving blocks at an estimated rate of 1.2 m³/s, and into a unique sub-base below the paving layer. The water will flow within the sub-base and released downstream into the natural environment in a controlled manner.

A garden will be planted on the roof of the building area. Some of the rainwater falling on the roof will be absorbed by the plants in the garden. The remainder of the stormwater will be directed to the underside of the building to recharge the sub-surface environment.

The difference in stormwater runoff for the 1 in 50-year storm event and the infiltration rate through the paving blocks is 0.2 m³/s. This difference equates to a required attenuation storage volume of 174 m³ which will accommodate the stormwater which does not infiltrate through the permeable paving blocks. This attenuation pond will be located at the south-western portion of the site within the disturbed wetland, Riparian 1. The stormwater within the attenuation pond will be discharged into the wetland in a controlled manner, ensuring that the pre-development runoff rate is not exceeded. This will further encourage the recharging of the sub-surface environment. The attenuation pond will have a trapezoidal cross-sectional shape with assumed side slopes of 1V:2H.

4.2.6 Wastewater Treatment

There is currently no municipal sewer pipeline connecting to the existing site, and no municipal sewer network in the vicinity. There are existing ablution facilities which discharge into an existing septic tank which is not in good operating order. Water for these ablution facilities is sourced from a spring located towards the north-eastern boundary of the site.

It is proposed that a WWTPP be installed to manage the wastewater from the development site. The treatment plant will treat the wastewater to general standards and the treated effluent will be discharged into the environment in a controlled manner. It is proposed that the wastewater treatment package plant be located at the south-western edge of the project footprint boundary (Figure 4-).

The design of the sewer reticulation network will be done according to the “Guidelines for Human Settlement Planning and Design” (Red Book) issued by CSIR building and construction technology and engineering best practices.

The sewer discharge was estimated to be 80% of the water demand for the development. See Table 4-2 for the sewer demand calculations.

Table 4-2: Sewer demand calculations

Demand/day (l/day)	Demand (l/day)
Total Water AADD	95,370
Sewer Discharge (80% of Water AADD)	76,296
15% Stormwater infiltration	11,444.4
Total	87,740.4
Which Equates to	88 kl

A 90 kl containerised WWTPP will be provided to treat the wastewater to general discharge limits as required by DWS. The WWTPP will not generate any sludge as it will be a biological treatment plant where biomass created will be consumed by the bacteria within the treatment plant. As this development falls under the land-use category business/ commercial, a peak factor 1.5 was assumed and this resulted in an equivalent peak flow of 1.52 l/s.

In summary, the worst case peak wet weather flow from the proposed development is 1.52l/s. The sewage in the development will be collected and treated to DWS general standards in the containerised WWTPP and released to the environment in a controlled manner. Sewer discharge from the proposed development will have no impact on the existing infrastructure.

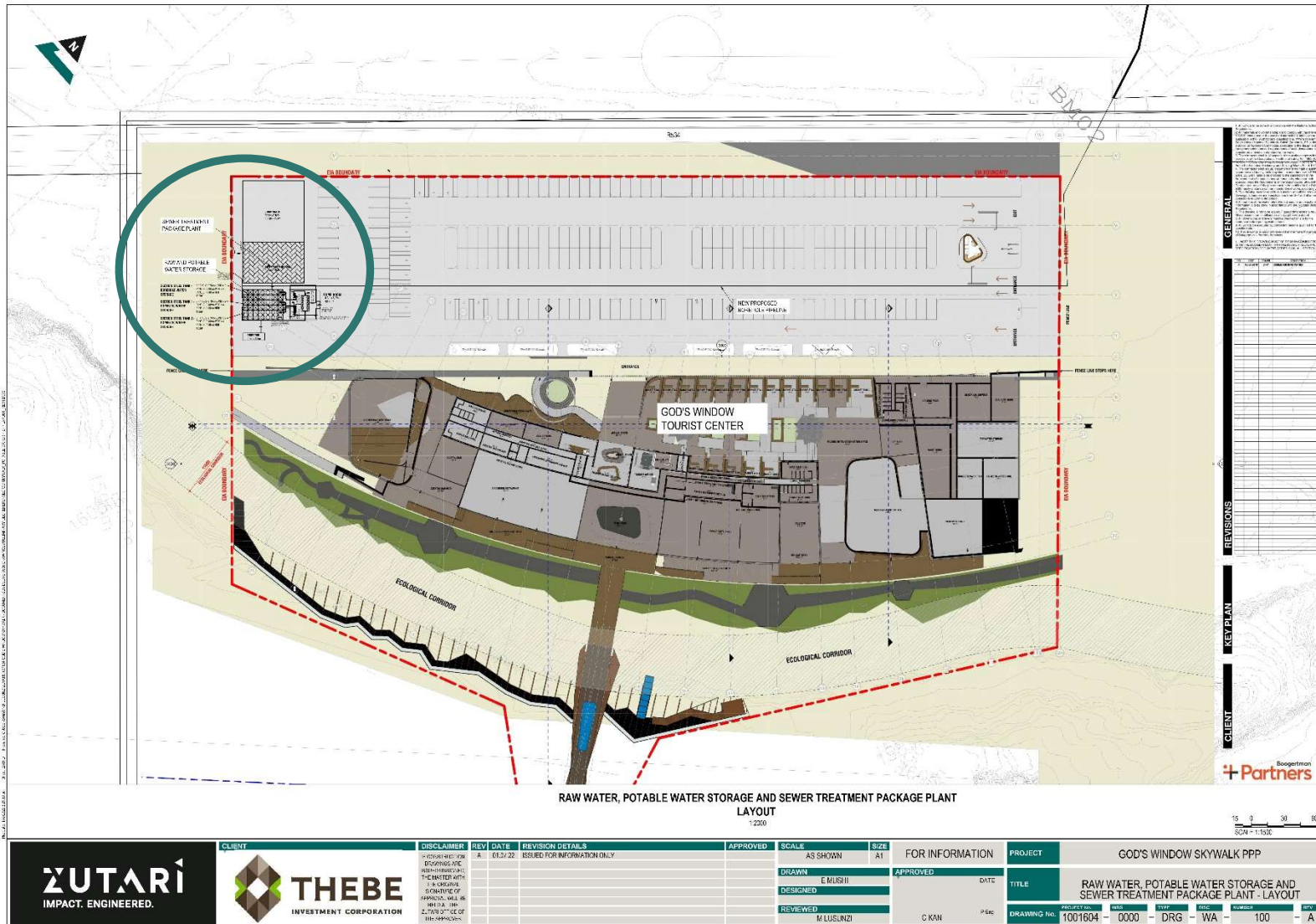


Figure 4-10: Preliminary design drawing indicating the proposed position of the wastewater treatment package plant (red circle)

4.2.7 Electricity supply

There are currently no existing electrical services on the site. The site requires that the primary supply be Eskom, complemented by a diesel generator. The load estimate for the proposed development was calculated based on SANS 204: Energy Efficiency In Buildings. A load estimate of 85VA/m² was used for the majority of areas, but selectivity was also applied for the different areas depending on the area usage and occupancy.

The load calculations can be summarised as below:

- Total Area used in calculation (approx.): 8125m²
- Average load VA/m²: 60VA/m²
- Total Load including 20% spare capacity: 585kVA
- Next size transformer up: 630kVA, 22kV/400V

The primary supply to the development will be Eskom. The supply to the area will be a 22kV Overhead line and will be installed along the R534 road.

The MTPA has applied and paid for a 50kVA connection from Eskom. The image below shows the proposed route of the overhead line to Gods Window.



Figure 4-11: Proposed Eskom supply route to God's Window

Although the final position of the transformer has not been decided yet, the diagram in Figure 4-13 shows an indicative position of the transformer location on site.

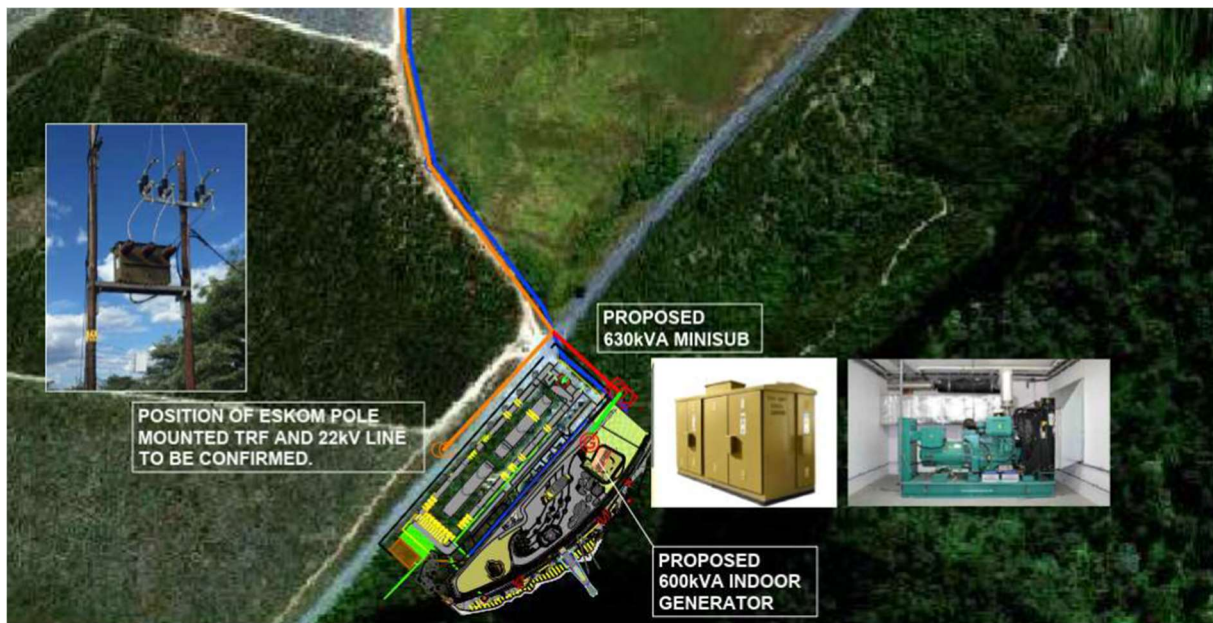


Figure 4-12: Draft layout indicating proposed transformer position (orange) and indoor generator (red)

In summary, the development will require that the 50kVA supply be upgraded to the required 630kVA. Discussions with Eskom are ongoing at this stage for the upgrade to the required 630kVA. The installation of a 500kVA Diesel Generator forms a part of the project to complement the Eskom Primary Source of Supply to the development.

4.2.8 Upgrading of existing pathways

The existing God's Window tourism site has established footpaths leading visitors from the parking area to the lookout points over the canyon. These footpaths mainly consist of paving made from natural stone tiles and wooden handrails in steep areas.

The new tourism development intends to upgrade these footpaths to ensure a higher level of safety and aesthetic value for the visitors. These upgrades may include replacing the paving with a non-slip paver and upgrading the handrails where necessary.

It is not envisaged that the footpaths will be widened permanently, however the adjacent vegetation is expected to be impacted upon during the construction period. As such, it is recommended that the area be demarcated prior to any work being done on the footpaths to prevent any undue disturbance. Any protected plant species that may be impacted on will be removed according to the applicable legal procedure.

4.2.9 Fire Management

Fires are common on the African continent and lead to a high number of annual fire disasters which result in many human fatalities and considerable financial loss. Increased population growth and concentrated settlement planning increase the probability of fire disasters and the associated loss of human life and financial loss when disasters occur.

In order to better understand the spatial and temporal variations and characteristics of fires in South Africa, an 11-year data set of MODIS-derived Active Fire Hotspots was analysed using an open-source geographic information system. The study included the mapping of national fire frequency over the 11-year period. Results indicate that the highest fire frequency occurred in the north-eastern regions of South Africa, in particular the mountainous regions of KwaZulu-Natal and Mpumalanga.

The fire design report related to roof vegetation and wildfire risks to the project is included in Annexure D. This report takes the recommended mitigation measures of the biodiversity specialists (specifically the fauna and flora mitigation measures) into account as far as possible to retain the ecological

connectivity of the areas surrounding the development. Figure 4-13 illustrates the required fire management designs that comply with the local authority and statutory requirements so that fire safety is achieved to as high a standard as possible while endeavouring to conserve the vegetation surrounding the development.

Due to the repurposing of the building's roof to relocate vegetation (i.e. the "green roof") much of the development's environment will need to be actively managed. In particular, the management of vegetation fuel loads on the roof will be necessary.

The grassland and surrounding woodlands at the God's Window site are expected to cause high intensity fires (also known as hot fires). As such, effective mitigation measures are required to be implemented according to the risk areas identified.

4.2.9.1 Natural ventilation roof openings

The natural ventilation and light openings with vegetation overhang or growing through the openings as per the architect's concept (Figure 4- and Figure 4-) increases the risk of fire spreading from roof level to the occupied ground level. To mitigate this risk, the following design requirements are proposed:

- Create a 3m wide vegetation free border zone around roof openings can be seen in Figure 4-13.
- Provide exterior fire sprinkler protection against the soffit around the roof openings.
- All wood cladding or pergolas will require fire treatment such as intumescent paint protection to ensure the building can be evacuated and occupants can escape safely within 5 minutes.
- Adequate means of escape to be provided in each portion of the building components including sufficient refuge areas and escape measures for disabled occupants.

4.2.9.2 Building structures on top of roof level

A wildfire raging from the Northeast or South West neighbouring sites vegetation side or driven up the cliff face towards the building by wind poses a risk to spread fire to the rest of the roof as well as the lower ground floor level and mechanical HVAC plant rooms on the roof. To mitigate this risk, the following design requirements are proposed:

- Mechanical plant rooms to have 120min fire rated wall construction.
- Provide exterior fire sprinkler protection to natural light and ventilation openings above roof level.
- All buildings on the roof will require early warning and heat detection.
- Change the 15m wide area setback from the cliff edge into an irrigated wet vegetation landscape with evergreen plants to ensure a natural fire break border in front of the building.
- Create a 3m wide vegetation free border zone around roof openings.
- Create 15m wide vegetation free, fire break zone between roof vegetation and natural bush / plantation on northeast and southwest side onto roof.
- Install an irrigation system to ensure green and wet vegetation zones on the roof and in front of the building during dry seasons.
- Maintain and keep escape feeder routes and walkways free from vegetation.

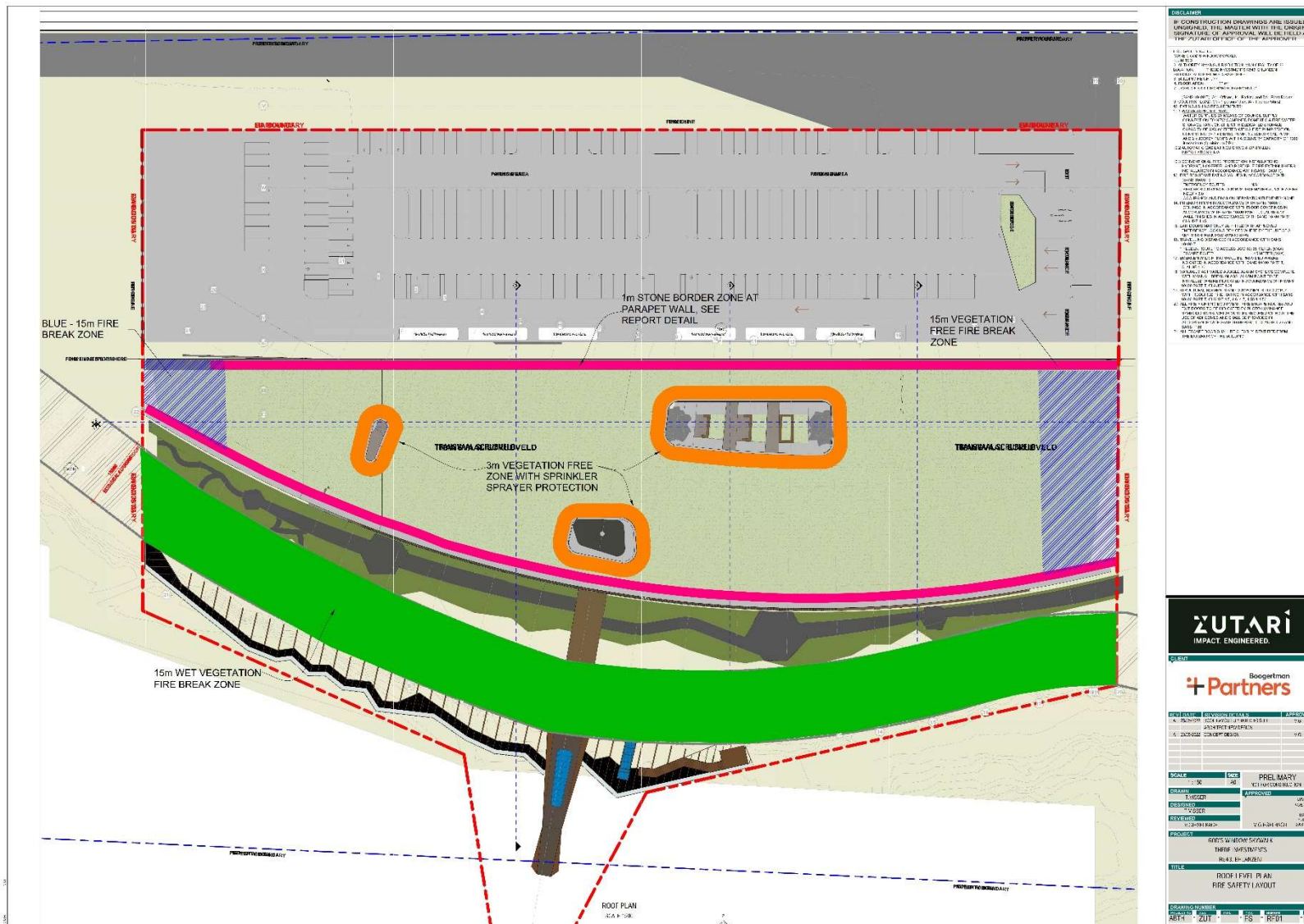


Figure 4-13: Fire management plan from a rooftop view of the proposed project



Figure 4-14: Concept design of roof openings with vegetation overhang



Figure 4-15: Concept design of a roof opening with a tree growing through

4.2.10 Traffic Management

It is anticipated that the development will attract approximately 1 089 visitors and 161 employees (accommodation schedule proposed by the project team), totalling to 1 250 person per day. As per the accommodation schedule proposed by the project team, the number tourist centre is expected to attract approximately 1047 people per day.

The proposed access to the site is to be situated at the existing location. As per the site plan, the parking is to be completely redeveloped to consist of the following parking bays:

- ▶ 160 visitor parking bays;
- ▶ 14 taxi parking bays;
- ▶ 6 bus parking bays; and
- ▶ 20 staff parking bays.

The following car occupancy has been assumed for the future development:

- ▶ Private car – 3 persons per vehicle
- ▶ Bus – 60 persons per vehicle
- ▶ Minibus taxi – 14 persons per vehicle.

The person trip modal split for the future God’s Window development, based on the development schedule, has been proposed as follows:

- ▶ Private car -: 46%
- ▶ Bus - .35%
- ▶ Minibus taxi- 19%

Table 4-3 illustrates the number of person (visitors and employees) per mode and number of vehicles (estimated using the proposed vehicle occupancy per mode), expected to access God’s Window daily.

Based on the development schedule (facility capacity), about 240 vehicles are estimated to accesses the future development per day.

Table 4-3: Daily number of persons and vehicles per mode for the proposed development

Mode	persons	Vehicles
Car	579	207
Bus	434	8
Minibus Taxi	236	24
Total	1250	239

In terms of traffic movement each vehicle is expected to generate an inbound and outbound movement per day resulting to at least two trips. On this basis, the future development can be expected to generate about 480 vehicle trips per day.

Table 4-4 shows the expected peak hour volumes which were estimated using the 12% derived from peak hour traffic of the traffic count conducted for this study.

Table 4-4: Proposed development peak hour trip generation

Mode	In	Out
Car	26	26
Bus	1	1
Minibus Taxi	3	3
Total	30	30

Based on the trip generation results, the proposed development is expected to generate about 60 trips during the peak hour.

Table 4-5 summarises the trip generation result of the existing development and the future proposed development.

Table 4-5: Comparison of the existing development and future development trip generation

Mode	Peak hour trip generation (vehicles)	Difference – Proposed development – existing development (vehicles)
Proposed development	60	
Existing development - Friday normal day	26	34
Existing development – Saturday normal day	129	-69
Existing development – Friday abnormal day	190	-130
Existing development – Saturday abnormal day	206	-146

The following can be concluded on the trip generation findings:

- ▶ The peak hour trip generation for the future development is approximately double the current trip generation for a normal weekday (in this case, Friday) but less than half of the current normal weekend day (in this case Saturday). It should also be noted that the future development trip generation is less than the average week peak hour traffic $((129+26)/2=78)$
- ▶ Considering the future proposed development is anticipated to attract more visitors, for this study, it was decided to conduct a sensitivity analysis to test a wide range of scenarios pertaining possible trip generate scenarios by the future proposed development. The scenarios included the following:
 - Low growth scenario – No additional trips are generated at the proposed development
 - Medium growth scenario- The proposed development will attract a magnitude of additional trips that is equivalent to 50 % of the current trips at the site
 - High growth scenario- The proposed development will attract a magnitude of additional trips that is equivalent to 100 % of the current trips at the site

4.2.10.1 Proposed road upgrades

Based on the traffic counts and figures as presented in the traffic impact assessment (Annexure D), no road upgrades are deemed necessary for the R534 and R532 (North), nor the R534 and R532 (South) intersections.

On a normal day at the Main Street, R532 and Richardson Avenue intersection will operate at an acceptable level and will therefore not require any upgrades. On an abnormal day, as previously mentioned, the intersection currently does not operate at an acceptable level and will slightly worsen up until 2027. A way to remedy the poor operational performance of the intersection is to signalize the intersection. Table 4-6 illustrates the results from the capacity analysis if this intersection were to be signalized.

Table 4-6: Signalised Main Street and R532 and Richardson Avenue capacity analysis

Intersection	Type of Intersection	Movement	Normal Day						Abnormal Day					
			FRI Peak Hour			SAT Peak Hour			FRI Peak Hour			SAT Peak Hour		
			V/C	Delay(s)	LOS	V/C	Delay(s)	LOS	V/C	Delay(s)	LOS	V/C	Delay(s)	LOS
Low Growth	South		0.222	14.9	B	0.210	15.5	B	0.997	37.7	D	0.669	18.5	B

Intersection Type of Intersection	Movement	Normal Day						Abnormal Day					
		FRI Peak Hour			SAT Peak Hour			FRI Peak Hour			SAT Peak Hour		
		V/C	Delay(s)	LOS	V/C	Delay(s)	LOS	V/C	Delay(s)	LOS	V/C	Delay(s)	LOS
	East	0.244	10.5	B	0.218	10.3	B	0.850	29.4	C	0.660	13.6	B
	North	0.192	15.0	B	0.217	15.6	B	0.714	25.4	C	0.690	18.8	B
	West	0.244	10.7	B	0.220	10.2	B	1.000	58.6	E	0.668	13.7	B
	Overall	0.244	12.9	B	0.220	13.0	B	1.123	37.5	D	0.690	16.2	B
Medium Growth Scenario	South	0.227	14.8	B	0.247	15.1	B	1.123	48.7	D	0.803	20.6	C
	East	0.249	10.5	B	0.266	10.8	B	0.957	41.9	D	0.828	19.4	B
	North	0.205	15.1	B	0.264	15.7	B	0.860	25.3	C	0.851	22.7	C
	West	0.245	10.7	B	0.256	10.6	B	1.097	85.3	F	0.739	15.4	B
	Overall	0.249	12.9	B	0.282	13.1	B	1.123	49.1	D	0.851	19.6	B
High Growth Scenario	South	0.229	14.8	B	0.258	15.0	B	1.175	55.7	E	0.711	21.6	C
	East	0.251	10.6	B	0.281	10.9	B	0.980	47.3	D	0.816	21.9	C
	North	0.211	15.1	B	0.282	15.8	B	0.920	27.6	C	0.849	23.8	C
	West	0.247	10.8	B	0.266	10.7	B	1.112	90.7	F	0.698	16.3	B
	Overall	0.251	13.0	B	0.282	13.2	B	1.175	54.0	D	0.849	21.0	C

This shows that the intersection will operate at an overall Level of Service (LOS) D or better during the normal and abnormal days when the intersection is signalised.

It should be noted that the local municipality is responsible for providing road upgrades required due to existing traffic conditions or traffic background growth.

However, it is imperative to note that the frequency of abnormal days is far less than those of normal days. Therefore, due to the intersection operating at an acceptable level during normal days, the signalization of the intersection is deemed not necessary.

4.2.10.2 Development access analysis

The SIDRA Intersection Software was used to analyse the proposed access to the site, which is the upgrading of the existing access.

The analysis entailed assessing whether the proposed access will have sufficient capacity to accommodate the expected traffic.

The existing access off the R534 will be used which is a three-legged intersection priority-controlled intersection with priority given to vehicles traveling along the R534 (Figure 4-).

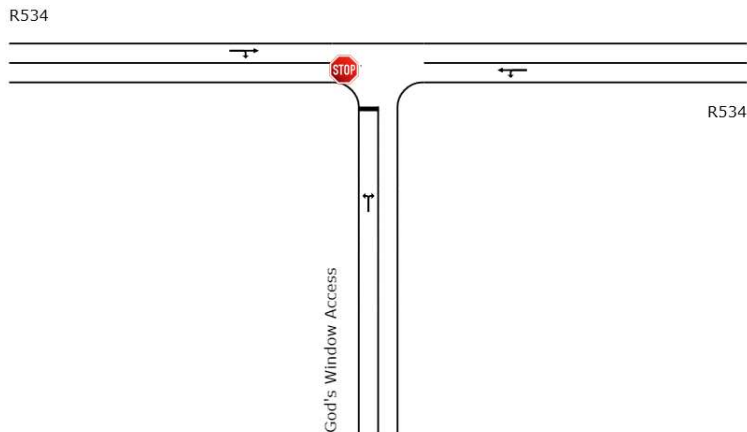


Figure 4-16: Access layout schematic drawing

As per the proposed entrance layout, the development will have two inbound lanes and two outbound lanes at the access. The queuing analysis results at the access indicated two inbound lanes and two outbound lanes would be adequate for normal days for all growth scenarios tested. The medium and high growth scenarios for abnormal days would require 3 and 4 inbound lanes respectively. The proposed two inbound lane would be able to handle about 15% development growth of the existing abnormal day demand.

For the ease of movement of the public transport vehicles to conduct drop offs and pickups, it is recommended that there be two inbound lanes into the site, from the intersection of the development access with R534, whereby one will be for public transport vehicles and the other for light vehicles entering their designated parking areas.

To promote a safe environment for non-motorised transport (NMT) users, a 2m wide sidewalk is recommended along the development frontage on. It is also recommended that separate gates for NMT users be provided at a convenient location, at the development access.

4.3 Project Phases

From a practical perspective the project lifecycle will likely be phased as follows:

- Pre-Construction
- Construction
- Operation

It is not envisaged that decommissioning of the development will be required. Instead, the development may undergo another refurbishment or upgrade in 20 – 25 years' time, should it be required. However, a brief description for decommissioning is included in this section.

4.3.1 Pre-construction/planning phase

Pre-construction activities involve tasks that establish the site, both in terms of the construction activities, as well as the social and environmental management systems. During this time, all effort should be made to ensure that the planning of the project is completed effectively to ensure that there are no delays to the project and that no unnecessary environmental degradation occurs.

The footprint boundaries will be demarcated, and no-go areas will be identified and demarcated according to the specialist recommendations. Any sensitive species that need to be relocated will be removed during this phase.

It is also important to ensure that social risk is addressed during the pre-construction period by ensuring that an appropriate grievance mechanism is put in place. Furthermore, all the Contractors' staff must

undergo training to ensure they understand the environmental and social sensitivities of the site. Please refer to the EMPr (Annexure G) for detailed information in this regard.

4.3.2 Construction phase

The contractor is to construct the access, parking, visitor's centre, skywalk and skybridge and associated infrastructure for the project during this phase. Construction materials will be trucked in via the existing God's Window access point.

Potential waste streams during construction will include general site waste and spoil (some of which can be reused). Bins will be placed at suitable locations. Waste mitigation measures are detailed in the EMPr.

Most of the low and semi-skilled employment opportunities will be available to residents in the area and nearby communities. This would represent a significant positive social benefit in the area. To maximise the potential benefits, the developer has committed to employing local community members to fill the low and medium skilled jobs, as far as possible.

4.3.3 Operational phase

The operational phase of the project entails the actual use of the project by visitors and staff. The use of the waste and sewage treatment plant, water supply, waste management and energy efficiency of the development will be implemented, and the development will generate an income.

4.3.4 Decommissioning phase

Decommissioning relates to the total dismantling, demolition and removal of all development infrastructure from the site after the project is no longer required. The decommissioning phase is generally expected to be similar to the construction phase with regards to potential impacts and mitigation measures to be put in place to prevent undue disturbance to the environment. All waste and materials will be required to be removed from site, disposed of in the legal and appropriate manner and the entire development area rehabilitated to its natural state.

4.4 Project Need and Desirability

The main need for the proposed God's Window Skywalk project is to develop a world class tourism facility to:

- Attract more local and international tourists to the development;
- Increase tourism activity in the surrounding areas;
- Harness the economical benefit of this increase in tourism by the local community;
- Direct economic benefits from the project to the land claimants;
- Entrepreneurial and employment opportunities directly from the development, or from the increase in tourism activity in the surrounding communities.

The need to improve the quality of life for the applicable stakeholders, and especially the poor, through increased entrepreneurial and employment opportunities is critical in South Africa, particularly after the economic impact of COVID-19. Further community involvement would be achieved through direct employment or indirectly through service industries e.g. catering, subcontracting and accommodation.

The specific need and desirability questions raised by the national and Western Cape Department of Environmental Affairs and Development Planning (DEA@DP) need and desirability guidelines are addressed in Table 4-7.

Table 4-7: Need and desirability checklist

Need and Desirability (Timing)	
Question	Response
1. Is the activity permitted in terms of the property's existing land use rights?	Yes, the land use will remain unchanged.
2. Will the activity be in line with the following? (a) Provincial Spatial Development Framework (PSDF)	Yes. The Mpumalanga PSDF lists the rich biodiversity and scenic beauty as aspects that can help with the development of the tourism industry to increase the economic opportunities of the province.
(b) Urban edge / Edge of Built environment for the area	N/A - The proposed project falls outside of the urban edge.
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	Yes. The Thaba Chweu LM lists tourism as a main economic sector. The IDP lists striving to be the best tourism destination as one of its strengths and opportunities.
(d) Approved Structure Plan of the Municipality	The proposed project entails the improvement and development of the tourism industry, which is compatible with the Local Economic Development (LED) which promotes tourism attraction to the municipality, job creation and skills development.
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	The approval of this application will not compromise the integrity of the existing environmental management priorities for the area as the new development is proposed at the existing tourism site. No EMF for the area has been adopted by the Department.
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	Yes. The affected municipality IDP lists tourism as one of the economic sectors identified to be a driver of economic development. The IDP does not list a timeframe for such development.
4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	Yes. The main objective of the proposed development is to benefit the historically disadvantaged community by ensuring the CPAs become the main benefactors of the income generated by the project. It also provides an upgraded opportunity to local entrepreneurs, to replace the existing, dilapidated crafters market at the current God's Window site.
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	No. There are currently no municipal services to the existing God's Window tourist site. Sewage and wastewater will be treated by the proposed WWPTP (section 4.2.6). There are currently no existing electrical services on the site. The site requires that the primary supply be Eskom, complemented by a diesel

Need and Desirability (Timing)	
Question	Response
	<p>generator. The primary supply to the development will be Eskom. The supply to the area will be a 22kV Overhead line and will be installed along the R534 road. MTPA has applied and paid for a 50kVA connection from Eskom (section 4.2.7).</p> <p>Should any need for other services arise the relevant authority will be communicated with, and the necessary approvals/ agreements obtained before proceeding.</p>
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?	Yes. The only service that will be required from the municipal infrastructure is the supply of electricity. The MTPA has already applied and paid for the connection from Eskom.
7. Is this project part of a national programme to address an issue of national concern or importance?	No.
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	Yes. The land use will not need to be changed since the project proposed the upgrading of the existing God's Window tourism site to a world class tourism development.
9. Is the development the best practicable environmental option for this land/site?	While the best environmental option for this site would be the no-go option, since the project footprint falls within a protected area and will affect sensitive and protected species. However, it is important to keep in mind that this is an existing tourist site. The development aims to respect the surrounding environment by honouring this pristine site by implementing various sustainable and green solutions. Please refer to section 4.2 for more detail.
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	<p>Yes. The negative impacts for the proposed development are of very low to high intensity, range from limited to municipal extent and short term to permanent in duration. The significance ranges from negligible to moderate (-) with mitigation. The proposed project will impact on vegetation ranging from a medium to a very high sensitivity. The vegetation further includes sensitive and unique habitats, and several plant species of conservation concern were confirmed to occur or are highly likely to be present. The proposed project activities that will impact on areas of very high sensitivity will have an impact on sensitive vegetation which is difficult, if not impossible, to rehabilitate. While no protected faunal species were observed, the floral habitat lends itself toward providing habitat for such species and the removal of vegetation is therefore expected to impact on the faunal environment as well.</p> <p>The proposed development would also enable positive impacts to be realised in a community in desperate need of economical upliftment. These positive impacts are expected to be of low (+) significance. However, with the implementation of recommendation measures from the social impact assessment and the planned transfer of the</p>

Need and Desirability (Timing)	
Question	Response
	<p>majority of the ownership (and income) to the CPAs, the positive impact is expected to increase in significance.</p> <p>As such, careful consideration must be given to weigh the benefits of project versus the negative impacts. It is the EAPs opinion that the social and socio-economic benefits outweigh the biodiversity impacts, especially since the architecture and design aspects have taken care to value and honour the affected environment by incorporating initiatives such as the green roof and ecological corridor. .</p>
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	Since the proposed development can be expected to increase tourism in the area, it can also be expected that similar activities (albeit to a smaller scale) may be endeavoured in the area in the future.
12. Will any person's rights be negatively affected by the proposed activity/ies?	No. No juristic or person's right will be adversely affected as land use agreements are being negotiated with the relevant landowners.
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	No. The proposed development occurs outside the urban edge and within the existing God's Window tourism site, therefore the urban edge will not be compromised.
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	No.
15. What will the benefits be to society in general and to the local communities?	<p>The main need for the proposed God's Window Skywalk project is to develop a world class tourism facility to:</p> <ul style="list-style-type: none"> ➤ Attract more local and international tourists to the development; ➤ Increase tourism activity in the surrounding areas; ➤ Harness the economic benefit of this increase in tourism by the local community; ➤ Direct economic benefits from the project to the land claimants; ➤ Entrepreneurial and employment opportunities directly from the development, or from the increase in tourism activity in the surrounding communities. <p>The need to improve the quality of life for the applicable stakeholders, and especially the poor, through increased entrepreneurial and employment opportunities is critical in South Africa, particularly after the economic impact of COVID-19. Further community involvement would be achieved through direct employment or indirectly through service industries e.g. catering, subcontracting and accommodation.</p>
16. Any other need and desirability considerations related to the proposed activity?	Previously disadvantaged land claimants on these two properties (farms) will benefit from the project.

Need and Desirability (Timing)	
Question	Response
	The proposed project will also provide local and international tourists with the opportunity to experience the country's pristine environment.
17. How does the project fit into the National Development Plan for 2030?	<p>The National Development Plan for 2030 aims to create jobs, develop and expand infrastructure, transition to a low carbon economy and unify South Africa. This project will fit into the National Development Plan as follows:</p> <p><u>Create jobs:</u></p> <p>The proposed project is expected to result in jobs for the construction phase and the operational phase.</p> <p>Indirect opportunities for small businesses would be generated such as accommodation, food and service industries through the increased number of people travelling to the proposed area.</p> <p>Many indirect jobs, such as the hospitality industry, transportation industry and manufacturing industry may also be created.</p> <p>Entrepreneurial opportunities are expected to increase.</p> <p><u>Transformation and unity:</u></p> <ul style="list-style-type: none"> As part of the Public Private Partnership (PPP) agreement between MTPA and the private party (Motsamayi), a certain percentage of the gross revenue, as well as an annual fee must be paid to the MTPA. According to the PPP, the Blyde Valley 04 CPA shall control a minimum of 10% shareholding of the undertaking. This is then regarded as B-BBEE shareholding. The private party is required to commit to increasing the minimum B-BBEE shareholding to 30% and 70% in year 10 and 20 of the project term, respectively. The increase in shareholding will be acquired by the CPAs at market value, through payments derived from dividends payable over the project term. The Private Party is also obliged assist the CPAs in raising the funding required to increase the shareholding.
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.	The purpose of section 23 of NEMA is to promote the application of appropriate management tools in order to ensure the integrated environmental management of activities. Table 4-8 below lists the general objectives of integrated management and provides a motivation as to how the proposed development has taken the objectives into account.
Table 4-8: Consideration of NEMA objectives	
Section 23(2) of NEMA: The general objective of integrated environmental management is to:	Description as to how the proposed development has taken these general objectives into account.

Need and Desirability (Timing)

Question	Response
(a) promote the integration of the principles of environmental management set out in section 2 of NEMA into the making of all decisions which may have a significant effect on the environment.	The underlying principle of this BA process is to ensure that the development is socially, environmentally, and economically sustainable. This has guided the assessment of impacts of the project by Specialists to ensure that the project will be undertaken in an environmentally responsible manner. In recognition that social responsibility is something which needs to be actively developed, a public participation process (PPP) will be undertaken. This process will be undertaken in such a manner to promote active participation and foster a clear understanding of the project and transparent sharing of information.
(b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;	<p>This BAR includes the list of potential impacts associated with this project. Each aspect was evaluated to determine the significance of the impact and mitigation measures have been proposed to reduce negative impacts and to enhance positive impacts.</p> <p>The EMPr has been developed to include the recommendations from the respective specialists to guide the construction and operational phases in an environmentally and socially sound manner (Refer to Annexure G).</p>
(c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them.	Specialist studies were commissioned to ensure that specific impacts are adequately assessed, and appropriate mitigation measures are proposed.
(d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment.	The Public Participation Process that is being undertaken for the proposed development is described in detail in Section 3.3. The Public Participation Process will be done in accordance with Regulation 41 of the 2014 EIA Regulations (GN R982 as amended) and the applicable best practice guidelines.
(e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment.	The designs included in this report have been developed with the input from the appointed specialists after their site visits. The areas of environmental sensitivity (illustrated in the sensitivity maps in Chapter 6) have been considered in the final layout based on the mitigation measures and restrictions recommended by the specialists. It should however be noted that not all recommendations from the specialists were found to be feasible to be implemented without compromising the success and social objectives of the project.
(f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.	Recommendations and mitigation/ enhancement measures for each of the impacts identified in Section 6 have been included in the EMPr in Annexure G. The purpose of these recommendations is to minimise the disturbance to the environment, and enhance possible opportunities associated with locating the proposed development at this particular site.

Need and Desirability (Timing)

Question	Response
	<p>Where negative impacts are unavoidable, strict management and rehabilitation is recommended to minimise the potential negative impacts.</p>
<p>19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.</p>	<p>Section 2 of NEMA lists a number of principles that underpin the role of Sustainable Development and the consideration of environmental impact within the Act. These principles are critical to achieve Sustainable Development as it is important to find the balance between the competing demands for resources from the Economic system, the Social system, and the Ecological system. These principles are applicable to the “actions of all organs of state that may significantly affect the environment” and it is therefore crucial to apply them to the proposed development, for decision-makers to be confident that their decision to allow a development, promotes Sustainable Development.</p> <p>The underlying principle of this BA process is to ensure that the development is socially, environmentally, and economically sustainable. This has guided the assessment of impacts of the project to ensure that the project will be undertaken in an environmentally responsible manner. Recognising that social responsibility is something that needs to be actively developed, PPP will be undertaken (as detailed above in Section 3.3). This process will be undertaken in such a manner to promote active participation and foster a clear understanding of the project and transparent sharing of information. Furthermore, knowledge from I&APs will be included in all forms, including traditional or ordinary knowledge. The PPP and consultation with the directly affected landowners will also aim to improve environmental awareness in the area (Section 2(4)(h) of NEMA).</p> <p>Key organs of state that may have interest in the project have been proactively identified, and an effort has been made to promote intergovernmental coordination as far as possible to reduce the potential for conflicts of interest, caused by lack of information or inappropriate communication channels. Proof of this correspondence is detailed in Section 3.3 and Annexure C.</p> <p>Environmental management has been considered to place people and their needs at the forefront of its concern, aiming to serve their physical, psychological, developmental, cultural and social interests equitably (Section 2(2) of NEMA).</p> <p>However, it is crucial that ecological considerations are also considered through this process and avoidance, minimising or rehabilitating measures are detailed for the disturbance of ecosystems and loss of biodiversity, pollution and degradation of the environment, disturbance of landscapes, and sites that constitute the nation’s cultural heritage, waste, and the use and exploration of non-renewable natural resources (Section 2(4)(a)(i-v) of NEMA). Where a negative impact is unavoidable,</p>

Need and Desirability (Timing)

Question	Response
	<p>measures have been considered to remedy the disturbance and address the effects (Section 2(4)(p) of NEMA).</p> <p>The nature of this BA process has been to undertaken a risk-averse and cautious approach, and where relevant the worst case scenario has been assessed. Each specialist has detailed their methodology as well as their assumptions and limitations about their assessments, and these reports have been included in full in Annexure D. The specialists undertook their site visits in March 2022. The findings of their investigations have been considered in determining the proposed layout of the development. The findings of these assessments have been amalgamated into this BAR which have assessed the impact of this proposed development.</p> <p>Should this BAR be granted a positive environmental authorisation, stringent environmental health and safety standards will be required. It will also acknowledge the right of workers to refuse work that is harmful to human health, or the environment, and be informed of any potential dangers (Section 2(4)(e & j)).</p> <p>In addition, this process has been undertaken in a manner that meets the principles and objectives of the South African legislation, and also meets global and international responsibilities relating to the environment by contributing to the renewable energy targets, and reducing the reliance on carbon heavy energy sources using fossil fuels (Section 2(4)(n)).</p>

5 CONSIDERATION OF ALTERNATIVES

The NEMA requires that alternatives are considered during the BA process. An alternative can be defined as a possible course of action, in place of another, that would meet the same purpose and need (DEAT, 2004).

The DEA&DP Guideline on Alternatives (2013)⁴ states that: “every EIA process must identify and investigate alternatives, with feasible and reasonable alternatives to be comparatively assessed. If, however, after having identified and investigated alternatives, no feasible and reasonable alternatives were found, no comparative assessment of alternatives, beyond the comparative assessment of the preferred alternative and the option of not proceeding, is required during the assessment phase. What would, however, have to be provided to the Department in this instance is proof that an investigation was undertaken and motivation indicating that no reasonable or feasible alternatives other than the preferred option and the no-go option exist.”

The 2014 EIA Regulations (GN R982) (as amended) provide the following definition: “*Alternatives*”, in relation to a proposed activity, means different ways of meeting the general purpose and requirements of the activity, which may include alternatives to the -

- property on which or location where the activity is proposed to be undertaken;
- type of activity to be undertaken;
- design or layout of the activity;
- technology to be used in the activity;
- operational aspects of the activity; and
- includes the option of not implementing the activity (“No-Go” alternative).

The proposed project involves the application for EA to upgrade an existing tourism facility with the specific objective of benefitting the affected community as part of the settlement agreement of the land claim. The project also intends to attract tourists/visitors to the scenic view associated with God’s Window.

As such, the nature and extent of the proposed project does not lean itself toward the consideration of location alternatives, as this would subsequently defeat the objective of the project and would therefore not meet the same need and purpose associated with the project. Likewise, it is not feasible to consider alternative types of activities since this project must be developed as a tourist attraction in order to generate an income to benefit the community. However, layout alternatives within the location of the site footprint were considered during the planning phase. Alternatives associated with the technologies and operational aspects of the development have also been considered.

The following layout in Figure 5- **was initially** considered for the project but has subsequently been found to be unfavourable due to their level of impact on the sensitive terrestrial and aquatic ecology of the site. This decision was made after specialist field assessments were undertaken, and a workshop was held with the architectural and structural design engineers and the environmental specialists to refine the design layout to lower the significance of the impact on the site’s biodiversity.

This initial layout had the development right up to the cliff face and included a “zorbing” pool to the west of the visitor’s centre. Figure 5- shows the initial roof plan.

⁴ This guideline has been used as a best practice tool since it is the most recent guideline on alternatives.

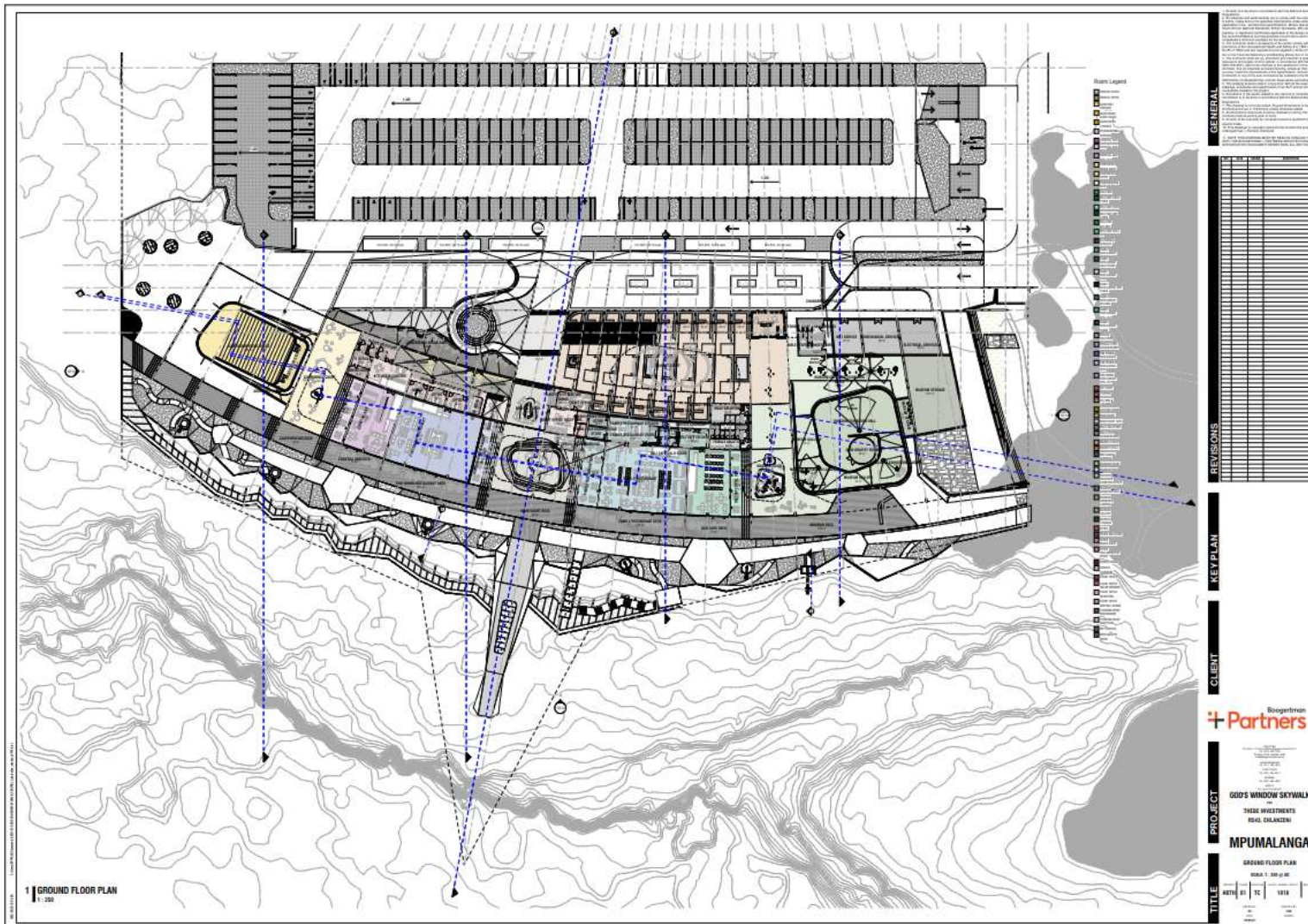


Figure 5-1: Floor plan for the initial development layout showing the development up to the cliff edge

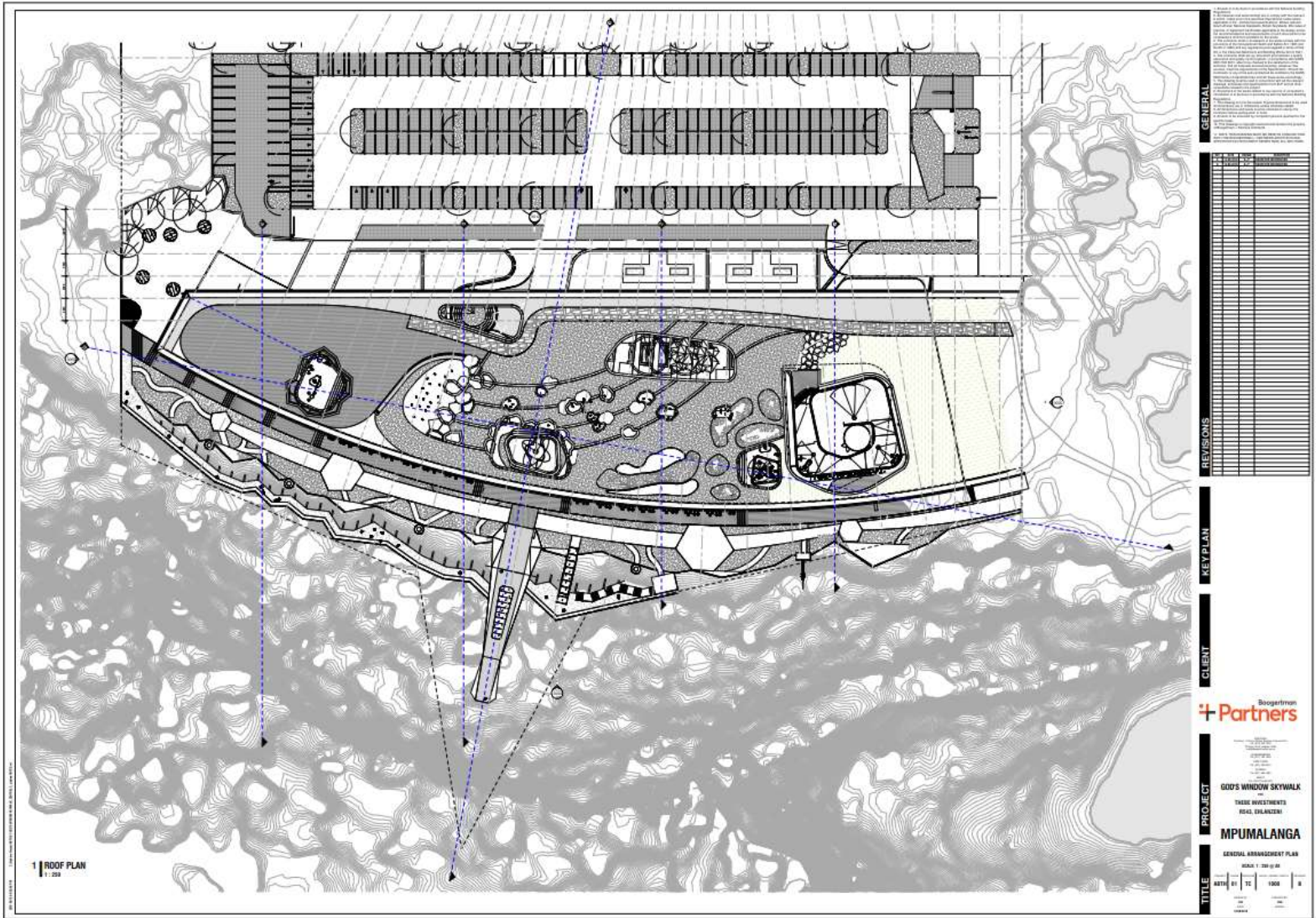


Figure 5-2: Roof plan for the initial development layout

The following environmental aspects were considered during the evaluation of this initial development layout:

- The significant impact on the *Aloe arborescens* and *Clivia caulescens* on the cliff edge, since the initial proposed layout extended all the way to the edge of the cliff.
- The significant impact of the extent of the development on the *Scleria transvaalensis* scrubveld due to the wider structure.
- The potential impact of the skybridge on bat species and sensitive flora due to the bridge being proposed to be “fitted” along the vertical cliff face.

This initial layout of the tourism development is therefore no longer part of the project. These main aspects have been reconsidered in line with the outcomes of the specialist field assessments. The designs taken forward in this BAR therefore take the sensitivities into account as far as possible, while ensuring that the objectives and aim of the project remain feasible.

The following alternatives have therefore been considered for the project and are discussed in more detail further in the Chapter:

- 1) **Alternative 1 (preferred):** The final development layout option which contains inputs from both a design/engineering and environmental specialist perspective; and
- 2) **No-Go option:** No change to existing tourism facility at God's Window, i.e. the status quo remains.

5.1 Alternative 1 (Preferred)

The final development layout has been optimised to reduce the environmental impacts of the project by implementing a 15m buffer corridor between the edge of the cliff and the visitor's centre. This was achieved by reducing the parking space on the northern side of the development footprint. This adjustment ensures a habitat corridor for the *Aloe arborescens* and *Clivia caulescens* currently growing on the cliff edge. This corridor also provides connectivity for the faunal species.

The reduction in the width of the building, which was achieved by removing the “zorbing” pool and rearranging the interior layout of spaces reduces the extent of the destruction of the *Scleria transvaalensis* scrubveld. This impact is further addressed by redesigning the roof space to include a substantial “green” roof. This green roof will contain flora species associated with the *Scleria transvaalensis* scrubveld to provide a larger habitat for such flora and associated faunal species. Refer to Figure 5- for an illustration of the proposed 15m setback and roof ecological corridor.

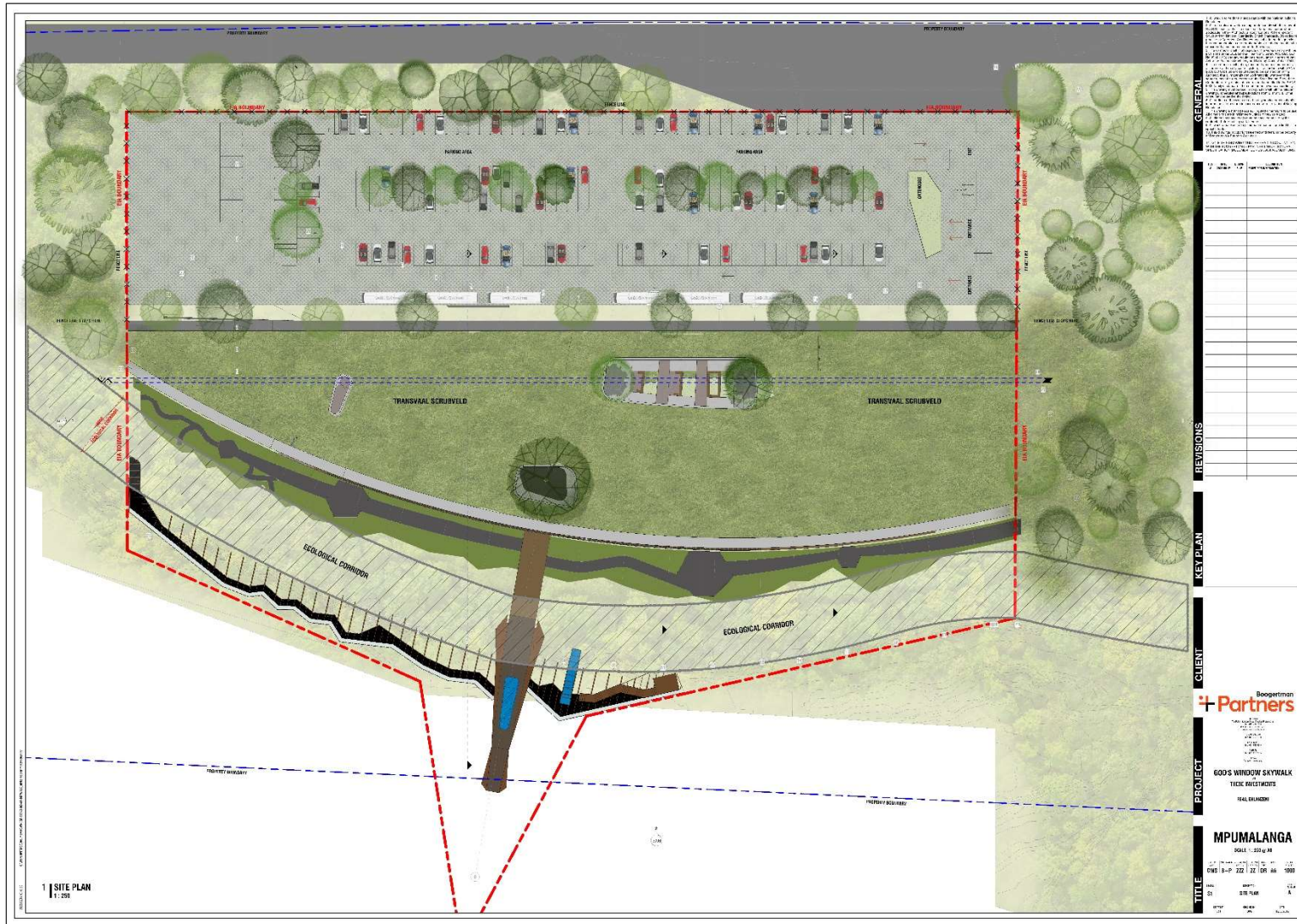


Figure 5-3: Diagram illustrating the proposed 15m setback corridor.

5.2 No-go option

The no-go option means aborting all plans to improve and upgrade the existing tourist facilities at God's Window. This means that the current (or status quo) of the site will remain in a dilapidated state, with relatively low economic benefit to the area and community.

All positive impacts related to the project, as described in Section 6 will fall away.

6 BASELINE ENVIRONMENT AND ENVIRONMENTAL IMPACT ASSESSMENT

The information contained in this section is taken from the appointed specialists' reports. All figures and data can be referenced to the reports contained in Annexure D. Each section describes the baseline environment and the specific impact assessment conducted for the specialist field. Recommended mitigation measures for each identified impact are contained in the individual impact assessment tables.

It should be noted that various mitigation measures proposed by the respective specialists may not be feasible to implement. These unfeasible mitigation measures have been highlighted as such in the individual impact assessment tables. Where mitigation measures cannot be implemented, it is assumed that the significance rating will remain as per the pre-mitigation assessment.

6.1 Topography and Hydrology

The proposed skywalk project is situated at an average elevation of about 1650m. The northern area of the assessed footprint reaches 1680m. The cliff drop to the valley in the southeast is approximately 1460m. The landscape is rugged, with steep east-facing cliffs. This escarpment is intersected in some areas with large east-flowing rivers. As per existing spatial layers, a non-perennial stream drains from the highest point towards the valley below (Figure 6-).

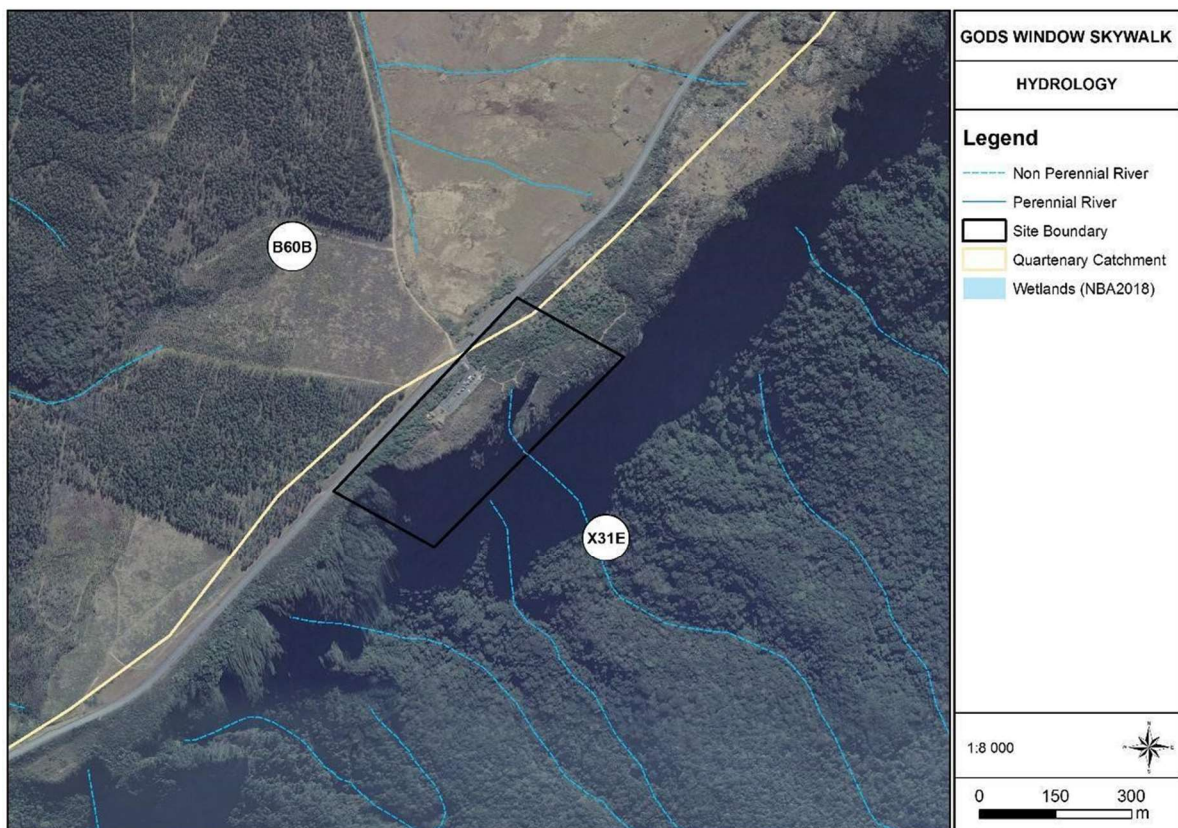


Figure 6-1: Hydrology of the proposed project area

6.2 Climate

The project falls within the summer rainfall area, with warm summers and cool winters. Summer rainfall usually exceeds 1 400 mm per annum, augmented by mist during large parts of the year (Mucina and Rutherford, 2006). The graphs below show the annual average temperatures and precipitation for the Graskop area. Most rain falls during December, which is also the warmest month. Mist is common and days are mostly partly cloudy during summer.

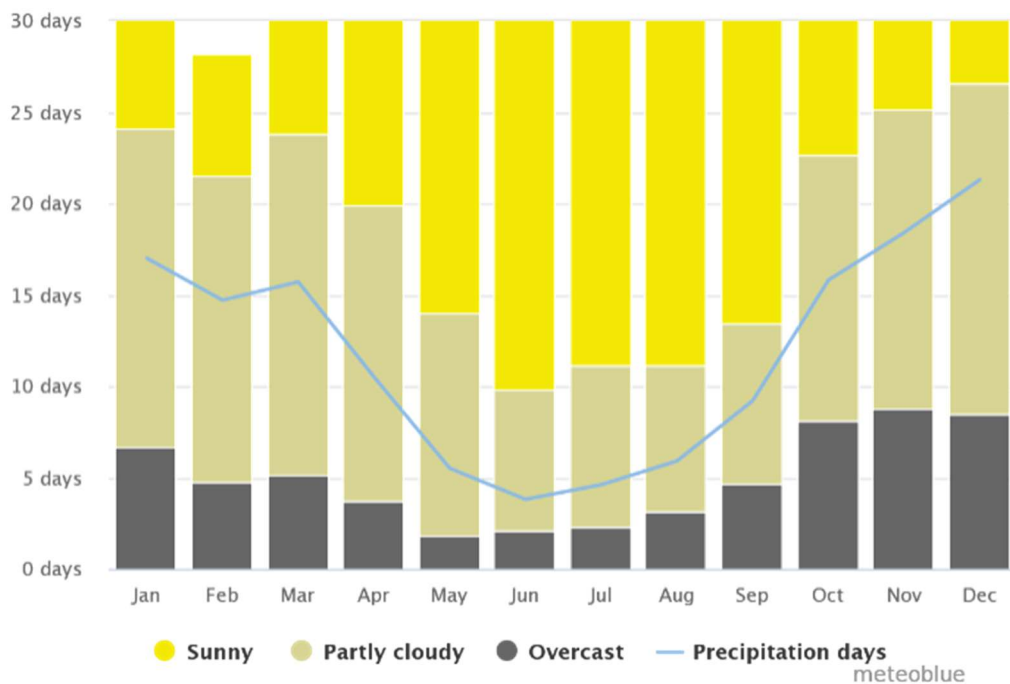
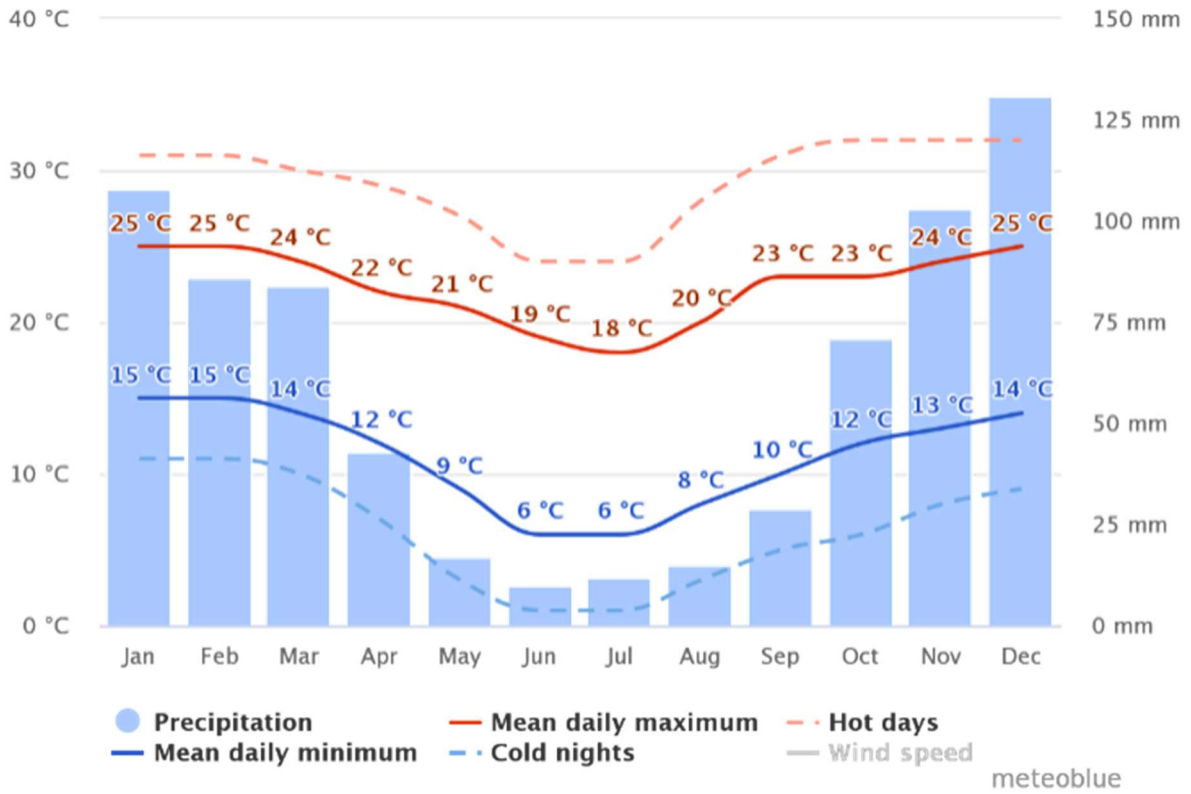


Figure 6-2: Average temperature and precipitation for the area (top) and cloudy days (bottom).

6.3 Geology and Soils

The landscape within the proposed footprint is very rocky and occurs on weather-resistant quartzite (Mucina and Rutherford, 2006). Quartzite is predominantly of the Black Reef Formation and the Wolkberg Group but also on the westerly Timeball Hill Formation and other quartzitic formations of the Pretoria Group (Transvaal Supergroup) (Mucina and Rutherford, 2006).

6.4 Geotechnical Investigations

Zutari conducted geotechnical investigations of the project site to inform the designs of the God's Window Skywalk development. These investigations also provided input into the freshwater and hydrogeology assessments. The preliminary findings are summarised below.

The bedrock encountered from surface is generally described as moderately to slightly weathered, closely to medium jointed, medium to coarse grained, hard to very hard rock sandstone. The sandstone bedrock typically occurs from surface to the end of investigated depths with the diabase intrusion encountered between 4 and 5 m. The sandstone from surface is occasionally with dark grey and brown bands of sandstone. These sandstone bands are encountered as soft rock to very hard rock. The diabase intrusion is encountered as closely to medium jointed, slightly to moderately weathered, very hard rock.

The above is underlain by a layer of slightly weathered, closely to medium jointed sandstone with dark grey and brown bands of sandstone, that typically extends to 11 m. This is underlain by slightly weathered, close to widely jointed, very hard rock quartzitic sandstone that is interbedded with minor dark grey sandstone bands. This layer extends to about 20 m.

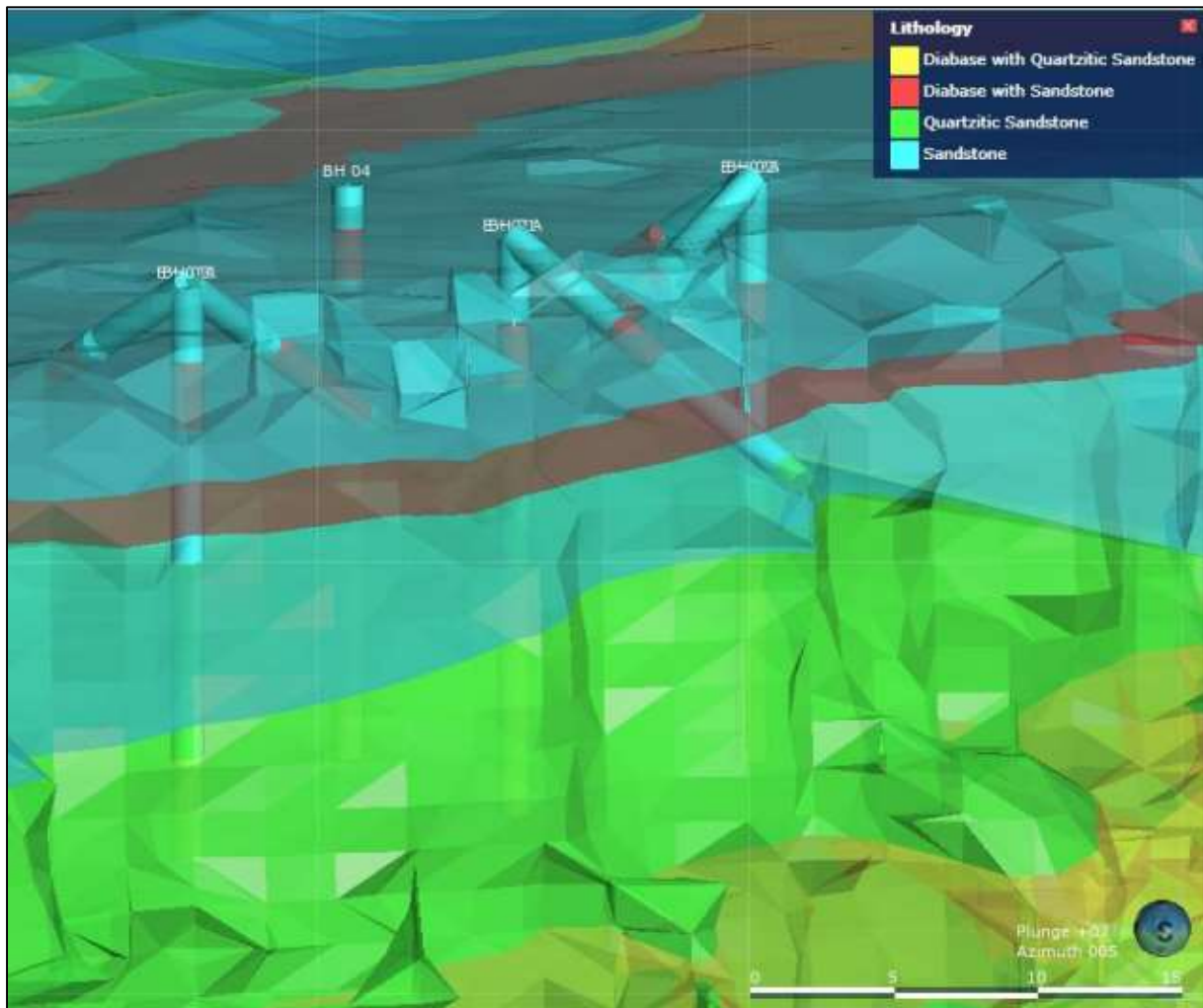


Figure 6-3: Initial interpretation of the ground model (Zutari, 2022)

6.5 Botanical Environment

Antoinette Eysell-Knox of Dimela Eco Consulting was appointed by Zutari to undertake the terrestrial vegetation assessment for this project, with field assessments being done from 1 March to 3 March 2022. The sections below have been taken from the vegetation report and reference is therefore made to the report dated March 2022 and updated according to the final designs in July 2022.

6.5.1 Baseline Description

The development footprint is situated within the Forests Biome and the Grassland Biome. The Forest Biome is defined as multi-layered vegetation which is dominated by trees with overlapping crown cover and the graminoids in the herbaceous layer are generally rare (Mucina & Rutherford, 2006). These forests are limited to regions with high water availability and persist in areas with mean annual rainfall of more than 725mm per annum during summer. The Grassland Biome is characterized by high summer rainfall and dry winters. Frost and fires during the winter, as well as marked diurnal temperature variations is unfavourable for tree growth resulting in the Grassland Biome consisting mainly of grasses and plants with perennial underground storage organs, such as bulbs and tubers.

Biomes can further be divided into smaller units known as vegetation types. According to Mucina and Rutherford (2006), three vegetation types occur within the area assessed namely: Northern Mistbelt Forest, Northern Escarpment Afromantane Fynbos and Northern Escarpment Quartzite Sourveld (Figure 6-).

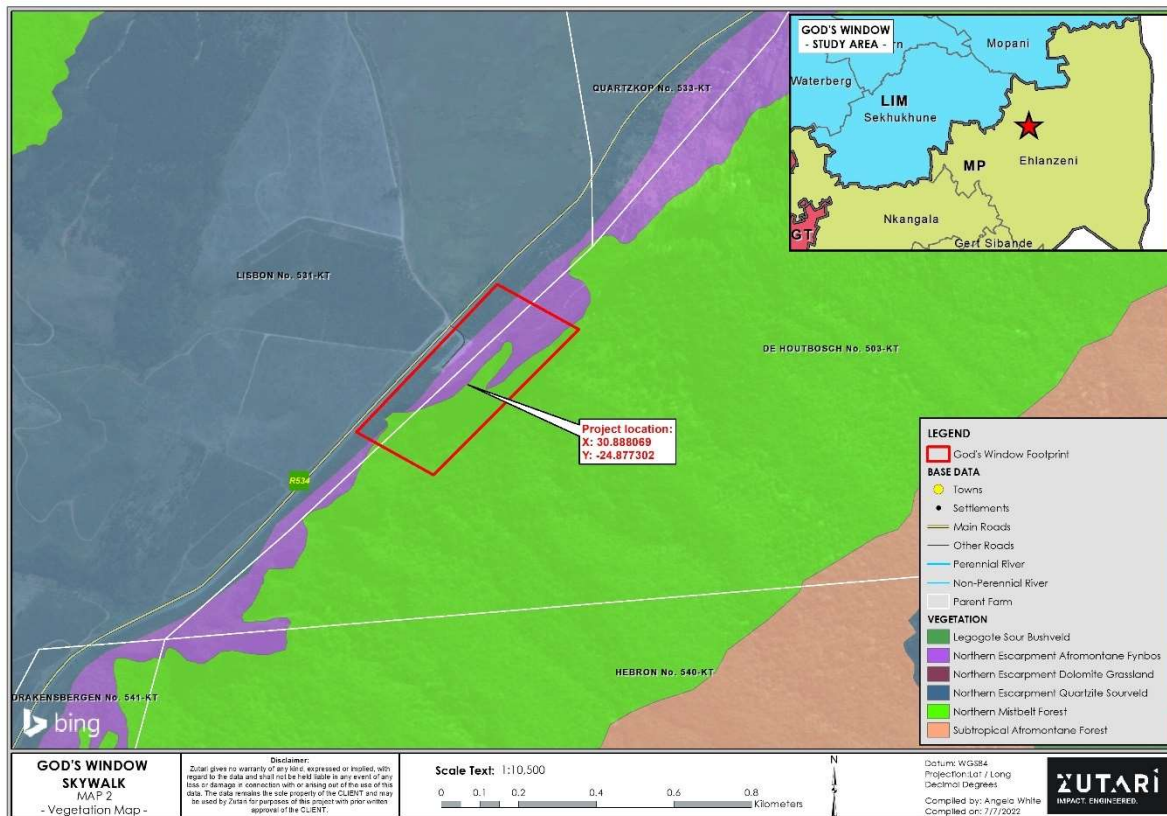


Figure 6-4: Vegetation map

6.5.1.1 Vegetation types

Northern Mistbelt Forest consists of tall, evergreen afrotemperate mistbelt forests on east facing cliffs and sheltered kloofs. The most common canopy trees include *Xymalos monospora*, *Podocarpus latifolius*, *Combretum kraussii*, *Cryptocarya transvaalensis* and *Pterocelastrus galpinii*.

The understory consists of species such as *Psycotria zombamontana*, *Canthium kuntzeanum*, *Gymnosporia harveyana*, *Peddiea africana*, *Mackaya bella* and *Sclerochiton harveyanus*. Northern Mistbelt Forest is classified as Least threatened with about 10% statutorily conserved in the Blyde River Canyon, Lekgalameetse, Songimvelo, Barberton and Starvation Creek Nature Reserves (Mucina and Rutherford, 2006).

Northern Escarpment Afrotropical Fynbos comprises shrubland which consists of sclerophyllous shrubs and herbs. Important taxa include small trees such as *Protea caffra*, *P. roupelliae*, succulent species such as *Aloe arborescens* and herbaceous species such as *Erica natalitia*, *Hypericum revolutum*, *Passerina montana*, *Cliffortia linearifolia*, *Erica revoluta*, *Erica simii*, *Euryops pedunculatus* and various *Helichrysum* species. This vegetation was classified as Least Threatened with more than 56% of this vegetation type protected (Mucina and Rutherford, 2006).

Northern Escarpment Quartzite Sourveld occurs along the high-altitude crests of the Northern Escarpment. The landscape is characteristically very rugged with steep east-facing cliffs which are dominated by species such as *Protea roupelliae*, *Faurea galpinii*, *Faurea rochetiana*, *Syzygium cordatum*, *Alsophila dregei*, *Vernonia myriantha*. Low shrub species includes *Athrixia phyllicoides*, *Clutia monticola*, *Crotalaria doidgeae*, *Erica woodii*, *Euryops pedunculatus*, *Aloe arborescens*, *Crassula sarcocaulis* while the diverse herbaceous layer consists of species such as *Berkheya echinacea*, *Dicoma anomala*, *Eriosema angustifolium*, *Gerbera ambigua*, *Monsonia attenuata* and *Pearsonia*

sessilifolia. Northern Escarpment Quartzite Sourveld is classified as Vulnerable with more than 38% transformed mainly by plantations (Mucina and Rutherford, 2006).

6.5.1.2 Listed Ecosystems

The National Environmental Management: Biodiversity Act (Act 10 of 2004) provides for listing threatened or protected ecosystems in one of four categories: critically endangered (CR), endangered (EN), Vulnerable (VU) or Protected (Section 52(1)(a) of the National Environmental Management: Biodiversity Act (Government Gazette 34809, Government Notice 1002, 9 December 2011).

Ecosystem status is based on the percentage of original area remaining untransformed (by croplands, mining, urban development & roads) in relation to the biodiversity target and a threshold for ecosystem functioning. Biodiversity target refers to the percentage of the original areas required to capture 75% of the species occurring in each vegetation type. The targets are aimed only at species conservation, and ecological processes are not considered. No significant disruption of ecosystem functioning is assumed in least threatened vegetation units, which still have more than 80% of their original extent untransformed (Anderson, 2010).

According to the 2011 Listed Ecosystems, Gods Window falls within the Endangered Blyde Quartzite Grasslands (Government Gazette 34809, Government Notice 1002, and 9 December 2011) (Figure 6-). Although the National List of Threatened Terrestrial Ecosystems published in terms of the Biodiversity Act in 2011 remains in legal force, the data contained in the recent National Biodiversity Assessment (NBA) 2018 represents an update of the assessment of threat status for terrestrial ecosystems as “Least Concern” (Figure 6-). However, since the National List of Threatened Terrestrial Ecosystems has not yet been revised, the gazetted 2011 Listed Ecosystems is still in force.

Ecosystems such as the Blyde Quartzite Grassland were classified as “special” ecosystems under Criteria F of the South African classification systems in 2011. These ecosystems are now part of provincial Critical Biodiversity Area networks and are more appropriately highlighted.



Figure 6-5: Threat status of the Blyde Quartzite Grassland as per the 2011 Listed Ecosystems

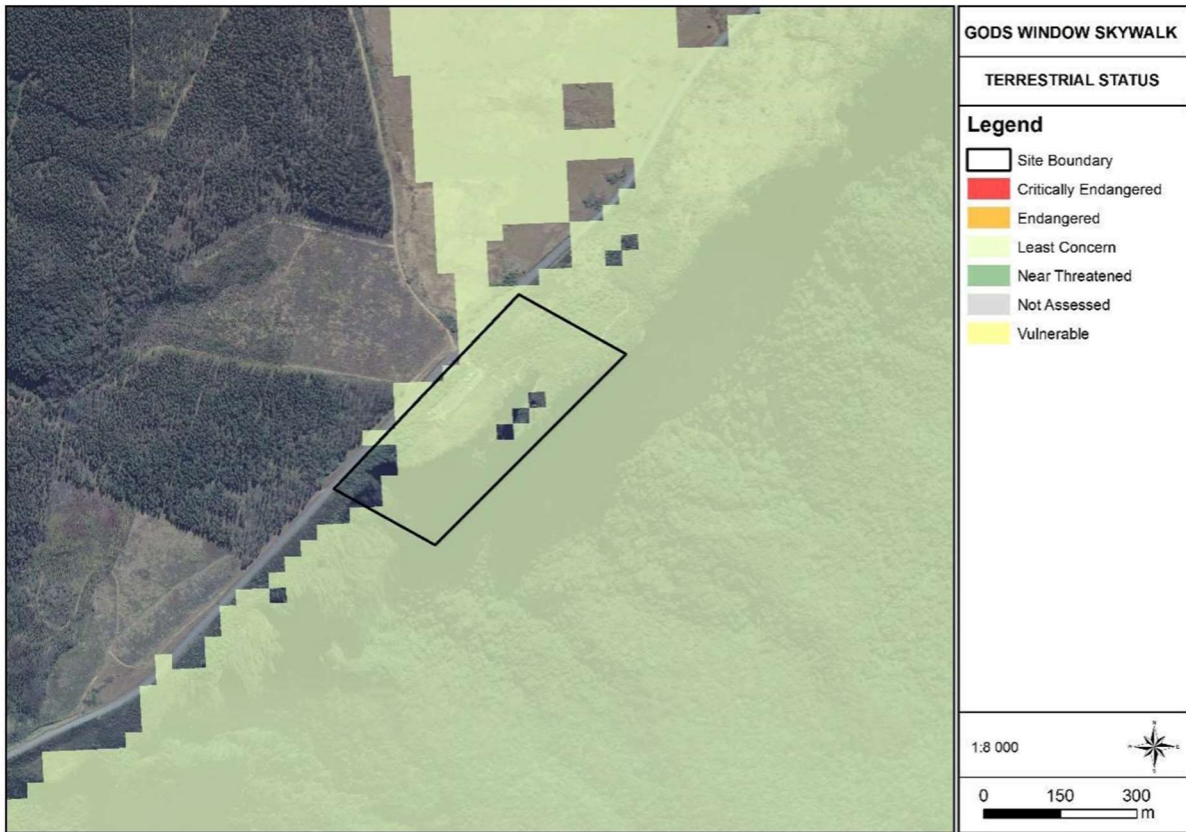


Figure 6-6: Terrestrial ecosystem status as per the more recent NBA (Skowno et al, 2019)

The updated threatened ecosystems as per the recent NBA (2018) are listed along with its protection and threat status in Table 6-1 below.

Table 6-1: The NBA's threat status and protection level of ecosystem within and around the site (Skowno et al, 2019)

Ecosystem	Threat Status	Protection Level
Northern Mistbelt Forest	Least Concern	Well protected
Northern Escarpment Afromontane Fynbos	Least Concern	Well protected
Northern Escarpment Quartzite Sourveld	Least Concern	Moderately protected

6.5.1.3 Protected Areas

God's Window falls within the Blyderivierspoort Nature Reserve, which forms part of the larger Kruger to Canyon Biosphere Reserve. The Blyde Forest Nature Reserve is situated to the north of the site as illustrated in Figure 6-.

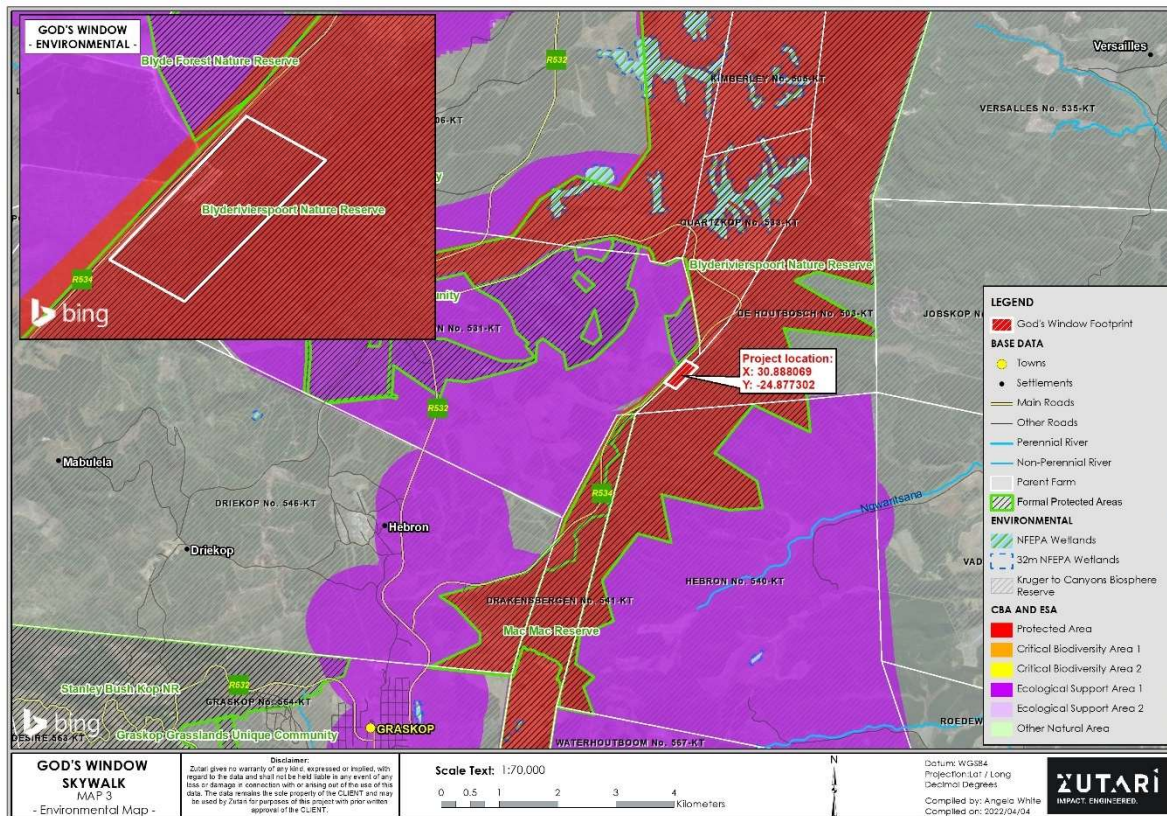


Figure 6-7: Environmental sensitivity map indicating the protected area, CBAs and ESAs associated with the project.

6.5.1.4 Mpumalanga Biodiversity Sector Plan

The Mpumalanga Biodiversity Sector Plan (MBSP) delineates the following categories: Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Other Natural Areas (ONAs), Protected Areas (PAs), and Modified Area (areas that have been irreversibly modified from their natural state). The map is a fine-scale map (1:10 000 - 1:25 000) that aims to guide sustainable development by providing a map of biodiversity priority areas that can be used by planners and decision-makers in a range of sectors.

The conservation categories present in the project area is geographically represented in Figure 6-. Table 6-2 describes the conservation categories that are present on and around the site and tabulates the MBSP management goals for these categories.

Table 6-2: Conservation categories

Conservation category	Management goals	Relevant section of the project
<p>ESAs: Protected Area Buffer:</p> <p>Areas surrounding protected areas that moderate the impacts of undesirable land-uses that may affect the ecological functioning or tourism potential of Protected Areas. Buffer distance varies according to reserve status:</p> <ul style="list-style-type: none"> Nature Reserves- 5 km buffer; 	<p>These areas should be maintained in a functional, near-natural state, but some habitat loss is acceptable.</p>	<ul style="list-style-type: none"> None The plantation north-west of the site forms part of this buffer area.

Conservation category	Management goals	Relevant section of the project
<ul style="list-style-type: none"> ○ Protected Environments- 1 km buffer. 		
<p>CBAs: Irreplaceable</p> <p>Most important biodiversity areas in the Province, outside of the protected area network. They represent the last remaining options for securing critical biodiversity and ecosystems and for achieving biodiversity targets. If these areas suffer any further loss of habitat or ecological function, it is likely that the biodiversity targets will not be met, and the status of species and ecosystems will decline.</p>	Maintaining the natural vegetation cover of CBAs in a healthy ecological state.	<ul style="list-style-type: none"> ○ None ○ Open space to the north of the site.
<p>Protected Area:</p> <p>Areas that are proclaimed as protected areas under national or provincial legislation, including gazetted Protected Environments. These areas meet biodiversity targets and therefore must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity.</p>	The Protected Areas Act (Act 57 of 2003) requires that land-use and management in each protected area is governed by a formally approved management plan.	<ul style="list-style-type: none"> ○ Entire proposed development footprint.

6.5.1.5 Ecological drivers and processes on the site

Frost, fire, and grazing maintain the herbaceous grass and forb layer and prevent the establishment of thickets or encroachment by trees into grasslands and scrubveld (Tainton, 1999). Fire is a natural disturbance caused by lightning, and regular burning is therefore essential for maintaining the structure and biodiversity of grasslands. Grassland plants are adapted to survive fires. If fire is prevented or frost becomes limited due to climate change factors, the vegetation structure degrades, and alien species could eventually dominate the natural vegetation. This will also lead to a decrease in species diversity as species adapted to fire and grazing will eventually decrease or die-off. Mismanagement of grasslands often leads to encroachment by non-herbaceous or 'woody' species. One such species is the Bracken fern (*Pteridium aquilinum*) which can rapidly establish in dense stands. This species was recorded in dense stands within the area classified as Northern Escarpment Afromontane Fynbos (SEF, 2013). At the time of this assessment, the bracken fern was less dense, however, other woody species such as *Cliffortia linearifolia* were dense in trampled and disturbed areas.

Forests consist of mostly evergreen trees that form a closed canopy, with layers of plants beneath the canopy. They grow in areas with high rainfall and no frost. Forests are moist and seldom burn. The ground layer is almost absent due to the dense shade. On the edges of the patches are distinctive communities, the so-called fringe and ecotonal communities, which can tolerate fire. Mammals and birds disperse seeds and maintain gap processes which allow succession within the forests - and the

maintenance of gene flow - which requires allowing seed dispersers and pollinators to move along the corridors between forest patches (Mucina and Rutherford, 2006). Fragmentation of forests will impact negatively on its conservation.

6.5.2 Assessment Results

During the 2022 vegetation assessment, the vegetation was found to be in a similar state as during the 2013 assessment (SEF, 2013). However, the structure and species dominance in the scrubveld have changed and several additional species were recorded throughout the vegetation groups. This assessment delineated four broad vegetation groups.

Each broad vegetation grouping is discussed below and geographically represented in Figure 6-. Plant species that were recorded within each vegetation group at the time of the site visit is listed in a table below the vegetation group discussion and a comprehensive list is given in Appendix B of the vegetation specialist report in Annexure D of this BAR.

1. *Passeraria montana*-*Scleria transvaalensis* scrubveld;
2. *Aloe arborescens*-*Clivia caulescens* cliff edges;
3. Vegetation on vertical cliffs; and
4. Mistbelt forests.

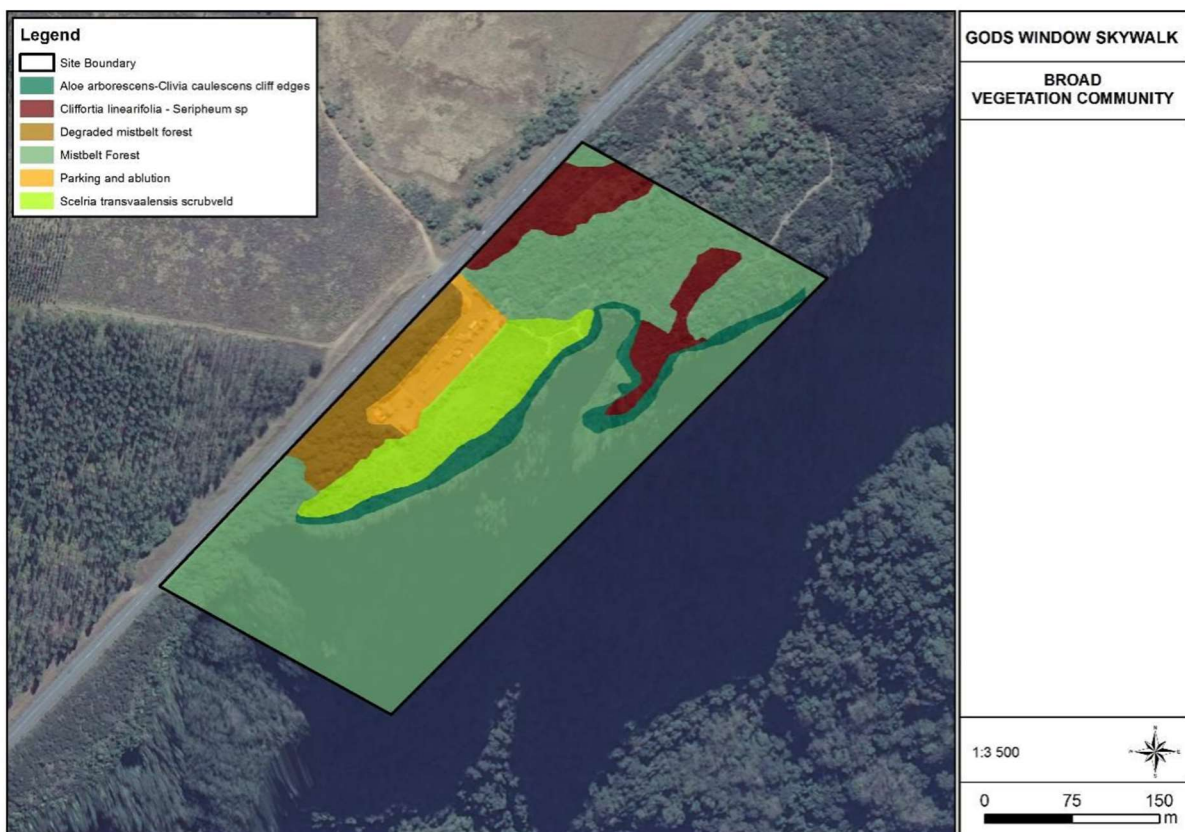


Figure 6-8: Delineated broad vegetation community map (Dimela, 2022)

6.5.2.1 *Passerina montana* -*Scleria transvaalensis* scrubveld

The vegetation to the east of the existing parking area was delineated as *Passerina montana*-*Scleria transvaalensis* scrubveld. This area is proposed for the bulk of the skywalk projects infrastructure.

Table 6-3: Summary of the prominent and dominant species recorded within the open *Passerina montana*-*Scleria transvaalensis* scrubveld

Dominant taxa recorded
<p><u>Sedge:</u> <i>Scleria transvaalensis</i></p> <p><u>Grasses:</u> <i>Cynodon dactylon</i>, <i>Pentaschistis natalensis</i>, <i>Panicum ecklonii</i></p> <p><u>Shrubs:</u> <i>Passerina montana</i>, <i>Helichrysum</i> species, <i>Cliffortia linearifolia</i>, <i>Buddleja salvifolia</i>, <i>Hypericum revolutum</i></p> <p><u>Herbaceous plants:</u> <i>Tetraselago natalensis</i>, <i>Anisopappus smutsii</i>, <i>Sebaea sedoides</i>, <i>Coleus calycinus</i>, <i>Lobelia flaccida</i>, <i>Senecio coronatus</i>, <i>Commelina africana</i>, <i>Cyanotis lapidosa</i></p> <p><u>Succulents:</u> <i>Aloe arborescens</i>, <i>Crassula pellucida</i>, <i>C. vaginata</i></p> <p><u>Geophytes:</u> <i>Ledebouria</i> species, <i>Drimia elata</i>, <i>Agapanthus inapertus</i></p> <p><u>Trees:</u> <i>Searsia tumulicola</i>, <i>Aeschynomene rehmannii</i></p> <p><u>Ferns / mosses:</u> <i>Pteridium aquilinum</i>, <i>Pellaea calomelanos</i>, <i>Cheilanthus cf hirta</i>, <i>Sellaginella dregei</i></p>
Species richness (indigenous species) at the time of the site visits
<p><u>Grasses:</u> 6 <u>Forbs / small shrubs:</u> 33 <u>Trees:</u> 3 <u>Sedges:</u> 6 <u>Ferns/mosses:</u> 6</p>
Protected or threatened plant species
<p>Four provincially protected species were recorded here:</p> <ul style="list-style-type: none"> • <i>Habenaria cf galpinii</i> • <i>Eulophia angloensis</i> • <i>Aloe arborescens</i> • The ferns <i>Pellaea</i> and <i>Cheilanthus</i> spp <p>One species classified as Data deficient, occurs at the edge of this vegetation unit and the <i>Aloe arborescens</i>-<i>Clivia caulenscens</i> cliff edge vegetation</p>
Alien and/or invasive plant species
<p><i>Lilium formasanum</i>, <i>Pinus patula</i>, <i>Solanum mauritianum</i></p>
Existing impacts
<ul style="list-style-type: none"> • Encroachment by the fern <i>Pteridium aquilinum</i>. • It seems the area was historically trampled. • Several holes, filled with rocks were noted closer to the cliff edge, likely historic test pits • A waste waterpipe from the bathrooms flood a portion of this vegetation to the south-west of the ablution facilities. • Alien invasive plant species
Sensitive ecological features
<ul style="list-style-type: none"> • Groundwater recharge zones • Habitat to provincial protected species and likely threatened species, although not recorded at the time.

6.5.2.1.1 *Cliffortia linearifolia*-*Seripheum* species A scrubland at forest margins

The scrubveld to the north and north-east of the existing parking area were dominated by dense stands of the shrubs *Cliffortia linearifolia* and *Seripheum* species A (Schmidt et al, 2002).

Table 6-4: Summary of the prominent and dominant species within the dense *Cliffortia linearifolia*-*Seripheum* species A scrubland

Dominant taxa recorded
<u>Sedge:</u> <i>Scleria transvaalensis</i>
<u>Grasses:</u> <i>Setaria lindenbergia</i> , <i>Pentaschistis natalensis</i> , <i>Panicum ecklonii</i>
<u>Shrubs:</u> <i>Seripheum</i> species A, <i>Cliffortia linearifolia</i> , <i>C serpyllifolia</i> , <i>Passerina montana</i> , <i>Buddleja salvifolia</i> , <i>Tephrosia polystachya</i> , <i>Psoralea latifolia</i>
<u>Herbaceous plants:</u> <i>Tetraselago natalensis</i> , <i>Helichrysum</i> species, <i>Hemizygia cf albiflora</i>
<u>Succulents:</u> -
<u>Geophytes:</u> <i>Agapanthus inapertus</i>
<u>Trees:</u> <i>Searsia tumulicola</i> , <i>Psychotria capensis</i> , <i>Cussonia spicata</i> , <i>Rapanea melanophloeos</i>
<u>Ferns / mosses:</u> <i>Blechnum punctulatum</i> , <i>Pentaschistis natalensis</i>
Species richness (indigenous species) at the time of the site visits
<u>Grasses:</u> 4 <u>Forbs / small shrubs:</u> 20 <u>Trees:</u> 6 <u>Sedges:</u> 4 <u>Ferns/mosses:</u> 4 <u>Climbers:</u> 2
Protected or threatened plant species
Several provincially protected ferns species occur in this vegetation group. The national protected tree <i>Podocarpus latifolius</i> was recorded, albeit limited in this vegetation
Alien and/or invasive plant species
<i>Lilium formasanum</i> , <i>Pinus patula</i> , <i>Solanum mauritianum</i> , <i>Acacia</i> (wattle)
Existing impacts
<ul style="list-style-type: none"> • Encroachment by the scrub into forest areas • Alien invasive plant species
Sensitive ecological features
<ul style="list-style-type: none"> • Groundwater recharge zones • Habitat to provincial protected species and likely threatened species, although not recorded at the time.

6.5.2.2 *Aloe arborescens*-*Clivia caulescens* cliff edge

This vegetation group agrees with the 2013 vegetation group *Aloe arborescens*-*Clivia caulescens*, although less dense, likely due to the 2018 /2019 fire. This vegetation forms a narrow band, and ecotone, between the *Passerina montana*-*Scleria transvaalensis* scrubland and the vertical cliff and includes species from both the scrubland and forests below (Table 6-5).

6.5.2.3 Vegetation on vertical cliffs

The steep nature of the cliff was a limitation to survey the vegetation growing within the crevices and the vegetation was not directly sampled. This report relies on the data recorded in the 2013 assessment when that specialist was able to rappel down the cliff face (SEF, 2013). In addition, zoomed in photographs from various look-out areas were used to ascertain species composition where possible, as well as what could be seen from accessible slopes.

The vegetation on vertical cliffs is usually highly adapted to cope with temperature extremes and various moisture regimes (usually very wet or completely dry). Many species are also lithophytes and specially adapted to the growing conditions on the cliff face.

The 2013 assessment recorded numerous rare, provincially protected species, as well as species of conservation concern on the cliff face (SEF, 2013). Refer to Table 6-6 for a summary of findings.

Table 6-5: Summary of the prominent and dominant species recorded within the *Aloe arborescens-Clivia caulescens*

Dominant taxa recorded
<p><u>Sedge:</u> <i>Scleria transvaalensis</i></p> <p><u>Grasses:</u> <i>Setaria lindenbergia</i></p> <p><u>Shrubs:</u> <i>Passerina montana</i>, <i>Psoralea latifolia</i>, <i>Buddleja salvifolia</i>, <i>Hypericum revolutum</i></p> <p><u>Herbaceous plants:</u> <i>Coleus bojeri</i>, <i>Impatiens sylvicola</i>, <i>Sebaea sedoides</i>, <i>Lobelia flaccida</i>, <i>Senecio coronatus</i>, <i>Commelina africana</i></p> <p><u>Succulents:</u> <i>Aloe arborescens</i>, <i>Aloe nubigena</i></p> <p><u>Geophytes:</u> <i>Ledebouria</i> species, <i>Drimia cf elata</i>, <i>Agapanthus inapertus</i></p> <p><u>Trees:</u> <i>Cussonia spicata</i>, <i>Faurea galpinii</i>, <i>Searisa tumulicola</i>, <i>Rapanea melanophloeos</i>, <i>Podocarpus latifolius</i>, <i>Greyia sutherlandii</i>, <i>Myrsine africana</i></p> <p><u>Ferns / mosses:</u> <i>Alsophila dregei</i> <i>Pteridium aquilinum</i>, <i>Dicranopteris linearis</i>, <i>Sellaginella dregei</i></p>
Species richness (indigenous species) at the time of the site visits – note that this area is partly inaccessible, and more species are likely present
<p><u>Grasses:</u> 1 <u>Forbs / small shrubs:</u>14 <u>Trees:</u> 7 <u>Sedges:</u> 1 <u>Ferns/mosses:</u> 6 <u>Climbers:</u> 1</p>
Protected or threatened plant species
<p>Five (5) provincially protected species were recorded here:</p> <ul style="list-style-type: none"> • <i>Aloe arborescens</i> and <i>A nubigena</i> • <i>Clivia caulescens</i> • <i>Alsophila dregei</i> (tree fern) • <i>Podocarpus latifolius</i> (yellow wood) <p>Three species are species of concern were recorded: 1 Near Threatened, 1 Rare and 1 Data deficient</p> <p>One national protected species were recorded, <i>Podocarpus latifolius</i></p>
Alien and/or invasive plant species
<p><i>Phytolacca octandra</i>, <i>Pinus patula</i>, <i>Solanum mauritianum</i></p>
Existing impacts
<ul style="list-style-type: none"> • Encroachment by the fern <i>Pteridium aquilinum</i>. • Alien invasive plant species particularly <i>Phytolacca octandra</i> and <i>Solanum mauritianum</i> have established on the edge of the cliff and will spread down to the forests.
Sensitive ecological features
<ul style="list-style-type: none"> • Highly sensitive vegetation with specific habitat requirements • Habitat to provincial protected species and threatened species.

Table 6-6: Summary of the prominent and dominant species recorded on the cliff face (SEF, 2013)

Dominant taxa recorded
<p><u>Shrubs:</u> <i>Passerina montana</i></p> <p><u>Herbaceous plants:</u> <i>Helichrysum galpinii</i>, <i>Monopsis kowynensis</i>, <i>Streptocarpus fenestra-dei</i></p> <p><u>Succulents:</u> <i>Aloe arborescens</i>, <i>Aloe nubigena</i></p> <p><u>Geophytes:</u> <i>Clivia caulescens</i>, <i>Merwillia plumbea</i>, <i>Schizochilus lilacinus</i></p> <p><u>Trees:</u> <i>Podocarpus cf falcatus</i></p> <p><u>Ferns / mosses:</u> <i>Alsophila dregei</i>, <i>Sellaginella dregei</i>, <i>Usnea</i> sp</p>
Species richness (indigenous species) at the time of the site visits – note that this area was inaccessible and more species are likely present
<p><u>Forbs / small shrubs:</u>5 <u>Trees:</u> 2 <u>Ferns/mosses:</u> 2</p>

Protected or threatened plant species
Seven (7) provincially protected species were recorded here, of which some are also nationally of conservation concern. A number of plant species of conservation concern were recorded, and their threat status are as follows: <ul style="list-style-type: none"> • 1 Near Threatened • 1 Rare • 3 Vulnerable One national protected species were recorded: <ul style="list-style-type: none"> • <i>Podocarpus latifolius</i>
Alien and/or invasive plant species
<i>Phytolacca octandra</i> , <i>Pinus patula</i> , <i>Solanum mauritianum</i>
Existing impacts
<ul style="list-style-type: none"> • Alien invasive plant species particularly <i>Phytolacca octandra</i> and <i>Solanum mauritianum</i> have established on the edge of the cliff and are spreading into crevices.
Sensitive ecological features
<ul style="list-style-type: none"> • Highly sensitive vegetation with specific habitat requirements. • Several plant species of conservation concern (sensitive species) were confirmed to occur (SEF, 2013). • Habitat to provincial protected species and threatened species.

6.5.2.4 Mistbelt forests

Mistbelt forests were recorded directly below the cliffs, as well as on much of the remainder of the study area. Below the cliffs the forest are natural, and according to the SEF 2013 report, the closed canopy comprises large trees such as *Podocarpus falcatus* (yellowwood), *Xymalos monospora* (lemonwood), *Cussonia spicata* (cabbage tree), *Schefflera umbellifera* (false cabbage tree) and *Psychotria capensis* (black bird berry) (SEF, 2013). The shrub layer consisted of *Obetia tenax* (nettle tree) as well as a diversity of fern species including *Alsophilla capensis* (forest tree fern). This area was not directly sampled during the current study as it was inaccessible from the cliffs edge. It is highly likely that numerous threatened species inhabit the forest floor.

The drainage line above the cliffs has also been colonised by forest species. The closed forest on the mountain stretched up and around a drainage line.

Table 6-7: Summary of the prominent and dominant species recorded within the mistbelt forests

Dominant taxa recorded
<u>Sedge:</u> <i>Carex spicato-paniculata</i> , <i>Cyperus cf digitatus</i> , <i>Cyperus albostratus</i>
<u>Grasses:</u> <i>Setaria lindenbergia</i> , <i>S. megaphylla</i> , <i>Pentaschistis natalensis</i> , <i>Brachypodium flexum</i>
<u>Shrubs:</u> <i>Psoralea latifolia</i> , <i>Cassinopsis ilicifolia</i> ,
<u>Herbaceous plants:</u> <i>Senecio tamoides</i> , <i>Secamone alpine</i> , <i>Dioscorea cotinifolia</i> <i>Hemizygia cf albiflora</i>
<u>Geophytes:</u> <i>Habenaria malacophylla</i> , <i>Crocoshia mathewsiana</i>
<u>Trees:</u> <i>Morella pilulifera</i> , <i>Bowkeria cymosa</i> , <i>Searsia chirendensis</i> , <i>Psychotria capensis</i> , <i>Cussonia spicata</i> , <i>Rapanea melanophloeos</i> , <i>Rawsonia lucida</i> , <i>Peddiea africana</i> , <i>Kiggelaria africana</i> , <i>Robsonodendron eucleiforme</i> , <i>Podocarpus latifolius</i>
<u>Ferns / mosses:</u> <i>Asplenium aethiopicum</i> <i>Alsophilla capensis</i> (<i>Cyathea</i>) <i>Cheilanthus cf viridis var viridis</i>
Species richness (indigenous species) at the time of the site visits – note that this area is partly inaccessible and more species are likely present
<u>Grasses:</u> 5 <u>Forbs / small shrubs:</u> 21 <u>Trees:</u> 28 <u>Sedges:</u> 3 <u>Ferns/mosses:</u> 6 <u>Climbers:</u> 4

Protected or threatened plant species
The forests are host to national protected trees, as well as plant species of conservation concern <ul style="list-style-type: none"> • 1 Rare species • 1 Near Threatened • 1 Vulnerable • At least two national protected tree species
Alien and/or invasive plant species
<i>Lilium formasanum, Pinus patula, Solanum mauritianum, Acacia (wattle)</i>
Existing impacts
<ul style="list-style-type: none"> • Encroachment by the scrub into forest areas • Alien invasive plant species • Litter along footpaths
Sensitive ecological features
<ul style="list-style-type: none"> • Groundwater recharge zones • Habitat to provincial protected species and likely threatened species, although not recorded at the time.

6.5.2.5 Plants species of conservation concern results and compliance statement

Appendix C of the vegetation report (Annexure D) lists thirty-eight (38) species of conservation concern (SCC). Of these species, three were historically classified as Declining; however, it has been reassessed to Least Concern. The numbers of these plants are still decreasing and therefore it is listed here as best practise.

The table below lists the number in each threat status that has been confirmed to occur and that is likely to occur. In total, ten (10) species of conservation concern were confirmed to occur. Appendix C of the vegetation report gives more details on the possible size of populations and provides a map wherein confirmed localities, including those confirmed in 2013 by SEF, are geographically represented.

Table 6-8: Number and threat of confirmed and highly likely to occur species.

Threat status	Number of species confirmed to occur	Number of species that has a medium to high possibility of occurrence.
Endangered	-	2
Vulnerable	3	3
Near Threatened	2	-
Data deficient (taxonomic problems)	1	-
Rare	4	2
Total	10	7

6.5.2.6 Provincially protected plants

The project area could support several plant species that are provincially protected by the Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) (MNCA). These species may not be removed, pruned or damaged without a permit from the MTPA. These species are most likely to occur along drainage lines and within undisturbed bushveld. The table below lists the provincially protected species recorded:

Table 6-9: Provincially protected species recorded and some species that are likely to occur

Protected species	Species recorded on site	Vegetation group (see map in Appendix C)
All fern species, except <i>Pteridium aquilinum</i> (bracken fern)	<i>Alsophila capensis</i> , <i>A. dregei</i> , <i>Asplenium aethiopicum</i> , <i>Blechnum punctulatum</i> , <i>Cheilanthes cf hirta</i> , <i>C. cf viridis var viridis</i> , <i>Dicranopteris linearis</i> , <i>Pellaea calomelanos</i> , <i>Pleopeltis macrocarpa</i>	Forests and scrubveld
All species of the Aloe genus, naturally occurring in Mpumalanga	<i>Aloe arborescens</i> and <i>Aloe nubigena</i>	<i>Aloe arborescens-Clivia caulescens</i> cliff edge, and vertical cliffs
All <i>Dioscorea spp</i>	<i>Dioscorea cotinifolia</i>	Forest, rocky areas close to cliff edge
Orchid family	<i>Habenaria-</i> , <i>Disperis-</i> , <i>Eulophia</i> , <i>Polystachya-Schizochilus-</i> , <i>Bronwlea</i> and <i>Stenoglottis</i> species	Mistbelt forest and <i>Passerina montana-Scleria transvaalensis</i> scrubveld
All Podocarpus species	<i>Podocarpus latifolius</i> and <i>P falcatus</i> (SEF, 2013)	Forests
Species likely to be present		
All species of Gladioli	<i>Gladiolus saxatalis</i>	Vertical cliffs
All <i>Ocotea</i> species	<i>Ocotea bullata</i> , <i>O kenyensis</i>	Forests

6.5.2.7 National protected trees

The National Forest Act, 1998 (Act No. 84 of 1998) enforces the protection of several indigenous trees. The removal, thinning or relocation of protected trees will require a permit from the DFFE (Notice of the List of Protected Tree Species under the National Forests Act, 1998 (ACT NO 84 OF 1998), Notice 44204, Government Gazette, 1 March 2021).

The table below lists the protected tree species that was confirmed to occur, as well as those that could be present within the project area and has a high likelihood of being present. Figure 6- indicates the location of the Yellowwoods identified during the specialist's walked transects.

Table 6-10: National protected species recorded and other species that are likely to occur

Species	Common name	Vegetation group Note these are the minimum localities which was recorded in walked transects or sampled areas. More individuals are likely present.
<i>Podocarpus latifolius</i> and <i>P falcatus</i> (SEF, 2013)	Yellowwoods	Forest vegetation, numerous individuals of <i>P latifolius</i> are present along the existing walking paths, along the cliff edge and at the proposed locality for the Prestressed Steel Tank
Trees likely to be present however not yet recorded		
<i>Curtissia dentata</i>	Assegai tree	Evergreen forests
<i>Ocotea bullata</i>	Stinkwood	Forests
<i>Warburgia salutaris</i>	Pepper bark	Forest

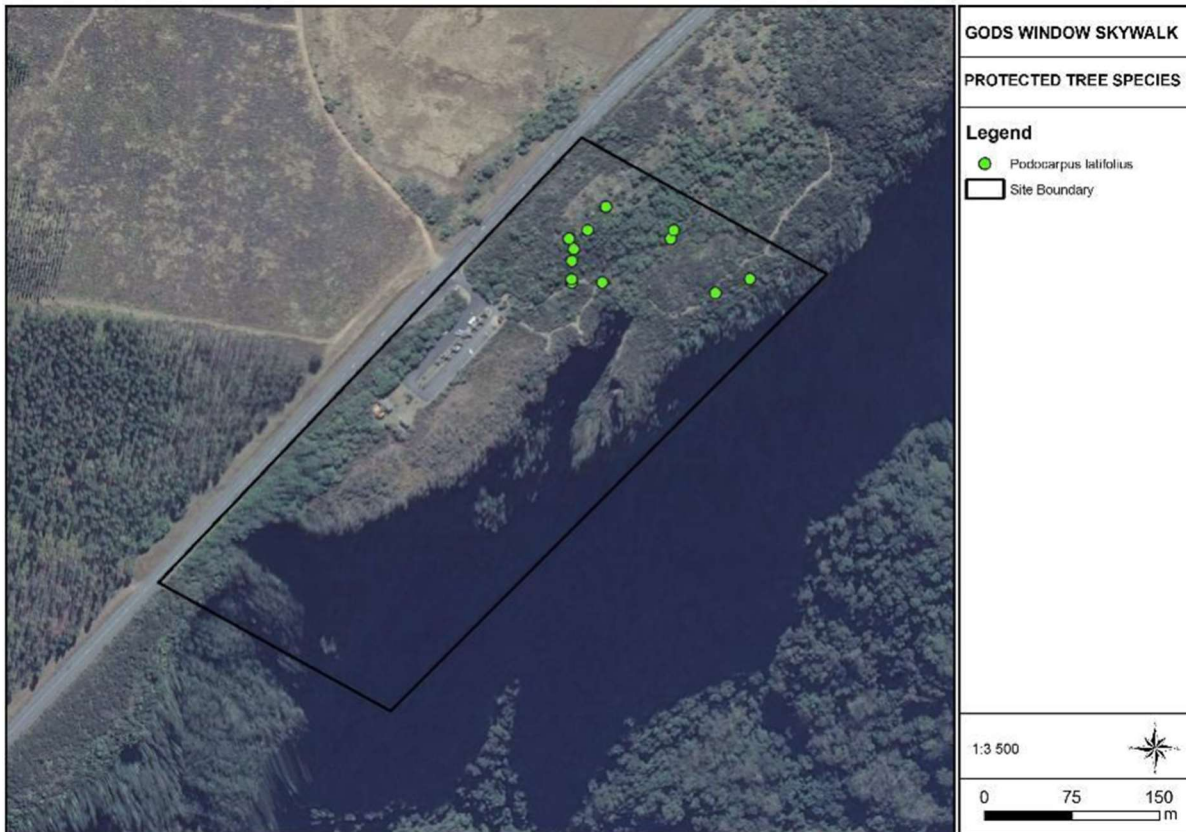


Figure 6-9: Protected tree localities in walked transects.

6.5.2.8 Alien invasive plant species

The project area is infested with alien invasive plant species which can significantly degrade the vegetation. Any project related impacts could result in the infestation of the disturbed areas by alien invasive plant species. Subsequently, remaining natural vegetation and available water resources will degrade further. The potential increase in alien invasive plant species is one of the major impacts associated with this project.

Declared weeds and invader plant species have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems. Therefore, it is important that these plants are controlled and eradicated by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001).

The alien plant species identified on the study site are listed in Appendix B of the vegetation report (Annexure D of this report). Sixteen (16) category 1b species were recorded and are listed in the table below.

Table 6-11: Category 1b invasive plant species and the vegetation group(s) it was recorded in

Species	Common name	Vegetation groups
<i>Canna indica</i>	Garden canna	Scrubveld at parking area
<i>Lilium formasanum</i>	St Joseph lily	Entire site
<i>Rubus cuneifolius</i>	American bramble	Most vegetation groups, however, limited in forest areas
<i>Solanum mauritianum</i>	Bugweed	High frequency along the <i>Aloe arborescens-Clivia caulescens</i> cliff edge, as well as in the scrubveld and degraded forest
<i>Solanum pseudocapsicum</i>	Jerusalem Cherry	Scrubveld and degraded forest
<i>Verbena bonariensis</i>	Wild Verbena	Degraded forest
<i>Phytolacca octandra</i>	Inkberry	<i>Aloe arborescens-Clivia caulescens</i> cliff edge

6.5.2.9 Site ecological importance

The Site Ecological Importance (SEI) in terms of the vegetation, was based on the site verification assessment, and is discussed, and mapped as per the requirements of the Species Environmental Assessment Guideline (SANBI, 2020). SEI is a function of the Biodiversity Importance of the receptor (e.g. species of conservation concern, the vegetation/fauna community or habitat type present on the site). Figure 6- illustrates the SEI calculated by the vegetation specialist.

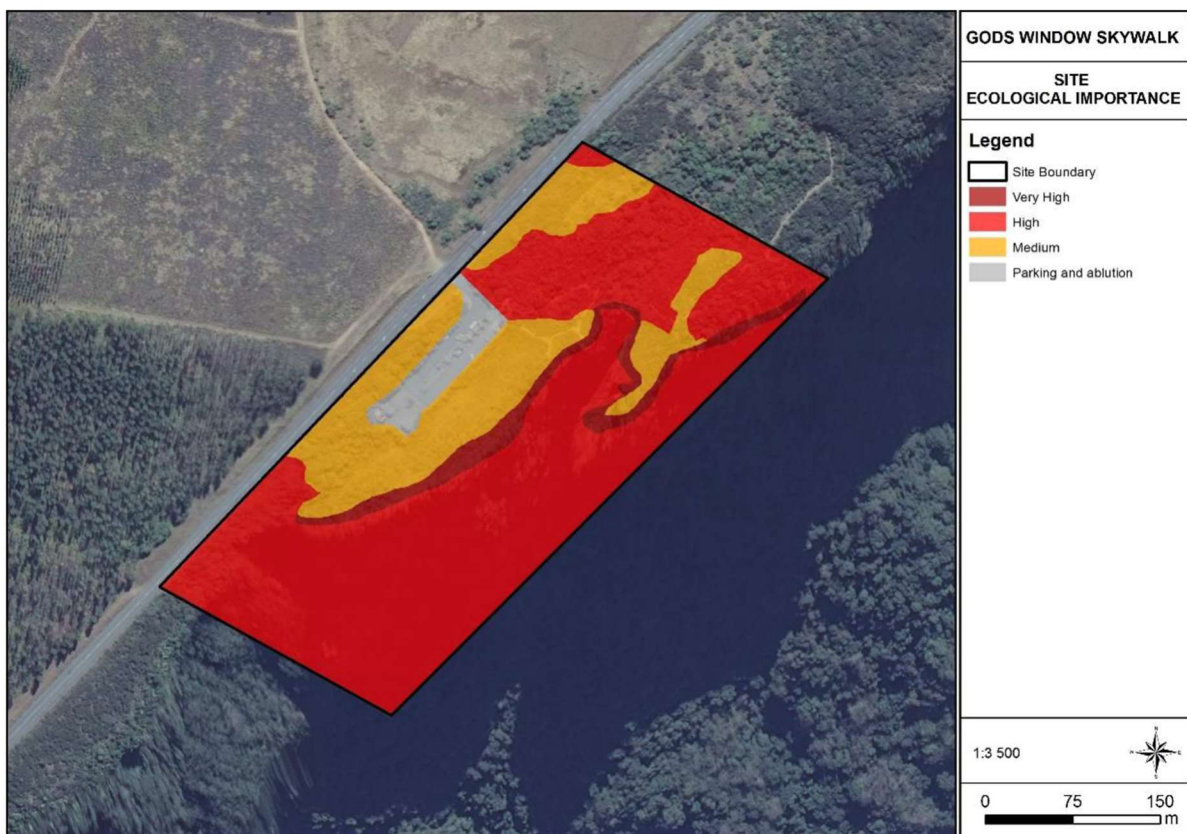


Figure 6-10: Site ecological sensitivity map

6.5.3 Impact Assessment

The vegetation of the project footprint includes sensitive and unique habitats, and several plant species of conservation concern were confirmed to occur or are highly likely to be present. The proposed project will have an impact on sensitive vegetation which is difficult, if not impossible, to rehabilitate. Some impacts as listed below can be mitigated, however, some impacts cannot be mitigated.

Project phase	Construction	
Impact	Destruction of natural vegetation of medium sensitivity	
Description of impact	<p>The proposed layout will remove the entire <i>Passerina montana-Scelria transvaalensis</i> scrubveld. The removal of vegetation from the site could also lead to a loss in the current ecological function (e.g., groundwater recharge zone) and general loss of species and genetic diversity. The removal of this vegetation could have a detrimental indirect effect on the vegetation of the cliff face (e.g. effect on the hydrology of the area)</p> <p>Areas that will not be developed, but that may be impacted on by construction related activities (e.g. where building materials are stored) must also be considered.</p> <p>In addition, the illegal disposal of construction material such as oil, could leach into soils which maybe hydrologically connected to the vegetation on the cliff face, thereby impacting on it.</p>	
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts
Potential mitigation	<p><u>Planning phase:</u></p> <ul style="list-style-type: none"> • Reduce the proposed development footprint to allow the conservation of some <i>Passerina montana-Scelria transvaalensis</i> scrubveld as open space around or within the development. This will ensure an ecological pathway through the development and conservation of species. It can also help maintain the function of this vegetation as groundwater recharge zones. However, such vegetation will have to be managed to ensure it persists. • The planned layout of the site must ensure that visitors activities can be restricted to a footprint and not sprawl out of control (e.g., increase in informal footpaths e.g. people taking shortcut through naturally vegetated areas). In this regard, it is recommended that no destructive activities such as quad biking or mountain biking are ever allowed as part of the entertainment at the site • Planning of the construction site must incorporate eventual rehabilitation of areas destroyed / damaged by construction and that does not contain infrastructure. • Construction camps and laydown areas for equipment and materials must be planned outside of sensitive vegetation and may not be placed within areas that are not earmarked for development. • The activities on the site should be managed in accordance with an ecological management plan. • This plan must include the construction as well as the operational phase of the development. <p><u>Construction:</u></p> <ul style="list-style-type: none"> • An independent Ecological Control Officer (ECO) should be appointed to oversee construction. • Keep the development footprint as small as possible. • Ensure that the areas that are not to be developed are protected from construction and related activities. • A temporary fence or demarcation must be erected around the construction area (include the actual footprint, as well as areas where material is stored) to prevent access to adjacent sensitive vegetation. • Maintain site demarcations in position until the cessation of construction work. • Only remove vegetation where necessary and retain vegetation in place for as long as possible prior to removal. • Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area. • Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas. • A vegetation rehabilitation plan should already be implemented during construction to rehabilitate areas that will be affected by edge effects. Such a plan should use indigenous species from the study area and must restore disturbed areas beyond the footprint of the infrastructure to what it was prior to construction, thereby making the impact on the remainder of the site negligible in the long term. Natural colonisation could take a long time, in which vegetation may degrade further or become dominated by encroacher or alien invasive plant species. Therefore, timely rehabilitation is imperative. Even in the event of good rains, annual pioneer plants are short-lived and therefore an effort must be made to keep as many shrubs in place as possible or to replace these as part of rehabilitation. • Where topsoil needs to be removed, store such in a separate area where such soils can be protected until they can be re-used for post-construction rehabilitation where applicable. Never mix topsoil with subsoils or other spoil materials. • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. • Prevent spillage of construction material, oils or other chemicals, strictly prohibit other pollution • Ensure there is a method statement in place to remedy any accidental spillages immediately • Do not dump litter or material within any vegetated areas. 	

	<ul style="list-style-type: none"> No open fires are permitted during construction. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Major - negative		Moderate - negative	
Comment on significance	Significance remains Major. Destruction of the entire <i>Passerina montana</i> - <i>Scleria transvaalensis</i> scrubveld will impact on ground water recharge zones, which could impact sensitive species growing on the <i>Aloe arborescens</i> - <i>Clivia caulescens</i> cliff face and the vertical cliffs. It is highly likely that the development will alter ecological processes. therefore, even with mitigation, the significance should be regarded as high.			
Cumulative impacts	The successful project may want to increase activities on the site and expand into the natural footprint.			

Project phase	Operation			
Impact	Destruction of natural vegetation of medium sensitivity			
Description of impact	<p>Edge effects include trampling by visitors – if any of this vegetation remains. It is likely that fire will be prevented to safeguard infrastructure, which could result in a change of the vegetation structure (increased woody vegetation) around the development and reduction of scrubveld.</p> <p>Lack of ecological corridor for movement of species / pollinators above the cliff face</p>			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	<p>Rehabilitate construction camps and any other vegetation that was impacted on by the construction.</p> <p>Any disturbances to the adjacent vegetation must be rehabilitated in accordance with the rehabilitation plan. This includes prevention of infestation by alien and invasive plant species on the site.</p> <p>Use indigenous plants local to the area where needed to stabilise soils, provide shade etc.</p> <p>No alien and invasive plant species as listed on 18 September 2020 in the list of Alien Invasive Species published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 43726 of 2020) may be planted or allowed to grow within the development.</p> <p>Maintenance, security or operational workers may not trample natural vegetation beyond the site and must be restricted to previously disturbed footprint.</p> <p>After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction.</p> <p>Do not plant shade trees that does not naturally occur at Gods Window.</p> <p>Erect signage educating visitors on sensitive environment and the result of edge effects.</p> <p>Ensure that visitors stay on dedicated paths and not remove plants</p>			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	On-going	Impact will last between 15 and 20 years

Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Moderate - negative	
Comment on significance	Edge effects could impact sensitive species growing on the <i>Aloe arborescens-Clivia caulenscens</i> cliff face and the vertical cliffs. It is highly likely that the development and operational activities, include fire prevention, will alter ecological processes.			
Cumulative impacts	Increase in areas impacted on due to edge effects			

Project phase	Construction			
Impact	Destruction of natural vegetation of high and very high sensitivity			
Description of impact	<ul style="list-style-type: none"> • Removal and damage to the <i>Aloe arborescens-Clivia caulenscens</i> cliff face vegetation (very high sensitivity) • The damage to or destruction of vegetation along the vertical cliff which was rated as very high sensitivity (constructing of skywalk and skybridge) • Edge effects into the mistbelt forest surrounding the development, as well as below the cliff face (high sensitivity) • Areas that will not be developed, but that may be impacted on by construction related activities (e.g., where building materials are stored) must also be considered. • Falling objects / building material dropped from the construction site onto these sensitive systems. • Contaminated rainwater from the construction site, could wash down the cliff during heavy rainfall. 			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	<p style="text-align: center;">Planning:</p> <p>The development layout should be set back from the cliff edge to protect and conserve the <i>Aloe arborescens-Clivia caulenscens</i> cliff face vegetation. This vegetation includes a Vulnerable species, a Near-Threatened species as well as a Data deficient species. A set back of a minimum of 15m from the cliff edge will protect the vegetation from edge effects. Only the access to the skywalk and skybridge may traverse this vegetation.</p> <p>A vegetation specialist must assess the final footprint on this vegetation to determine the species that will need to be relocated. Where such species are within the development footprint, they may only be removed once a permit for the removal / pruning was granted by the relevant authority.</p> <p>The panels of the skybridge must be manufactured from material that will let sunlight through, without concentrating the light which could burn sensitive plants below the skywalk.</p> <p>Ideally these panels should allow rainwater through, without concentrating / channelling the water onto plant species below the skywalk. These species grow in very shallow soils in crevices or on rocks and can easily be dislodged by concentrated waterflow.</p>			

Position the skybridge away from the cliff face (e.g., allow for a gap between the cliff face and the skybridge). This should allow rainwater to trickle down the cliff face unhindered and limit the impact on the vegetation on the cliff face.

Keep the width and length of the skywalk as narrow and short as possible as to limit its impact on the cliff face. Ideally, the skywalk should be reconsidered due to its likely impact on sensitive plant species.

Ensure that litter can not fall from the skywalk or skybridge (e.g. place nets along the skywalk / below it, to prevent litter falling down to the forest).

Design a stormwater management plan that will prevent any water from the development footprint from running down the cliff face.

Construction:

- An independent Ecological Control Officer (ECO) should be appointed to oversee construction.
- Keep the development footprint within the high and very high SEI as small as possible.
- Prevent polluted water running off the construction area and down the cliff or within the forested areas - implement a storm water management plan.
- Keep the work area (e.g. area to be disturbed) to a minimum. Manual labour is recommended in high and very high sensitivity areas, with no heavy vehicles driving over or turning within the high SEI areas
- A temporary fence or demarcation must be erected around the construction area (include the actual footprint, as well as areas where material is stored) to prevent access to adjacent vegetation.
- Place nets under the construction site to prevent falling building material impacting on the *Aloe arborescens-Clivia caulescens* cliff face vegetation, vegetation along the cliff face and the forest below. The erection of these nets should however be overseen by a suitably qualified botanist to ensure that the various threatened plants that have been recorded on the cliffs are not damaged.
- Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area.
- No open fires are permitted within naturally vegetated areas.
- Implement a vegetation rehabilitation plan. Natural colonisation could take a long time, in which vegetation may degrade (bush encroachment) or be invaded by alien invasive plant species. Therefore, timeous rehabilitation is imperative.
- Construction workers may not remove flora and neither may anyone collect seed from the plants without permission from the local authority.
- Where topsoil need to be removed, store such in a separate area where such soils can be protected until they can be re-used for post-construction rehabilitation
Never mix topsoil with subsoils or other spoil materials
- Maintain site demarcations in position until the cessation of construction work.
- After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction.

Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain / Highly probable	It is most likely that the impact will occur

Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Major - negative		Moderate - negative	
Comment on significance	Impacts to high sensitivity vegetation will likely be permanent and several unforeseen impacts can occur.			
Cumulative impacts	Degradation of vegetation along the vertical cliffs and the forests below. Change in ecological processes. Increased littering			

Project phase	Operation			
Impact	Destruction of natural vegetation of high and very high sensitivity			
Description of impact	<p>Edge effects include trampling by visitors, removal of plants along the skywalk, as well as maintenance activities.</p> <p>Overshadowing of vegetation underneath the Skywalk and Skybridge.</p> <p>Rain shadow effect caused by the infrastructure, preventing mist and rainfall on plants along and below the Skywalk and Skybridge.</p> <p>Magnifying effect of sunlight being concentrated through the glass skywalk, potentially burning plants</p> <p>Water being channelled and flow concentrated from the bridge or skywalk downwards can dislodge sensitive plant species. These species grow in shallow soils in crevices and can easily be dislodged.</p> <p>Falling objects from visitors and litter.</p> <p>Chemicals used to clean the skywalk and skybridge can drip or be flushed from the surfaces and will likely kill plant species on the cliff face and change soil pH.</p> <p>A faulty Prestressed Steel Tank and the associated pipeline will result in damage to forest vegetation as well as erosion within vegetation that harbours plant species of conservation concern.</p>			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. Ensure that maintenance work does not take place haphazardly, but according to a fixed plan. Cordon off areas that are under rehabilitation as no-go areas. If necessary, these areas should be fenced off to prevent vehicular, and pedestrian access. Maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition, mitigation measures as set out for the construction phase should be adhered to. Do not use chemicals to clean the skywalk and skybridge. Cleaning solutions made of organic ingredients and that are biodegradable should be used, and even then, these solutions should not be allowed to drip or wash of the surfaces. Visitors should not be allowed to take any food or beverages onto the Skywalk and Skybridge, this will limit the possibility of rubbish thrown into the cliffs and mistbelt forest below the walks The area below the Skywalk complex should be cleaned every four (4) months from any rubbish by qualified rope access technicians. Ensure stormwater management systems are regularly checked and cleared of debris. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Medium term	Impact will last between 5 and 10 years	Medium term	Impact will last between 5 and 10 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements

Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Minor - negative	
Comment on significance	The significance rating is disputed here. The significance rating should be high prior to mitigation as irreplaceable resources could be affected, with moderate significance post mitigation			
Cumulative impacts	<ul style="list-style-type: none"> • Degradation of vegetation along the vertical cliffs and the forests below. • Change in ecological processes. • Increased littering" 			

Project phase	Construction			
Impact	Removal / Destruction of protected plants and plants of conservation concern			
Description of impact	<p>The development will necessitate the removal of plant species of conservation concern, impact on their habitat conditions, pollinators and inevitably the persistence of these species (particularly along the vertical cliff and within the <i>Aloe arborescens-Clivia caulenscens</i> cliff face vegetation. This could put further strain on the already declining populations.</p> <p>Falling objects could dislodge sensitive species from the cliff face.</p> <p>The upgrade of pathways will destroy protected tree species and plant species of conservation concern</p>			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<p>Planning:</p> <ul style="list-style-type: none"> • Limit the development footprint and the developments impact on areas of very high and high SEI. • Reconsider the need for a skywalk compared to the need to conserve sensitive plant species. As best practise, the skywalk should be limit in its extent and thus resulting impacts. • The development should be set back a minimum of 15m from the cliff edge, thereby conserving the <i>Aloe arborescens-Clivia caulenscens</i> cliff face vegetation. • It is also recommended that the development takes place in a phased approach. The impact of the development on the sensitive plant species on the vertical cliffs can not be entirely foreseen or envisaged as it has not been studied. A Phased approach (e.g. parking, restaurant and Skybridge as Phase 1) could provide time to study the impact of the development prior to phase 2 of the development (skywalk and additions to the restaurant and visitors centre). • The final development layout should be made available to the specialist prior to the plant species assessment that will search for additional plant species of conservation concern. The development footprint will be ground-truthed to verify the impact on the sensitive species. • Sensitive species that are under threat from the construction activity, must be removed by a suitably qualified specialist and replanted as part of vegetation rehabilitation after the construction (note, these plants may only be removed with the permission of the provincial authority). • Implement a plant relocation plan for plant species of concern that was recorded. For species that can not be relocated (e.g. large trees), apply for permit for the pruning / removal thereof. • If the development is to proceed, a management plan for these species, during construction and operation, must be implemented and regularly monitored and reported on to the MTPA. The management body of the development should undertake to conserve and monitor the remaining numbers of these plants along the <i>Aloe arborescens-Clivia caulenscens</i> cliff face and the vertical cliffs. • Implement mitigation as set out in 4.3.2 above. 			

- The final method and plan for upgrading the pathways needs to be submitted to the specialist in order to mark species that must be avoided by the upgrade activities, or be relocated.

Construction:

- Where possible, the species of conservation concern that were confirmed to occur, should be avoided by construction and related activities. The species should be marked or cordoned off to protect them from construction activities and vehicles. Construction workers should be made aware of the species and the aim to protect them from damage.
- Prior to construction, a botanist or ecologist must walk the final footprint of the development within the growing and flowering period of the Vulnerable plant species, to determine the number that might be displaced or that may be impacted on by the final development layout.
- Where individual plants or subpopulations of the Vulnerable species, as well as provincially protected plants will be impacted on, these plants must be removed and replanted by a botanist / horticulturist. This can only take place once the MTPA has granted a permit to do so.
- Any additional development, other than this proposed development which should still reduce its footprint, is not supported by this assessment.
- Construction workers may not remove any plants, seeds or plant parts other than that necessary for the development footprint
- Before construction is initiated, all areas earmarked for an authorized development must be fenced off from those areas to be retained as an open space system, and all construction-related impacts (including service roads) must be contained within the fenced-off development areas.
- As per above, implement an ecological management plan. This must take place prior to the start of the operational activities and include:
 - a. An Ecological Management Plan must be compiled by a suitably qualified ecologist (at least a BSc (Hons) in Plant Ecology or equivalent) as approved by the Department.
 - b. The implementation of the Ecological Management Plan is the responsibility of an appropriate management authority, such as the management company or section 21 company, vested with the authority to ensure the correct ecological management of the area where the Red List Plant Species population is growing.
 - c. The Ecological Management Plan must –
 - d. Ensure the persistence of the Red List Plant Species population;
 - e. Include a monitoring programme that monitors the size, stage structure and vigour of the Red List Plant Species population as well as threats to the population;
 - f. Facilitate/augment natural ecological processes such as fire and herbivory;
 - g. Provide for the habitat and life history needs of important pollinators;
 - h. Minimise artificial edge effects (e.g. water runoff from developed areas and application of chemicals);
 - i. Include an ongoing monitoring and eradication programme for non-indigenous species with specific emphasis on invasive and weedy species;
 - j. Result in a report back to the Department on an annual basis.
 - k. Mitigatory measures are required to protect the Red List Plant Species population during construction.
- The ECO should take note of any unearthed geophytes or orchids and contact a specialist for the correct naming and threat status of the species. This will determine whether any follow-up action is required.
- Construction workers may not tamper or remove these plants and neither may anyone collect seed from the plants without permission from the local authority.

Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Long term	Impact will last between 10 and 15 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain / Highly probable	It is most likely that the impact will occur

Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Major - negative		Moderate - negative	
Comment on significance	Failure to adhere to measures could have detrimental effects			
Cumulative impacts	<ul style="list-style-type: none"> • Species removed and relocated as part of rehabilitation could die due to transplantation shock or damage during replanting. • Degradation of vegetation along the vertical cliffs and the forests below. • Change in ecological processes. • Unforeseen impacts. 			

Project phase	Operation			
Impact	Removal / Destruction of protected plants and plants of conservation concern			
Description of impact	<p>Falling objects and litter, as well as channelled stormwater could dislodge sensitive species from the cliff face.</p> <p>Visitors could pluck flowers and remove plants along the skywalk area.</p> <p>The skywalk could overshadow sensitive species, or concentrate sunlight and alter the species microhabitat, ultimately causing its demise.</p>			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • The relocated species should be monitored for at least three years post relocation. If die back is noted, a specialist should be consulted, and corrective action taken as soon as possible. • Monitor the impact of the operations on the plant species and vegetation and report back to the Department on an annual basis. • Do not use chemicals to clean the skywalk and skybridge. Cleaning solutions made of organic ingredients and that are biodegradable should be used, and even then, these solutions should not be allowed to drip or wash of the surfaces. • Visitors should not be allowed to take any food or beverages onto the Skywalk and Skybridge, this will limit the possibility of rubbish thrown into the cliffs and mistbelt forest below the walks • The area below the Skywalk complex should be cleaned every four (4) months from any rubbish by qualified rope access technicians. • Ensure stormwater management systems are regularly checked and cleared of debris. • Educate visitors and prevent removal of and accessibility to plant species of conservation concern 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Medium term	Impact will last between 5 and 10 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Very high	Natural and/ or social functions and/ or processes are majorly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified

Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Major - negative		Moderate - negative	
Comment on significance	Failure to adhere to measures could have detrimental effects			
Cumulative impacts	<ul style="list-style-type: none"> • Species removed and relocated as part of rehabilitation could die due to transplantation shock or damage during replanting. • Degradation of vegetation along the vertical cliffs and the forests below. • Change in ecological processes. • Unforeseen impacts. 			

Project phase	Construction			
Impact	Potential increase in invasive vegetation, including alien species and indigenous encroacher species			
Description of impact	<ul style="list-style-type: none"> • The seed of alien invasive plant species that occur on and in the vicinity of the construction areas could spread into the disturbed and stockpiled soil. • Also, the construction vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds or indigenous plants not belonging to this vegetation unit to the construction site. • In addition, if rehabilitation of the indigenous vegetation along the route, are unsuccessful or is not enforced, exotic and invasive vegetation may further invade the area. 			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • Alien invasive species, in particular category 1b species that were identified within the study area, should be removed from the development footprint and immediate surrounds, prior to construction or soil disturbances. By removing these species, the spread of seeds will be prevented into disturbed soils which could thus have a positive impact on the surrounding natural vegetation. • Two aggressive category 1b species were recorded within the <i>Aloe arborescens-Clivia caulescens</i> cliff face vegetation. These species readily set seed and has already spread down towards the forests. These species should be removed by qualified persons such as the Working for Water High Altitude team that are trained in rappelling. • All alien seedlings and saplings must be removed as they become evident for the duration of construction. • All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction areas. This should be verified by the ECO. • If filling material is to be used, this should be sourced from areas free of invasive species. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Long term	Impact will last between 10 and 15 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere

Significance	Moderate - negative	Minor - positive
Comment on significance	With the implementation of the recommended mitigation measure, the effective control of alien plant species is expected to have a positive impact on the project development area.	
Cumulative impacts	<ul style="list-style-type: none"> • The area that the proposed development is situated in is already infested with alien invasive plant species. Therefore, if mitigation measures to limit and prevent the spread of alien species are not implemented, the cumulative impact could lead to remaining natural vegetation transformed by alien plant species. • Due to the high occurrence of alien invasive plant species in the area, the residual risk of increased alien vegetation cover is moderate to high." 	

Project phase	Operation			
Impact	Potential increase in invasive vegetation, including alien species and indigenous encroacher species			
Description of impact	Introduction of alien species via landscaping or visitors			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • No alien and invasive plant species as listed on 18 September 2020 in the list of Alien Invasive Species published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 43726 of 2020) may be planted within the development. • Only use indigenous species naturally occurring on the site for rehabilitation or landscaping. No trees that are not natural to the Gods Window area may be planted at parking areas or the development landscape. Rather, the areas should be rehabilitated to the natural occurring vegetation. • Implement an alien invasive plant monitoring and management plan whereby the spread of alien and invasive plant species into the areas disturbed by the construction are regularly removed and re-infestation monitored. This plan should regularly be updated and be implemented for the entire operational phase of the development. • Remove alien invasive species from the Gods Window area as soon as they become apparent. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Long term	Impact will last between 10 and 15 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - positive	
Comment on significance	With the implementation of the recommended mitigation measure, the effective control of alien plant species is expected to have a positive impact on the project development area.			

Cumulative impacts	<ul style="list-style-type: none"> • The area that the proposed development is situated in is already infested with alien invasive plant species. Therefore, if mitigation measures to limit and prevent the spread of alien species are not implemented, the cumulative impact could lead to remaining natural vegetation transformed by alien plant species. • Due to the high occurrence of alien invasive plant species in the area, the residual risk of increased alien vegetation cover is moderate to high."
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Project phase	Construction			
Impact	Clearing of land for construction camps and potential pollution of the soil and water			
Description of impact	<p>These may be at one or several locations, area will be cleared and levelled where necessary, site offices may be temporary structures, machinery, building supplies and temporary staff facilities (excluding accommodation) will be housed here. The impacts could include:</p> <p>Removal of vegetation Levelling and compaction of soils Storage of machinery, supplies and staff facilities This could lead to the loss of vegetation and/or species of conservation concern, alteration, and loss of microhabitats, altered vegetation cover, increased erosion and contamination of soil and groundwater.</p>			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<p>Keep the clearing of natural vegetation to a minimum and locate construction camps within transformed or modified areas.</p> <p>After the final layout has been approved, conduct a thorough footprint investigation to determine any protected plant species population location and size.</p> <p>Stay within demarcated temporary construction areas and strictly prohibit any off-road driving or parking of vehicles and machinery outside designated areas</p> <p>Prevent spillage of construction material and other pollutants, contain, and treat any spillages immediately, strictly prohibit any pollution/littering according to the relevant EMPr</p> <p>No open fires may be lit for cooking or any other purposes, unless in specifically designated and secured areas</p> <p>Facilities may not be used as staff accommodation</p> <p>No vehicles may be washed on the property, except in suitably designed and protected areas</p> <p>No vehicles may be serviced or repaired on the property, unless it is an emergency in which case adequate spillage containment must be implemented</p> <p>After construction remove all foreign material prior to starting the rehabilitation</p> <p>The rehabilitation plan for all temporarily affected areas must aim to re-introduce species naturally occurring in the area.</p> <p>Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed</p> <p>Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. Monitoring should continue for at least two years after construction is complete.</p>			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered

Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	A reduction in the intensity and probability of the impact results in the minor impact being assessed as negligible with the implementation of mitigation measures.			
Cumulative impacts	<ul style="list-style-type: none"> • If mitigation measures are not strictly implemented, erosion of the development area, contamination of ground water and the spread and establishment of invasive species can take place. • Compaction on construction camps could result in altered topsoil characteristics and vegetation composition. These areas are also prone to invasion by alien invasive plant species. 			

Project phase	Construction		
Impact	Compaction and destruction of soils		
Description of impact	<p>The movement of heavy machinery over vegetated areas during construction and maintenance will result in soil compaction that will modify habitats, destroy vegetation, and inhibit re-vegetation. Soil compaction because of vehicles and traffic, could lead to a decrease of water infiltration and an increase of water runoff. Such areas are more likely to be colonised by pioneer, alien invasive plant species, than indigenous species. This will further transform the vegetation of the area. The health of the topsoil is imperative for re-vegetation. Incorrect stripping, handling and storage could lead to failed rehabilitation.</p>		
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts	
Potential mitigation	<ul style="list-style-type: none"> • Vehicles and machinery may not veer from the dedicated roads. • Once construction is complete, obsolete roads should be obliterated by breaking the surface crust and erecting earth embankments to prevent erosion, while the natural species composition should be re-established. • Prior to construction, the topsoil must be removed and stored separately from subsoil. The topsoil is imperative for the successful re-establishment of indigenous vegetation and it carries seed from the existing vegetation • Topsoil (the upper 25 cm of soil) is an important natural resource; where it must and can be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise handling of topsoil. • Topsoil is typically stored in berms with a width of 150 – 200 cm, and a maximum height of 100 cm, preferably lower, ideally in a disturbed but weed-free area. Place berms along contours or perpendicular to the prevailing wind direction. • Rapid decomposition of organic material in warm, moist topsoils decreases microbial activity necessary for nutrient cycling, and reduces the number of beneficial micro-organisms in the soil. Therefore, topsoil should therefore not be stored for extensive periods and it is recommended that the reapplication of topsoil takes place as soon as possible. Adhere to the following general rule: the larger the pile of topsoil storage needs to be, the shorter should be the time it is stored • Topsoil handling should be limited to stripping, piling (once), and re-application. • Any movement of heavy machinery or vehicles over stored topsoils must be strictly prohibited. • Maintenance / operational vehicles may not deviate from dedicated roads. 		

Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Short term	impact will last between 1 and 5 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	In the absence of mitigation, the impacts are considered to be Moderate			
Cumulative impacts	Failed rehabilitation and soil compaction associated with the development could lead to a cumulative invasion by alien invasion plant species from the surrounding transformed vegetation that can easily spread into the compacted soils. Altered soil characteristics and vegetation that remain in an unstable, pioneer phase or invaded by alien invasive plant species.			

Project phase	Construction			
Impact	Destruction of unique rocky habitats and trees			
Description of impact	Parts of the development falls on rocks that create the unique habitat, might be destroyed, or shifted. In addition, large trees might be removed, or the roots severed, which could result in diseases and trees toppling			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<p>The planning layout must impact on as little vegetation as possible. The need to remove trees, shrubs and undergrowth must be limited.</p> <p>Workers must undergo environmental awareness training and understand the need to limit impacts on the natural environment.</p> <p>Do not remove large rocks or break boulders. Incorporate the rocks into planning of the development footprint.</p> <p>Do not remove large and unique trees along the footpaths, or orchids and other protected species.</p> <p>Keep the development footprint and areas to be disturbed as small as possible.</p> <p>Prevent damage to trees and shrubs that are not directly within the development footprint.</p> <p>Maintain clear footpaths to prevent random access of visitors over rocks where they could trample smaller vegetation.</p> <p>Monitor the survival of relocated species.</p>			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings

Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	In the absence of mitigation, the impacts are considered to be Moderate to High			
Cumulative impacts	None envisaged			

Project phase	Operation			
Impact	Modification of the natural vegetation			
Description of impact	Post construction, the vegetation within the development footprint might be landscaped and irrigated. This could change the species composition and abundance (or density) of the vegetation around the development footprint. Lush areas around the development could encourage a variety of birds to the area, which can spread seed of plant species not naturally occurring in the area.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Limit the need for rehabilitation and landscaping of vegetation. The landscape plan should only make use of species naturally occurring within the Gods Window area Irrigated areas should be kept to a minimum Erect a temporary fence or demarcation around the construction area to prevent access to sensitive environs. No random-access routes, equipment storage or construction camps may be situated in the watercourse. Prevent the unnecessary removal and trampling of vegetation No operational activities may directly impact on the vegetation of very high and high SEI, other than the proposed skywalk. Rehabilitate areas that was disturbed with an indigenous species that naturally occur at Gods Window. Manage the vegetation within the development footprint to maintain it in a natural to near-natural state. The area should not be irrigated. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Medium term	Impact will last between 5 and 10 years
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge

Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	In the absence of mitigation, the impacts are considered to be Moderate			
Cumulative impacts	<p>Degradation of the vegetation around the development particularly from the cliff edge downwards. This will impact on the vegetation species composition and functionality.</p> <p>Landscaping and irrigation of the vegetation within the development footprint could increase bird diversity, resulting in the establishment of plant species not naturally from the area on and around the site.</p> <p>Operational activities may cause indirect impacts to the vegetation along the river, including pollution. This could result in a change in species composition and functionality. If mitigation measures are adequately undertaken, the residual risk is low as the impacts are unlikely to exceed the construction impacts.</p>			

Project phase	Construction			
Impact	Impact on ecological processes			
Description of impact	<ul style="list-style-type: none"> As per the 2013 ecological and wetland report, the hydrology of the area seems interconnected and important in terms of regulating different moisture regimes in different areas, many areas serving as habitat harbouring a multitude of species of conservation concern (SEF, 2013 and 2014). These species are dependent on the wet conditions of some of the cliffs. The wet conditions of these cliffs are most probably caused by wetlands on the top of the escarpment, and it is therefore likely that disturbance caused to these wetlands will impact the water regimes on the vertical cliffs which will cause the moisture dependant species to die. Construction and operation could cut off the waterflow to plant species of conservation concern growing on the cliff edge and on the vertical cliff. The current layout destroys most of the <i>Passerina montana</i> -<i>Scleria transvaalensis</i> scrubveld. Fire in scrubveld maintain the species composition and vegetation structure. Fires will be prevented to safeguard infrastructure, which could result in a change of species composition. Mismanagement of the vegetation and lack of rehabilitation could lead to encroachment by non-herbaceous or 'woody' species such as the bracken fern (<i>Pteridium aquilinum</i>) and <i>Cliffortia linearifolia</i> which were already present in large numbers. This could change ecotonal communities, which can tolerate fire 			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Limit the need for rehabilitation and landscaping of vegetation. The landscape plan should only make use of species naturally occurring within the Gods Window area Irrigated areas should be kept to a minimum Erect a temporary fence or demarcation around the construction area to prevent access to sensitive environs. No random-access routes, equipment storage or construction camps may be situated in the watercourse. Prevent the unnecessary removal and trampling of vegetation No operational activities may directly impact on the vegetation of very high and high SEI, other than the proposed skywalk. Rehabilitate areas that was disturbed with an indigenous species that naturally occur at Gods Window. Manage the vegetation within the development footprint to maintain it in a natural to near-natural state. The area should not be irrigated. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Long term	Impact will last between 10 and 15 years

Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Major - negative		Minor - negative	
Comment on significance	In the absence of mitigation, the impacts are considered to be Moderate			
Cumulative impacts	<ul style="list-style-type: none"> • Possible bush densification around the development footprint and loss of indigenous species diversity. • Drying out of cliff faces and subsequent demise of plant species of conservation concern. • Unforeseen impacts 			

Project phase	Construction			
Impact	Impact on ecological processes			
Description of impact	<ul style="list-style-type: none"> • Fire in scrubveld maintain the species composition and vegetation structure. Fires will be prevented to safeguard infrastructure, which could result in a change of species composition. • Mismanagement of the vegetation and lack of rehabilitation could lead to encroachment by non-herbaceous or 'woody' species such as the bracken fern (<i>Pteridium aquilinum</i>) and <i>Cliffortia linearifolia</i> which were already present in large numbers. This could change ecotonal communities, which can tolerate fire 			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • Monitor the establishment of dense stands of encroacher species and remove or thin as soon as detected. • A rehabilitation plan, using indigenous species from the study area, must be implemented that will restore disturbed areas beyond the footprint of the infrastructure to what it was prior to construction, thereby making the impact on the remainder of the site negligible in the long term. • Develop a burning, cutting management plan with an ecologist which considers safety of the operation, local by-laws and national legislation, in order to effectively manage natural vegetation. • Implement a fire management plan that safeguards visitors and infrastructure, while allowing natural fires to burn. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Medium term	Impact will last between 5 and 10 years
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge

Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Major - negative		Minor - negative	
Comment on significance	In the absence of mitigation, the impacts are considered to be Moderate			
Cumulative impacts	<ul style="list-style-type: none"> • Possible bush densification around the development footprint and loss of indigenous species diversity. • Drying out of cliff faces and subsequent demise of plant species of conservation concern. • Unforeseen impacts 			

6.5.4 Conclusion and Recommendations

The project area is situated within a protected area and comprise mainly of natural vegetation. The proposed project will impact on vegetation ranging from a medium to a very high sensitivity. The vegetation further includes sensitive and unique habitats, and several plant species of conservation concern were confirmed to occur or are highly likely to be present. The proposed project activities that will impact on areas of very high sensitivity will have an impact on sensitive vegetation which is difficult, if not impossible, to rehabilitate. Some impacts can be mitigated; however, some cannot and the feasibility of the project, compared to conservation of sensitive plant species must be considered.

The following is recommended to limit the foreseen impacts:

- Reduce the development footprint within the *Passerina montana -Scleria transvaalensis* scrubveld (medium sensitivity) and position the development based on recommendations of the wetland and geo-hydrology assessments. This will allow the persistence of this vegetation, while safeguarding the groundwater source that the species on the cliff face is likely dependent on.
- Reconsider the need for a skybridge compared to the need to conserve sensitive plant species. If the skywalk is developed, as best practise, the skybridge should be limited in its extent and thus resulting impacts.
- Consider implementing the development in a phased approach. The impact of the development on the sensitive plant species on the vertical cliffs cannot be entirely foreseen or envisaged as it has not been studied, the geohydrology assessment could assist in determining the impact. A phased approach (e.g., parking, restaurant and Skywalk as Phase 1) could provide time to study the impact of the smaller development prior to phase 2 of the development (skybridge and additions to the restaurant and visitors centre).
- Avoid the use of foundations were possible, e.g., employ lightweight steel construction and stilts instead of digging foundations into the lateral waterflow.
- The development layout should be set back from the cliff edge to protect and conserve the *Aloe arborescens-Clivia caulenscens* cliff face vegetation. This vegetation includes a Vulnerable species, a Near-Threatened species as well as a Data deficient species. A setback of a minimum of 15m from the cliff edge will protect the vegetation from edge effects. Only the skybridge may traverse this vegetation and the access to the skywalk.

6.6 Fauna Environment

Scientific Terrestrial Services (STS) CC was appointed by Zutari to undertake the terrestrial fauna assessment for this project, with field assessments being done on 16 and 17 March 2022. The sections

below have been taken from the specialist report and reference is therefore made to the report dated May 2022.

6.6.1 Baseline description

From a faunal perspective three habitat units have been identified within the study area. The three habitat units associated with the study area for fauna are discussed briefly in terms of faunal utilisation and importance below. Please note some wet response areas were recorded within the study area but have not been mapped as different habitat units as the vegetation

characters were not significantly different. These locations will provide suitable habitat for moisture dependant faunal species. Figure 6- below provides a visual representation of the habitats within the study area.

- Escarpment scrubveld habitat: This unit is predominantly found on the escarpment plateau within the study area. This habitat has avoided human transformation and maintains intact herbaceous and shrub communities providing valuable structure and forage (both grazing and browsing) for fauna. The more open habitat does reduce shelter for larger fauna but the high-density herbaceous layer does provide valuable shelter and forage locations for smaller faunal species, especially invertebrates and herpetofauna and also SCC within these and other classes.
- Forest habitat: This unit is dense in its shrub and tree composition and offers valuable shelter and habitat for more specialist species while also offering species in the adjacent open habitats suitable areas to shelter. A reduced herbaceous layer is present in locations where a thick canopy is present. This unit occupies the more rugged and steep terrain associated with the escarpment and drainage features (Valleys or Drainage channels) and is largely based on an intact and undisturbed tall woody component with differing densities. High avifaunal and invertebrate diversities were observed within this unit and it likely supports numerous reptiles species (although not observed during a site visit of limited duration). The Forest habitat unit has experienced little disturbance and remains valuable habitat for most faunal assemblages. This unit likely hosts several SCC.
- Transformed habitat: This habitat unit includes areas where existing tourist infrastructure and parking exist and offer limited opportunities as faunal habitat.




Figure 6-11: Conceptual illustration of the habitat units associated with the study area



6.6.2 Assessment results

A dashboard report of the findings of each faunal class including the probability of occurrence (POC) is provided in the following sections.

6.6.2.1 Mammals

Table 6-12: Field assessment results pertaining to mammal species within the study area

Photograph Notes:	Mammal SCC	Threat Status	POC
<p>Top: <u>Left:</u> <i>Mastomys natalensis</i> (Natal Multimammate Mouse) were common in the Escarpment scrubveld. <u>Right:</u> <i>Rhabdomys dilectus</i> (Four-striped field mouse) captured within the Escarpment scrubveld. Bottom: <u>Left:</u> <i>Atelix paludinosus</i> (Marsh mongoose) scat noted within the Escarpment scrubveld. <u>Right:</u> A well-developed animal path through the Forest habitat.</p>	<p><i>Cercopithecus albigularis</i> (Samango Monkey) are arboreal omnivores which live in a variety of forest habitat. Within the study area the Forest Habitat will be suitable habitat for this species. Open and closed savanna and grassland act as a dispersal barrier for this species.</p>	Threatened or Protected Species (TOPS) – Vulnerable (VU)	High
	<p><i>Leptailurus serval</i> (Serval) are associated with a number of habitats throughout their range. They prefer moist grassland associated with riparian environments yet can penetrate dense forest and inhabit semi-desert as long as sufficient cover is available in adjacent open habitats. Within the study area it is likely to occupy the Escarpment Scrubveld habitat but will move throughout the entire study area. They may utilize the study area as a corridor through which to move along the escarpment.</p>	TOPS - Protected	Medium
	<p><i>Pelea capreolus</i> (Grey Rhebok) are generally associated with areas where rocky hills, grassy slopes and plateau grasslands occur. They are predominantly browsers feeding on ground hugging fords and largely independent of water, obtaining the necessary liquid available from their food. They may utilize the study area as a corridor through which to move along the escarpment.</p>	Near Threatened (NT)	Medium
	<p><i>Panthera pardus</i> (Leopard) are highly adaptable inhabiting almost all habitat types. Potentially utilises the forest and drainage features up the escarpment to move up and down the feature.</p>	VU	Medium

		<p><i>Miniopterus natalensis</i> (Natal long-fingered bat) Its core distribution is in the savannas and grasslands of southern Africa. It is cave dependent and hence the availability of suitable roosting sites may be more critical in determining its presence in an area than the surrounding vegetation. Aerial clutter-edge forager, known to migrate long distances between roost caves. It feeds on a variety of prey – Diptera, Hemiptera, Coleoptera, Lepidoptera and Isoptera.</p>	NT	High
		<p><i>Ourebia ourebi</i> (Oribi) inhabit savanna woodland and other open grassy habitats from sea level to about 2000 mamsl. They often occur in association with other grazers. They prefer locations where thick cover is located so a mosaic of dense vegetation within grassland is most suitable to this species. May utilise the study area as a corridor along the escarpment.</p>	TOPS – Endangered (EN)	High
Mammal SCC			Threat Status	POC
<p><i>Rhinolophus clivosus</i> (Geoffroy's horseshoe bat) Roosts in caves and mine adits and can reach numbers of thousands. It is a clutter forager, eating mainly Lepidoptera and Coleoptera.</p>		NT Confirmed		
<p><i>Miniopterus fraterculus</i> (Lesser long-fingered bat) It is a cave-dependant species that predominantly occurs in montane grasslands of the eastern parts of the country. It is a clutter edge forager.</p>		NT Confirmed		
<p><i>Myotis tricolor</i> (Temminck's hairy bat) Roosts gregariously in caves. Associated only with mountainous habitat, not flat areas. It is a clutter edge forager.</p>		NT Confirmed		
<p><i>Pipistrellus rusticus</i> (Rusty pipistrelle) Associated with water bodies and rocky habitat in savannah woodland. Roosts mainly in tree crevices and buildings. It is a clutter edge forager.</p>		NT Confirmed		
General Discussion				

Large mammal abundance in the local area is low as a result of adjacent forestry and historic mammal extirpation, however, signs of medium and smaller mammal diversity appeared in intermediate abundances. The lowered abundances are likely also due to high levels of human presence within the study area. Both medium and smaller mammals were present and fill an important function within the landscape. Large mammals and their signs, in the form of scat, were not observed within the study area during the investigation. Terrestrial small mammals sign were minimal, yet abundances are high as 9 out of the 10 Sherman traps were triggered and two species identified. This suggests a healthy population of small mammals exists within the Escarpment. Rain during the evening limited bat activity resulting in the bat detector device failing to accurately record any bat species during the site assessment. However, historic studies as well as available online information was also utilized to make an informed decision on bat diversity. The current diversity and abundance of mammals has certainly been reduced from historic levels through anthropogenic activities (human presence and adjacent forestry) which disturb native fauna leading them to utilize suitable habitat in more remote locations.

The Escarpment Shrubveld remains the last natural corridor along the escarpment and is important for maintaining connectivity within the landscape. The study area is almost completely natural with portions of existing infrastructure within the footprint area. Along the eastern border a road (R535) is situated and forestry occurs above the escarpment reducing connectivity along the escarpment. As a result the integrity of the landscape is reduced in the uplands (escarpment area) while the forest habitat remains intact with high integrity, habitat availability and resource provisioning. The natural landscape ensures that food availability remains high and sufficient resources are available to the full suite of mammals within the study area, however, the study area is small and cannot function in isolation. In some cases the footprint will only form a portion of habitat within some of the species territories and foraging ranges and as such, some of these species will only temporarily utilise or pass through the study area verse inhabiting the study area on a permanent basis. Herbaceous material for grazing is abundant in the Escarpment Scrubveld but reduced in the forested locations where browsing potential was high. Considering the low abundance of herbivores and browsers, it is considered unlikely that this competition would have any detrimental effects of the grazing guild within the study area.

Conclusion

The observed mammal abundance and activity in the study area was intermediate with mostly common species present. The reduced abundance of mammals is likely the result of persecution and disturbance by humans and large scale forestry to the east of the study area. Mammal diversity is largely restricted to a common species (Grey Duiker, Cape Porcupine, Bushpig and Vervet monkeys) yet suitable habitat for more rare and specialist species is available and many of these secretive SCC are likely to make use of the study area. The study area is of a high ecological sensitivity in terms of mammal conservation and the habitat remains an important ecological corridor along the escarpment which should be maintained. As the activities are taking place within a Nature Reserve the proponent is implored to initiate well planned and executed rehabilitation measures to limit AIP proliferation and to maintain ecosystem function and service provisioning while ensuring connectivity within the landscape is preserved. The Screening Tool indicated a medium sensitivity for *Ourebia ourebi* (Oribi), *Dasymys robertsii* (African Marsh Rat), *Amblysomus robustus* (Robust Golden Mole), *Hydricotis maculicollis* (Spotted-necked Otter), *Crocidura maquassiensis* (Makwassie Musk Shrew), *Chrysospalax villosus* (Rough-haired Golden Mole) and *Cercopithecus albigularis* (Samango Monkey).

The study area is located outside of the known ranges for *Amblysomus robustus* (Robust Golden Mole) and *Crocidura maquassiensis* (Makwassie Musk Shrew). The lack of dense permanent wetland vegetation with permanent water as a result of the steep topography reduce the suitability of the habitat for *Dasymys robertsii* (African Marsh Rat) and *Hydricotis maculicollis* (Spotted-necked Otter) to low levels. The absence of grassland habitat also reduces the suitability of the study area for *Chrysospalax villosus* (Rough-haired Golden Mole) to low. *Cercopithecus albigularis* (Samango Monkey) will occur within the study area. The medium sensitivity is considered applicable to the study area for *Ourebia ourebi* (Oribi).

6.6.2.2 Avifauna

Table 6-13: Field assessment results pertaining to avifaunal species within the study area

Photograph Notes:	Avifauna SCC	Threat Status	POC
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Top: Left to right: *Crithagra scotops* (Forest Canary), *Pycnonotus tricolor* (Dark-capped bulbul) and a *Batis capensis* (Cape Batis) observed within the Escarpment scrubveld.
Middle: Densely vegetated Escarpment scrubveld provides open habitat favoured by grassland species. **Bottom:** Forest habitat provides areas of valuable structure and are habitat to several SCC.



***Aquila verreauxii* (Verreaux's Eagle)** This species is known within the region but has a low reporting rate for the area. Known to inhabit mountainous regions where cliffs or rocky outcrops are present. Favoured to feed on *Procavia capensis* (Rock Hyrax), it will however prey upon medium sized mammals should an opportunity present itself.

VU Medium

***Stephanoaetus coronatus* (Crowned Eagle)** are mostly found in forest though they will readily occupy woodland and more densely vegetated gorges in grassland and savanna habitats. The Forest Habitat within the study area are likely favoured by the species within the study area.

VU Confirmed

***Macheiramphus alcinus* (Bat Hawk)** are widespread in evergreen forest and low-lying mesic woodland, especially in hilly country where roosting sites for bats are present. It often utilizes plantations to roost and is often found near human habitation.

EN Medium

***Falco biarmicus* (Lanner Falcon)** are distributed within open grassland, cleared woodlands and agricultural areas. Breeding occurs on cliffs, however they will utilize alternative structures such as electricity pylons, trees or buildings in the absence of cliffs. Lanner falcons are distributed sparsely throughout their range. Within the study area the species will likely favour most habitats except for the densely wooded locations within the Forest habitat unit.

VU High

***Sylvia nigricapillus* (Bush Blackcap)** inhabit much of the escarpment of southern Africa where they occur in both primary forest and the lower foothills of the escarpment. Breeding requirements are very specific and only 2 % of their range is considered suitable for these purposes. It is unlikely that the species breeds on site due to the lack of suitable stands of primary forest, yet it may forage within the smaller Forest and adjacent units within the study area.

VU High

***Zoothera gurneyi* (Orange Ground Thrush)** occurs along the escarpment of southern Africa yet is more restricted to primary forest than the Bush Blackcap.

NT Medium


Avifauna SCC	Threat Status	POC
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<p>Sarathrura ayresii (Striped Flufftail) inhabits shallowly flooded high altitude marshes which are dominated by sedges and other vegetation. This species is considered to be a migratory species between the Ethiopian Highlands and South Africa making its corridors for movement important.</p>	VU	Confirmed
<p>General Discussion</p>		
<p>For avifauna vegetation structure, as opposed to actual plant species richness, is widely acknowledged as the primary determinant of bird communities (Skowno & Bond 2003; Wichmann <i>et al.</i> 2009; Burgess <i>et al.</i> 2011; Smith <i>et al.</i> 2017). The forested areas will host a high diversity of avifauna with both upland grassland communities together with forest and more lowland woodland species. The mosaic of scrubveld and forest habitat provided suitable structure to support a diverse assemblage of avifauna within the study area. Within the habitat units themselves however, avifaunal diversity was varied. Diversity was high in the Forest whilst the diversity noted within the Escarpment scrubveld was low. Diversity within the Escarpment scrubveld was likely reduced due to the homogenous structure of the unit and the reduced cover, yet it will provide valuable habitat for more specialist grassland species. The scale and isolation of this unit does limit the abundance and diversity as opposed to similar habitat south of the study area. The integrity of the study area with regard to avifaunal species is considered intermediate. Although the footprint area itself has some transformation from existing tourist infrastructure the remainder of the study area is natural with high integrity within the forest. On a landscape level on the plateau the Escarpment scrubveld remains an important ecological corridor along the escarpment and connectivity within this landscape feature must be maintained. The Escarpment scrubveld and the Forest inhabited by similar communities which is explained by the proximity of the units. The Escarpment scrubveld habitat only contributes small area to the site and has a lower species richness than the adjacent Forest which comprises of a diverse assemblage of avifauna. Numerous smaller birds were observed gleaning in the forest and scrubveld units which suggests high invertebrate abundances. Within the Escarpment scrubveld grass and forb seeds and a healthy abundance of invertebrates form a staple food resource for granivorous and insectivorous species. No forage resource deficiencies are likely within the Forest habitat where invertebrates, fruits, seeds and vegetation are anticipated to occur in high abundances. The heterogenous vegetation structure and the moist conditions will likely enhance the year-round provisioning of food for these species, though, understandable reductions in insect abundance may occur in winter when many birds will migrate altitudinally or to other regions. In terms of habitat integrity, the escarpment forms an important landscape feature and a corridor along which both smaller and large avifauna will move. Although most will just pass over any proposed developments will still interrupt the natural corridor within the landscape considering the forestry which overlays large swathes of land to the east.</p>		
<p>Conclusion</p>		
<p>Overall, the avifaunal sensitivity associated with the study location is moderately high with a high diversity of avifaunal species which occur within this landscape which is located within the Blyde River IBA. Species richness and abundance levels are certainly lower within the more open Escarpment scrubveld than the Forest which possesses a species rich assemblage</p> <p>The proposed activities are not anticipated to lead to the large-scale loss of habitat and food resources, within the study area. They do, however have the potential reduce the habitat connectivity within the landscape. Thus, it is necessary to ensure that a buffer remains along the Escarpment scrubveld to maintain connectivity within the landscape. Should large scale developments occur species within the Escarpment scrubveld will relocate into the surrounding areas that will then be subject to higher levels of competition for food resources and space. The increased movement of vehicles traveling to and from the proposed activities increases the risk of vehicles striking and killing avifaunal species, whilst anthropogenic movement and noise will impact on avifaunal abundance. The developments are unlikely to result in changes in diversity, but an important corridor for movement may be bisected. The Screening Tool indicated a high sensitivity for <i>Ciconia nigra</i> (Black Stork) and <i>Aquila verreauxii</i> (Verreaux's Eagle). As a result of the high human presence within the study area it is considered unlikely that either of these species will inhabit the locality, but they will utilize the escarpment as a corridor for movement. The absence of suitable foraging areas limits the potential for Black Stork to occur within the study area.</p>		

6.6.2.3 Herpetofauna

Table 6-14: Field assessment results pertaining to reptile and amphibian species within the study area

Photograph Notes:	Herpetofauna SCC	Threat Status	POC
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<p>Top: At two locations within the focus area pipes released water. One located within the Forest habitat and one within the Escarpment scrubveld providing moisture rich amphibian habitat. Bottom: Moisture rich Escarpment scrubveld with high cover provided suitable habitat for reptiles and amphibians.</p>	<p><i>Homoroselaps dorsalis</i> (Striped Harlequin Snake). This species is partially fossorial and known to inhabit old termite mounds in grassland habitat. Most of its range is at moderately high altitudes, reaching 1 800 m.</p>	<p>NT</p>	<p>Medium</p>
	<p><i>Chamaesaura aenea</i> (Coppery Grass Lizard) This species is restricted to the grassland biome in the Highveld and the eastern escarpment. It likely shelters at the base of grass tussocks.</p>	<p>NT</p>	<p>Medium</p>
	<p><i>Bradypodion transvaalense complex</i> (Dwarf Chameleon) are found in forested patches along the eastern escarpment and associated areas. The species is normally encountered at high altitudes on mountain slopes and plateaus or in valley gorges. Also occurs in scrub on road verges near forested areas.</p>	<p>VU</p>	<p>High</p>
	<p><i>Chamaesaura macrolepis</i> (Large-scaled Grass Lizard) Species occurs in the Savanna, Indian Ocean Coastal Belt and Grassland Biomes. Found especially in rocky mountain grassy hillsides. Known to inhabit hollows under rocks.</p>	<p>NT</p>	<p>Medium</p>
	<p><i>Hadromophryne natalensis</i> (Natal Cascade Frog) found along the along the Eastern Escarpment in primary forest with high rainfall where clear shaded perennial, highly oxygenated fast flowing streams are found.</p>	<p>VU - MP 2003 Status</p>	<p>High</p>
	<p><i>Scelotes mirus</i> (Montane Burrowing Skink). This species utilizes forest, scrub, savanna and grassland, particularly rocky locations between 800 m and 2000 m.</p>	<p>NT – MP 2003 Status</p>	<p>High</p>
<p>General Discussion</p>			
<p>Herpetofaunal diversity within the study area is considered intermediate, no reptiles or amphibians were observed during the investigation but <i>Strongylopus grayii</i> (Clicking Stream Frog) was heard. Yet, the study area will present a higher reptile and amphibian diversity than was noted as these classes are inherently secretive and shy, making their detection and identification in the field hard. The field assessments was undertaken in cold weather, decreasing the likelihood of reptile observations. However, the forest habitat and the remaining Escarpment Scrubveld with its rocky nature do provide suitable habitat for a host of species. The densely vegetated forest areas provide valuable habitat for diverse assemblages of reptiles as numerous niches are provided and clustered rocky areas occur within these locations. Amphibian species were not observed yet heard at high abundances within the study area. No reptile species were observed however records within the ADU indicate the potential for a rich diversity of species which include <i>Agama aculeata</i> (Distant's Ground Agama), <i>Trachylepis striata</i> (Striped Skink), <i>Panaspis</i></p>			

wahlbergii (Wahlberg's Snake-eye Skink), *Nucras ornata* (Ornate Sandveld Lizard), *Smaug vandami* (Van Dam's Girdled Lizard), *Lycodonomorphus inornatus* (Olive ground snake), *Lycophidion capense* (Cape wolf snake) and *Causus defilippii* (Snouted Night Adder).

Water sources in the form of Hillslope Seeps within both the focus area and the broader study area provided opportunities for amphibian species who often require temporary or permanent water sources for breeding. All watercourse locations where amphibians are expected to occur were actively searched. Diversity was mostly noted through vocalisations, no direct observations were made. The cryptic nature of many amphibian species makes them hard to observe in the field even when abundances are high. The moist nature of both the forest and the Escarpment scrubveld increase the suitability of the study area for amphibian foraging while the freshwater features increase the potential for breeding within the study area and focus area where these features occur. Amphibians expected to occur within the study area include *Kassina senegalensis* (Bubbling kassina), *Hyperolius marmoratus* (Marbled reed frog), *Xenopus laevis* (Common platanna), *Breviceps mossambicus* (Mozambique Rain Frog), *Semnodactylus wealii* (Rattling frog) and *Amietophrynus gutturalis* (Guttural Toad).

Habitat integrity of the study area with regards to herpetofauna species is considered to be **moderately high**. The general study area remains mostly natural providing valuable habitat for most herpetofauna. Constant human movement will reduce the abundance of reptiles, but the rim of the escarpment and the natural funnel created by the forestry imposing on the eastern flank of the study area makes this location a valuable corridor for movement. Food resources are not anticipated to be a limiting factor for herpetofauna within the study area. High invertebrate and rodent abundance likely support many reptile and amphibian species.

Conclusion




The sensitivity of the site for herpetofauna is considered to be moderately high due to the moderately high habitat availability, increased integrity and because of the valuable niche habitat on the Escarpment Plateau and the Forest. A few SCC which were not observed, have distributions which overlap the locality and have a medium or high POC. The sensitivity is increased as the landscape is unique and offers habitat for more specialist montane and forest species which have more specific habitat requirements.

The proposed activities may not lead to the destruction of large tracks of land but will reduce connectivity within the landscape for herpetofauna. Maintaining connectivity should be the principal focus of any proposed development. Clearing of vegetation for the proposed activities will have a direct impact on habitat availability in these areas, leading to localised migration of herpetofauna species into the surrounding areas. The movement of herpetofauna species out of the disturbance footprint areas will result in higher levels of competition for food resources and habitat, which can potentially lead to a decrease in abundance levels as resource competition increases.

6.6.2.4 Invertebrates

Table 6-15: Field assessment results pertaining to insect species within the study area

Photograph Notes:	Invertebrate SCC	Threat Status	POC
Top: <u>Left to right:</u> Tenebrionid beetles observed copulating within the Escarpment scrubveld and a Psychidae (Bagworm Moth) cocoon; Middle: <u>Left to right:</u> <i>Miomantis</i> sp. (Praying Mantis) observed within the Escarpment scrubveld and a <i>Allograpta</i> sp. (Streaktail) captured while sweep netting. Bottom: <u>Left and right:</u> <i>Xysticus</i> sp. (Ground Crab Spider) and the web of a grass funnel web species (<i>Agelena</i>).	All baboon spiders and scorpions of the genus's <i>Ceratogyrus</i> , <i>Harpactira</i> , <i>Pterinochilus</i> , <i>Hadogenes</i> , <i>Opisthacanthus</i> and <i>Opisthophthalmus</i> are Protected under TOPS (2007).	Protected TOPS	Medium/High

	<p>Within the study area, it is likely that several scorpion species of genera <i>Opistacanthus</i>, <i>Hadogenes troglodytes</i> and <i>Opisththalmus glabrifrons</i> occur within the study area whilst baboon spiders such as <i>Harpactira gigas</i> and <i>Harpactira overdjiki</i> may also occur in the study area.</p>		
	<p><i>Lepidochrysops irvingi</i> (Irving's Blue) this species is restricted to montane grassland in Eswatini and Mpumalanga. Its distribution is less restricted than the above-mentioned species and thus the impacts likely to occur are reduced for this species.</p>	VU	Medium
	<p><i>Thoracistus Jambila</i> (Jambila Seedpod Shieldback) is a data deficient species of which almost nothing is known. It is known to occur in tall grassy habitats which in this report are assumed to be similar in character to portions of the Escarpment Scrubveld.</p>	EN	Medium
	<p><i>Chrysoritis phosphor</i> dwells high up in forested habitat that is surrounded by grassland. It is often found near streams where it drinks from muddy ground.</p>	EN	High
	<p><i>Doratogonus praealtus</i> (High-altitude Black Millipede) has been collected from both forest and grassland in high altitude areas. Little is known about specific habitat requirements. It appears to be reliant of forested habitats though.</p>	VU	Medium
<p>General Discussion</p>			
<p>The study area overall has an intermediate invertebrate diversity. The cooler temperatures experienced during the field investigation did reduce the invertebrate abundances yet a valuable invertebrate diversity, potentially with high endemism, is likely. Insect diversity will be highest in the Forest habitat where increased structural composition increases habitat and high biomass insures a forage resource rich environment. Insects are generally the most abundant macro-organisms within landscapes and often perform services vitally important for ecosystem functioning. Therefore, high insect abundance can indicate a healthy landscape. Insects serve as pollinators, remove detritus material, bury dung and associated parasites below the surface helping to cycle nutrients back into the soil while decreasing the parasitic load within an environment, reducing the risk of disease. Additionally, insects serve as a food resource for fauna within the study area, and as such a low insect diversity and abundance may reduce forage sustainability for other faunal species from various classes. From an arachnid perspective, these species are notoriously hard to detect over a relatively short period of time, which can often lead to the under estimation of diversity and abundance. Taking this into consideration, habitat conditions for arachnids as well as available resources were analysed, whilst additional information on arachnid occurrences and species diversity for the QDS was collected from databases such as iNaturalist and the Animal Demography Unit (ADU). The low diversity noted during the study can be attributed to poor weather conditions. Online databases indicated that only a few records of arachnids occur within the QDS 2430DD. The information available on databases, supplemented with the observations recorded on the site and the general habitat provide sufficient information and evidence to suggest that the diversity within the locality is intermediate.</p>			

The ADU website has records of a single baboon spider species within the QDS's, namely: *Harpactira gigas*, while *Harpactira darlingi* and *Harpactira overdijki* may occur within the habitat present in the study area. Within Mpumalanga species belonging to the genera *Ceratogyrus* spp., *Harpactira* spp. and *Pterinochilus* spp. are listed in schedule 7 of the Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) and require a permit to keep, collect, sell, catch, purchase, donate or receive as a donation, convey or import or export these species. Scorpion habitat within the study area was available both within the Escarpment scrubveld and the Forest habitat and it is likely that an intermediate diversity occurs on site. Only two scorpions are indicated on the ADU for the associated QDS which include: *Uroplectes triangulifer* and *Cheloctonus intermedius*. Species within the genera *Opisthacanthus*, *Hadogenes* and *Opisththalmus* are protected under TOPS, and should they be discovered no further damage to their burrows should be undertaken and should they need to be removed permits will be necessary to do so.

Habitat integrity is **moderately high** within the study area due to the almost completely undisturbed habitat and the high degree of ecosystem functionality and niche habitat for invertebrates. Although modifications within the focus area have occurred through the development of tourist infrastructure and parking suitable habitat for numerous invertebrates with sufficient resources exists throughout the study area. Some of the portions on the study area are invaded and surrounded by AIPs but much of the landscape is encompassed by high integrity natural vegetation. Within in a broader landscape sense landscape connectivity within the escarpment is reduced by forestry and maintaining connectivity along the escarpment is vital as invertebrates, especially butterflies, will utilise this area while foraging or migrating. The study area is composed of 2 major vegetation units of varying structure and altitudes offering a range of habitats to utilize. Insect abundance was considered to be **intermediate**, however, temperatures were not satisfactory for high invertebrate activity. Nonetheless it appeared that the Forest habitat was most suitable for insects. Varying types of habitats for insect species in terms of sandy areas for species that burrow and nest in, subterranean environments, fallen and dead trees which numerous insects can inhabit and seek refuge, were observed. Freshwater habitat was encountered allowing water dependant species an opportunity for breeding.

Conclusion

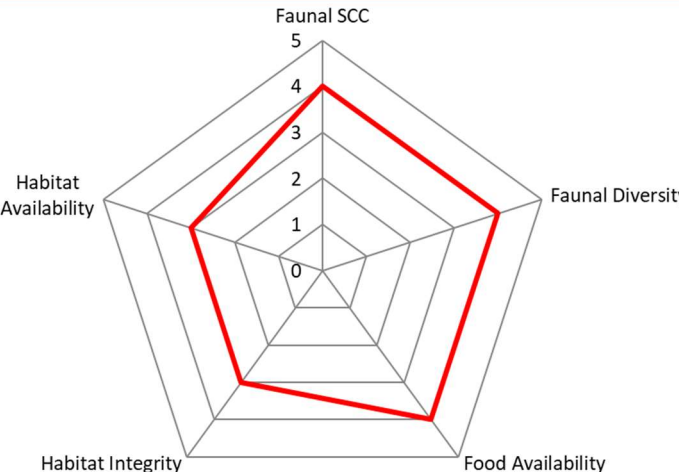
Overall, the invertebrate sensitivity associated with the study area is considered to be **moderately high**. The lower temperatures during the study did not allow for a high diversity or abundance of insects to be sampled, this was however taken into consideration when analysing the field data and developing this report. The proposed activities will not lead to the loss of extensive tracks of habitat but will result in the loss of habitat located within a corridor along the escarpment which may reduce connectivity within the landscape. It is deemed necessary that a suitable buffer be maintained along the Escarpment to allow for invertebrate movement along this corridor. Insect species are considered a vital and important link in the ecosystem, fulfilling many ecological roles, including pollination, removal of dead animal and plant material, pest predation and parasitism and clearing of dung and scat from larger mammals. Insect species also provide a vital food resource for many of the other faunal species in the study area. As such the loss of insect abundance and diversity will have a negative cascading effect on other faunal species in the study area.

The Screening Tool indicated a medium high sensitivity for *Lepidochrysops irvingi* (Irving's Blue), *Chrysoritis phosphor borealis* (Golden Flash), *Doratogonus praealtus* (High-altitude Black Millipede) and *Thoracistus jambila* (Jambila Seedpod Shieldback). All these species do have potential to occur within the study area.

6.6.3 Sensitivity mapping

Figure 6- below conceptually illustrates the faunal ecological sensitivity for the various areas. The areas are depicted according to their sensitivity in terms of the presence or potential for faunal SCC, habitat integrity, levels of disturbance and overall levels of diversity. Table 6-16 below presents the sensitivity of each habitat along with an associated conservation objective and habitat characteristics.

Table 6-16: A summary of the sensitivity of each habitat unit and implications for the proposed activities

Habitat Unit	Habitat Sensitivity	Conservation Objective	Key Habitat Characteristics
Escarpment scrubveld Habitat	<p style="text-align: center;">Moderately High</p> 	<p>Preserve and enhance the biodiversity of the habitat unit, limit development and disturbance.</p>	<ul style="list-style-type: none"> - The screening tool indicates that this area is of High sensitivity and has the potential of hosting several SCC. In accordance with this assessment, the sensitivity is considered Moderately High and in line with the screening tool; - No SCC were observed within this unit at the time of the assessment but it does provide valuable habitat for several SCC; - This habitat remains natural with increased resource availability and habitat integrity ensuring that these systems have moderately high integrity and remain ecologically functional. This habitat forms part of an important landscape corridor along the escarpment; - Where areas of high sensitivity occur in CBAs or Protected Areas, there is a conflict between the intended land use and the conservation requirements for the region and as such development should be avoided within these locations; and - It is important that edge effect impacts on areas outside of the direct footprint be strictly managed.

Habitat Unit	Habitat Sensitivity	Conservation Objective	Key Habitat Characteristics
Forest Habitat	<p style="text-align: center;">High</p>	<p>Preserve and enhance the biodiversity of the habitat unit, no-go alternative must be considered.</p>	<ul style="list-style-type: none"> - In accordance with this assessment, the sensitivity is considered High and in mostly in line with the screening tool; - These habitat units provide unique vegetation structure and composition creating unique niche habitat that hosts numerous faunal species, including SCC; - These habitats have experienced minimal anthropogenic transformation and thus remain in a natural condition with increased habitat integrity, food availability and diversity; - These units are unique and provide valuable niche habitat for arboreal species; - All activities should remain outside of these units to reduce impacts to faunal species within this unique habitat; and - Where areas of high sensitivity occur in CBAs or Protected Areas, there is a conflict between the intended land use and the conservation requirements for the region and as such development should be avoided within these locations.
Transformed Habitat	<p style="text-align: center;">Low</p>	<p>Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.</p>	<ul style="list-style-type: none"> - This habitat encompasses areas where existing tourist infrastructure occurs and thus a reduced habitat suitability and floral richness (faunal habitat) were observed; - AIP species were more abundant within this unit as compared to the neighbouring habitat units and potential proliferation into adjacent habitats should be monitored; - Activities in this habitat will have very limited impacts to faunal species in terms of forage, habitat and shelter; - No SCC are anticipated to utilise this habitat on a permanent basis; and - In accordance with this assessment, the sensitivity is considered low and does not align with the screening tool.

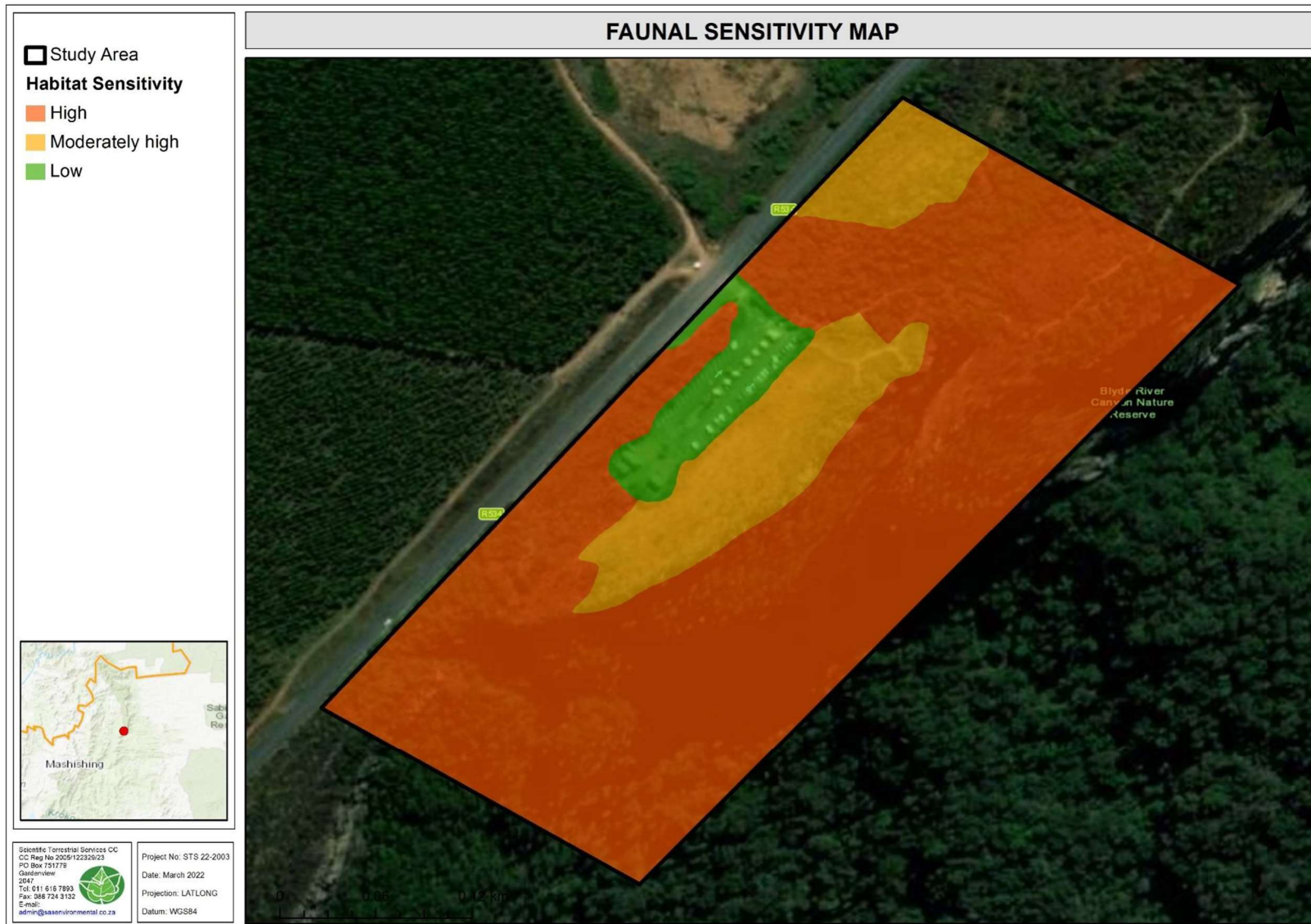


Figure 6-12: Faunal habitat sensitivity map for the study area

6.6.4 Impact assessment

The below impact tables indicate the perceived risks to the faunal ecology associated with the construction and operational phase relating to the proposed God's Window Skywalk infrastructure. The tables also provide the findings of the impact assessment undertaken with reference to the perceived impacts prior to the implementation of mitigation measures and following the implementation of mitigation measures. The mitigated results of the impact assessment have been calculated on the premise that all mitigation measures as stipulated in this report are adhered to and implemented. Should such actions be found to be unfeasible to implement or not be adhered to, it is highly likely that post-mitigation impact scores will increase. Due to the small footprint of the proposed activities the impact assessment has been completed looking at the entire site as a single unit and not separating impacts per habitat unit. This was completed on the premise that the impacts on fauna in respect of the Escarpment scrubveld and Forest habitat units will be of the same impact significance.

Another important aspect to note when viewing the below impact assessment results is that, at the time of the assessments, the initial proposed fire management required a large portion of the 15m ecological corridor setback zone to be unvegetated to act as a fire break around the building. Since this would have resulted in the nullification of the objective of the ecological corridor to connect the surrounding habitats for faunal movement, the fire management plan was revised to include a tailored approach to managing the fire risk in this unique development. As a result, the installation of sprinklers to create a "wetter" vegetation within the ecological corridor was approved which negates the need for unvegetated areas. **As such, relating mitigation measures proposed by the specialist are now considered unnecessary/unfeasible and have been highlighted in red.**

Project phase	Construction			
Impact	Loss of Habitat and altered faunal species diversity			
Description of impact	Clearance of vegetation for the proposed infrastructure leading to habitat loss, decreased food resources and displacement of faunal species from these areas.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Connectivity within the landscape needs to be maintained to ensure faunal movement along the escarpment and as such a movement corridor (15m) should be incorporated into the design where no vegetation clearing occurs. Should this be a fire hazard the proposed infrastructure should be further set back to accommodate a fire break. No infrastructure besides lifted walkways (limited to 2m in width) and the skybridge should be proposed therein. The footprint areas are to remain as small as possible with only those are necessary being cleared. As much herbaceous and shrubland vegetation as possible must remain under the walkways. Small reptile and arachnid species, should they not self-relocate, must be carefully moved to habitat outside of the disturbance footprint. Vegetation clearance will have to be done in a phased manner, ideally working from the southern portion of the study area northwards. This will provide faunal species the opportunity to move out of the area ahead of the clearance activities. All cleared vegetation should be restored on the roof of any infrastructure be vegetated. If at all possible construction should occur during spring or autumn (when bats are moving to seek new roosts). Consider the creation / rehabilitation of small "islands" of habitat within the development footprint. As far as possible the installation of the anchor points for the skybridge and skywalk along the cliff face must be done in such a way as to minimise vibrations and noise impacts. Bird flappers should be installed along any suspended cables. The skywalk planned along the cliff face should be positioned in such a way as to not impact on roosting sites for bats or interfere with any cliff nesting avifauna. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years

Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Minor - negative	
Comment on significance	Given the increased sensitivity of the habitat within an important landscape feature, the impacts will lead to clearance of vegetation and the restriction of faunal movement along the escarpment. This is considered to be a significant impact to habitat connectivity within the local area.			
Cumulative impacts	The construction of the infrastructure will likely further add to the overall loss of habitat in the local area. The reduction in the movement potential for fauna along the escarpment with likely lead to fragmentation of populations and a reduction in gamete transfer while decreasing potential for colonization of new locations where suitable habitat persists.			

Project phase	Operation			
Impact	Loss of Habitat and altered faunal species diversity			
Description of impact	Maintenance activities and edge effects leading to habitat degradation and decreases in faunal species diversity and abundance.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • Manage alien plant proliferation in disturbed areas and footprints. • No catching / hunting of faunal species during operational activities. Manage erosion to ensure further habitat degradation does not occur. • Do not clear vegetation unnecessarily. • Night lighting should be kept to a minimum. • No lighting, which may attract insects and their predators, should be installed over the cliff face. • No persecution or collection of fauna or flora may be allowed. No further pathways or obstructions should be allowed to develop within the proposed development area and especially within the 15m buffer. • The proposed 15m firebreak at the northern and southern ends of the building are to be reconsidered in terms of design. Current plans call for 15m wide non-vegetated areas. This will negate efforts to re-instate a resemblance of habitat connectivity. • As such, these firebreaks should rather comprise of short (mowed) grassed areas with an integrated sprinkler system to mitigate and manage all fire risks. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain / Highly probable	It is most likely that the impact will occur

Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Major - negative		Moderate - negative	
Comment on significance	Through the destruction of floral habitat an important faunal movement corridor along the escarpment will be drastically reduced along this important landscape feature.			
Cumulative impacts	Habitat loss and reduction in faunal movement capacity in the uplands. Increased human presence will also reduce faunal abundances, particularly of larger more charismatic species.			

Project phase	Construction			
Impact	Impact on SCC			
Description of impact	Potential loss of faunal SCC from the affected areas due to habitat degradation and/or loss as well as risk of direct mortalities resulting from collisions with vehicles. Human - wildlife conflict and potential harvesting for wildlife trade during construction activities may also impact on SCC in the affected areas.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Vehicles to use designated roads as far as possible. No paths should be created by inquisitive tourists. Minimise vegetation clearance to only what is needed. No collection or destruction of faunal species and SCC is to occur. SCC to be relocated outside of disturbance footprint if they do not relocate themselves (Professional help may be required for such). If at all possible construction should occur during spring or autumn (when bats are moving to seek new roosts). 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Minor - negative	
Comment on significance	Although this habitat unit is likely to host SCC, the small footprint areas reduce the potential for direct impacts yet the impacts on a landscape level through the termination of a movement corridor for SCC will be significant.			

Cumulative impacts	The construction of the infrastructure will likely further add to the overall loss of SCC habitat in the local area. The reduction in the movement potential for faunal SCC along the escarpment with likely lead to fragmentation of populations and a reduction in gamete transfer while decreasing potential for colonization of new locations where suitable habitat persists.
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Project phase	Operation			
Impact	Impact on SCC			
Description of impact	Potential loss of faunal SCC from the affected areas due to habitat degradation and/or loss as well as risk of direct mortalities resulting from collisions with vehicles. Human - wildlife conflict and potential harvesting for wildlife trade may also impact on SCC in the affected areas.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • Maintain existing habitat in a good ecological condition with suitable corridors implemented. No collection or trapping of faunal SCC. • Manage edge effects, habitat degradation and alien plant proliferation. • Nocturnal lighting should be kept to a minimum. • No lighting, which may attract insects and their predators, should be installed over the cliff face. • Where SCC are located a rescue and relocation plan must be undertaken with the guidance of a suitably qualified specialist and the relevant permits. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Major - negative		Moderate - negative	
Comment on significance	As the area will have been transformed to a large degree the possibility that SCC will remain in the study area is low and thus impact significance is also low.			
Cumulative impacts	The operational activities will likely further add to the overall loss of SCC diversity in the local area. The reduction in the movement potential for faunal SCC along the escarpment which will likely lead to fragmentation of populations and a reduction in gamete transfer while decreasing potential for colonization of new locations where suitable habitat persists.			

6.6.5 Conclusion and recommendations

From a faunal perspective habitat integrity and diversity is considered to be moderately high to high for most of the study area. The uplands on the plateau adjacent the focus area have reduced integrity as a result of the high degree of forestry which limit the connectivity in the landscape channelling fauna through the focus area. Thus, the focus area remains an important conduit for faunal movement along this valuable landscape feature. Forests, by their nature, are often fragmented but large swathes of forest occur within the western portion of the study area maintaining healthy faunal assemblages. As the study area is considered to be largely natural habitat and has for the most part evaded human

modification, forage resources and suitable habitat for breeding are available for a large assemblage of fauna which include several SCC. The variation in the habitat units ensures that niche habitats will be available to most habitat selective, secretive and rare fauna. Only the Transformed habitat offers reduced integrity and species diversity. This location has been degraded by human infrastructure development and has reduced faunal habitat and diversity. As the study area preserves valuable habitat with a high degree of faunal diversity, it maintains valuable ecosystem services and functions and as such is of high conservation value.

Impact significance prior to mitigation on the receiving faunal environment (habitat, species and SCC) ranges from major-negative to moderate-negative. Following the implementation of mitigation measures and sound environmental management, impact significance can be reduced to moderate-negative and minor negative. The footprint location is within a Protected Area and acts as an important faunal corridor. As such, it is important that faunal movement and the potential for gamete exchange be maintained within the landscape. Disturbances to the environment, through the clearance of vegetation, AIP proliferation, soil erosion, changes to the hydrological regime, collisions with infrastructure and general human movement during the operational phase may continue to impact on faunal ecology and habitat availability throughout the operational phase.

Should habitat clearing and degradation occur over the entire proposed footprint, it will negatively impact faunal communities on a landscape level, leading to further declines in diversity (including SCC), increased fragmentation and increased cumulative impacts. It is imperative that the area of impact and overall impact significance be kept as small as possible and that connectivity in the landscape be maintained. Thus, a 15m setback, including a raised boardwalk of no more than 2m, has been recommended by the specialist to allow for an area where indigenous vegetation is left undisturbed.

The design and engineering team took the recommendations of the specialist into account as far as technically feasible and economically viable. The original design saw the development near the edge of the cliff. This design was revised to include a 15m setback from the edge to include an ecological corridor. The existing Scrubveld will be preserved as far as possible by replanting it on top of the roof slab. This will help to replicate the environment for the existing plant and animal life to ensure that they are not displaced or lost. The roof slab will be shaped and ramped from West to East so that fauna can easily move across the site through the rooftop Scrubveld as if the building beneath were not in their path.

6.7 Freshwater Environment

WaterMakers was appointed by Zutari to undertake the freshwater biodiversity assessment for the proposed project. The specialist report is included in Annexure D and reference is made to this report dated July 2022 for this section. Multiple site visits were undertaken in February and June 2022. The specialist also conducted assessments for the initial EIA that was conducted for this project in 2014.

6.7.1 Baseline description

The proposed Gods Window Skywalk is located within the Southern Temperate Highveld freshwater ecoregion, which is delimited by the South African interior plateau sub-region of the Highveld aquatic ecoregion, of which the main habitat type, in terms of watercourses, is regarded as Savannah-Dry Forest Rivers. Aquatic biotas within this bioregion have mixed tropical and temperate affinities, sharing species between the Limpopo and Zambezi systems. The Southern Temperate Highveld freshwater ecoregion is considered to be bio-regionally outstanding in its biological distinctiveness and its conservation status is regarded as Endangered. The ecoregion is defined by the temperate upland rivers and seasonal pans

Ecoregional typing at a national level based on spatially variable combinations of causal factors including physiography, climate, geology, soils and potential natural vegetation. Accordingly, the proposed Gods Window Skywalk is located within the Northern Escarpment Mountains Ecoregion, and more specifically within Level II Ecoregion 10.02.

According to the National Biodiversity Assessment's Freshwater Component (Nel and Driver, 2012), the study area falls within the Mesic Highveld Grassland Group 9 wetland vegetation group which has a conservation status of Least Threatened according to the Wetland Vegetation Group's Ecosystem Threat Status.

The National Water Resource Strategy, Version 1 (NWRS-1) originally established 19 Water Management Areas within South Africa and proposed the establishment of the 19 Catchment Management Agencies to correspond to these areas. In rethinking the management model and based on viability assessments with respect to water resources management, available funding, capacity, skills and expertise in regulation and oversight, as well as to improve integrated water systems management, the original 19 designated WMAs have been consolidated into nine Water Management Areas (WMAs).

The study area is situated within the Southern Temperate Highveld freshwater ecoregion. Further, the study area is located on the watershed of the Inkomati Water Management Area (WMA) and the Olifants WMA. Wetlands within the study that drains west of the watershed feed into the Lisbon River that in turn feed into the Blyde River and eventually feed the Olifants River. Water that drains east of the watershed feeds into the Ngwaritsana River which eventually feeds into Inyaka Dam. (Figure 6-).

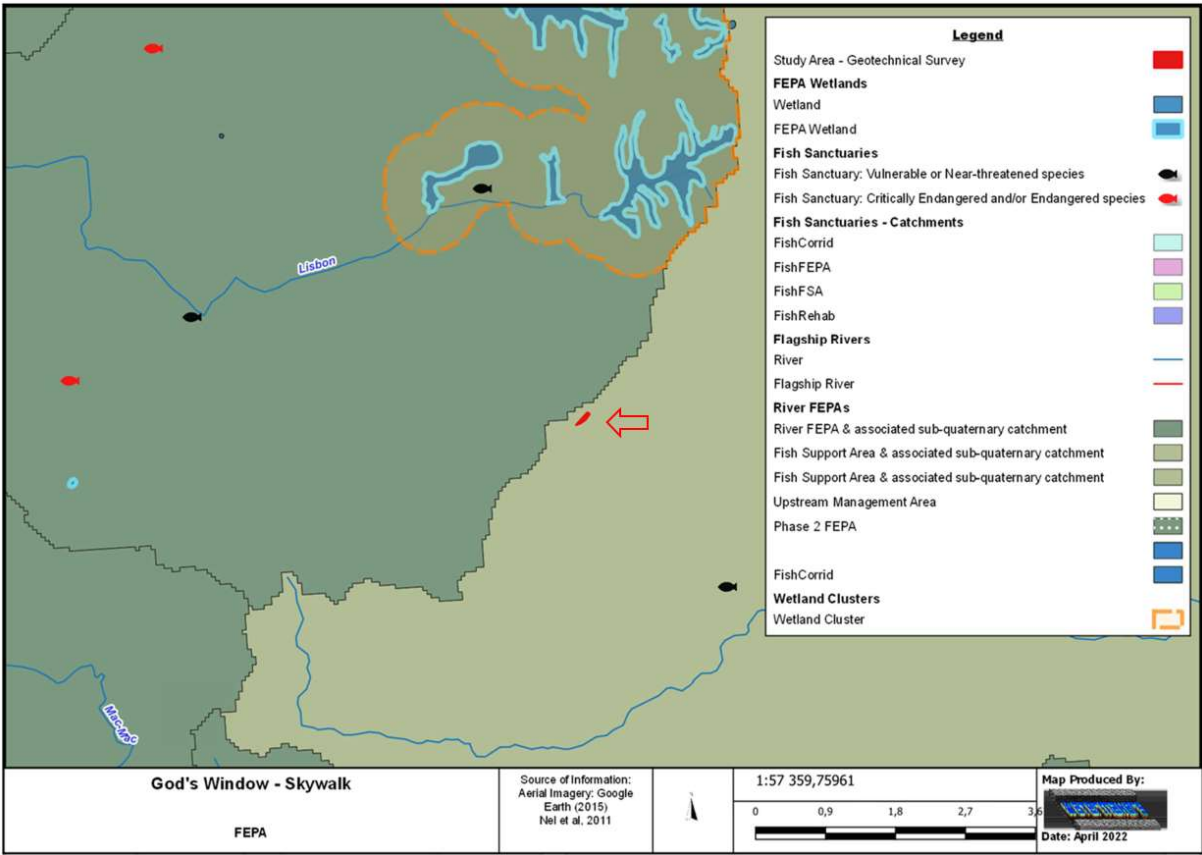


Figure 6-13: National Freshwater Ecosystem Priority Areas associated with the study area are (indicated by the red arrow)

The National Freshwater Ecosystem Priority Areas (NFEPA) project represents a multi-partner project between the Council for Scientific and Industrial Research (CSIR), South African National Biodiversity Institute (SANBI), Water Research Commission (WRC), Department of Water Affairs (DWA; now Department of Water and Sanitation, or DWS), Department of Environmental Affairs (DEA), now DFFE, Worldwide Fund for Nature (WWF), South African Institute of Aquatic Biodiversity (SAIAB) and South African National Parks (SANParks).

Based on current outputs of the NFEPA project, no FEPA wetlands were identified within the study area, although FEPA wetlands and wetland clusters were identified 450m north of the study area (draining into another catchment (Figure 6-).

However, the catchment of the Marite River upstream of its confluence with the Motitsi River (and within which the proposed development will occur) is recognised as a Fish Support Area for *Enteromius brevipinnis*, *Opsaridium peringueyi*, *Serranochromis meridianus* and *Labeobarbus nelspruitensis*, and supported wetlands representative of one wetland ecosystem type. In contrast, the catchment of the Lisbon River (located to the west of the proposed development) is identified as being a FEPA catchment, containing various representative river and wetland ecosystem types that are deemed to be in a good condition (Ecological Category A/B), supporting at least one FEPA wetland cluster as well as being a sub-quaternary necessary for rehabilitation for threatened fish species, including *Enteromius anoplus*, *Enteromius lineomaculatus*, *Enteromius treurensis* and *Opsaridium peringueyi*.

The project is in the Mpumalanga Drakensberg Surface Water & Northern Lowveld Escarpment Groundwater strategic water source area (SWSA). Only 2.63% of this strategic water source is currently protected. Gods Window forms part of a protected area and is thus important to conserve the Mpumalanga Drakensberg Surface Water & Northern Lowveld Escarpment Groundwater SWSA.

6.7.2 Assessment results

6.7.2.1 Wetland and riparian soils

The traversed catenas within the direct vicinity of the proposed development revealed no hydromorphic soil forms according to hydromorphic classification of DWAF (2005; 2008). The closest hydromorphic soils were located approximately 300m north of the development and or in a neighbouring catchment, these soils typically included gleylic subsoil horizons as well as organic rich topsoil horizons. Graskop, Nomanci and Mispah soils with shallow rock dominated the proposed footprint and vicinity with the closest drainage line downstream being dominated by geolithic saprolites.

Redox morphology was absent within the saprolites of riparian habitat and closest delineated watercourse to the study area, Riparian 1, indicating a weak hydrological signature. A likely result of anthropogenic topographic manipulation and the possible sterilisation of the original watercourse during road construction of the R534 and existing tourist facilities.

Gleyed saprolites and subsurface flow paths were identified upslope and approximately 300m north of the proposed development which indicated the importance of the Misbelt Forest as a water-source area. Soils associated with the Misbelt Forest also contained organic rich topsoils with faint red mottling and rhizospheres as well as gleyed subsoils which are likely indicative of permanent wet conditions within the Misbelt Forest clumps along the escarpment. Cliff faces below the Misbelt Forest and below the proposed development contained overhangs and cave formations which were 'groundwater' supported developed organic rich soils likely derived from especially mosses and ferns.

According to the Department of Water Affairs and Forestry (2005), soil wetness indicators (i.e. identification of redoximorphic features) are the most important indicator of wetland occurrence due to the fact that soil wetness indicators remain in wetland soils in most instances, even if they are degraded or desiccated. It is important to note that the presence or absence of redoximorphic features within the upper 500mm of the soil profile alone is sufficient to identify the soil as being hydric (a wetland soil), or non-hydric (non-wetland soil). Redoximorphic features were present in some of the sampled soil profiles north of the study area, such as HGM 1. **No redoximorphic features were observed within the vicinity of the proposed development.**

6.7.2.2 Delineated wetland and riparian areas

A total of four riparian networks were delineated within the study area and within 500m downstream from the study area (Figure 6-). Several other riparian watercourses north of the study area (upstream) were delineated that support HGM 1. One hydro-geomorphic unit (HGM), comprising one HGM type, HGM 1, a hillslope seepage wetland connected to a watercourse, was delineated and classified within 500m from the proposed development, although upstream and within a neighbouring catchment (and therefore not relevant to the current assessment). The Misbelt Forest that is situated approximately

300m north of the proposed development acts as a critically important water-source area, classification as true wetland habitat is debatable, albeit tiny pockets contain wetland conditions to some extent, not all classical criteria as a specific hydro-geomorphic type is met. From a hydrological perspective, the Misbelt Forest is situated uphill from the proposed development and thus also not relevant to the assessable impacts likely to arise from the development.

It should be noted that Riparian 1 was previously classified as a hillslope seepage based on what was interpreted as potential champagne soil forms (organic soils), this was likely however sewage solids which was subsequently flushed out of the system which is currently functioning as a riparian channel. Several transects through Riparian 1 indicated geolithic saprolithic horizons which translates to a likely ephemeral system. The possibility exist that this riparian channel is anthropogenic in nature due to topographical manipulation of the area during the construction of the R543 and existing tourist facilities. Historic imagery suggest that the riparian channel could have been situated slightly more west historically which would explain that geolithic nature of bedrock within the current channel.

Further, the portion directly downstream of Riparian 1 could contain what would best be described as small vertical hanging wetlands (hugging the overhanging cliff edge laterally) situated on the >30m vertical cliff face edge. Verification of these “hanging wetlands” will require a rope access approach and will highly likely cause considerable damage to the habitat, therefore it is strongly recommended not to verify and use the pre-cautionary principle instead and consider the cliff edge as hydrologically and ecologically sensitive (due to likelihood of several red data species).

The same required NEMA pre-cautionary principle should also be applied to the cliff and cliff edge habitat on the cliffs situated directly south-east and east from the study site, where there is the potential for several small daylighting headwaters through fissures and cracks, representing the very head of several riparian drainages (including Riparian 2 and Riparian 3).

Channel differentiation should be based on the classification of river channels outlined in the DWAF delineation guideline for wetlands and riparian areas Department of Water Affairs and Forestry (2005). The channel network is divided into three types of channels, which are referred to as A Section, B Section or C Section channels. The essential difference between the “A”, “B” and “C” Sections is their position relative to the zone of saturation in the riparian area. The zone of saturation must be in contact with the channel network for base flow to take place at any point in the channel and the classification separates the channel sections that do not have base flow (A Sections) from those that sometimes have base flow (B Sections) and those that always have base flow (C Sections). Riparian networks within the vicinity of the proposed development were regarded as A Section channels, B Section channels and C Section channels. The A Sections are those headward channels that are situated well above the zone of saturation at its highest level and because the channel bed is never in contact with the zone of saturation, these channels do not carry baseflow (DWAF, 2005). The A Sections are the least sensitive watercourses in terms of impacts on water yield from the catchment and are not regarded as having riparian habitat (Department of Water Affairs and Forestry, 2005). B and C section channels were delineated and represented in the current delineation with Riparian 1 being delineated on a precautionary principle.

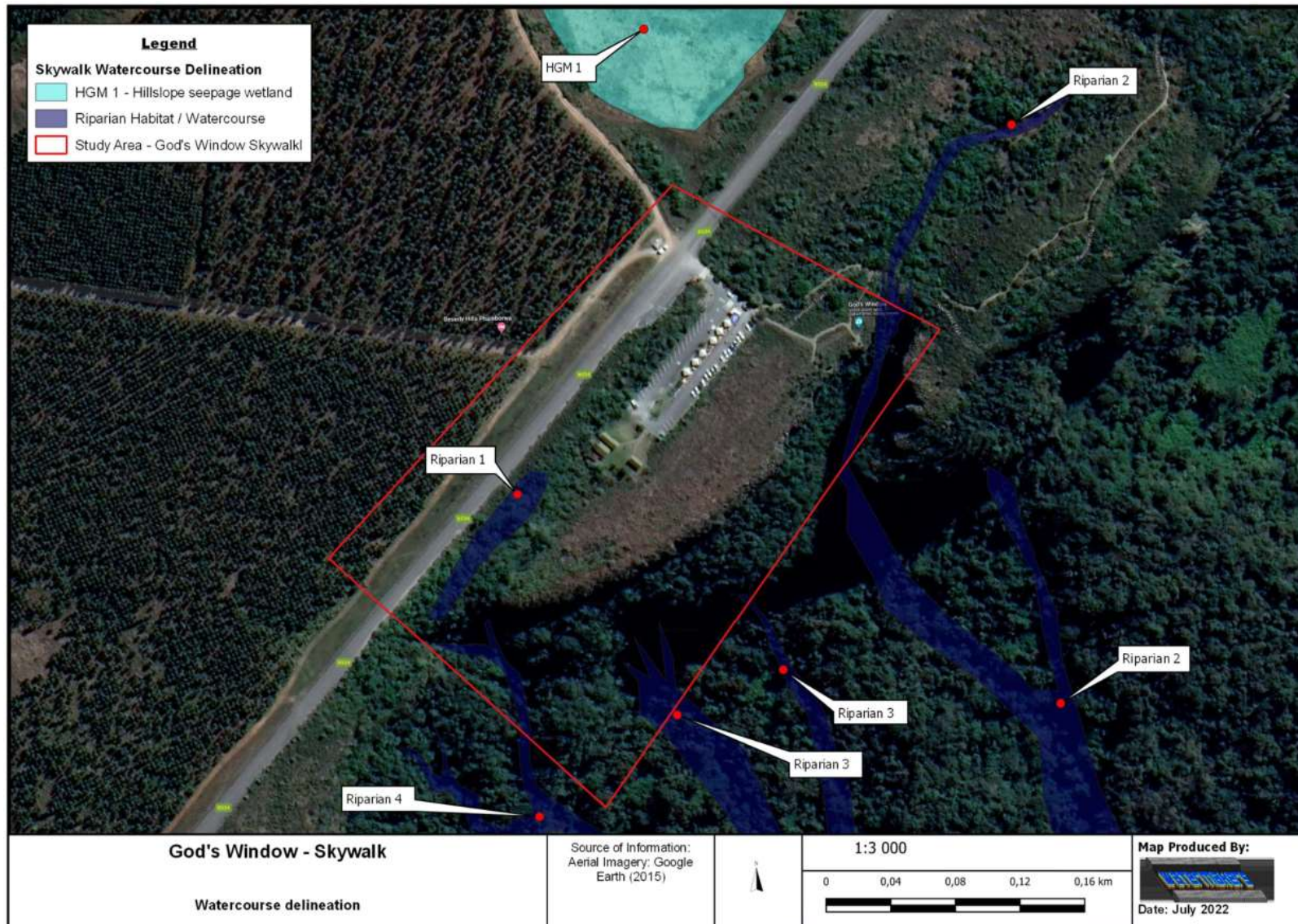


Figure 6-14: Wetland and riparian delineation for the study area

6.7.2.3 Watercourse drivers / Hydropedology

Hydropedology is the relatively new, interdisciplinary research field which focuses on the interactive relationship between soils and water. Soil physical properties, such as the hydraulic conductivity and porosity, have an important impact on the occurrence and rates of hydrological processes.

Digital Soils Africa (Pty) Ltd (DSA) was appointed to conduct a hydropedology study for the project.

Hydrology of the soil types:

The area surrounding the footprint of the development is dominated by shallow soils on hard rock, consisting of the Graskop, Nomanci, Mispah and rock outcrops. The Graskop and Nomanci are classified as recharge soils due to the free draining character of Humic horizon (Figure 6- A and F). The Lithic horizon was weathered and there are no indications of stagnant water in the horizons. These soils were found on the roadside of the site and are cultivated with forestry (Figure 6-). This contrasts with the soils found higher in the hillslope under the forest vegetation with was characterized by large boulders with gleyed material in between the boulders (Figure 6- B). Runoff will be the dominant flowpath on these soils. The saturation in the soils is an indicator of impermeability below the weathering in between the boulders which prevents drainage. This area is an unlikely, or low volume, source of recharge for cracks in the cliff.

The position of the different soil types is presented in Figure 6-.



Figure 6-15: Soil characteristics of the God's Window area; a) shallow lithic soils, b) gleyed material between rocks, c) soil/rock flowpath in the mispah soil, d) hard rock outcrops, e) 1.5 m change from humic (upslope) to orthic (downslope), and f) high organic matter of the humic topsoil.

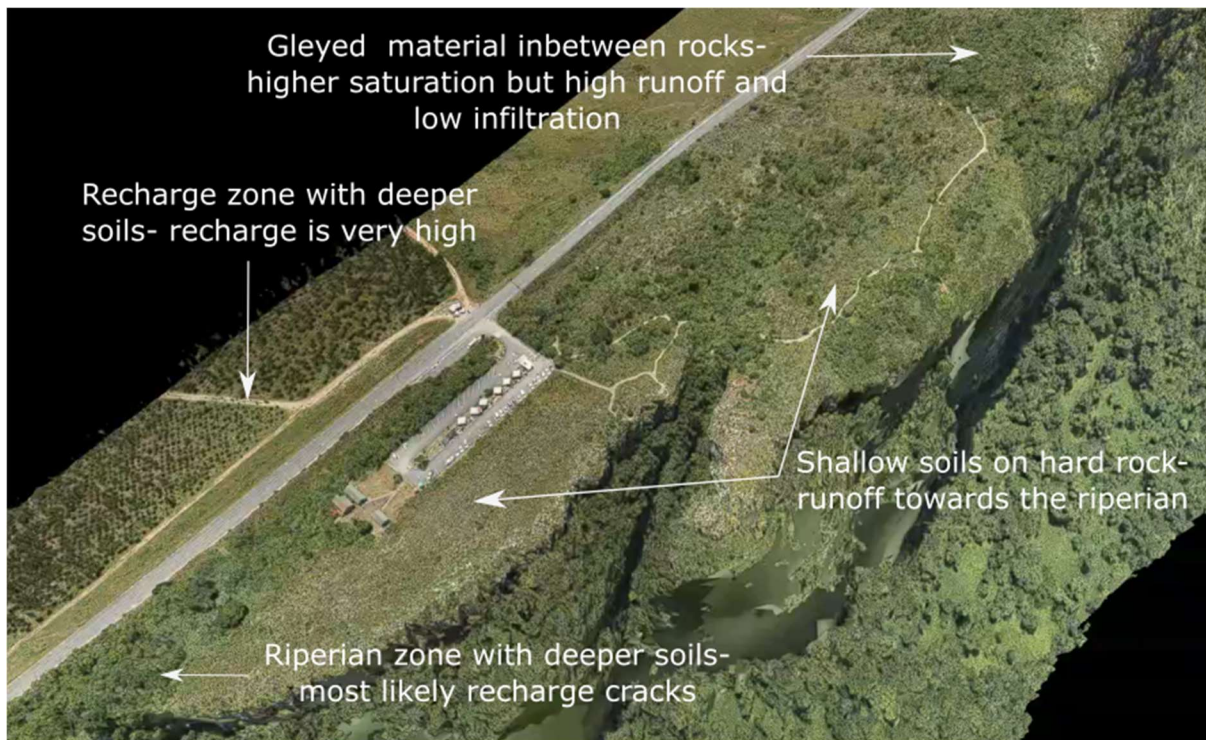


Figure 6-16: The soil distribution and flowpaths present in the study area.

Large areas upslope of the parking lot and towards the cliff are classified as Mispah soils, which is an Orthic horizon on hard rock. Overland flow and interflow at the soil/bedrock interface is the dominant flowpath and is the primary source of water for the riparian zone.

Conceptual hydrological response model:

Overland flow- will be dominant in most of the site. Runoff on the upper slopes in the shallow soils is probable during high intensity rainfall events. The soils are very shallow throughout the site, which results in overland flow due to saturation excess. The soils saturated quickly and then infiltration ceases, causing overland flow.

Recharge- is most likely in the Nomanci to the free draining character of Humic horizon and the underlying Lithic horizon. The lack of gleying in the lithic below the topsoil horizons indicates that the water is not impeded sufficiently for reduction to occur. The water will exfiltrate the soil into the weathered rock, either recharge the groundwater aquifer or move along bedding planes and cracks as interflow to the lower lying wetlands where it wets up the soil and may surface as returnflow.

Interflow- is present as soil/bedrock interflow. Interflow in soil occurs when vertically draining or downwards moving water is impeded by a layer with relatively lower hydraulic conductivity, which in turn results in the development of saturation in the material with higher hydraulic conductivity. When a horizon approaches saturation, water is then deflected and moves in a direction parallel with the slope of the interface between the layers.

On the site, interflow occurs when water drains through the topsoil and is impeded by the solid sandstone bedrock. This is a common flowpath around the current car park and a source to riparian 1 identified by the wetland delineation.

The Conceptual models of the dominant hillslopes of the study area are shown in (Figure 6-).

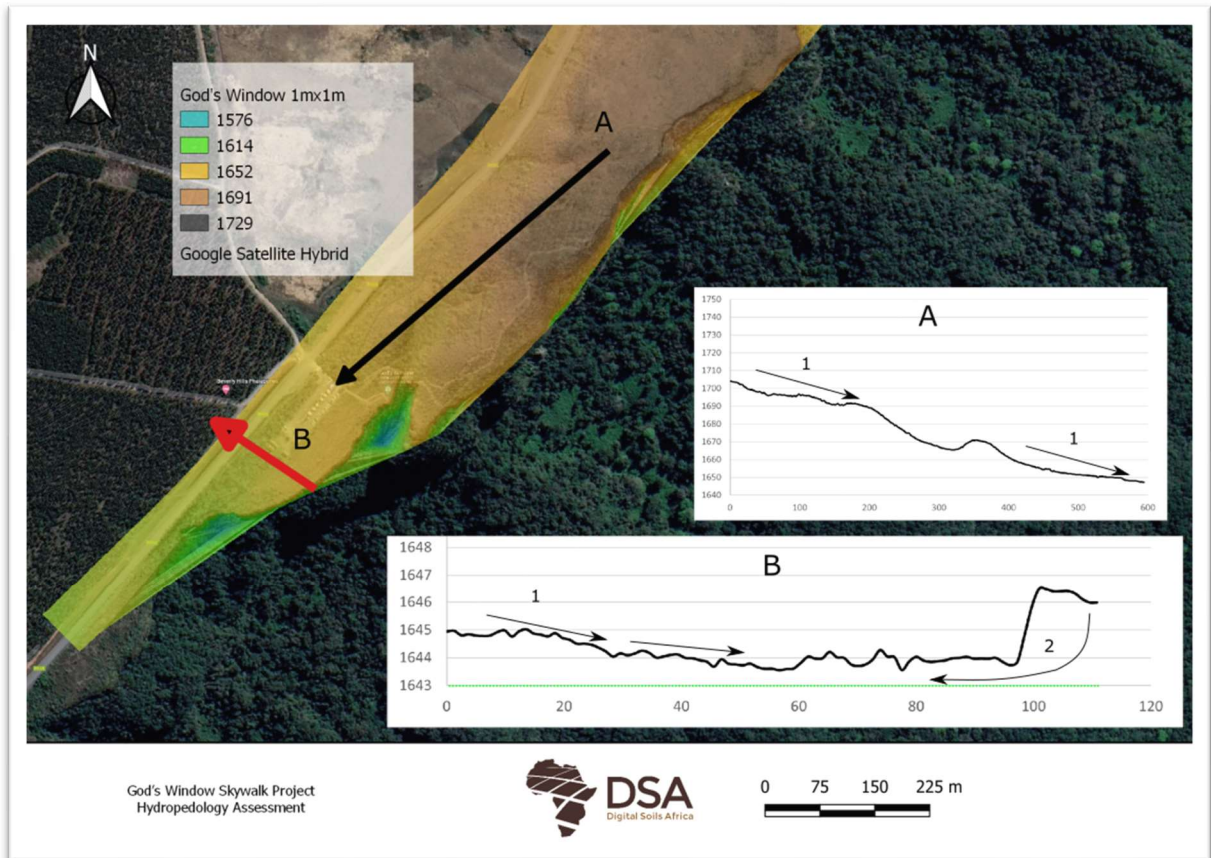


Figure 6-17: Elevation of the study areas and profile cross sections

A topographic wetness index (TWI) is an indicator of water accumulation based on surface topography and the distance to channel. The current surface infrastructure clearly shows water accumulation (Figure 6-), which is expected. The many drainage lines can also be seen from the TWI for the site, further evidence that overland flow into drainage channels is the dominant flow on site.

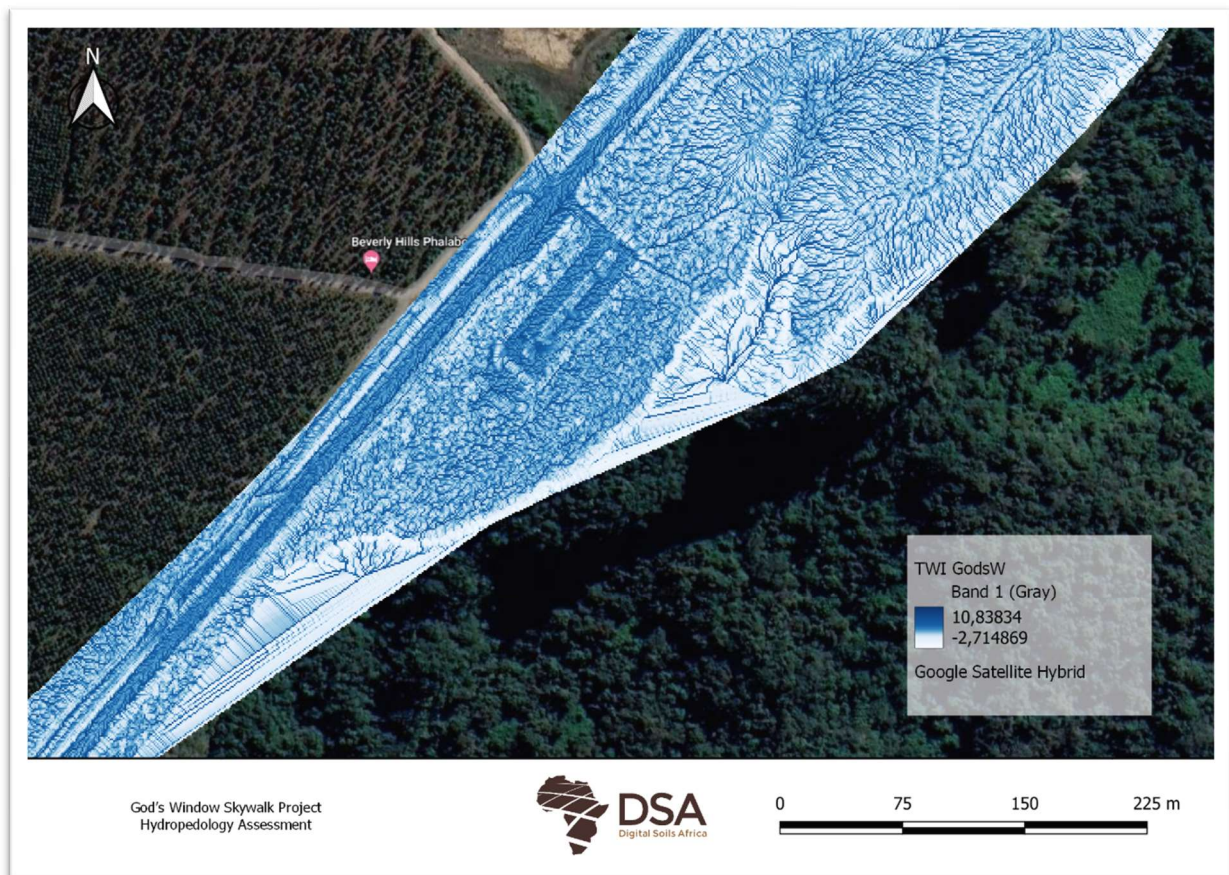


Figure 6-18: Topographic wetness index

In the specialist report, modelling results were presented at two different scales to understand the hydrological processes. At the basin scale, the processes that contribute to the five subbasins were presented, while at the Landscape Unit LSU scale, the flowpaths of the selected soils in the study are analysed. Evapotranspiration (ET) accounts for a significant portion of the water balance, which is expected from the climate of the site (Figure 6-). Water yield (Runoff & Lateral flow) is the most dominant process and accounts for most of most of the water balance. This is expected as large rock outcrops will account for surface runoff and the slope will increase lateral flows

As illustrated in Figure 6-, hydrological response unit (HRU) 96 (pertaining to the proposed footprint), is dominated by ET losses, accounting for 90% of the water balance. This is largely due to losses from the forest vegetation. The transmission (water lost from tributary channels in the HRU via transmission through the bed. This water becomes recharge for the shallow aquifer during the time step) losses are relatively high (8%). The laterals flows are low and most likely occur during higher rainfall events (These are the lateral flows over and through the soil, not in the drainage channels).

HRU 19 is representative of the larger wetland (HGM1). The land use change to grassland drastically reduced the ET (42%) when compared to the forest. Lateral flows are high (35%), mostly dominated by overland flow. This is typical of wetland soils at a slight slope. The percolation is high (12%), this is due to the higher soil water contents which allow drainage through the soils.

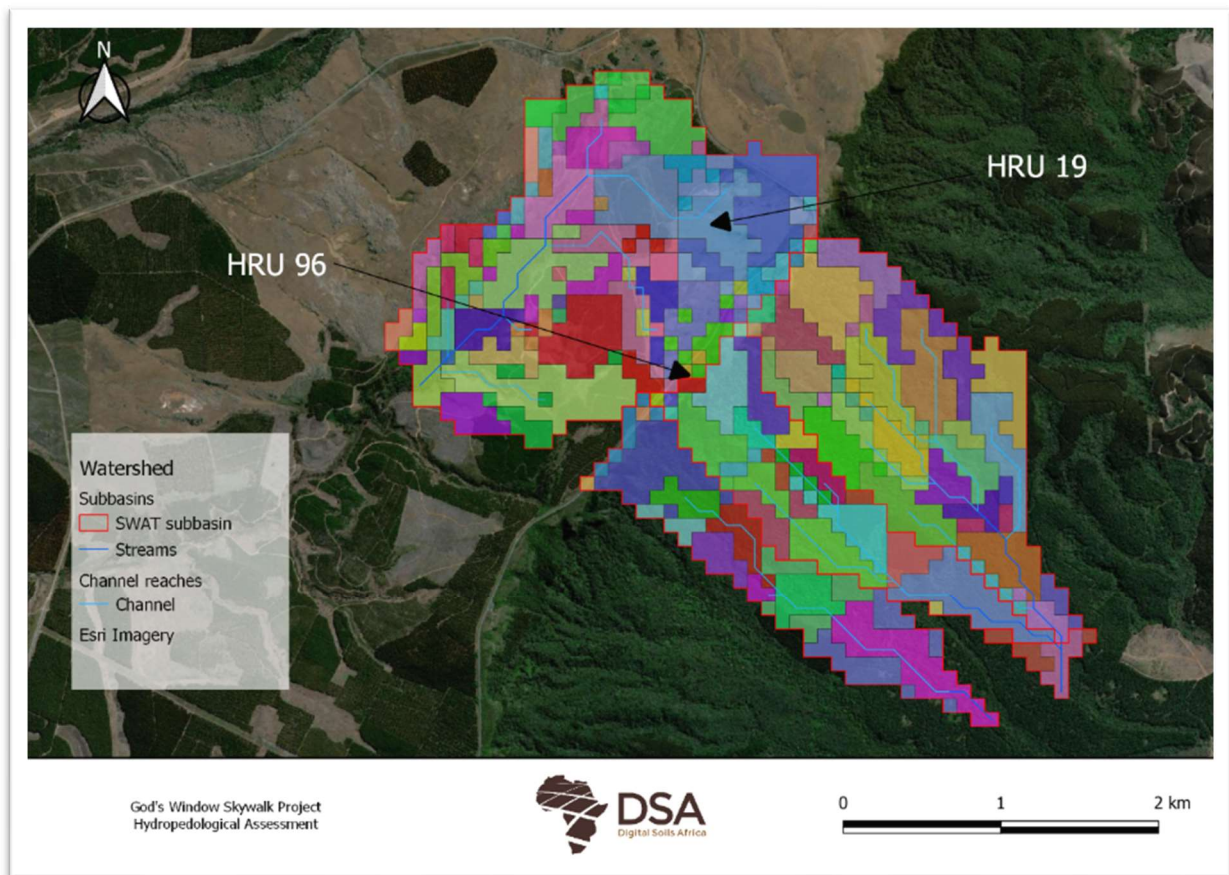


Figure 6-19: The position of the HRU's and subbasins of the site and surrounding area (DSA, 2022)

The dominant flowpath and source for the riparian areas is overland flow. Therefore, water will flow into the drainage channels during a rainfall event and exit the system through the channels. Soils classified as recharge are limited, and therefore, the areas recharging the cracks and fissures of the cliff face are most likely further away from the cliff façade. To predict the recharge areas more accurately, an isotope study could determine the residence time of the water exiting the cliff façade. This can then be linked to areas further away.

The road has most likely cut off the recharge flowpath through the weathered rock to Riparian 1. Therefore, there is an opportunity for the development to replace the loss of more constant source of water caused by the road, by having an attenuation pond into Riparian 1 (**Error! Reference source not found.**). It will be important to calculate the hydraulic properties of the soils around the attenuation pond to calculate the rates of water release.

The natural balance between surface water and water beneath the ground is proposed to be mimicked in the building design. Above the roof slab, water will naturally find its way through the soil for the Scrubveld into an engineered layer below, which will be designed to attenuate the rainwater from above. This will slowly drain to pipes in the supporting columns down into a drainage system below the ground slab. From here the rainwater will either recharge the ground water that naturally percolates into the fissured rocks feeding the escarpment or it will be stored on site.

Foundations will be single, isolated bases directly beneath each column. This design will minimise the impact on the fissured rock and the natural water flow.

6.7.2.4 Aquatic Biota and Freshwater Biodiversity

Given the lack of surface water associated with the development footprint of the proposed Gods Window Skywalk, no aquatic biodiversity elements are expected. Accordingly, no aquatic biodiversity studies are deemed feasible.

With regards to Impacts on Aquatic Biodiversity Features, given the lack of surface water presence within the proposed footprint of the Gods Window site, it is unlikely that the proposed development will have any direct impact on aquatic biota within the larger affected catchment, and thus any direct impact on the FEPA designation of the associated catchment. However, one must be cognisant of possible surface water runoff and discharges in downslope watercourses and mitigated accordingly through appropriately designed and maintained infrastructure as well as appropriate management regimes. In addition, consideration must be given to possible impacts associated with potential rockfalls into watercourses located at the base of the escarpment, and every effort should be made in preventing such rockfalls. An additional consideration should be the potential for members of the public (i.e. users of the Skywalk facility) to dispose of waste over the Skywalk, with such items accumulating within the natural habitat at the base of the escarpment (including watercourses).

6.7.3 Site sensitivity

Findings of the Vegetation Response Assessment Index (VEGRAI) conducted on riparian units identified within the study area indicated that riparian habitat associated with the study area were regarded as being in a largely natural state (i.e. Ecological Category A/B; Table 6-17).

The exception was Riparian 1 that has been seriously impacted through historic tourism and road infrastructure development. Collectively these heavily impacted zones form a very small percentage of the total riparian habitat (considering the downstream linkages) within the study area and surroundings. The impacted zone of Riparian 1 includes the historic development of the R534, up to which time both Riparian 1 and Riparian 2 were largely dominated by graminoids and associated grasslands on top of the escarpment

Table 6-17: VEGRAI score for the riparian vegetation

Riparian Unit	VEGRAI Score	Ecological Category
Riparian 1	81.8	E
Riparian 2	83.1	B
Riparian 3	82.9	A
Riparian 4	81.2	A

In terms of ecological importance and sensitivity, riparian habitat (Riparian 1 to Riparian 4) within the study area was designated as sensitive as a result of the ecological and functional values attributed to riparian areas in general, legal regulations and requirements as well as the supporting ecological services afforded to the downstream ecosystems. Table 6-18 indicates the scores and classification of the ecological importance and sensitivity conducted.

Table 6-18: Ecological importance and sensitivity scores for riparian habitat

Riparian Unit	EIS Score (0 – 5)	Class
Riparian 1	2.9	Moderate
Riparian 2	4,8	Very High
Riparian 3	4,8	Very High
Riparian 4	4,7	Very High

Considering the largely intact nature and present ecological condition associated with the majority of riparian habitat within the study area, all riparian habitat within the vicinity of the study area was designated as sensitive as a result of the high ecological and functional values attributed to riparian areas in general and specifically the presence of so many species of conservation concern, legal regulations and requirements.

Considering the specific and unique singularity of the proposed footprint of the development, the degraded/anthropogenic state of Riparian 1 (and required rehabilitation within and directly surrounding Riparian 1), freshwater ecosystem buffers were not considered a viable option from a watercourse mitigation perspective. Instead, mitigation measures will be designed site specifically in order to eliminate current negative impacts associated with riparian habitat and aim to enhance potential positive outcomes such as more sensitive stormwater attenuation, infiltration and appropriate sewage treatment and polishing with diffuse release where appropriate.

6.7.4 Impact assessment

Project phase	Construction	
Impact	Sedimentation of watercourse	
Description of impact	<p>The clearing of natural vegetation and the stripping of topsoil will result in increased runoff of sediment from the site and potentially into watercourses downstream of the study area, particularly during times of high rainfall. Water flowing down trenches and access roads, as well as movement of construction vehicles and personnel, could cause additional sediment to accumulate within downstream watercourses and in severe circumstances potentially impact FEPA Fish support catchments downstream. The potential siltation of watercourses downstream would alter geomorphologic functioning, the movement of water through the system (hydrological functioning) as well as having an impact on water quality within the resource.</p>	
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	<p><u>Mitigation Measures - Planning phase</u> Plan the development footprint to stay well clear of watercourses, particularly Riparian 1. This has been achieved as per the latest lay-out. The design of drainage and stormwater systems for the construction period must ensure there is no sedimentation, eutrophication or erosion of riparian habitat or its associated catchment. It is advised that silt fences and coir logs be installed in areas of expected run-off to collect sediment. The southern and western boundary of the development footprint (downstream side) must therefore be "coir-logged" on contour to force any run-off through these sediment traps. Keep the development and construction footprint as small as possible through planning various components of construction flow with limited space in mind. Timing, orientation, spatial utilisation and optimisation by appropriate planning throughout the entire construction process, is therefore cardinal</p> <p><u>Mitigation Measures - Construction phase</u></p> <ul style="list-style-type: none"> • An independent Ecological Control Officer (ECO) should be appointed to oversee construction and appropriately briefed and trained by the freshwater ecologist on all issues pertaining to watercourses and site stormwater management. The ECO should in turn train any new construction staff and or contractors that arrive on site ensuring that all environmental are appropriately considered and managed. • As first point of departure it must be ensured that all no-go areas on the perimeter of the footprint is appropriately fenced off before construction are initiated. Coir logs must be installed on this fence line also prior to initiation of construction <p>Only remove vegetation where necessary and retain vegetation in place for as long as possible prior to removal. Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area. Ensure this aspect form part of training Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas. As per Dimela 2022, a vegetation rehabilitation plan should already be implemented during construction to rehabilitate areas that will be affected by edge effects. Such a plan should use indigenous species from the study area and must restore disturbed areas beyond the footprint of the</p>	

	<p>infrastructure to what it was prior to construction, thereby making the impact on the remainder of the site negligible in the long term. Natural colonisation could take a long time, in which vegetation may degrade further or become dominated by encroacher or alien invasive plant species. Therefore, timeous rehabilitation is imperative. Even in the event of good rains, annual pioneer plants are short-lived and therefore an effort must be made to keep as many shrubs in place as possible or to replace these as part of rehabilitation.</p> <p>Where topsoil needs to be removed, store such in a separate area where such soils can be protected until they can be re-used for post-construction rehabilitation where applicable. Never mix topsoil with subsoils or other spoil materials.</p> <p>All stockpiles must be protected from erosion, stored for the minimum amount of time necessary and on flat areas where run-off will be minimized, and be surrounded by bunds;</p> <p>If possible, re-position the topsoil stockpile (where relevant) upslope of any infrastructure within the surface infrastructure footprint so as to prevent contaminated surface water coming into contact with topsoil;</p> <p>The ECO must be vigilant to detect any negative impacts on watercourses and consult with a wetland specialist if erosion, sedimentation or other negative impacts within the vicinity of watercourses are noticed.</p>			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Very limited	Limited to specific isolated parts of the site
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Negligible - negative	
Comment on significance	Appropriate planned mitigation would likely prevent observable sedimentation to the downstream environment			
Cumulative impacts	There are no other developments planned within the specific catchment.			

Project phase	Construction	
Impact	Erosion	
Description of impact	<p>The removal of surface vegetation will cause exposed soil conditions where rainfall and high winds can cause mechanical erosion. In addition, hardened surfaces and bare areas are likely to increase surface run off velocities and peak flows received by watercourses.</p>	
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	<ul style="list-style-type: none"> An ecologically-sound stormwater management plan must be implemented at the onset of the construction phase; A riparian monitoring program should be initiated before the onset of the construction phase. The Environmental Control Officer should be briefed by a wetland / aquatic specialist on specific monitoring issues. An inspection of cleared and disturbed areas as well as any stormwater infrastructure needs to take place after each large rain event. Appropriate 	

	<p>mitigation needs to be implemented after consultation with relevant specialist if any problems are detected;</p> <ul style="list-style-type: none"> • Erosion must not be allowed to develop on a large scale before effecting repairs; • All areas susceptible to erosion must be protected and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas; • Natural trees, shrubbery and grass species must be retained wherever possible; • Areas exposed to erosion due to construction should be vegetated with species naturally occurring in the area; • Surface water or storm water must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being in place; and • The incorporation of Sustainable Drainage Systems (SuDS) as well as Water Sensitive Urban Design (WSUD) (e.g. permeable pavements, alignment/orientation of roads, etc.) within the layout planning and design is required to reduce runoff from the site. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Very limited	Limited to specific isolated parts of the site
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Negligible - negative	
Comment on significance	Appropriate planned mitigation would likely prevent observable erosion impacting on the downstream environment			
Cumulative impacts	There are no other developments planned within the specific catchment.			

Project phase	Construction			
Impact	Alien Invasive Vegetation			
Description of impact	<p>During construction, vegetation will be removed and soil disturbed. The seed of alien invasive species that occur on and in the vicinity of the construction area could spread into the disturbed and stockpiled soil. In addition, the construction vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds or indigenous plants not belonging to this vegetation unit to the construction site. Alien vegetation could easily disperse into the watercourses through stormwater infrastructure located on site.</p>			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • All protocols and mitigation measures as recommended by the vegetation specialist pertaining vegetation and alien invasive species control must be implemented; • During construction, the construction area and immediate surroundings should be monitored regularly for emergent invasive vegetation; • Surrounding natural vegetation should not be disturbed to minimize chances of invasion by alien vegetation; 			

	<ul style="list-style-type: none"> All alien seedlings and saplings must be removed as they become evident for the duration of construction and operational phase; Manual / mechanical removal is preferred to chemical control; All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction site. This should be verified by the ECO; and An alien invasive eradication and monitoring plan must be compiled and implemented whereby all emergent invasive species are removed during construction. The monitoring plan must also ensure that the re-emergence of invasive species is monitored continuously during the operational and decommissioning phases and that monitoring and eradication continues post decommissioning. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Long term	Impact will last between 10 and 15 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Minor - positive	
Comment on significance	In addition to removing recruiting alien species during the construction process, existing alien vegetation established on site will be removed			
Cumulative impacts	Due to the high occurrence of alien invasive plant species in the area, the residual risk of increased alien vegetation cover is moderate to high			

Project phase	Construction	
Impact	Water Quality Deterioration	
Description of impact	<p>Hydrocarbon-based fuels or lubricants spilled from construction vehicles, construction materials and litter deposited by construction workers may be washed into drainage lines and wetlands. The mobilisation of sediments, excavations, removal and disturbances to vegetation, mobilisation of hydrocarbon and other compounds could have various negative impacts on wetland/riparian areas and their associated functionality. Should appropriate toilet facilities not be provided for construction workers at the construction crew camps, the potential exists for surface water resources and surroundings to be contaminated by raw sewage</p>	
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	<ul style="list-style-type: none"> Construction vehicles are to be maintained in good working order so as to reduce the probability of leakage of fuels and lubricants; 	

	<ul style="list-style-type: none"> • A walled concrete platform, dedicated store with adequate flooring or bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas; • Storage of potentially hazardous materials should take place far away from preferential flow paths and or stormwater infrastructure. These materials include fuel, oil, cement, bitumen etc.; • Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils; • Concrete is to be mixed on mixing trays only, not on exposed soil; • Concrete and tar shall be mixed only in areas which have been specially demarcated for this purpose; • After all the concrete / tar mixing is complete all waste concrete / tar shall be removed from the batching area and disposed of at an approved dumpsite; • Stormwater shall not be allowed to flow through the batching area. Cement sediment shall be removed from time to time and disposed of in a manner as instructed by the Consulting Engineer; • All construction materials liable to spillage are to be stored in appropriate structures with impermeable flooring; • Portable septic toilets are to be provided and maintained for construction crews, and are to be located at least 100m from designated buffer zones. Maintenance must include their removal without sewage spillage; • No uncontrolled discharges from the construction crew camps to any surface water resources shall be permitted. Any discharge points need to be approved by the relevant authority; • In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water and Sanitation must be informed immediately; • Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed; • The construction site should be cleaned daily and litter removed; and • Conduct ongoing staff awareness programs to reinforce the need to avoid littering. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Immediate	Impact will self-remedy immediately
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Negligible - negative	
Comment on significance	Considering the red data species situated on the cliff edge directly downstream from Riparian 1, a chemical or hydrocarbon spill could have high significance if not prevented through appropriate mitigation			
Cumulative impacts	There are no other developments planned within the specific catchment.			

Project phase	Operation			
Impact	Altered Hydrologic Regime			
Description of impact	<p>The clearing of natural vegetation with high basal cover and subsequent replacement with hardened surfaces and other infrastructure including an increase of access roads and other compacted areas as well as roofs are likely to result in increased run-off, especially peak flow velocities received by watercourses and potential recharge areas. The hydrology of the area seems interconnected and important in terms of regulating different moisture regimes in different areas, many areas serving as habitat harbouring a multitude of species of conservation concern. Lateral water movement seems likely to be an important component of the geohydrology of the area with potential groundwater-fed headwaters occurring in several locations within and surrounding the study area. Large foundations and or cut and fill or blasting operations could have a significant impact on subsurface flows. Further, albeit likely to be a very minor impact, the building itself could result in changes to the orthographic generated precipitation process and patterns, especially mist, on the escarpment edge</p>			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> The construction of foundations for the new tourist facility could potentially intercept surface water flows, a perched aquifer and or other water-bearing geological features leading to desiccation of wetland and other sensitive habitats, especially cliff edges and headwaters of riparian habitat. However, latest results from geotechnical and hydrogeological modelling indicates that the main hydrological mechanisms in the vicinity of the footprint of the proposed development is suggested to be more surface flow orientated. A conservative and precautionary approach in the design has been taken already, including limitation of impermeable surfaces as well as roof top indigenous gardens with sub-infrastructure drainage linked to the foundation via pillar drainage, thereby significantly reducing potential impacts on surface and subsurface drainage and daylighting hydrological regimes (Figure 6- and Figure 6-). Thus, rainwater from the building roof will be released into the environment in a controlled manner to also encourage recharging of the potential sub-surface flows. The development hydrology will thus mimic the site's hydrogeology (filling and spilling) though allowing water to potentially recharge through cracks underneath the foundation with excess overflow directed towards Riparian 1 for further attenuation and diffuse release New parking to be laid with permeable block paving. Rainwater will infiltrate through the permeable concrete blocks into a sub-base comprising of stone layers and will encourage recharging of the sub-surface flow. Rainwater which does not infiltrate through the paving blocks will run overland and will be channelled into a stormwater attenuation pond. Stormwater discharged from the attenuation pond into the natural environment in a controlled manner to not exceed the pre-development peak flows, which will also encourage recharging of the sub-surface flow. The incorporation of Sustainable Drainage Systems (SuDS) as well as Water Sensitive Urban Design (WSUD) (e.g. permeable pavements, alignment/orientation of roads, etc.) within the layout planning and design is required to decrease runoff from the site during rainfall periods; Implement an ecologically-sensitive stormwater management plan that includes not allowing stormwater to be discharged directly into regional stormwater systems but rather be attenuated on site through attenuation facilities with diffuse release infrastructure. It should be investigated through the ARC what temporary weather station monitoring programs and equipment would be necessitated to determine baseline and monitor precipitation regimes pre and post development and whether such endeavours could be done cost effectively. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Very limited	Limited to specific isolated parts of the site
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Low	Natural and/ or social functions and/ or processes are somewhat altered

Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Negligible - negative	
Comment on significance	The potential significance could be high considering the amount and conservation importance of species of conservation concern potentially impacted by an altered hydrological regime			
Cumulative impacts	There are no other developments planned within the specific catchment.			

Project phase	Operation			
Impact	Water Quality deterioration			
Description of impact	Operational impacts on water quality include discharge of inappropriately treated sewage effluent, spillages of chemicals and or cleaning agents utilised for maintenance purposes.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Appropriate backup and fail systems should be built into the design of the sewage treatment works to prevent any spillages into the downstream environment Rehabilitation of Riparian 1 should include attenuation, infiltration and diffuse release mechanisms which can promote artificial wetland conditions capable of polishing stormwater and or treated sewage effluent. The upper most attenuation facility should be lined and act as a last fail save to prevent any effluent that does not meet the DWS determined discharge qualities to be kept temporarily (either pumped back into treatment works for further treatment or pumped to honey sucker. Pressurised water should be utilised as far as possible rather than any chemicals. Only bio-friendly cleaning agents should be utilised as last necessity where required. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere

Significance	Moderate - negative	Minor - positive
Comment on significance	The potential significance could be high considering the amount and conservation importance of species of conservation concern potentially impacted by an altered hydrological regime. However, introduction of effective sewage management on terrain will halt current ongoing sewage pollution to Riparian 1	
Cumulative impacts	There are no other developments planned within the specific catchment.	

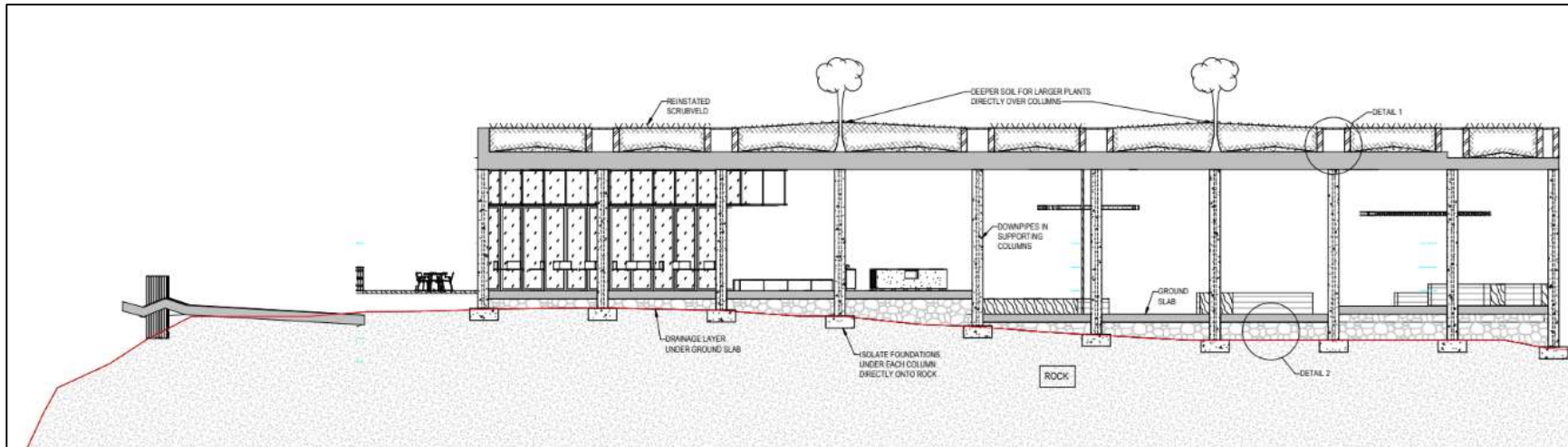


Figure 6-20: Drawing illustrating the concept of roof planting and building drainage system

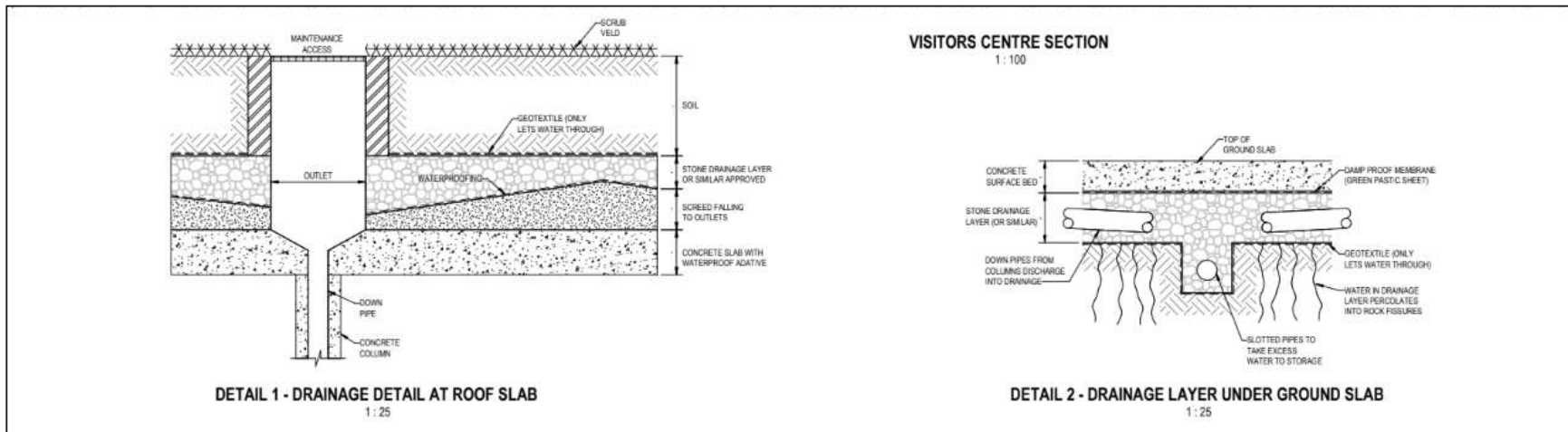


Figure 6-21: Drainage detail at the roof slab on left, and underneath the ground slab on the right

6.7.5 Conclusion and recommendations

Considering the level of investigation, baseline conditions and potential impact and mitigation measures that are being developed, from a watercourse perspective it is recommended that the development continues, provided all recommended mitigation measures are implemented.

6.8 Visual and Landscape Environment

Elmie Weideman of Create Landscape Architecture and Consulting (Pty) Ltd was appointed by Zutari to undertake the landscape and visual impact assessment for this project, with field assessments being done from 23 April to 24 April 2022. The sections below have been taken from the specialist report and reference is therefore made to the report dated 13 May 2022.

6.8.1 Baseline Description

6.8.1.1 Landscape baseline

Table 6-19 summarises the landscape baseline which aims to analyse and describe the intrinsic value of the existing landscape, including aspects of the natural, cultural and scenic landscape. The sections below describe the character, uniqueness, intactness, quality, rarity and vulnerability.

Table 6-19: Summary of landscape baseline

Landscape parameter	Description
Climate	<p>The Study Area has a temperate highland tropical climate with dry winters and wet summers. The district's yearly temperature is 22.3°C, Graskop typically receives about 71.61 millimetres precipitation and has 119.92 rainy days with an average cloud cover of 56% throughout the year and visibility ranging between 8 – 10km. Heavy mist and fog is a common occurrence during the summer months which could affect overall visibility, however this was not considered during the rating of possible impacts. (https://www.weather-atlas.com/en/south-africa/graskop-climate).</p>
Topography and hydrology	<p><u>Study Area</u></p> <p>The topography within the wider region of the Study Area ranges from sheer cliffs dropping off at perpendicular angles to relatively flat plateau's valleys and rolling hills. Elevation ranges from 580m to over 1900m above sea level. The local topography can be described as undulating which will provide sufficient screening ability in some areas.</p> <p>There are three perennial rivers within the Study Area, namely, Waterval Spruit (approximately 5.2 km north of the site), Maritsane river (approximately 5.3 km north east of the site) and the Ngwaritsana river (approximately 3.9 km north of the site).</p> <p><u>Site</u></p> <p>The Site for the proposed development is located on the edge of the canyon escarpment and is fairly level (0-3%) right up to the escarpment edge where it drops at a perpendicular angle into a cliff of approximately 700m.</p> <p>There are strong drainage lines visible on the edge of the escarpment. After rain events these drainage lines turn into a series of small waterfalls. During the site visit spontaneous small trickles of water, which run from the natural rock and pathways were visible.</p>

Landscape parameter	Description
Vegetation cover	<p><u>Biome</u></p> <p>The Study Area is situated within two Biomes, namely Afrotropical, Subtropical and Azonal Forests and the Grassland Biome.</p> <p><u>Vegetation types</u></p> <p>Biomes can further be divided into smaller units known as vegetation types and according to Mucina and Rutherford (2006), three natural occurring vegetation types namely Northern Mistbelt Forest, Northern Escarpment Afromontane Forest and Northern Escarpment Quartzite Sourveld are located within the Study Area.</p> <ul style="list-style-type: none"> • Northern Misbelt Forest <p>This evergreen indigenous forest, mostly occurs in small, fragmented patches within moist east facing, sheltered kloofs and characterised by tall trees;</p> <ul style="list-style-type: none"> • Northern Escarpment Afromontane Forest <p>This vegetation is mainly found in kloofs recognised by a wide variety of tall indigenous trees and reaching a maximum height of up to 20m; and</p> <ul style="list-style-type: none"> • Northern Escarpment Quartzite Sourveld <p>This vegetation type mainly consists out of a complex of grassland and low density, scattered small trees and shrubs occurring on quartzite outcrops with average tree height between 5 -7m</p> <p>The forest vegetation types will provide sufficient screening ability for this type of infrastructure, whereas the grassland Northern Escarpment Quartzite Sourveld, which includes scattered small trees and shrubs (predominantly found on the plateau area west of the site), will not provide sufficient screening ability.</p> <p>The 2015 ecological study states that a diversity of vegetation communities was recorded within the relatively small Study Area and included <i>Passerine montana/Pteridium aquilinum</i> scrubveld, <i>Aloe arborescens/Clivia caulescens</i> on cliff edges, vertical cliffs and mistbelt forests. At least eight (8) plant species of conservation concern, <i>Monopsis kowynensis</i> (Vulnerable), <i>Streptocarpus fenestra-dei</i> (Rare), <i>Schizochilus lilacinus</i> (Extremely Rare), <i>Merwillia plumbea</i> (Declining), <i>Drimia alata</i> (Declining), <i>Clivia caulescens</i> (Near Threatened), <i>Alsophila capensis</i> (Declining) and <i>Rapanea melanophloeos</i> (Declining) were recorded during the field survey. In addition to this, one nationally protected tree, <i>Afrocarpus falcatus</i> (Small leaved Yellowwood) and numerous provincially protected species were also recorded throughout the Study Area.</p> <p><u>Timber plantations</u></p> <p>Natural vegetation has made way for large scale monoculture tree plantations which will significantly screen views, especially for views from a general west and east direction (fern tree height ranged from approximately 15m – 30m).</p>
Landcover	<p>The main landcover includes plantation forest, natural grassland and indigenous forest along the escarpments. Residential areas are associated with the formal towns of Graskop and Pelgrims Rest (located south and west of the site) as well as settlements from Bushbuckridge, London, Dwarsloop, Shatale and Casteel, all located more than 15km north east of the Site. As mentioned above, plantations (and indigenous forest to some degree) will provide sufficient screening ability. Grassland vegetation will not provide any screening ability. Refer to Figure 6-.</p>
Land use	<p>The site is zoned as “Provincial Park” and is a well-known tourist attraction along the popular Panorama Route (R534 scenic route). Current infrastructure on site includes</p>

Landscape parameter	Description
	dilapidated vendor stalls, ablution facilities, a carpark, a guard house, natural stone footpaths and litter bins.
Landscape character	<p><i>Landscape character is a distinct, recognisable, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse. Landscape character includes the natural and man-made attributes of the Study Area, including topography, land cover and vegetation. The overall landscape character is influenced negatively by incompatible activities, or positively by the presence of natural and/or man-made features, such as steep gradients, presence of rocky ridges, natural vegetation, pans, and floodplains.</i></p> <p><u>Study Area</u></p> <p>The Study Area is perched on the edge of the Drakensberg escarpment, the landscape can be described as rugged and undulating with a rocky escarpment, characterised by steep cliffs, standing in contrast to higher laying flatter plateau areas and valley bottoms intersected with rivers. The natural vegetation can be described as short, closed grassland rich in forb species with scattered trees and shrubs amongst rocky outcrops.</p> <p>Logging have become the area’s number one economic driver and large formal patches of timber plantations and associated machinery and infrastructure (such as saw mills) are visible throughout the Study Area.</p> <p>The R534, turns off the R532 and is a panoramic, meandering, tarred loop road connecting various scenic attractions. Various dirt access roads (specifically for logging purposes) turn off from the main tarred roads in the area.</p> <p>The greater area is further commonly known for its number of scenic tourist attractions such as Bourke’s Luck Potholes (outside the Study Area), Three Rondawels (outside the Study Area), Pinnacle Rock as well as spectacular waterfalls such as Lisbon Falls, Berlyn Falls and Mac Mac Falls. The town of Graskop with its old charm character is located south west of the God’s Window site. The town has various tourist accommodation curio shops, pubs coffee shops and eateries which brings this small town to life.</p> <p><u>Site</u></p> <p>The site comprises of dense, low- to medium growing shrubby vegetation covered with lichens and moss to create a forest-like atmosphere. In some sections the vegetation is so dense (around and above the footpaths) that a “green tunnel effect” is experienced when moving through the space. These vegetation tunnels open up at designated viewpoints which allows for breath-taking views. At the edge of the escarpment sheer rock face plummets down into a green mass of Mistbelt Forest and pine plantations below.</p>
Visual absorption capacity (VAC) and visual intrusion	<p><i>VAC is an indication of the ability of the landscape to visually conceal the proposed development. Areas with high VAC can accommodate and absorb physical changes in the landscape without transforming its visual character and quality, while a low VAC rating implies a low ability to absorb or conceal visual impacts (Oberholzer, B.2005). The factors that contribute to the VAC factor includes topographical diversity, vegetation, soil contrast, visual pattern, and recovery time.</i></p> <p><i>VAC is further closely related to visual intrusion, which refers to the physical characteristics and nature of the contrast created by a project on the visual aspects of the receiving environment. It is also, as with VAC, a measure of the compatibility or the conflict of a project with the existing landscape and surrounding land use.</i></p>

Landscape parameter	Description
	<p>The VAC can generally be described as moderate – high (this will depend on the location of the visual receptor) which implicates that the proposed development will be concealed to a large extent but will still be fully visible from a number of observation points (especially located from a distance of more than 5km).</p> <p>There is currently no similar infrastructure present in the area (except for the Graskop Gorge Lift, however it does not include a structure protruding over the canyon). Based on the current design’s available information, the proposed building’s shape, texture and colour have moderate visual intrusion. This is partially as a result of the concept of “cutting into the landscape” and the proposed roof garden which will further mitigate visual intrusion during the operational phase of the project.</p>
Landscape quality	<p><i>Landscape quality is based on human perceptions and expectations in the context of the existing environment. A landscape’s visual quality is therefore a factor of an observer’s emotional response to physical landscape characteristics and therefore assigning values to visual resources is therefore a subjective process.</i></p> <p><i>Landscape quality increases with the presence of water, topographic ruggedness and where diverse patterns of vegetation occur. Areas that contain more natural features or harmonious man-made compositions will have a more favourable landscape quality than areas with non-harmonious human activity.</i></p> <p>The landscape quality of the Site and larger Study Area is considered high due to the striking visual impression it leaves on the viewer (hence this being a famous viewpoint along a scenic route). The intactness would also have been very high if it wasn’t for some level of visual encroachment on the natural landscape which includes (to some extent) the timber plantations and associated man-made elements. Existing infrastructure on site include the carpark, stone-paved footpaths as well as paved and unpaved roads, buildings and overhead transmission lines in the proximity of the existing God’s Window site.</p>
Landscape value	<p><i>Landscape value is concerned with the relative value attached to a specific landscape by society, bearing in mind that a landscape may be valued by different stakeholders for a whole variety of reasons. Value can apply to areas of landscape as a whole or to the individual elements, features and aesthetic or perceptual dimensions which contribute to the character of the landscape. (IEMA, 2013)</i></p> <p>The Study Area is likely to be most valued by tourists who visit the town of Graskop, and the various scenic tourist attractions as discussed earlier (including the God’s Window site itself). Recreational users involved in outdoor recreational activities such as hiking, and mountain biking will most likely attach moderate – high value to the landscape. They utilise the landscape for enjoyment purposes and are aware of the qualities of the landscape which often include the visual quality that is associated with the landscape.</p> <p>The Study Area is likely to be moderately valued by residents permanently residing in the Study Area (which do not have a direct connection with the timber industry) and workers who have vested interest in the tourism industry.</p> <p>The proposed project may therefore lower the landscape value for the above groups of receptors by:</p> <p>The potential visual intrusion and presence of a building and cantilevered structure of such monumental scale; and</p> <p>The direct loss of vegetation (especially during the construction phase of the project).</p> <p>Contractors or permanent employees related to the forestry industry will have a different perception because of their more regular contact with the adjacent landscape and the</p>

Landscape parameter	Description
	ongoing timber industry related type changes within it. The proposed project will not affect the landscape value for these receptors.
Lights at night	<p>To determine the potential visual impact of night time lighting, it is important to understand the existing lighting levels within the Study Area. The Institute for Lighting Professionals (ILP) 2011 identifies five zones for exterior lighting control, describing the existing lighting conditions within the landscape. These zones are supported by design guidelines to reduce lighting pollution, which can inform mitigation measures.</p> <p>The Study Area can be classified as rural with low district brightness and due to its location (right on the edge of an escarpment) the Skywalk Project would almost act as a light beacon and would be visible for many kilometres towards the west when lit at night. This would be experienced by motorists traveling along the R533, residents on the outskirts of Graskop as well as by forestry workers in the in the lower lying eastern areas below the proposed development. The sheer viewing distance will however reduce the intensity of the impact.</p>
⁵Sense of place	<p><u>Study Area</u></p> <p>The sense of place associated with the Study Area can be described as scenic, rural, and peaceful with low – moderate levels of activity. The Study Area is somewhat commercialised as a result of the large-scale timber forest plantations.</p> <p>Natural forest vegetation, the R532, the R534, patches of pine forest, sheer rocky cliffs (associated with the high canyon), scenic vistas, meandering rivers, and waterfalls dominates the visual scene. Scattered tourism accommodation on the outskirts of Graskop and small settlements such as Driekop further enhances the overall rural sense of place.</p> <p><u>Site</u></p> <p>Observers develop a sense of place through knowledge and experience of a particular area. The uniqueness of the landscape, simplicity, and visual character of God’s Window is already widely known on a national, and to some extent, on an international level. The site has a strong sense of place, deeply rooted to the natural scenic environment, with low key infrastructure at the viewpoints, allowing the observer to focus on the landscape’s natural beauty.</p>

6.8.1.2 Visual baseline

During the site visit potential visual receptors and their sensitivity were identified. These are indicated in Table 6-20 below. Their sensitivity is dependent on the location, the activity of the viewer and the importance of the view. Receptor locations are not only stationary but can also be roads along which people travel. Reference can be made to Appendix B7 of the specialist report which provides further detail on receptor sensitivity.

⁵ Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. It is created by the land use, character, and quality of a landscape, as well as by the tangible and intangible value assigned thereto.

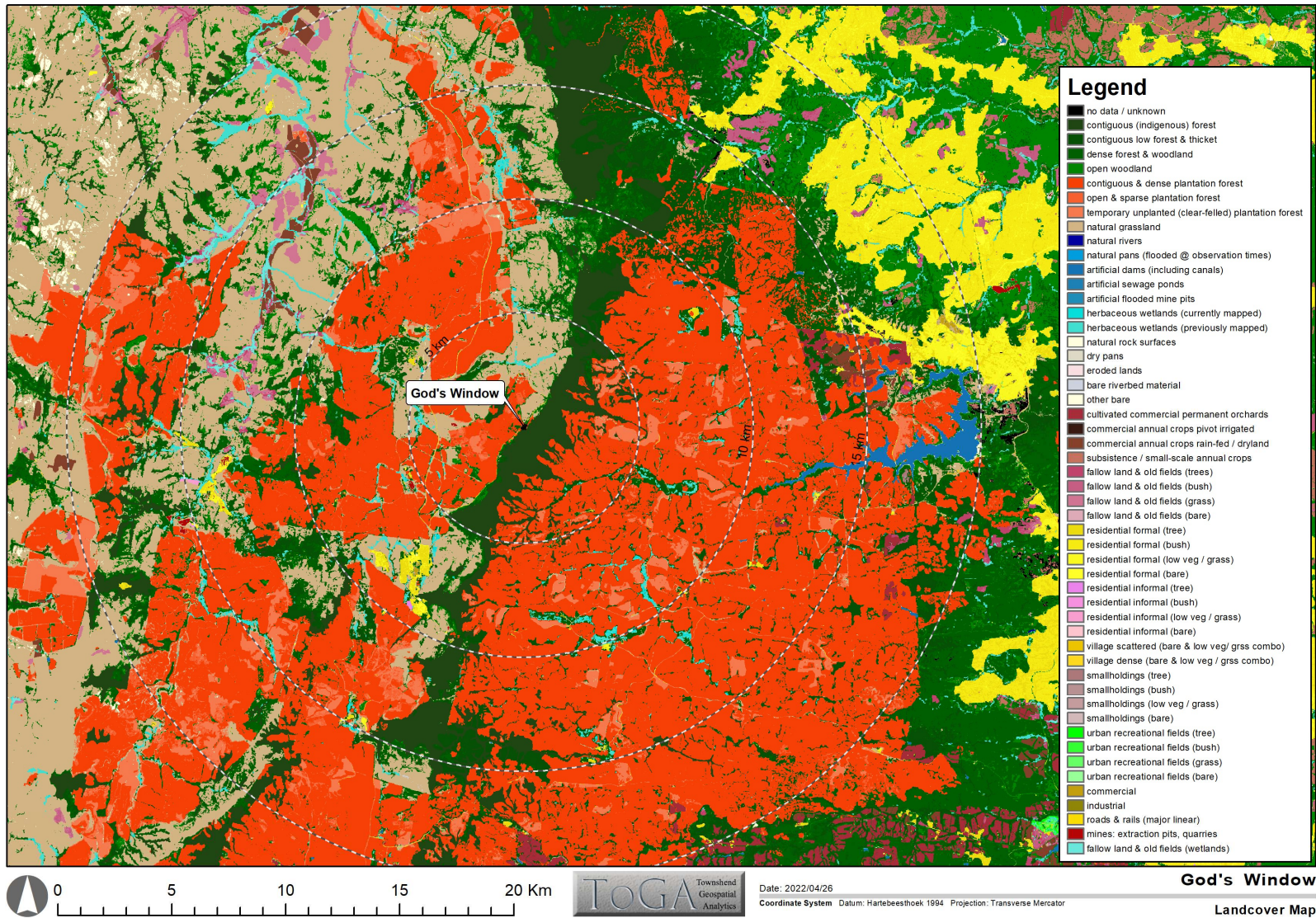


Figure 6-22: Landover map

Table 6-20: Visual receptor sensitivity

Receptor	Sensitivity
Tourists visiting the God's Window viewpoint and other scenic points within the Study Area	High sensitivity (the sole purpose of them visiting this attraction is to experience the spectacular views that it is being promoted for). Tourists visiting the site will be directly exposed to the construction and operational activities of the proposed project and will therefore experience it more intensely.
Permanent residents on the outskirts of Graskop	Moderate - High sensitivity (Even though the viewing distance will be over 5km (and the intensity might be low) residents will have a sustained visual exposure to the proposed development).
Recreational users utilising the plantation roads and hiking/mountain biking routes in the area.	Moderate sensitivity (Recreational users utilise the landscape for enjoyment purposes and are aware of the qualities of the landscape which often include the visual quality that is associated with the landscape; however, they will be focused on their immediate environment and on the task at hand and not necessarily on the scenic value of the landscape).
Motorists traveling along the R532 (main road from Graskop, connecting smaller settlements to the north), the R533 (between Graskop and Bushbuckridge), the R535 (between Graskop and Hazyview) as well as along the R534 which runs past the site. These provincial roads form part of the scenic Panorama Route.	⁶ High - low sensitivity (Momentary view and experience of the proposed development as their attention is focused on the road, most views will be screened by dense timber plantations and therefore lowering the intensity).
Forestry workers working at the foot of the escarpment	Low sensitivity

6.8.1.2.1 Visual exposure and visibility

In order to accurately illustrate the visibility and visual exposure of individual infrastructure the viewshed analyses was spilt into the following sections:

- The main building;

⁶ Receptor sensitivity will vary between high (tourists traveling along the panoramic routes) to low (workers/contractors traveling to and from forestry plantations).

- The Skywalk; and
- The Skybridge

In the viewshed analysis illustrated in Figure 6- to Figure 6-, the shaded areas (red, orange and yellow) show the areas and the degree of visibility where the proposed infrastructure may be visible. The unshaded areas illustrate areas where there will be no visibility.

Main building:

According to the viewshed analysis (purely based on topography) the main building will be highly visible on some sections along the R534 and along some areas east of the site, all within a 5km radius. During the site visit it was noted that, while driving along the R534 (from south to north) visibility will appear and disappear momentarily which offers road travellers an element of surprise.

Moderate visibility is expected for some sections towards the east, within a distance of between 5 - 10km. Scattered higher laying sections towards the west will also experience moderate visibility.

Marginal visibility in isolated locations is expected beyond 10km, however it is most likely that views from these areas will be mostly obscured by other infrastructure and vegetation (tree plantations). The viewshed indicates that the main building will not be visible from the town of Graskop. Reference can be made to Figure 6-.

Skybridge:

The Skybridge's visibility will mostly be restricted to the east, with high visibility expected within a 5km radius and moderate visibility expected between 5 -10km. Due to the nature of the structure (glass and Corten steel) which are set amongst dense indigenous planting it is expected that observer's will struggle to distinguish it in the landscape for distances past 5km. Reference can be made to Figure 6-.

Skywalk:

Visibility will be high and mostly focused on areas east of the site, the structure will also be highly visible along sections of the R534 (within a 3km range from the site) as the observer approach the site from the south. Moderate visibility is expected within a distance of between 5 -10km and marginal visibility is expected beyond that. The viewshed indicates that the Skywalk will not be visible from the town of Graskop. Reference can be made to Figure 6-.

With reference to Figure 6- Figure 6-, the highly visible section to the east (an almost uniform area shaded in red on all the viewsheds) does not include any permanent residences and is in general not accessible to the public due to road access restrictions. These areas are typically utilised by forestry workers and views will be severely restricted due to the area mostly consisting out of high and dense pine tree plantations.

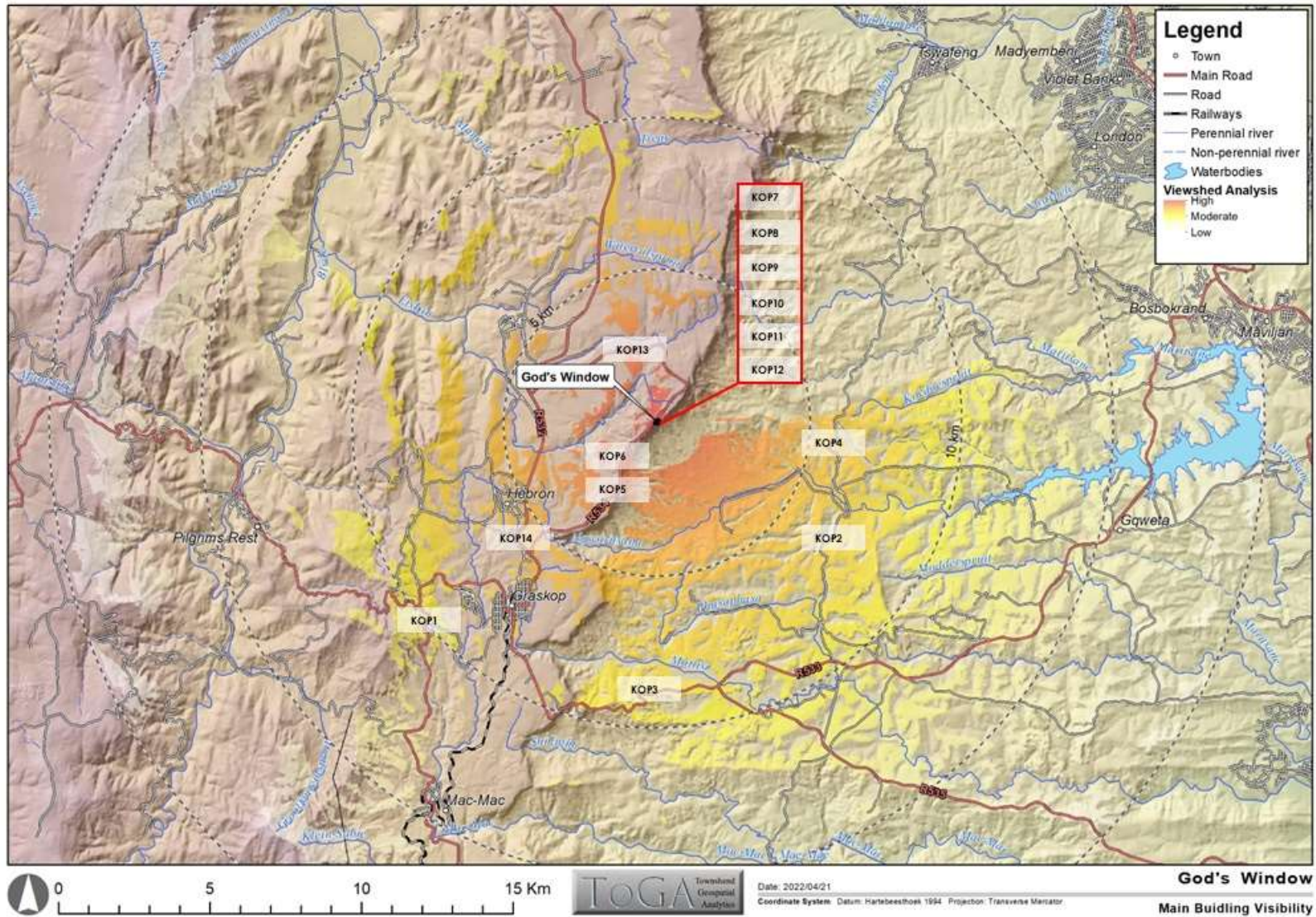


Figure 6-23: Viewshed analysis of the main building

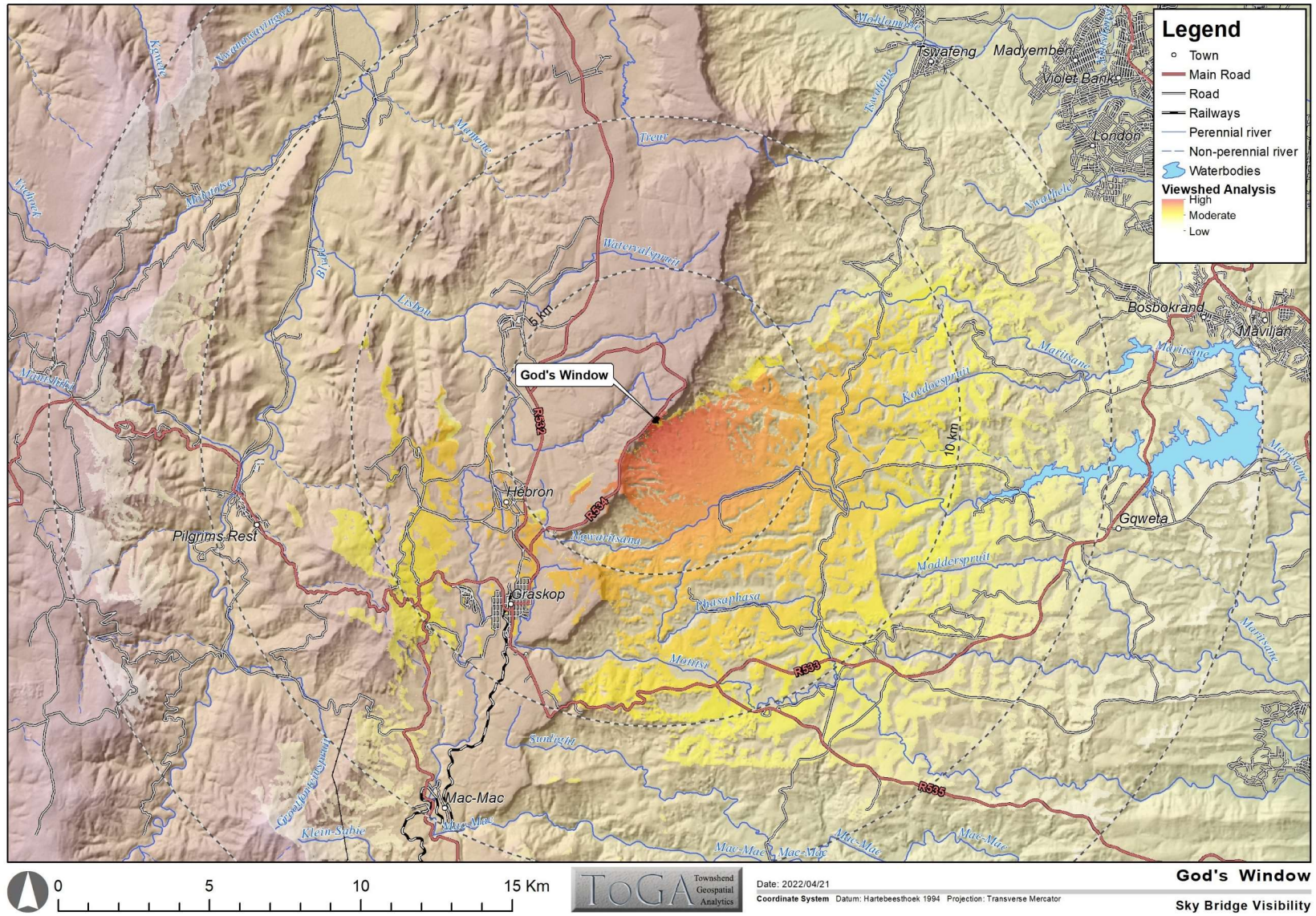


Figure 6-24: Viewshed analysis of the Skybridge

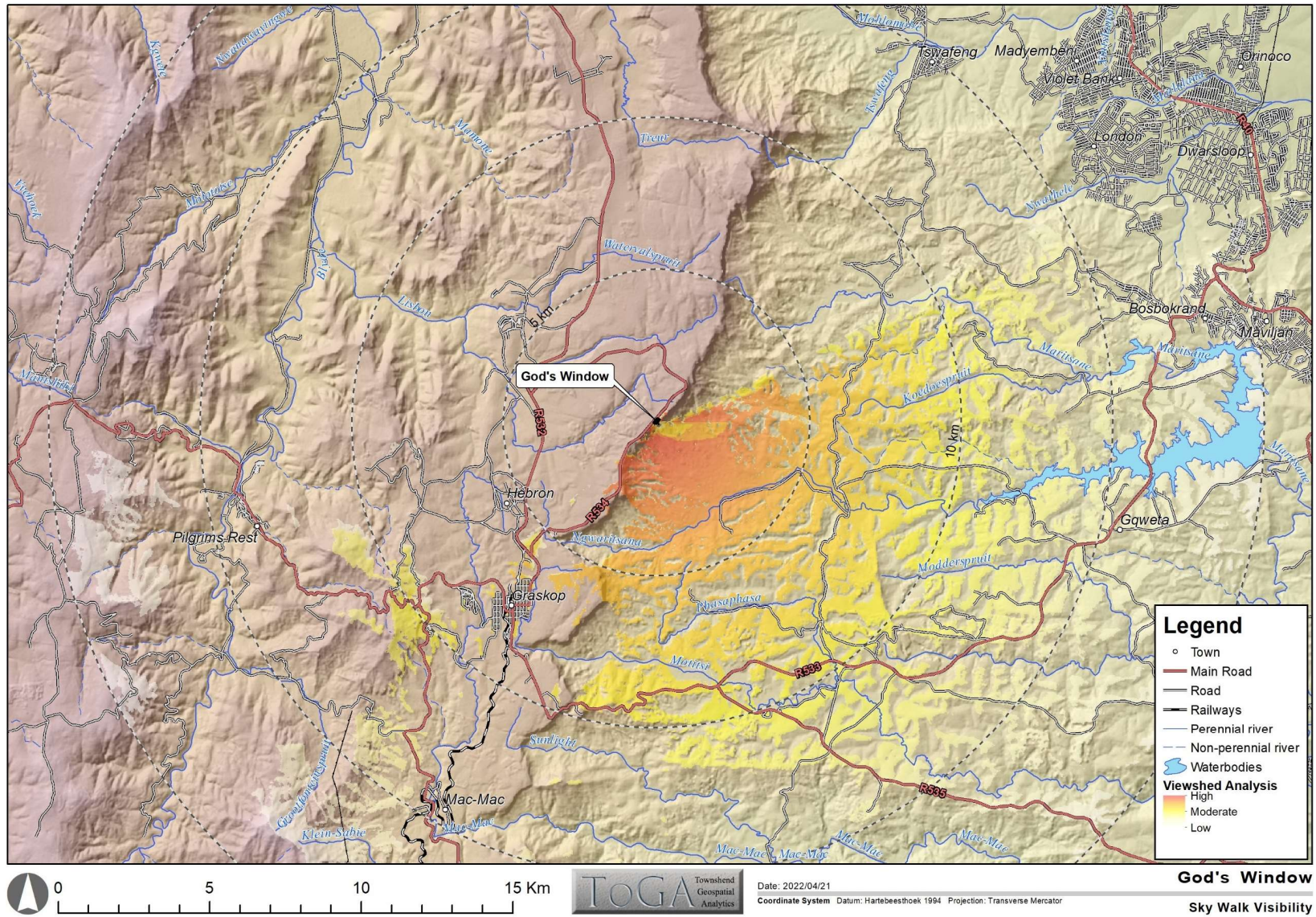


Figure 6-25: Viewshed analysis of the Skywalk

6.8.1.2.2 Key observation points

Table 6-21 describes the key observation points (KOP) which were identified near the project site. Their correlating figures are included in Table 6-22.

Table 6-21: Description of key observation points

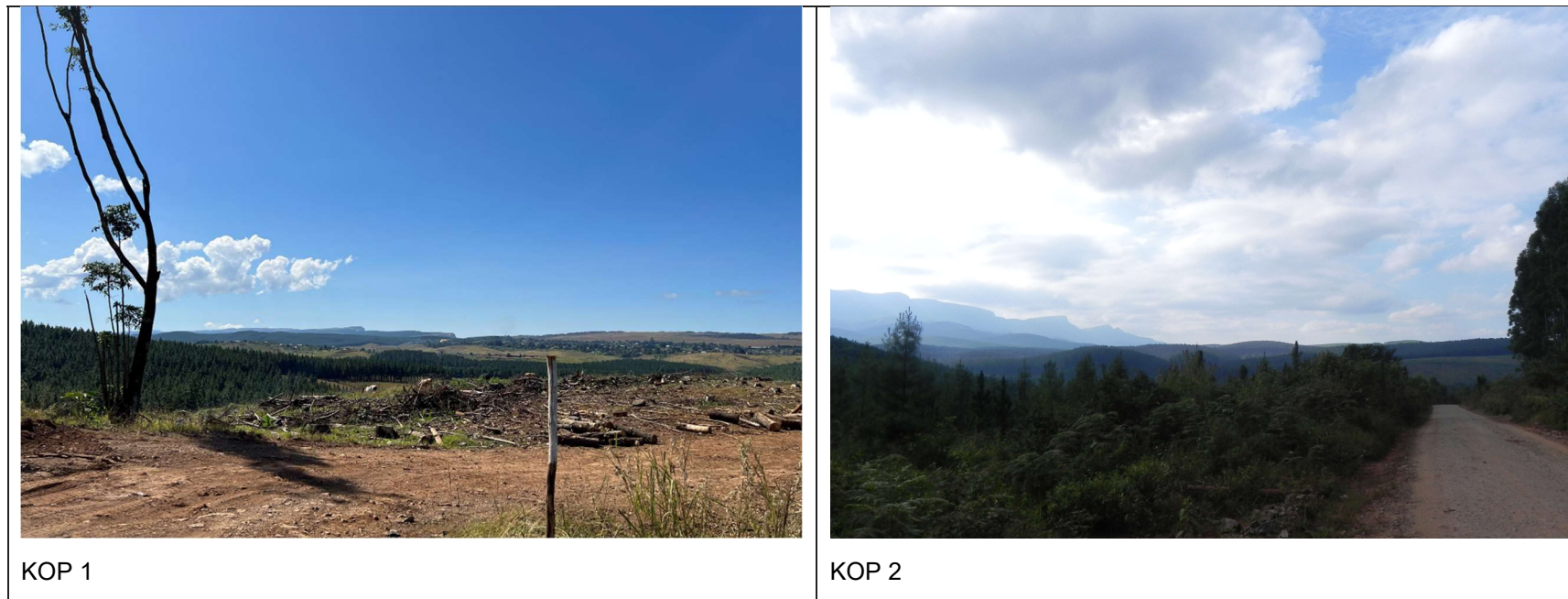
KOP	GPS location	Visibility	Receptor sensitivity	Nature of the view	Transient or stationary	Comment
1	24°57'9.49"S 30°48'48.80"E (Along the R532 towards Graskop) 11,5km south west of the project site	Moderate-marginal visibility	Moderate - Low	Full	Transient	Due to the topography receptors will be able to have a view over the tree plantations (located in the middle ground) towards the proposed infrastructure. It will be difficult to distinguish detail from this point, but the Skywalk could potentially be recognisable as a linear element perched above the horizon.
2	24°54'26.07"S 30°56'46.88"E (Along a timber plantation gravel access road, off the R533) 7km east of the project site	Moderate	Low	Full	Transient and stationary	During the time of the site visit the timber plantation trees were recently planted and the observer currently have views over it. As the trees mature, views from this specific location will be visually obscured.
3	24°57'29.08"S 30°53'1.42"E (Along the R533) 9km south of the project site	Moderate marginal visibility	Moderate - Low	Full	Transient	The photo was taken in the afternoon with some cloud cover, haziness, and shadows. Views will most likely be clearer in the morning on an open cast day.
4	24°52'32.11"S 30°56'48.92"E	Moderate	Low	Full	Transient and stationary	The timber plantations were recently cleared in this area and as a result the observer will have a unobstructed view towards the Site.

	(Along a timber plantation gravel access road, off the R533) 6,5 km east of the project site					
5	24°53'53.65"S 30°52'29.24"E (Along the R534) 2,7km south west of the site	High	Moderate - Low	Partial (main building) Full (Skywalk)	Transient	This is one of the first sections along the R534 where the Skywalk will become visible.
6	24°53'22.96"S 30°52'32.78"E (Along the R534) 1,8 km south west of the site	High	Moderate-Low	Partial (main building) Full (Skywalk)	Transient	The view towards the site opens up spectacularly just before the road bend. The vegetation at this point is of such height that motorists will have a clear view towards the site.
7	24°52'33.66"S 30°53'15.54"E (Along the R534) At the existing site's main entrance	High	Moderate - High	Partial (main building)	Transient and stationary	The existing vegetation obstruct views from this point.
8	24°52'36.34"S 30°53'18.88"E View from existing platform 1 100m east of the proposed Skywalk	High	High	Partial	Stationary	The existing vegetation and cliff formation obstruct views towards the west (overlooking the proposed Skywalk). This point however provides the observer with a moderately open view towards the east and south.

9	24°52'35.81"S 30°53'19.67"E View from existing platform 2. 150m east of the proposed Skywalk	High	High	Full (Skywalk)	Stationary	From this viewing platform the Skywalk and Skybridge will be much more visible than platform 1. The observer will be able to view the protruding structure set against the escarpment background
10	24°52'34.86"S 30°53'20.55"E View from existing platform 3. 200m east of the proposed Skywalk	High	High	Full (Skywalk)	Stationary	This observation point provides the same viewing experience towards the Skywalk as indicated in KOP 9 above, however the observer will be slightly further away.
11	24°52'34.04"S 30°53'25.13"E View from existing platform 4. 300m east of the proposed Skywalk	High	High	Partial - marginal	Stationary	Due to the existing vegetation and the rocky curves at the edge of the escarpment, the Skywalk structure will be almost fully obscured from this point. (It is likely that the last section could be visible from here).
12	24°52'28.51"S 30°53'29.32"E View from existing platform 5 500m east of the proposed Skywalk	High	High	None	Stationary	As a result of the natural topography none of the newly proposed infrastructure will be visible from this point. This is the only existing platform which will have an unspoilt view.
13	24°51'22.67"S 30°52'47.10"E	High	Moderate – low	Marginal	Transient	The topographical higher laying area and lower grassland vegetation allows for views towards the upper section (Corten steel element and roof garden) of the proposed main building.

	View from a topographical higher laying area on the R534. 2,4km north west of the site					
14	24°54'44.09"S 30°50'31.19"E View from the R532. 6km south west of the site.	Moderate	Moderate – low	Partial – marginal	Transient	At this specific section there is a visually unobtrusive strip of land between two plantation sections which frames the view towards the God's Window site. Sections of the proposed infrastructure could be visible from this point.

Table 6-22: Table of KOP figures





KOP 3



KOP 4



KOP 5



KOP 6



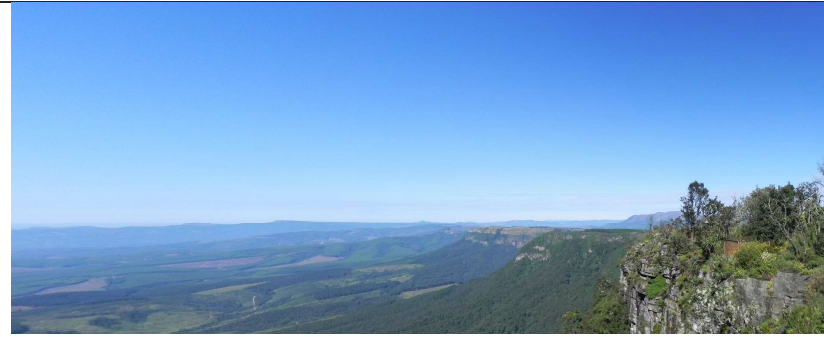
KOP 7



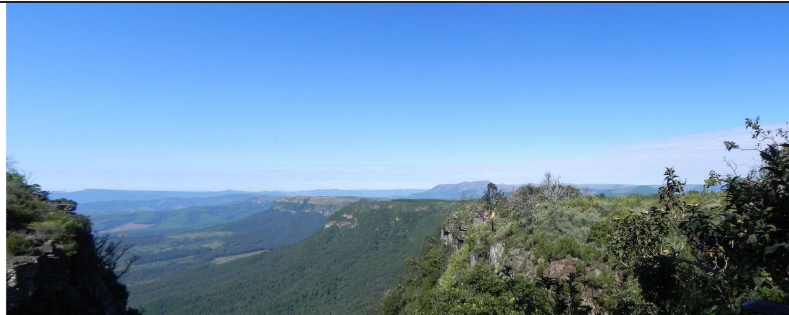
KOP 8 (south eastern view)



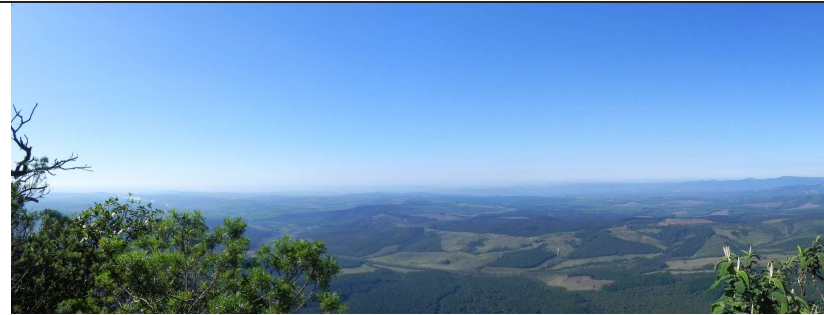
KOP 8 (north eastern view)



KOP 9



KOP 11



KOP 12



KOP 13



KOP 14

6.8.2 Impact assessments

Potential landscape and visual impacts associated with the proposed infrastructure on the Study Area are discussed in the sections below. This section also presents an assessment of the significance of the impacts prior to mitigation and after mitigation (when visual inputs and mitigation measures are put in place and taken into consideration), depending on whether mitigation measures are feasible and possible and assuming they are fully implemented.

6.8.2.1 Impact on landscape character and sense of place

Project phase	Construction			
Impact	Impact on landscape character and sense of place			
Description of impact	Change in the landscape character and sense of place by constructing the Skywalk (which will protrude over the cliff's edge), Skybridge and main building which will have a larger footprint than the existing infrastructure on site.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	None			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Municipal area	Impacts felt at a municipal level	Municipal area	Impacts felt at a municipal level
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Moderate - negative	
Comment on significance	<p>The existing infrastructure on site does not visually contribute positively to the site's sense of place and the natural landscape character of the Study Area has already been permanently altered through the presence of large-scale timber plantations.</p> <p>These changes to the landscape character and sense of place during the operational phase of the project will have both positive and negative impacts within the landscape setting. The intensity of positive impacts may be increased through the implementation of visual enhancement measures which are discussed in the specialist report.</p> <p>The significance of the impacts on the landscape character and sense of place will be negative (moderate) during the construction phase of the project.</p> <p>The impact as a result of negative change in landscape character and sense of place cannot be mitigated, the only option is a no project alternative.</p>			
Cumulative impacts	The proposed development could become a catalyst for more formal development (filling of an area with similar types of development) within the Study Area and specifically along the panoramic route (R534) which will result in further changes to the natural landscape character with increased visual intrusion, lights at night and greater visibility.			

Project phase	Operation			
Impact	Impact on landscape character and sense of place (positive)			
Description of impact	Change in the landscape character and sense of place by operating the Skywalk (which will protrude over the cliff's edge), Skybridge and main building which will have a larger footprint than the existing infrastructure on site.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Buildings should not be allowed to fall in disrepair, damage to structures and maintenance to infrastructure should be carried out timeously and regularly as required.			
Assessment	Without mitigation		With mitigation	
Nature	Positive		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Municipal area	Impacts felt at a municipal level	Municipal area	Impacts felt at a municipal level
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Very high	Natural and/ or social functions and/ or processes are majorly altered
Probability	Likely	The impact may occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - positive		Moderate - positive	
Comment on significance	During the operational phase of the project, the significance of the impacts on the landscape character and sense of place will be both negative (moderate) (it will take away some of the rural character and sense of place within the Study Area) and positive (moderate) (proposed project will replace the run-down old structures on site). The negative impact is tabled below.			
Cumulative impacts	The proposed development could become a catalyst for more formal development (filling of an area with similar types of development) within the Study Area and specifically along the panoramic route (R534) which will result in further changes to the natural landscape character with increased visual intrusion, lights at night and greater visibility.			

Project phase	Operation			
Impact	Impact on landscape character and sense of place (negative)			
Description of impact	Change in the landscape character and sense of place by operating the Skywalk (which will protrude over the cliff's edge) Skybridge and main building which will have a larger footprint than the existing infrastructure on site.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	None			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Municipal area	Impacts felt at a municipal level	Municipal area	Impacts felt at a municipal level
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur

Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Moderate - negative	
Comment on significance	The pre-and post-mitigation significance remains moderate negative since the proposed project is expected to it take away some of the rural character and sense of place within the Study Area. The impact as a result of negative change in landscape character and sense of place cannot be mitigated, the only option is a no project alternative.			
Cumulative impacts	The proposed development could become a catalyst for more formal development (filling of an area with similar types of development) within the Study Area and specifically along the panoramic route (R534) which will result in further changes to the natural landscape character with increased visual intrusion, lights at night and greater visibility.			

6.8.2.2 Impact on visual intrusion and visual absorption capacity

Project phase	Construction			
Impact	Impact on visual intrusion and VAC			
Description of impact	The level of compatibility and the ability of the landscape to visually absorb the proposed infrastructure, including contrast in form, line, colour and texture as a result of vegetation clearing			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Locate the construction camps in areas that are already disturbed or where it is not necessary to remove established vegetation; Utilise the existing screening capacity of the site and improve it by enclosing the construction site and stockyards with a dark green or khaki brown shade cloth which are at least 3m high, as an additional screen; Exposed soil (carpark area) must be covered or 'camouflaged' using a biodegradable soil mat and vegetation cover to reduce the duration of visible scarring of the landscape; Retain the existing vegetation cover of the site through selective clearing, where practical; Dust suppression techniques should be implemented especially on windy days, preferably using biodegradable binding agent; Remove rubble and other construction rubbish off site as soon as possible or place it in containers in order to keep the construction site free from additional unsightly elements; Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and Monitor all areas for rehabilitation failure and implement remedial action immediately. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Extremely high	Natural and/ or social functions and/ or processes are severely altered	Very high	Natural and/ or social functions and/ or processes are majorly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge

Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Minor - negative	
Comment on significance	Visual intrusion will be slightly lower (moderate - minor) during the construction phase and moderate during the operational phase. Views of ground clearance, the construction camp, material lay-down yards, stockpiles, cranes, scaffolding, delivery vehicles, dust and general construction will create a visual contrast with the landscape character and cause a negative visual impact (especially for tourists visiting the viewing platforms).			
Cumulative impacts	The proposed development could become a catalyst for more formal development (filling of an area with similar types of development) within the Study Area and specifically along the panoramic route (R534) which will result in further changes to the natural landscape character with increased visual intrusion, lights at night and greater visibility.			

Project phase	Operation			
Impact	Impact on visual intrusion and VAC			
Description of impact	The level of compatibility and the ability of the landscape to visually absorb the proposed infrastructure, including contrast in form, line, colour and texture as a result of vegetation clearing			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Buildings should not be allowed to fall in disrepair, damage to structures and maintenance to infrastructure should be carried out timeously and regularly as required.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Municipal area	Impacts felt at a municipal level	Municipal area	Impacts felt at a municipal level
Intensity	Extremely high	Natural and/ or social functions and/ or processes are severely altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Moderate - negative	
Comment on significance	During the operational phase of the project mitigation measures and visual inputs will lower the intensity of the impact, but not the overall significance. The Skywalk will be the most visually obtrusive built element as the long and linear feature will extend over the ridge line creating a strong contrast when set against the horizon and organic lines of the natural landscape. Due to the natural topographic variations as well as the existing vegetation (which makes the proposed project less noticeable in the landscape), the main building will be visually less obtrusive than first anticipated (especially for tourists traveling along the R534). The successful maintenance of vegetation buffers (existing vegetation along the R534) can reduce the intensity this impact on the landscape. The slight reduction in intensity of the impact with the implementation of mitigation measures does not change the significance of the impact which will remain moderately negative.			
Cumulative impacts	The proposed development could become a catalyst for more formal development (filling of an area with similar types of development) within the Study Area and specifically along the panoramic route (R534) which will result in further changes to the natural landscape character with increased visual intrusion, lights at night and greater visibility.			

6.8.2.3 Impact on visual exposure and visibility

Project phase	Construction			
Impact	Visual exposure and visibility impacts			
Description of impact	The visibility of construction related machinery and equipment and the change in views from main roads and other key observation points as well as the progressive visual exposure of the proposed project.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • Locate the construction camps in areas that are already disturbed or where it is not necessary to remove established vegetation; • Utilise the existing screening capacity of the site and improve it by enclosing the construction site and stockyards with a dark green or khaki brown shade cloth which are at least 3m high, as an additional screen; • Exposed soil (carpark area) must be covered or 'camouflaged' using a biodegradable soil mat and vegetation cover to reduce the duration of visible scarring of the landscape; • Retain the existing vegetation cover of the site through selective clearing, where practical; • Dust suppression techniques should be implemented especially on windy days, preferably using biodegradable binding agent; • Remove rubble and other construction rubbish off site as soon as possible or place it in containers in order to keep the construction site free from additional unsightly elements; • Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and • Monitor all areas for rehabilitation failure and implement remedial action immediately. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Extremely high	Natural and/ or social functions and/ or processes are severely altered	Very high	Natural and/ or social functions and/ or processes are majorly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Moderate - negative	
Comment on significance	During the construction phase visibility and visual exposure will be moderate, with higher visibility and visual exposure from areas towards the east and along scenic roads such as the R534 in areas where views open up towards the site and the change in view will be more noticeable. Receptors (motorists traveling along the R535, R533 and R532 provincial roads as well as forestry workers in the plantations below, receptors on the outskirts of Graskop and recreational users of hiking and cycling paths) may experience glimpses of higher construction elements such as cranes, and scaffolding.			
Cumulative impacts	The proposed development could become a catalyst for more formal development (filling of an area with similar types of development) within the Study Area and specifically along the panoramic route (R534) which will result in further changes to the natural landscape character with increased visual intrusion, lights at night and greater visibility.			

Project phase	Operation			
Impact	Visual exposure and visibility impacts			
Description of impact	The visibility and the change in views from main roads and other key observation points as well as the progressive visual exposure of the proposed project.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Buildings should not be allowed to fall in disrepair, damage to structures and maintenance to infrastructure should be carried out timeously and regularly as required.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Very high	Natural and/ or social functions and/ or processes are majorly altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Moderate - negative		Moderate - negative	
Comment on significance	<p>Visibility and visual exposure during the operational phase will be highest just after construction, when newly planted trees and rehabilitated vegetation have not yet matured. This impact will be intensely experienced (and could potentially even be more significant) especially for receptors located at existing viewing platform 2 and 3. This is mainly as a result of their close proximity and the views opening up over the canyon at these specific points. The Skywalk at these specific points will visually interfere with current unspoilt, continuous open views (especially those towards the south), which, will be foreshortened through the introduction of the visually prominent Skywalk. The total project (including all its project components) will not be visible all at once from any of the KOPs located within 5 km from the site.</p> <p>The visual impacts due to visibility and visual exposures will decrease to some extent if mitigation measures and visual inputs are implemented, and through the utilisation of existing site opportunities (such as screening from established vegetation along the existing entrance). These concepts must be further explored and developed during the detail design and planning phase of the project.</p>			
Cumulative impacts	The proposed development could become a catalyst for more formal development (filling of an area with similar types of development) within the Study Area and specifically along the panoramic route (R534) which will result in further changes to the natural landscape character with increased visual intrusion, lights at night and greater visibility.			

6.8.2.4 Impact due to night-time lighting

Project phase	Construction	
Impact	Night-time lighting	
Description of impact	The visibility of night-time lighting during the construction phase of the project	
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts
Potential mitigation	<ul style="list-style-type: none"> Install low level lighting or limit mounting heights of lighting fixtures by utilising footlight or bollard level lights. The use of high light masts and high pole top security lighting should be avoided along the security fence of infrastructure areas. Any high-level masts should be covered to reduce glow and light spillage; 	

	<ul style="list-style-type: none"> Use minimum lumen or wattage in light fixtures, where possible and practical; Up lighting of structures must be avoided where possible, with lighting installed downward angles that provide precisely directed illumination beyond the immediate surroundings of the infrastructure, thereby minimising the light spill and trespass; All structures must have "full cut off" light fixtures that direct light only below the horizontal; Use low pressure sodium lamps, yellow Light Emitting Diode (LED) lighting, or equivalent to reduce sky glow. (Bluish white lighting is more likely to cause glare); and Make use of motion detectors on security lighting at operations and/or maintenance type buildings. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	<p>The introduction of formal infrastructure will contribute to sky glow and night time lighting in the Study Area (especially if viewed from areas east of the site) where the main building will appear as a prominent feature against the mountainous terrain.</p> <p>During the construction phase, the impact significance due to night time lighting will be greatly reduced if construction activities are limited to daylight hours and the residual impact which will remain, will mainly include temporary security lighting at construction camps.</p>			
Cumulative impacts	The proposed development could become a catalyst for more formal development (filling of an area with similar types of development) within the Study Area and specifically along the panoramic route (R534) which will result in further changes to the natural landscape character with increased visual intrusion, lights at night and greater visibility.			

Project phase	Operation	
Impact	Night time lighting	
Description of impact	The visibility of night time lighting during the operational phase of the project	
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	<ul style="list-style-type: none"> Install low level lighting or limit mounting heights of lighting fixtures by utilising footlight or bollard level lights. The use of high light masts and high pole top security lighting should be avoided along the security fence of infrastructure areas. Any high-level masts should be covered to reduce glow and light spillage; Use minimum lumen or wattage in light fixtures, where possible and practical; Up lighting of structures must be avoided where possible, with lighting installed downward angles that provide precisely directed illumination beyond the immediate surroundings of the infrastructure, thereby minimising the light spill and trespass; All structures must have "full cut off" light fixtures that direct light only below the horizontal; Use low pressure sodium lamps, yellow Light Emitting Diode (LED) lighting, or equivalent to reduce sky glow. (Bluish white lighting is more likely to cause glare); and Make use of motion detectors on security lighting at operations and/or maintenance type buildings. 	
Assessment	Without mitigation	With mitigation
Nature	Negative	Negative

Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Moderate - negative	
Comment on significance	Even though there is little night time lighting associated with the site itself, the significance, as a result of the permanent lights, will be moderate as the viewing distance for receptors will be between 2 -10km. The impact intensity of exterior lighting can be somewhat reduced through the implementation of mitigation measures, however impact significance will remain unchanged. Due to the nature of the building (which mostly consist out of steel and glass) the screening of interior lighting will not be easily achieved.			
Cumulative impacts	The proposed development could become a catalyst for more formal development (filling of an area with similar types of development) within the Study Area and specifically along the panoramic route (R534) which will result in further changes to the natural landscape character with increased visual intrusion, lights at night and greater visibility.			

6.8.3 Visual inputs as mitigation measures for the exterior designs

The visual inputs are mainly focused on the exterior design of the concept models for the project. From a landscape and visual perspective certain essential objectives must be achieved in order to lower the visual contrast and visual intrusion and for the building to stand in visual harmony with its setting. These objectives include:

- Use indigenous vegetation (where possible use similar to what is found in the immediate area around the site) not just to form an integral part of the development but also to create spaces for wildlife habitat;
- Be a landscape led and terrain inspired building rather than an iconic building which stands in contrast to its context (this is mainly achieved through shapes, colours, texture and materials);
- Express the character of the landscape in the building;
- Make use of visual softening techniques on the building façades;
- Use the proposed courtyards as an integration of the landscape and the building;
- Keeping to natural materials and minimizing the use of colours and signage on the hiking routes; and
- Use sound design strategies to preserve the visual character of the landscape such as the use of colour and camouflage applications on facilities that may be used to minimize visual impacts from development. (This concept is further discussed in Appendix D of the specialist report).

The visual input techniques proposed by the specialist as mitigation measures are:

1. The rooftop edge line towards the valley (eastern façade) should also have a green buffer strip similar to the west facing façade, this allows for further visual softening of the rooftop line for potential views from the east.;
2. There should be a dense planting strip between the R534 and the parking area, this not only screens the building, but also creates a 'green tunnel effect' with views opening up when entering the complex which are in line with the landscape's character;
3. The islands in the parking lot should mimic patterns of trees found in their natural environment, i.e., a combination of large, medium, and small trees planted densely in random clumps and not in rows. This can be achieved without changing the demarcated green spaces;
4. Strip planters must be added on the outside of the lift and the stairs, this will minimize straight vertical lines on the eastern façade and make it appear more organic. Glass panels must be avoided along the balustrade as it will cause unnecessary glare;
5. The routes should be upgraded to celebrate the natural environment and the "green tunnel effect", and anything that is added should not detract from the focus of the view/s and must not create any additional visual impact as it will further encroach on these scenic settings, compromising visitors' experiences. The proposed conceptual squares, stand out as follies, and detract from the character of the landscape and the scenic views in these specific areas. The frames, furthermore, make the views appear much smaller which is in contrast to the grandeur of the actual scale. There should be no additional balustrades (except in areas where they are required for public safety), features and structures;
6. Additional trees should be allowed for in the atrium space at the conference court (move the existing planter over the atrium space). It will allow for a more continuous tree canopy on the western and eastern façade, mimicking the silhouette of mountains and trees in the background.
7. The pavers in the parking driveway should be a "blended colour" (red brown and charcoal) and not a monotone light grey paver;
8. Route signage should be grouped (where possible) and similar linear Corten steel elements as used in the landscape should form the basis for route signage. Avoid additional, materials, colouring and other elements;
9. Hand railings (vertical elements) along the sky walk should either be Corten, or a charcoal steel colour to blend in with the darker colours (shadows) of the rock face at the back.

6.8.4 Conclusion and recommendations

Based on the findings of this study it is evident that the proposed project is located in an area with a high visual quality and diverse topography offering breath taking views over the valley. Apart from the large sections of forest plantations, the landscape character can be described as natural and rural with various scenic tourist destinations located within natural forest vegetation and small towns within close range to the Site itself.

It was further concluded that there will be a potential intrusion on views which may lead to a change in the scenic resource and visual character, introducing a new precedent for development in the area. Potential impacts to the landscape and visual environment due to the proposed project have been identified, these include the impact on visual character and sense of place, impact on visual intrusion and VAC, the impact on visibility and visual exposure and the impact due to night time lighting. Based on the impact assessment, it was found that the various landscape and visual impacts would generally be moderate.

The potential landscape and visual impacts will be both positive and negative. With reference to the most recent architectural design concept, negative impacts are most likely associated with the construction stage of the project whereas impacts during the operational phase will potentially be twofold i.e., the existing sense of place and landscape character of the site will be permanently altered, but the new Skywalk will provide the user with an improved viewing experience.

During the construction phase, the intensity on tourists visiting the God's Window site will be the highest, however, it is assumed that the site will be closed to visitors when major construction commences (construction of the main building etc.). Motorists traveling along the R533 and R534 provincial roads as well as forestry workers in the plantations below and residents on the outskirts of Graskop may experience glimpses of higher construction elements such as cranes, scaffolding etc. Recreational users utilising the plantation roads and hiking routes in the area may also experience views of these higher construction elements.

During the operational phase of the project the proposed Skywalk will extend out over the cliff which will potentially make it visible to motorists traveling along the R533 and R534 provincial roads as well as to forestry workers in the plantations below and for residents on the outskirts of Graskop. As a result of the visually prominent Skywalk structure the landscape character and views from some of the existing God's Window platforms will be permanently changed. The project will furthermore act as a gateway project, allowing other similar projects to emerge within the Study Area and therefore adding to the possible cumulative effect along the Panoramic Route.

Theoretically the predicted visual impact [based on the Guideline for Involving Visual and Aesthetic Specialists on EIA processes (Oberholzer, B.2005)] is expected to be high, after assessing the nature of the development and the sensitivity of the existing landscape and visual environment it can be regarded as moderate based on the following:

The project as a whole, will not be viewed in full range over short distances (distances less than 5km), but will be in full range view from isolated areas on the outskirts of Graskop which is more than 5km away from the impact;

Even though the forest plantations detract from the natural character of the Study Area, it offers visual screening from a range of various locations throughout the Study Area;

Highest visibility will be experienced from areas directly east of the Site; however, the intensity will be lowered as a result of the sheer viewing distance (5 -10km), low receptor sensitivity and access to the public is restricted;

The Skybridge will not be visible from a significant distance as the eastern elevation mainly consist out of glass with the natural rock formation and vegetation as the background;

As time goes by, vegetation will mature, and concrete elements will become browner due to the natural aging process of concrete which will make it less visible and inconspicuous;

The current architectural concept design (assuming proposed mitigation measures are implemented where practically feasible) meets the objectives as set out in Section 6.8.3.

In light of the above and considering all factors (including the residual impact) the specialist is of opinion that (although the Skywalk Project will have a significant impact from various locations, especially from some of the existing viewing decks) the implementation of this project will not be unacceptable from a visual point of view. The introduction of new meaningful context driven infrastructure brings along a new 'sense of place' which, in this case, also provides positive visual outcomes. Compared to the design considered under the previous S&EIR, the most recent design respects and fits well within the landscape (low, long and linear building placed along the edge of the escarpment). Visual intrusion will be lowered by using materials such as Corten, natural rock, concrete and "infill" vegetation as a strategically placed visual softening technique. The concept of colour and camouflage as discussed in Appendix D, must be further investigated during the detail design phase.

6.9 Heritage Environment

Zutari appointed Adasonia Heritage Consultants to conduct a phase 1 heritage impact assessment (HIA) on archaeological and other heritage resources for the project site. A site visit was conducted in March 2022. The sections below have been taken from the specialist report and reference is therefore made to the report dated March 2022.

6.9.1 Baseline description

The whole district is divided in two, with the Drakensberg Escarpment (in which the study area is situated), and the Lowveld towards the east. Today, we found that the boundaries of groups are intersected and overlapping. Languages such as Zulu, Xhosa, Swazi, Nhlangu, Nkuna, sePedi, hiPau and seRôka, are commonly spoken throughout this area.

When the Swazi began to expand northwards, they forced the local inhabitants out of Swaziland, or absorbed them. There is evidence of resistance, but the Eastern Sotho groups who lived in the northern parts of Swaziland, moved mainly northwards. This appeared to have taken place towards the end of the 18th century, when these groups fled from Swaziland to areas such as Nelspruit, Bushbuckridge, Klaserie, Blyde River and Komatipoort.

Several circular stone-walled complexes and terraces as well as graves have been recorded in the vicinity of Hazyview, Bushbuckridge, Graskop and Sabie, clay potsherds and upper as well as lower grinding stones, are scattered at most of the sites. Many of these occur in caves as a result of the Swazi attacks on the smaller groups.

Van Warmelo based his 1935 survey of Bantu Tribes of South Africa on the number of taxpayers in an area. The survey does not include the extended households of each taxpayer, so it was impossible to actually indicate the number of people living in one area. The only early trade route mentioned, which crossed this section, was a footpath used by the African groups from Delagoa Bay towards Bushbuckridge (Magashulaskraal), along the Sabie River, up the Escarpment, and further north to the Soutpansberg. There is however, no physical evidence left of this particular early route, but it is most likely that the route went up the Escarpment via Kowyn's Pass.

6.9.1.1 Eastern Sotho group: The Pai

Van Warmelo identified the groups in northern Swaziland and the Pilgrim's Rest district before 1886, as Eastern Sotho (Pulana, Pai and Kutswe). According to Von Wielligh, the Pai occupied the area as far south as the Komati River (umLumati). Most of the younger generation has adopted the Swazi language.

The Swazi constantly attacked the Eastern Sotho groups during the nineteenth century. The Pai fled to the caves in the mountains near MacMac (west of Graskop), while some of them (which were subjugated by a Swazi leader) fled from Mswazi in about 1853 to Sekukuniland (Steelpoort area), but decided to turn back towards their country along the Sabie River (1882). By this time, Europeans had already settled in this area when gold was discovered in 1873, near Graskop.

6.9.1.2 Eastern Sotho group: The Pulana

The history of the Pulana goes back to the Barberton area from where they trekked via Krokodilpoort (Nelspruit district) to settle north-east of Pretoriuskop. When the Swazi invaded them, they moved on and split up under several chieftainships, of whom chief Kobêng (after which Kowyns' Pass south of Graskop, was named), is well-known in the area's history.

The Pulana roughly lived in the following areas: north of the Crocodile River, west of the western boundary of the Kruger National Park as far north as its crossing the Sabie River, south of the Sabie River until its cutting through the main road from Pretoriuskop to Bushbuckridge, west of this road as far as Klaserie, south of a line drawn from Klaserie to the confluence of the Blyde and Orighstad rivers, east of the Blyde River. This large area is divided in two by the main road from Pilgrim's Rest and Graskop to Bushbuckridge. This road was since ancient times the only connection between the Lowveld and Escarpment, and became known as "Kowyns' Pass". The majority of Pulana lived to the north of this line (mainly below the Escarpment), while south of this line the Pulana are scattered in groups into which are wedged Pai groups on both sides of the Sabie River, and Swazi peoples in the south, and south-eastern portions. It was the Pulana clans who, under chief Maripi Mashile, defeated the Swazi at Mariepskop in the Blyde River Canyon, ca 1864 (north of Graskop).

6.9.1.3 Eastern Sotho group: The Kutswe

The Kutswe trekked from the northern parts of Swaziland northwards as a result of pressure from the Swazi in the south. The Kutswe settled north-east of the present Nelspruit at a river called Kutswe (Gutshwa) from where they got their present name. From here they moved on and settled at various places, and ruins of their kraals are scattered from Pretoriuskop, Hazyview (Phabeni) as well as on the farms Welgevonden 364, Lothian 258, Boschhoek 47, Sandford 46, Culcutta 51 and Oakley 262 in the Bushbuckridge area, all situated in the Lowveld. They occupied additional areas between White River and Sabie, and had sufficient influence amongst the Pai during the early 20th century, to establish authority over more than 2000 individuals living on farms on both sides of the Sabie River from the town of Sabie as far as the main road from White River to Bushbuckridge. They had chief jurisdiction over the following farms near Bushbuckridge: Oakley 262, Culcutta 51, Madras 50, Alexandria 251, Cork 60 and Ronoldsey 273. They intermarried with Nhlangu (Shangaan), Swazi and Pai.

6.9.1.4 Tsonga groups: The Nhlangu and Tshangana

The Nhlangu and Tshangana (also generally known as the Shangaan-Tsonga) form part of the larger Tsonga group of which the original group occupied the whole of Mozambique (Portuguese East Africa), and it has been recorded that by 1554, they were already living around the Delagoa Bay area (Maputo). They fled from the onslaughts of the Zulu (Nguni) nation from the Natal area and great numbers of emigrants sought safety in the "Transvaal" as recently as the 19th century, especially in the greater Pilgrim's Rest district. The Tsonga also moved west from Mozambique into the "Transvaal". They have never formed large powerful tribes but were mostly always subdivided into loosely-knit units, and absorbed under the protection of whichever chief would give them land. They were originally of Nguni origin. The term "Shangaan" is commonly employed to refer to all members of the Tsonga division.

The Nhlangu occupied the Lowveld area in their efforts to escape the Zulu raids during 1835-1840. They lived side by side with the Tshangana, and the differences between the two are inconsiderable. They have mixed extensively with other tribes.

The Tshangana are also of Nguni origin who fled in the same way as the Nhlangu, settled in the "Transvaal" a little later than the former. Most of the Tsonga were subjects to Soshangane, who came from Zululand. The downfall of Ngungunyana (son of Soshangane) saw his son seeking sanctuary in the "Transvaal", and the latter became known as Thulamahashi, the name that is still used for the area east of Bushbuckridge.

6.9.1.5 The history of Graskop

The town of Graskop is at an altitude of 1493m and dates back to the 1840's when the Voortrekker Andries Potgieter went down the escarpment in search of a route to Delagoa Bay or Maputo. When Potgieter settled on the Ohrig River (near Ohrigstad north of Graskop), he found the MaPulana tribe in occupation of the Highveld and the immediate foothills of the Drakensberg. The Swazi claimed sovereignty over the whole of the Lowveld though this area was virtually uninhabited.

During the earlier part of the 19th century, the Swazi continually raided the MaPulana and carried off their cattle. In the 1860's the MaPulana, under their Chief Mariep, annihilated the Swazi impis in a fierce battle at what is now known as Mariepskop (to the north of Graskop).

In the 1950's, the Graskop area was a farm owned by Abel Erasmus, the Chief Native Commissioner for the Lydenburg District, who was involved in hunting, prospecting and imposing law and order in the area. Following the discovery of gold at Mac Mac, the farm Graskop was bought from Abel Erasmus by the Government of the Republic of Transvaal. The purpose was to establish a Government Township from the newly discovered goldfield. The town was never proclaimed as most of the diggers left the area in favor of the new discovery of gold in Pilgrim's Rest (1873). Graskop is also famous for Jock of the Bushveld, which dates between 1885 and 1887. Sir Percy Fitzpatrick established his camp at Paradise berg (in Graskop) and described his experiences of this area in his book Jock of the Bushveld.

The shortest route from Graskop to the Lowveld was via the Kowyn's Pass. (Kowyn's Pass is approximately 4km south of the study area). In the 1840's, access to the Lowveld was by means of an animal track on land under control of a local chief, Koveni, translated into Afrikaans as Kowyn. Chief Kowyn had his settlement halfway down the pass and his people used this track to reach the top of the Escarpment. In 1902, Max Carl Gustav Liebnitz arrived on the farm Graskop and erected a trading store, hotel and a house at the top of Kowyn's Pass. He soon realized that a road to carry wagons was essential for his business. He turned the existing animal track into the first, Kowyn's Pass. The pass had a gradient of, in some places 1 in 3. The heavier wagons required three spans of oxen to get up the steeper sections. Going down was not much easier as huge branches had to be attached to the wagons to assist with braking.

The present road is the third, and was opened in 1959. Due to the high rainfall on the escarpment (Graskop being the highest rainfall area in South Africa), dangerous rock falls had been common. Engineers incorporated a Swiss design to create a more protected passage between the Highveld and the Lowveld, which was completed in 1980.

In 1910, the newly formed government of the Union of South Africa, decided to build a railway line from Nelspruit to the farm Graskop, the nearest place to the goldfields of Pilgrim's Rest. The station was called Graskop and the official date for the establishment of Graskop was 12 September 1914.

R.W. Richardson introduced the Zeederberg Coach Service between Graskop railway station and Pilgrim's Rest. He also opened the first garage and motor agency in Graskop. Together with Max Liebnitz, he served on the first Health Committee of Graskop. A.P. Cartwright in his book "Valley of Gold" refers to a "Gold Rush" in 1908, when the Department of Mines cancelled the concession on the farm Graskop and proclaimed the area as a goldfield, to allow syndicates and individual diggers the opportunity to peg new claims.

Gods Window which is approximately 5km north of Graskop, forms part of the Mpumalanga Drakensberg Escarpment, which is on average 1000m high and stretches from the Blyde River Canyon in the north (roughly from the Strijdom Tunnels), to Graskop, and Sabie in the south. It forms the boundary between the grassy Highveld plateau and the bushveld or Lowveld. The entire area is interspersed with plantations, forests, rivers, waterfalls and gorges, resulting in spectacular scenery of incredible beauty which makes it a popular tourist destination.

Graskop is still today the centre of mining, forestry and timber-milling industries.

6.9.2 Site sensitivity and impact assessment

In order to place the Graskop area in an archaeological context, primary and secondary sources were consulted by the specialist. Ethnographical and linguistic studies by early researchers such as Ziervogel and Van Warmelo shed light on the cultural groups living in the wider area since circa (ca) 1600. Historic and academic sources by Kusel, Meyer, Voight, Bergh, De Jongh, Evers, Myburgh, Thackeray and Van der Ryst were consulted, as well as historic sources by Makhura and Webb.

Primary sources were consulted from the Pilgrim's Rest Museum Archives for a background on the pre-history and history of the study area. The information centre in Graskop was helpful but had very little information on the history of the town. Previous research has been done by the specialist on San rock art as well as Bantu speaking rock art sites on the Mpumalanga Escarpment area, of which several are recorded towards the north of Graskop. None have been recorded in the direct vicinity of the God's Window study area.

The 1:50 000 topographical map of GRASKOP 2430DD (1997) revealed no features of interest. It is indicated as natural woodland with a few existing buildings for the God's Window Viewpoint tourist attraction (see topographical map 6 & Appendix 2 of the specialist report).

Very little contemporary research has been done on prehistoric African settlements in the study area. Only one professionally excavated Early Iron Age site was executed, in the wider area namely the

Plaston site near White River, dating ca 900 AD. The Lydenburg Head site, which was discovered by a school boy in the 1960's, dated to approximately 400 Anno Domini (AD).

The Bushman Rock Shelter was excavated in the 1970's near Ohrigstad. Archaeological excavations dating to the Later Iron Age have been conducted in the Kruger National Park and in the Lydenburg area but none have been conducted to date directly within the study area. A stone walled settlement with terracing was recorded by C. van Wyk (Rowe) near Hazyview, as well as several others further west and north-west, 15 outside the study area.

The Graskop area at the top of the escarpment was sparsely populated in the past. The area below the escarpment was however extensively and continuously inhabited since the 17th century, and the local people made use of animal footpaths to reach the top of the escarpment. One of these footpaths became the later Kowyn's Pass. The field survey, literature study and personal communication with specialists in the field revealed that this area was not rich in archaeological material or sites.

According to Bergh, there are no recorded sites that date from the Stone Age, or Iron Age (Early or Late) settlements. Two rock painting sites are indicated to the north of Graskop. It can be confirmed that no archaeological or rock art sites are present on the study area.

The footprint for the God's Window Skywalk project had a Low sensitivity in terms of archaeological and cultural heritage, and no archaeological, cultural or historical remains, or graves were identified during the site survey. A memorial cross which was mentioned in the 2013 HIA done for the God's Window project is no longer visible.

6.9.3 Conclusion and recommendations

No archaeological / heritage features of significance or graves were identified in the project area, and from an archaeological and heritage perspective, Adansonia Heritage Consultants have no reason to prevent the proposed God's Window Skywalk development to continue.

Archaeological material or graves are not always visible during a field survey and therefore some significant material may only be revealed during construction activities. It is therefore recommended that the developers be made aware of this possibility and when human remains, clay or ceramic pottery etc. are observed, a qualified archaeologist must be notified and an assessment be done. Further research might be necessary in this regard for which the developer will be responsible.

6.10 Palaeontological Environment

Professor Marion Bamford was appointed by Zutari to conduct a desktop Palaeontological Impact Assessment (PIA) for the project. The sections below have been taken from the specialist report and reference is therefore made to the report dated February 2022.

6.10.1 Baseline description

6.10.1.1 Geology

Figure 6- illustrates the geology of the project area. The site is shown as the blue rectangle. Abbreviations of the rock types are explained in Table 6-23.

Table 6-23: Explanation of symbols for the geological map and approximate ages thereof.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Neogene, ca 2.5 Ma to present
Vdi	Diabase	Diabase dykes, intrusive	Post Transvaal SG, approx. 2000 Ma

Symbol	Group/Formation	Lithology	Approximate Age
Vmd	Malmani Subgroup, Chuniespoort Group, Transvaal SG	Dolomite, chert	Ca 2750 – 2650 Ma
Vbr	Black Reef Fm, Transvaal SG	Quartzite, conglomerate, shale, basalt	Ca 2650 – 2640 Ma
Vwu	Upper Wolkberg Group	Shale, quartzite, pebbles, micaceous shale	
Vwl	Lower Wolkberg Group	Quartzite, grit conglomerate	Neo-Archaean Ca 2693 Ma
Zn	Nelspruit Suite	Porphyritic biotite granite	Neo-Archaean Ca 2756 Ma

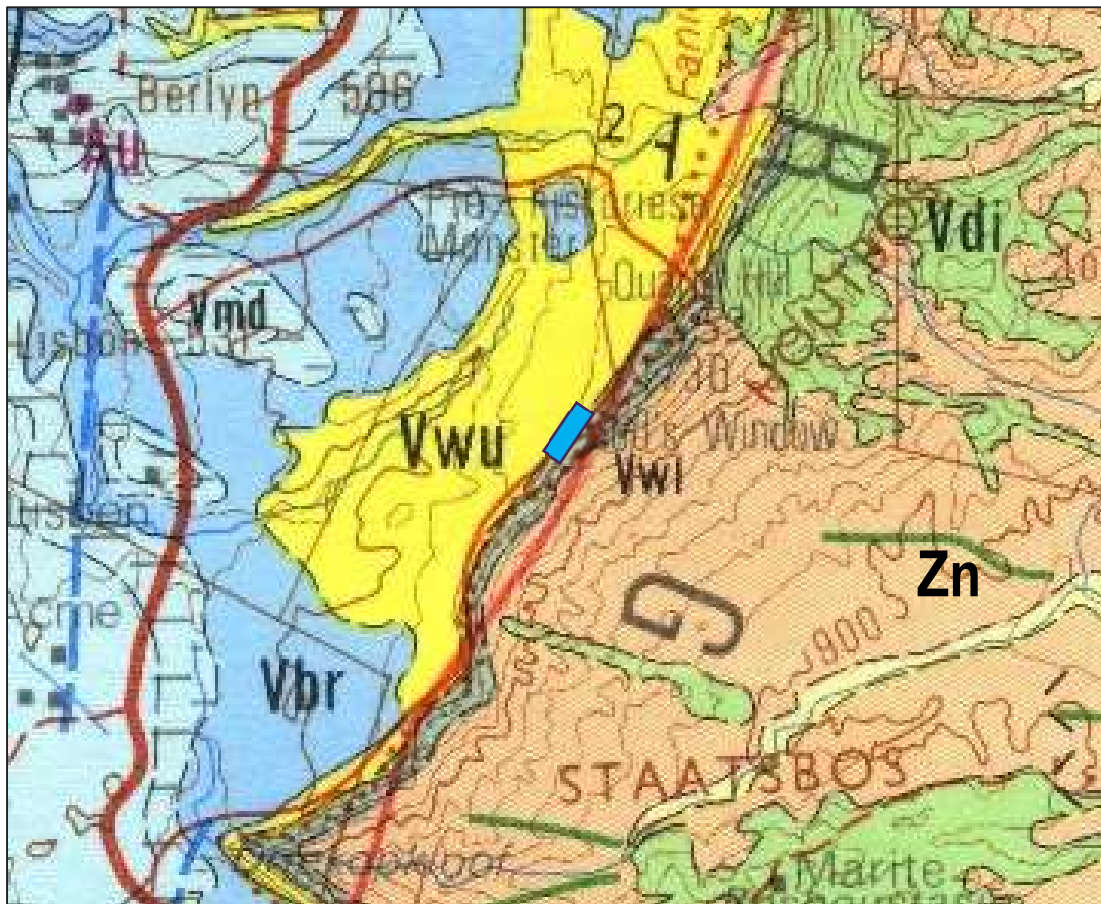


Figure 6-26: Geological map of the area around God's Window.

The project lies in the quartzites of the Wolkberg Group, one of a number of “protobasinal rocks”, a term used by Eriksson et al. (2006) for the discrete stratigraphic units that border the Transvaal Basin and precede the deposition of the huge and earliest carbonate platforms in the world. The basal rocks of the Transvaal Supergroup are adjacent to and northwest of the Wolkberg Group in this region. All these rocks overlie the ancient basement rocks of the Nelspruit Suite that are exposed in the Blyde River Canyon to the east.

The Wolkberg Group has been divided into eight units with the lower group composed of the Sekororo, Abel Erasmus and Schelem Formations. The upper group comprises the Selati, Mabin and Sodowa Formations. Above these are the Langkrans and Serala Formations. There are several models for the formation of these rocks from fluvial sedimentation, to deposition in a closed basin, to braided fluvial deposition (Eriksson et al., 2006). Nonetheless, tectonic activity, mechanical rifting and finally thermal subsidence were involved in the formation of these rocks (ibid). This group predates the Transvaal Supergroup so range from 2769 – 2618 million years old (Zeh et al., 2020).

6.10.1.2 Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 6-. The site for development is in the Lower Wolkberg Group close to the edge of the canyon, and the Upper Wolkberg Group along the top of the canyon. No finer resolution is presented in the geological maps and no new literature could be found on the Wolkberg Group. Since the palaeoenvironmental setting was that of a fluvial or lacustrine system, it is possible that trace fossils (stromatolites, microbialites or microbially-induced sedimentary structures, or MISS *sensu* Noffke et al., 2001), such as those found in similar settings, could be present. No such trace fossils have been recorded from this Group, possibly because of post depositional tectonic and thermal activities that affected the sediments after their deposition.

The Lower and Upper Wolkberg Group are indicated as moderately sensitive (green), based on the claim by Groenewald et al. (2014; Palaeotechnical Report for Mpumalanga Province) that there are stromatolites in this Group in Limpopo. No references, however, were provided. It is not known if “Limpopo” refers to the province or to the river valley. The Wolkberg Group does not occur in the Limpopo River valley but in the southern part of the Limpopo Province. Furthermore, stromatolites tend to grow in shallow marine and intertidal environments and is not known if such an environment was present in the Wolkberg Group situation.

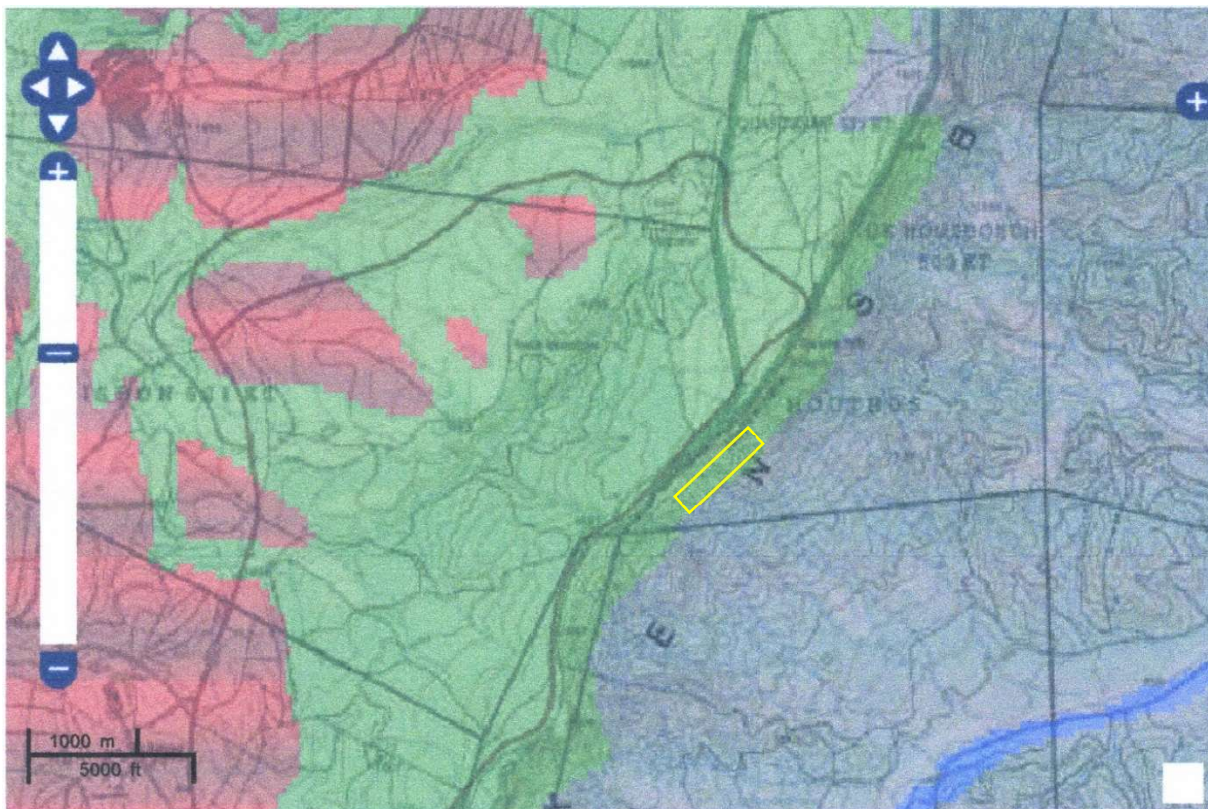


Figure 6-27: SAHRIS palaeosensitivity map for the site for the proposed God's Window Skywalk project shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

6.10.2 Impact assessment

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are much too old to contain body fossils. Since there is an extremely small chance that trace fossils such as stromatolites were present and may be disturbed a Fossil Chance Find Protocol has been added to the EMP. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the granites, dolerites, quartzites, sandstones, shales and sands are typical for the country and do not contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils. It is not possible to verify if indeed stromatolites have been preserved in the Wolkberg Group.

6.10.3 Conclusion and recommendations

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the quartzites of the Wolkberg Group or the soils of the Quaternary. There is a very small chance that trace fossils may occur in the Wolkberg Group so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once drilling and excavations for foundations and supports has commenced then they should be rescued, and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, so the project should be authorised.

6.11 Social environment

Zutari conducted a social impact assessment (SIA) to provide details on the socio-economic receiving environment and the social impacts that are likely to emanate from the proposed project on various sectors of the community. The sections below have been taken from the specialist report and reference is therefore made to the report dated July 2022.

6.11.1 Land ownership

God's Window is located in the Blyde River Canyon Nature Reserve, which is managed by the MTPA. The entire Blyde River Canyon Nature Reserve, which is a Protected Area, has been claimed by four communities. The claimant communities are represented by four Communal Property Associations (CPAs) who together form the so-called Blyde Valley 04 CPA:

- ▶ **Maorabjang CPA:** claimed the area from the Mac Mac Falls to the Forever Resort in Blyde River Canyon (including the project area and a large component to the north thereof);
- ▶ **Moletele CPA:** claimed land stretching from the Blyde River Forever Resort to the Swadini Forever Resort (about 50 km north of the project area);
- ▶ **Setlhare CPA:** claimed a portion of land to the north of the project site, but south of the Moletele CPA area; and
- ▶ **Mahubahuba a Bokone CPA:** claimed a portion of land below the escarpment, to the northeast of the project area.

The CPAs avail the land on a lease basis.

In 2006, the Department of Land Affairs (DLA) and the Department of Environment, Agriculture and Tourism (DEAT, now Department of Forestry, Fisheries and the Environment [DFFE]) signed a Memorandum of Understanding (MoU) which stated that land restitution in Protected Areas would occur in title only (SEF, 2013). Thus, the claimant communities would receive the title deed to the land but would be prohibited from settling on the land. Three of the four claimant communities fall under tribal authorities (SEF, 2013).

To expand the commercial tourist product potential of the Protected Area, MTPA has granted the PPP rights for the design, build, finance, operation, management, maintenance and transfer of the Project to the private party, Mapulana Canyon.

As part of the PPP agreement between MTPA and the private party (Motsamayi), a certain percentage of the gross revenue, as well as an annual fee must be paid to the MTPA. According to the PPP, the Blyde Valley 04 CPA shall control a minimum of 10% shareholding of the undertaking. This is then regarded as B-BBEE shareholding. The private party is required to commit to increasing the minimum

B-BBEE shareholding to 30% and 70% in year 10 and 20 of the project term, respectively. The increase in shareholding will be acquired by the CPAs at market value, through payments derived from dividends payable over the project term. The Private Party is also obliged assist the CPAs in raising the funding required to increase the shareholding as stated in this Clause.

It is therefore important for all stakeholders to understand that the project requires a lot of upfront investment, and numerous payments were made and will continue to be made to parties such as the MTPA to ensure that the project is well-managed within the protected area, and that the project can be executed. It will therefore only become lucrative once the development becomes operational and starts to generate net profits. The Return on Investment will therefore only become evident within a few years of the development becoming operational, and not right away.

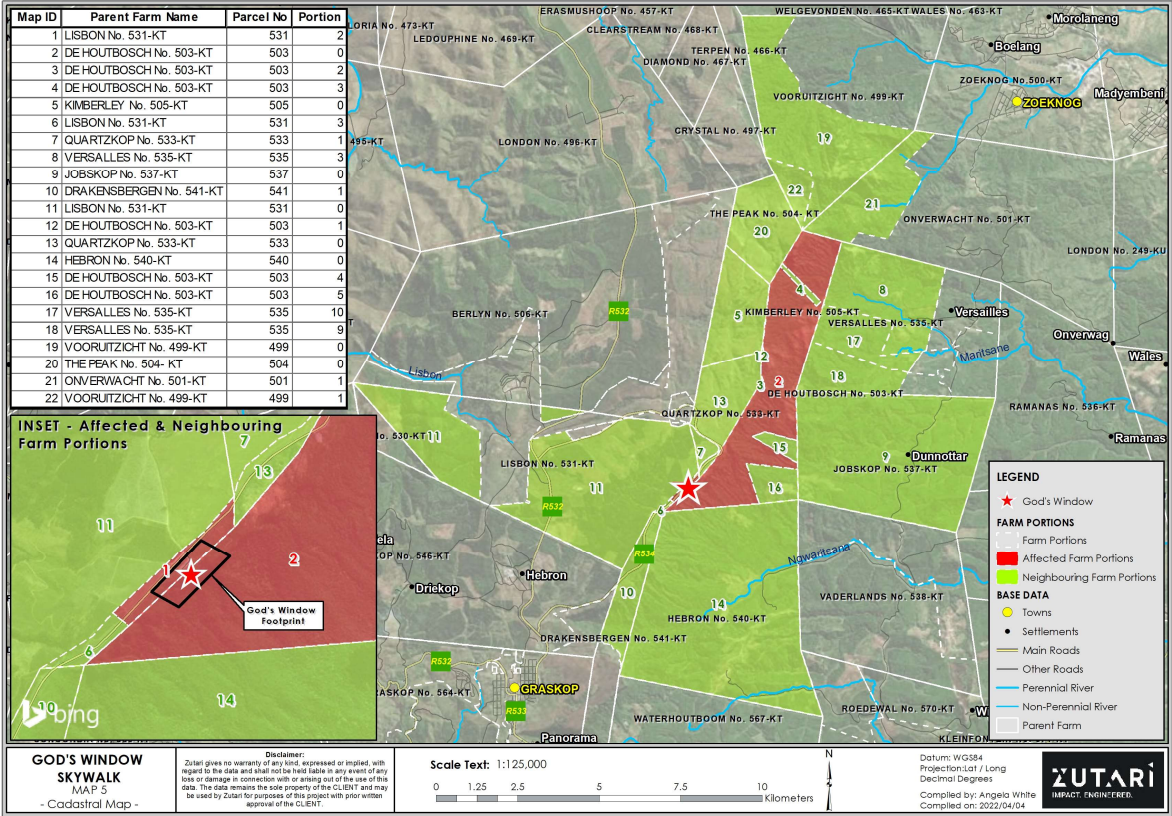


Figure 6-28: Cadastral map of the affected and neighbouring farms, showing that the Skywalk project is proposed across two farm portions

6.11.2 Baseline description

The proposed project will be located in Ward 10 of the Thaba Chweu Local Municipality (TCLM). The TCLM falls under the Ehlanzeni District Municipality (EDM) in the Mpumalanga Province.

6.11.2.1 Mpumalanga Province

6.11.2.1.1 Geography

Mpumalanga is situated in the north-eastern part of South Africa, covering an estimated 76 544 km² with a population of 4 335 963 people, according to the 2016 StatsSA Community Survey. Mpumalanga shares an international border with Mozambique and provincial borders with the Limpopo, Gauteng, Free State and KwaZulu Natal Provinces. The capital of Mpumalanga is Mbombela/Nelspruit.

6.11.2.1.2 Population, age, households and language

Approximately 72% of the population of Mpumalanga is under 34 years of age with the median age being 24 years (CS 2016). 57% of the population lies within the 18-64 years age bracket. The dominant population group is Black African, representing 94% of the total population. The province is evenly balanced between males (49%) and females (51%).

Siswati and Isizulu are the dominant languages in the Mpumalanga Province, each making up 28% of the languages most spoken at home. 97% of the population was born in South Africa and 98% of the population are South African citizens.

10.9% of the dwellings in Mpumalanga are informal dwellings or shacks. 62% of households are owned or fully paid off. 40% of households are female headed households. 7.3% of informal dwellings are child headed households.

The average annual household income corresponds to the national average of R 29 400, based on 2011 Census data.

6.11.2.1.3 Unemployment and poverty

The province has a 37.5% employment rate (Census 2011) and 69% of that is in the formal sector. This means that only 17% of working individuals are employed in the informal sector. The unemployment rate of females of 32% was 6.5% higher than that of males (25.5 per cent) in the province (MDEDT, 2011). The unemployment rate of the youth was 38.7% and they made up almost three quarters of the unemployed cohort 73.2 per cent.

Geographically, the number of unemployed people was skewed towards rural areas with 55.2% of the unemployed in the province found there. The unemployment rate of rural areas at 33.3% was higher than the provincial rate as well as that of urban areas, which is 24%.

Poverty income is defined as the minimum income needed to sustain a household and varies according to the size of the household. The poverty rate is the percentage of people living in households with an income less than the poverty income (MDEDT, 2011).

In 2009, Mpumalanga's poverty rate of 46.8% was higher than the national rate of 41.3%. Mpumalanga's poverty rate was the fourth highest (worst) among the nine provinces. It was estimated that 1.75 million of Mpumalanga's citizens lived in households with an income less than the poverty income. Over the 13-year period from 1996 to 2009, the poverty rate in Mpumalanga deteriorated (increased) by 0.8%, which was more than the 0.4% at which the poverty rate increased nationally.

6.11.2.1.4 Education

In the Province, 69% of individuals 20 years and older have completed Grade 9 or higher, while only 41.6% have completed matric or higher.

6.11.2.1.5 Economic profile

Manufacturing (21%) and mining (19%) are the largest sectors in the province. The province is driven mainly by the tertiary sector, making up a total of 49.6% of the provincial economy (MDEDT, 2011).

6.11.2.1.6 Basic services

The majority (87%) of the population has access to water from a service provider, but only 46% have piped water inside their yard. Only 6.8% of the population has no access to electricity. 81% of the population has an in-house prepaid meter.

Less than half (45.5%) of the population has access to flush or chemical toilets. 40% of the population is getting refuse disposal from either a local authority, a private company or community members.

6.11.2.2 Ehlanzeni District Municipality

6.11.2.2.1 Population size

The Ehlanzeni District Municipality (EDM) is made up of four local municipalities, namely, Bushbuckridge, City of Mbombela, Nkomazi, and Thaba Chweu Local Municipalities. According to the Community Survey 2016, the EDM area had a total population of 1 754 931. The population is comprised 39.6% of the City of Mbombela, 31% from Bushbuckridge, 23% from Nkomazi and 5% from TCLM. The City of Mbombela has been the fastest growing municipality within the district. This is due to its economic hub which attracts immigrants from the other municipalities and outside the province and the country (EDM, 2021).

As can be seen in Figure 6- below, the TCLM is the smallest local municipality in the district by population.

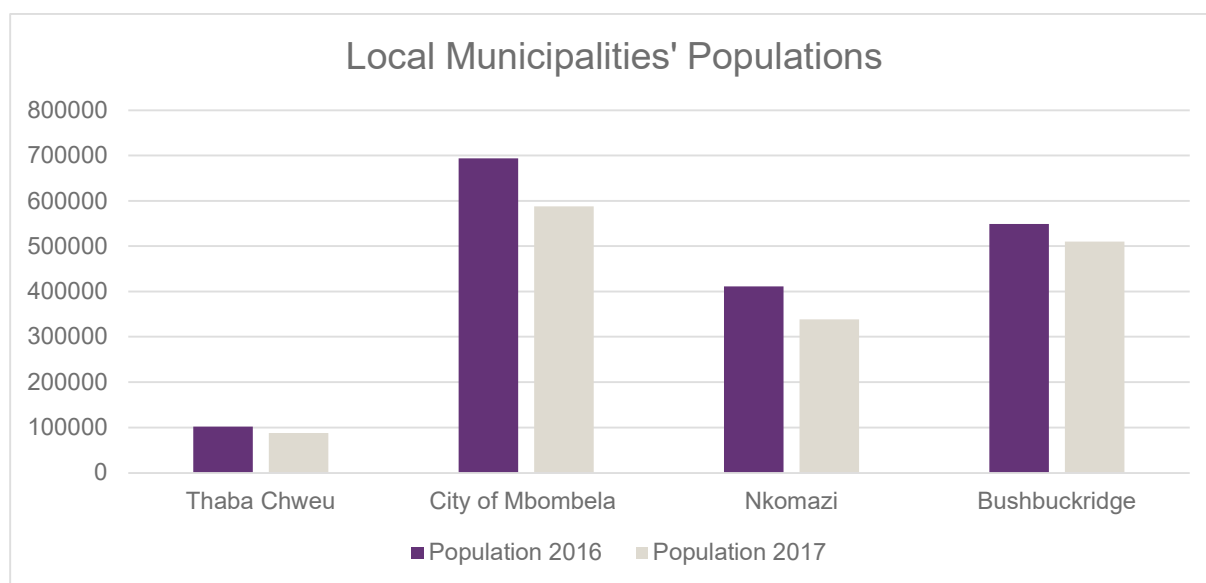


Figure 6-29: Population distribution of the LMs in the Ehlanzeni District Municipality in 2007 and 2016

6.11.2.2.2 Age and sex composition

Age and sex distribution has a potential impact on future economic possibilities.

The district is fairly evenly split between males and females, as shown in Table 6-24. Children are always the single largest population group in every local municipality. TCLM has a smooth distribution between age groups with a healthy number of youth and adults that could potentially be part of the work force, as shown in Table 6-25.

Table 6-24: Population and gender distribution of the LMs in the Ehlanzeni District Municipality

Municipality	Male	Female	Total	Male (%)	Female (%)
Nkomazi	195 806	215 101	410 907	48	52
Bushbuckridge	252 905	295 855	548 760	46	54
Thaba Chweu	53 008	48 887	101 895	52	48
City of Mbombela	342 914	350 454	693 369	49	51

Table 6-25: Population age group distribution of the LMs in the Ehlanzeni District Municipality

Municipality	Children 0-14 yrs	Youth 15-34 yrs	Adults 35-64 yrs	Elderly 65+ yrs	Total	Children (%)	Youth (%)	Adults (%)	Elderly (%)
City of Mbombela	284 676	197 328	168 502	42 865	693 371	41	29	24	6
Thaba Chweu	36 693	28 255	29 120	7 827	101 895	36	28	29	8
Nkomazi	212 001	110 321	76 198	22 387	410 907	49	27	18	5
Bushbuckridge	276 393	131 061	102 465	38 842	548 761	50	24	19	7

6.11.2.2.3 Population growth

The population of the district is generally growing quite rapidly. TCLM has stabilised at the rate of 2.05%, as shown in Figure 6- below. Although this is not as pronounced as other municipalities in the district, it does mean that there will always be a need for increased employment opportunities, housing and social facilities. According to StatsSA data there has been an increase in the LM’s population size from 1996 to 2011 and further increases are expected due to migration and due to economic pull factors into the area.

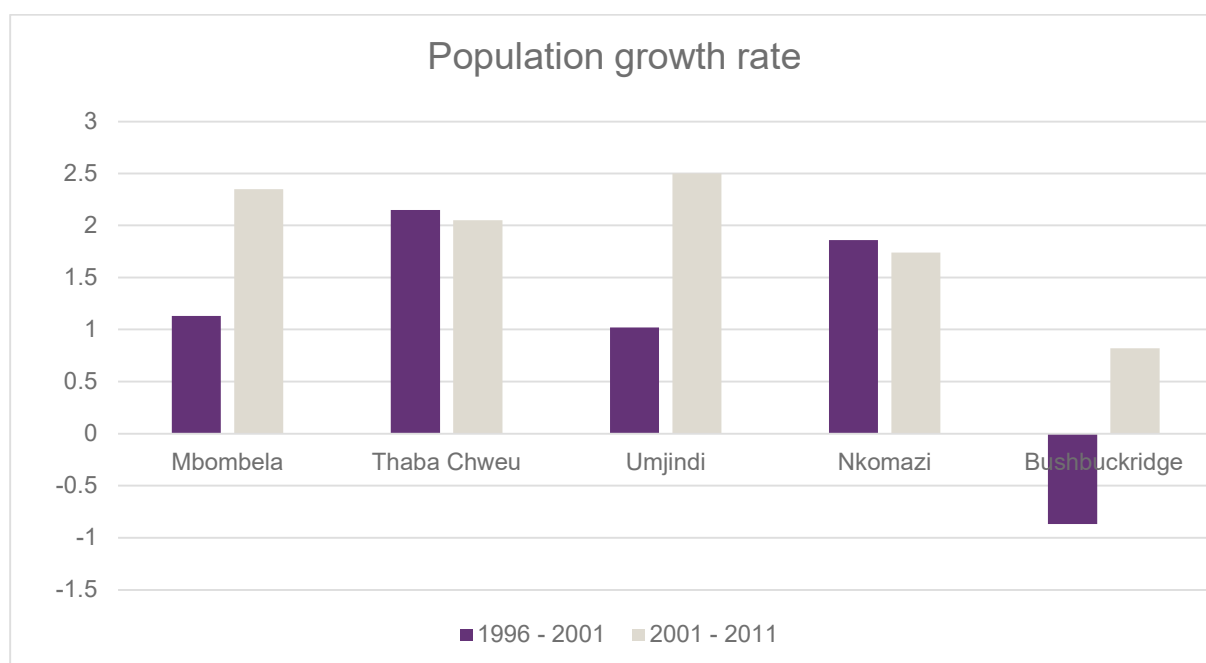


Figure 6-30: Population growth rate of the LMs in the Ehlanzeni District Municipality

6.11.2.2.4 Population density

Population density measures the average number of people in an area. It is calculated by dividing the number of people (4 335 963) by the area (76 544.3 km²). It tells how many people are residing in a specific unit of area and allows for broad comparison of settlement intensity across geographic areas. The population density of the Mpumalanga Province is 56.6 people per square kilometre.

6.11.2.2.5 Population changes from 2000 – 2020

There are three components that cause population change: births, deaths, and migration. The changes in the population from births and deaths is often combined and referred to as natural increase or natural change. Populations grow or shrink depending on the rate at which they gain and lose people.

- ▶ The fertility rate of Mpumalanga as 2.44 between 2016 and 2021, considered medium when compared to the rest of the country.
- ▶ Mpumalanga had a positive net migration between 2006 and 2021.
- ▶ The total number of deaths in the Ehlanzeni District Municipality has decreased from 7 082 to 6 716 from 2013/14, 2014/15 and 2015/16 respectively.

6.11.2.2.6 Life expectancy at birth

The United Nations Development Plan (UNDP) defines life expectancy at birth as the number of years a newly born infant could expect to live if prevailing patterns of age-specific mortality rates at the time of birth stay the same throughout the infant's life. The indicator is an important yardstick for any economy as it gives an indication of its health status. The implications of low life expectancy include loss of a productive workforce, loss of tax revenue and a high dependency ratio. Being able to predict how a population will age has implications for the planning and provision of services. Increases in life expectancy could translate into large increases in the population.

The life expectancies at birth in Mpumalanga has slowly increased over time between 2001 and 2021 for both males and females, as shown in Table 6-26. The number of years by which the life expectancy improved between every interval increased, showing that the Mpumalanga Province has seen some improvements in wellbeing and possible general wellbeing.

Table 6-26: Life expectancies at birth of males and females in Mpumalanga between 2001 and 2021 (Stats SA, 2019)

	2001-2006	2006-2011	2011-2016	2016-2021
Males	52.4	53.3	57.8	60.4
Females	56.1	57.6	63.5	66.2
Total (average)	54.3	55.5	60.7	63.3

6.11.2.2.7 Poverty and unemployment

The district as a whole has a high poverty rate, straining its economy. The good news is that poverty rates in two of the local municipalities (Bushbuckridge and Nkomazi) have decreased between 2011 and 2015, as shown in Figure 6-. TCLM has the lowest poverty and unemployment rate in the district. This may mean that there is comparatively more economic stability in this local municipality; the poverty rate is also stable over the years.

TCLM once again displays a stability in its relatively low unemployment rate. The district as a whole experienced a decline in unemployment between 2011 and 2015, as shown in Figure 6-.

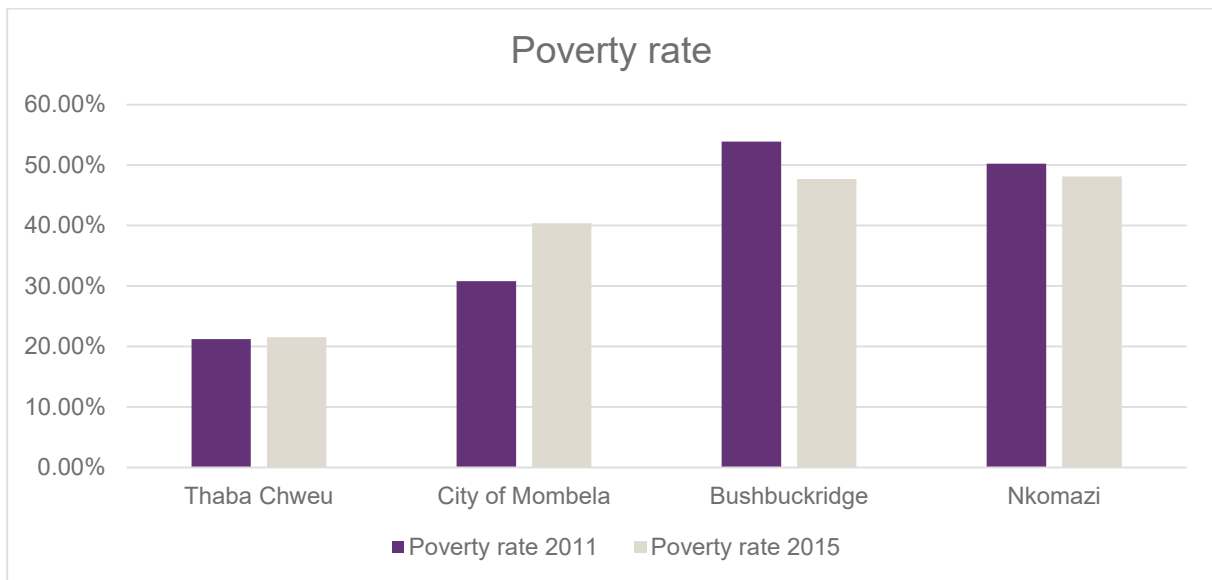


Figure 6-31: Poverty rate of the LMs in the Ehlanzeni District Municipality

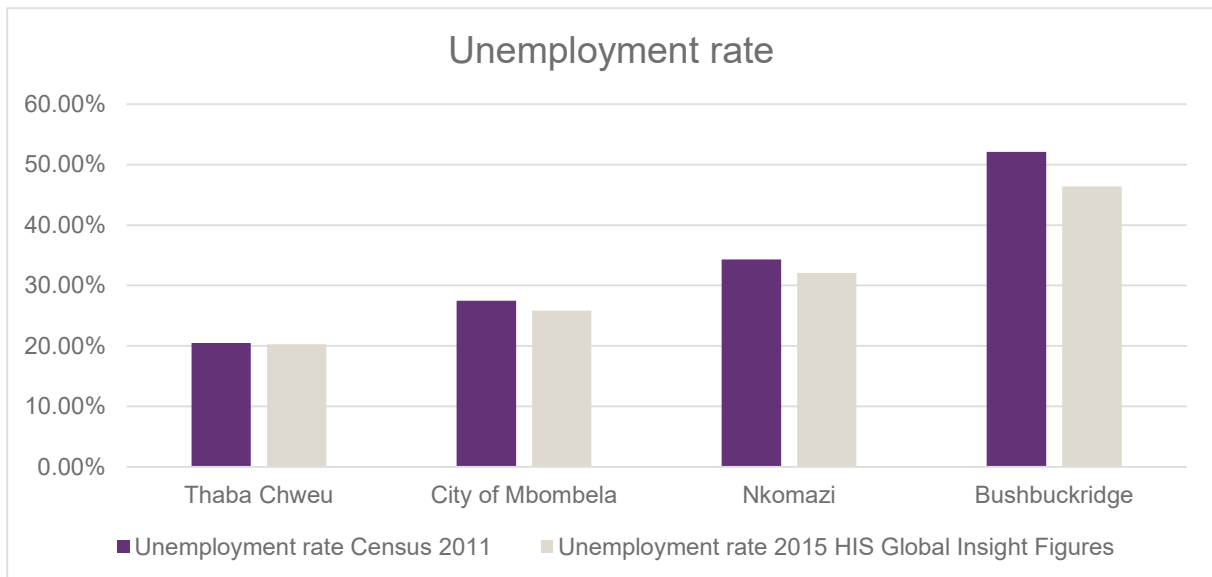


Figure 6-32: Unemployment rate Ehlanzeni District Municipality

6.11.2.2.8 Economic profile

EDM's main economic contributors are trade, community and financial services. Agriculture, forestry and tourism are also some of the main economic activities. According to the district's 2021/22 IDP, Mbombela, White River and Nsikazi are the district's major industrial centres.

The district is shifting from a primary based economy to a tertiary-based economy as was exemplified by the shift from agriculture to community services and trade and finance as the dominant sectors in the economy. The area currently experiences limited investment and high unemployment which means that interventions are required to achieve the desired economic growth targeted in the National Development Plan (EDM, 2021).

Tourism is emerging as a major contributor to the district's GDP (12.2%). This is very promising as it means that there is potential for government to align with projects such as the God's Window project, which is tourist based, to promote more economic opportunity in the area.

The district's environment is very favourable to agriculture and is home to, among many other agricultural activities, the second largest citrus production in the country. Most of Mpumalanga's minerals are sourced from the EDM. Land in the district is mostly dominated by forestry activities.

6.11.2.3 Thaba Chweu Local Municipality

The two most spoken languages spoken in the TCLM are Sepedi (35%) and SiSwati (17.3%).

Table 6-27: Languages spoken in TCLM (StatsSA, 2011)

Language	Percentage
Afrikaans	14.7%
English	4.1%
IsiNdebele	2.3%
IsiXhosa	0.5%
IsiZulu	7.4%
Sepedi	35%
Sesotho	7%
Setswana	0.9%
Sign Language	0.2%
SiSwati	17.3%
Tshivenda	0.4%
Xitsonga	5.3%
Other	1.6%
Not Applicable	3.3%

6.11.2.4 Ward 10 of the Thaba Chweu Local Municipality

The proposed project is located in Ward 10 of the TCLM.

6.11.2.4.1 Population and household sizes

There are roughly 6 371 people in Ward 10, and 2 682 households. The number of informal households or shacks (26%, shown in Figure 6-) is higher than that of the TCLM as a whole.

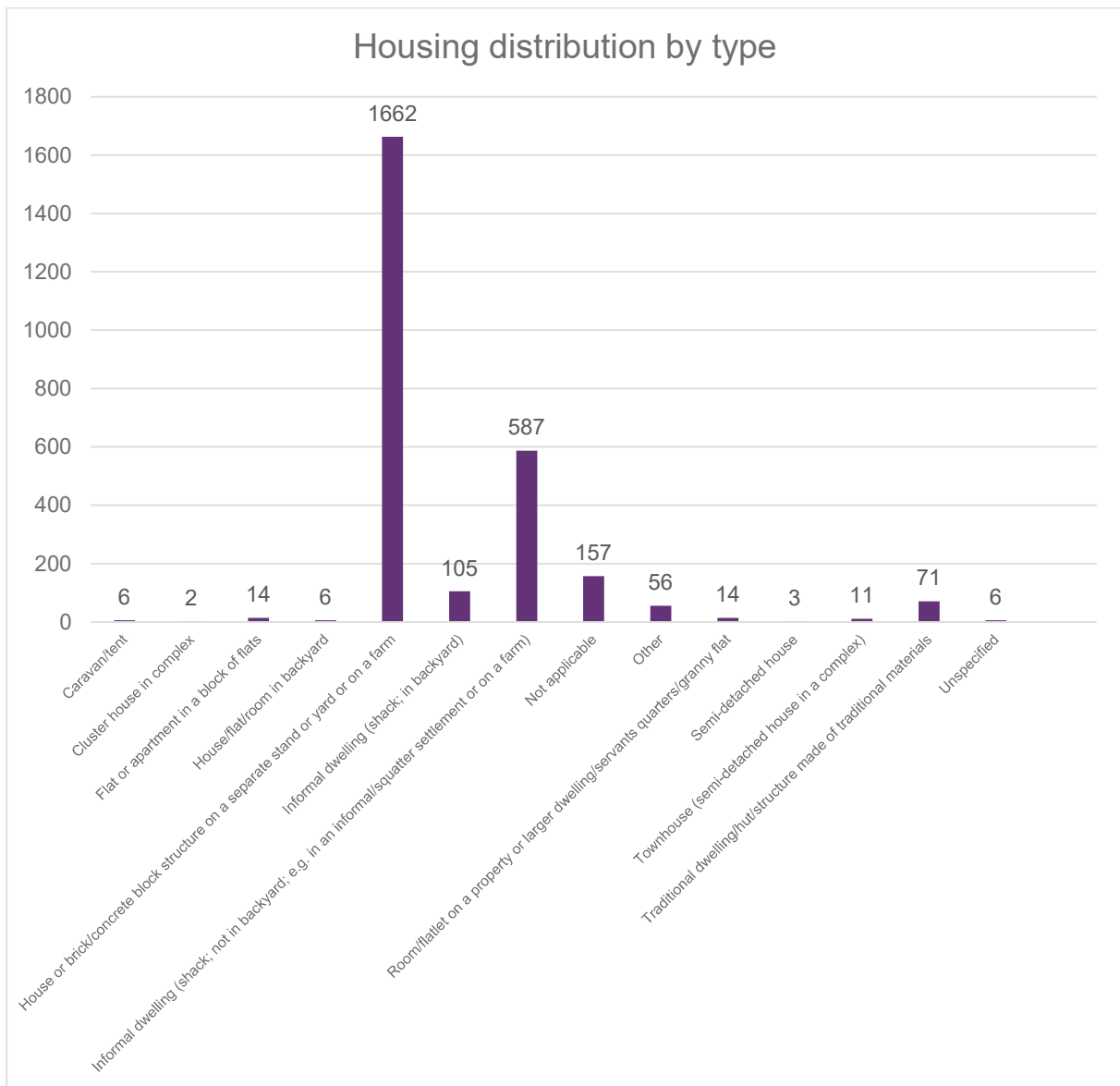


Figure 6-33: Housing distribution by type in Ward 10 of the TCLM (Census 2011)

Only 28% of households are fully paid off as shown in Figure 6-, which indicates low rates of ownership, especially in relation to provincial and district statistics. 31.6% of households are female headed households, which is slightly below the provincial trend.

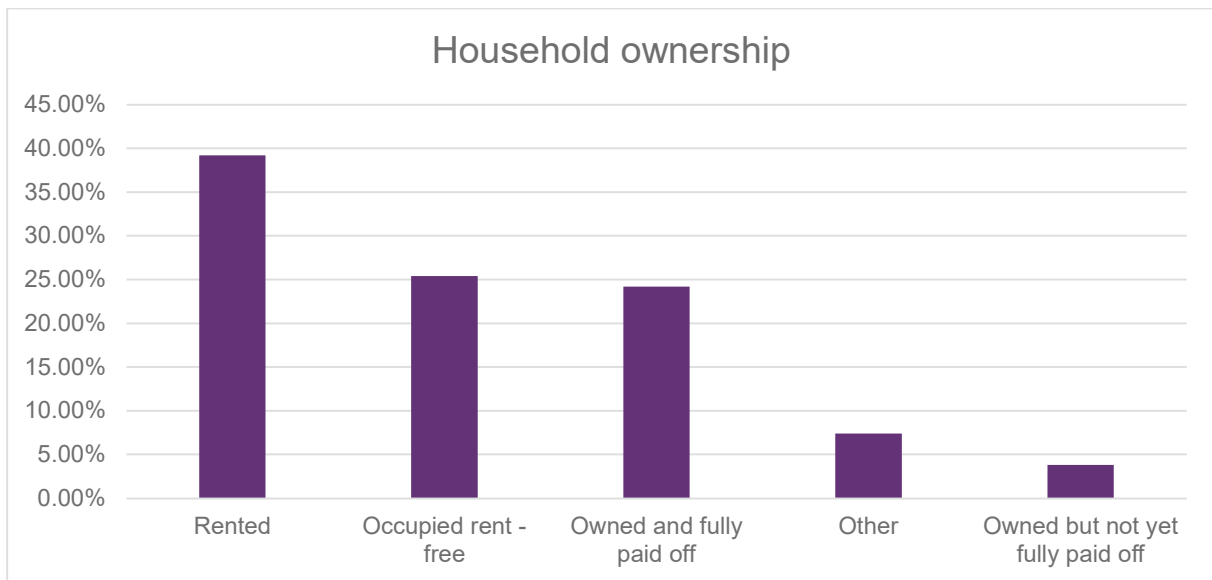


Figure 6-34: Tenure status of Ward 10 households in the TCLM (Census 2011)

There is a fairly even split of gender demographics with 54% males and 46% females.

The majority of the population (73%) is black African, and the next largest population group is white (17%). The predominantly spoken languages are Sepedi (35%), Afrikaans (18%) and Sesotho (10%).

90% of the population is reported to be South African citizens. This is higher than provincial and district averages. It must be kept in mind that this may not be a true reflection of the presence of foreigners due to statistical underreporting and un-documentation of incoming foreign nationals as well as the taboo that exists around them.

6.11.2.4.2 Age demographics

Ward 10 has a youthful population with the largest single population group of the 6 371 people in the ward being 20-29 years of age (21%). 72% of the population is within the working age bracket of 18-64 years of age. This indicates a large potential workforce that can be tapped into and that would need to be absorbed by economic activities.

6.11.2.4.3 Employment

Within the large working age group of Ward 10, 66% are employed in the formal sector, as shown in Figure 6-. This has most likely decreased after the Covid-19 pandemic, putting pressure on government and other entities to create employment opportunities.

The average annual income of those employed is R 30 000, slightly higher than the average household annual income of R 29 400 nationally and provincially, meaning that households usually have only one bread winner. Furthermore, as can be seen below in Figure 6-, there is a clear gap in earnings between males and females at every income level. This highlights the current social and cultural makeup of the community where men tend to be the breadwinners. Future developments should seek to address this income disparity as it may help to alleviate other social ills.

Employment and income statistics paint a clear picture of the need for further economic opportunities in the region. This puts pressure on up-and-coming projects to address this need.

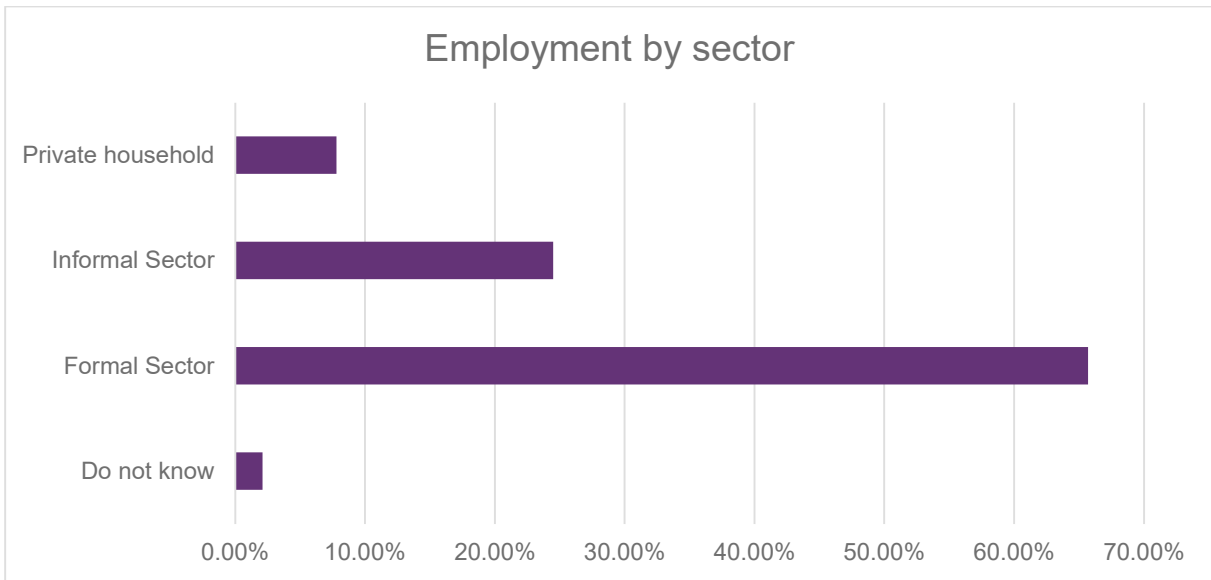


Figure 6-35: Employment statuses of Ward 10 in the TCLM (Census 2011)

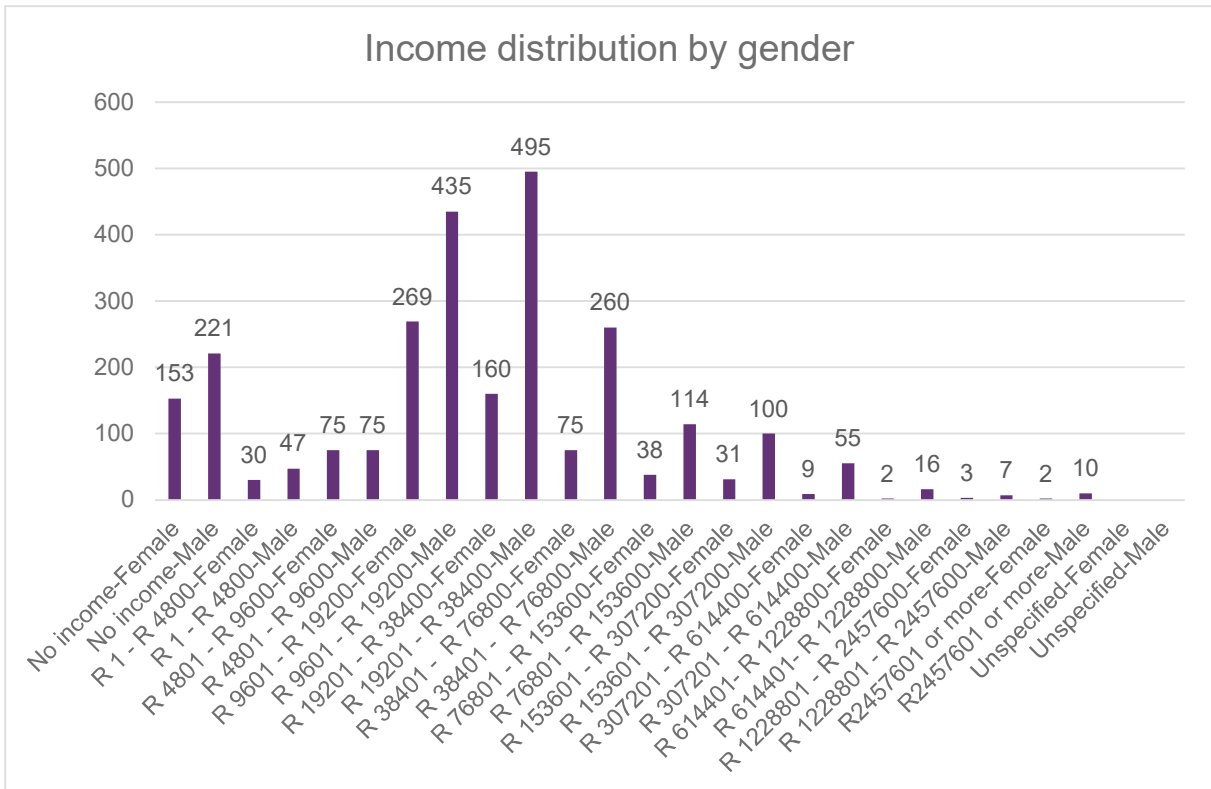


Figure 6-36: Income distribution by gender in Ward 10 of the TCLM (Census 2011)

6.11.2.4.4 Education

Only 37% of the population of Ward 10 has completed matric or higher, as show in Figure 6-.

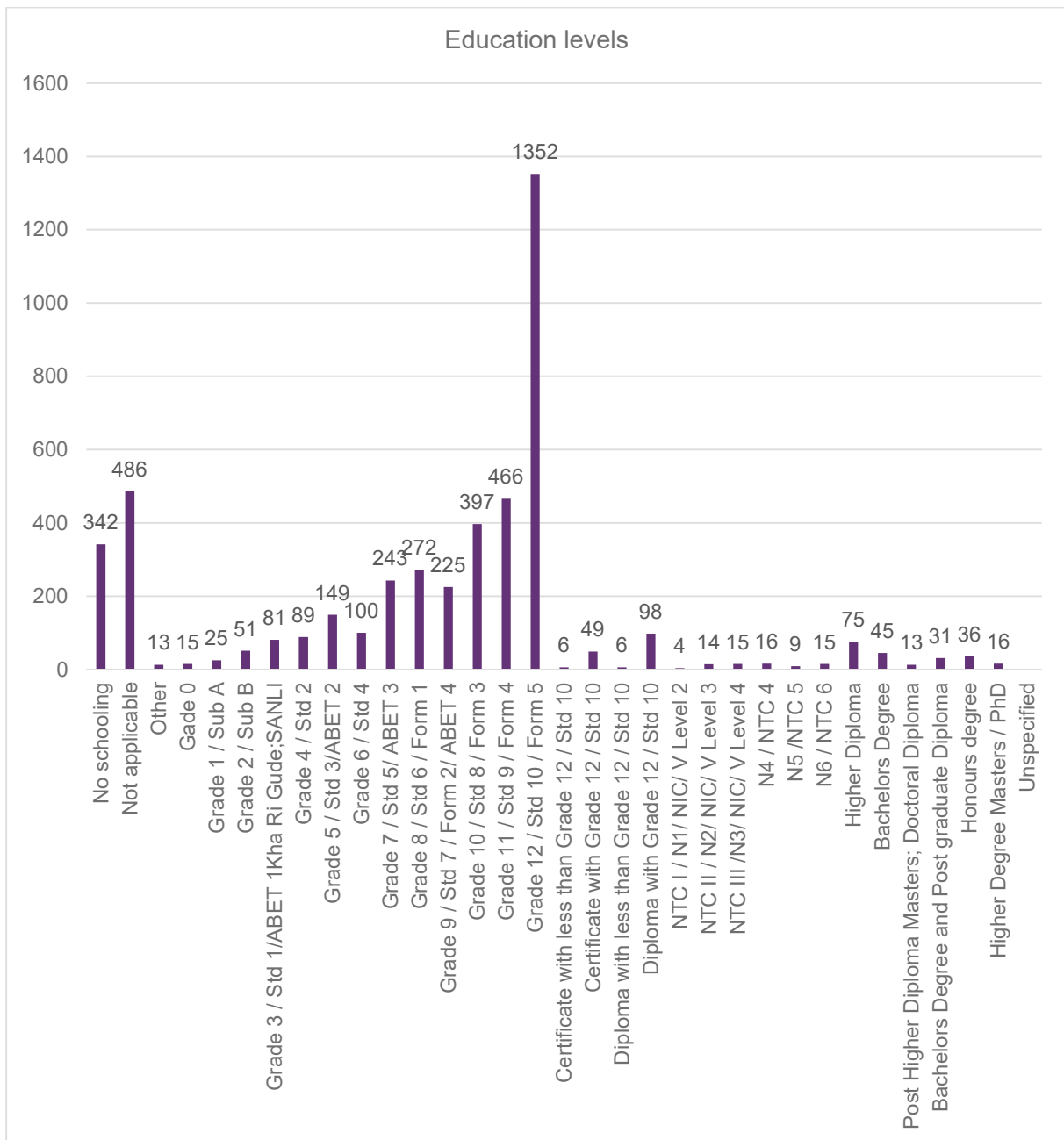


Figure 6-37: Education levels of Ward 10 in the TCLM (Census 2011)

6.11.2.4.5 Agriculture

The main form of farming in the area is animal husbandry. 50% of households that farm, farm animals and mainly poultry but with some livestock as well.

Vegetables are the main form of crops in the area with 26% of farming households doing crop farming.

6.11.2.4.6 Access to basic services

72% of households in Ward 10 get water from a regional service provider, as shown in Figure 6- and 62.3% have access to flush or chemical toilets. 57% of households get refuse disposal from a local authority or private company.

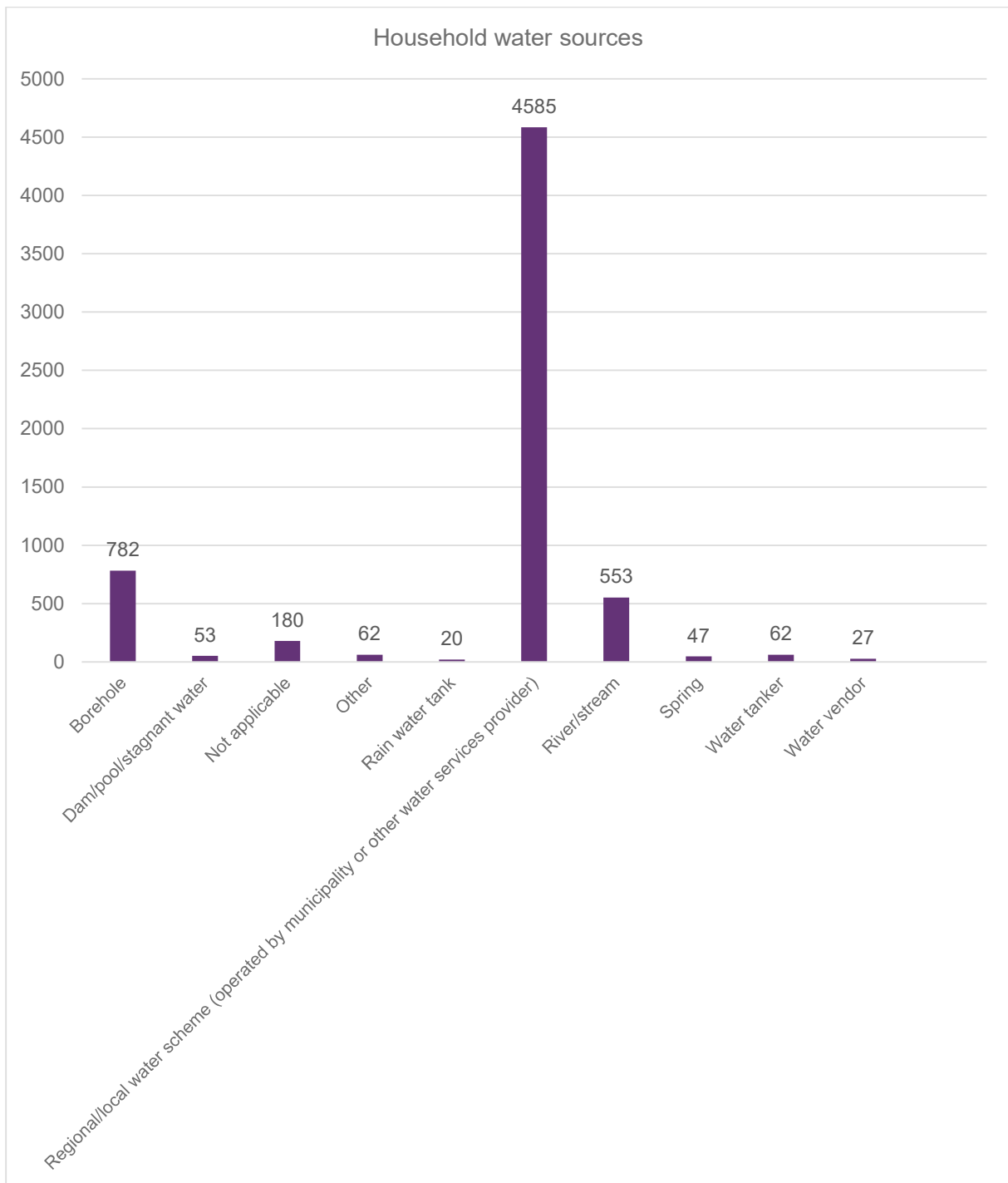


Figure 6-38: Water sources of households in Ward 10 of TCLM (Census 2011)

6.11.2.4.7 Community relations and associated social dynamics

Community engagement associated with the project has traditionally been done via the CPAs listed in Section 6.11.1. From previous engagements before this phase, the CPAs expressed the need for more frequent updates regarding the project. The community itself has a variety of perceptions regarding the CPAs. However, some community members feel that they are left out of the process and form “concern” groups. There are alleged disputes on the claimant beneficiaries and leadership. Others are happy with CPA communications. Unhappiness usually results from employment and income expectations not being met by the project. It is not necessarily the case that the project or the CPAs are not fulfilling their

duties, but rather that there are undue expectations on the project and people expect benefits where there simply are none.

Previous social consultants have indicated that the social situation is quite depressing due to unemployment, especially among the youth, leading to increased crime in the area.

There are eight tribal authorities in the area, including the:

- ▶ Malele Traditional Council;
- ▶ Thabakgoulo Traditional Council;
- ▶ Moreipusho Traditional Council;
- ▶ Setlhare Traditional Council;
- ▶ Moletele Traditional Council;
- ▶ Mogane Traditional Council;
- ▶ Mashilane Traditional Council; and
- ▶ Mohlala Morudi Traditional Council.

6.11.3 Impact assessment

The following section of the report focuses on the identification of social impacts and potential mitigation and management measures. It must be considered that most social impacts are of a cumulative nature, as many existing social challenges are present in the affected community. Residual impacts were also considered, such as those associated with community health, safety and security, and multiplier effects on the local economy. These impacts will be re-considered and (if necessary) updated after the PPP.

6.11.3.1 Impact on livelihood of curio vendors

Project phase	Construction			
Impact	Livelihood impact on curio vendors			
Description of impact	During the construction phase, it is quite likely that curio stalls around the parking lot will have to close due to safety risks and there being no tourists visiting the site. This will result in the loss of an income source for many of the vendors in the area, as well as their households who depend on the income.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Temporary relocation of stalls to other sites such as Wonderview and granting of permits to them to sell at other sites. Temporarily selling at other sites may cause further complications such as transport of goods, structures to sell under, safety, sufficient customers as well as competition with possible existing vendors at particular sites. Some curio vendors could also be given temporary jobs at the construction site.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the	Medium	The affected environment will only recover from the impact with significant intervention

		impact with significant intervention		
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	The expected moderately negative impact that the vendors may experience during the construction of the development may decrease to a minor negative impact with the implementation of mitigation measures.			
Cumulative impacts	Potential integration of curio vendors from God's Window into an alternative site such as Wonder View will have to be complemented with an integration plan to ensure that these vendors integrate with the "host" vendors. The cumulative impact to consider is that some curio vendors might feel that those from God's Window have an unfair advantage over them in that they not only benefit from being at God's Window currently (which is seen as more popular by some curio vendors), but also that they might benefit from the new development by no accomplishment of their own - by chance, they sell at God's Window where the new development is proposed.			

6.11.3.2 Impact of expectation of job opportunities

Project phase	Operation			
Impact	Expectation of job opportunities			
Description of impact	Expectation of job opportunities raised due to the low unemployment rate. In some cases, long-term job opportunities are expected, and temporary, construction-related jobs are regarded as inferior. This expectation was raised by various stakeholders, including Tribal Councils who expect people under the Tribal Authorities to be first in line for job opportunities.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Number, type, duration and nature of available jobs, and criteria to apply for jobs must be well-publicised through appropriate communication channels well before job applications open. Key stakeholders are to be informed of job opportunities via diverse channels, but from a single, reliable source to ensure that the expectation for jobs does not live on through unreliable information sources. Spatial- or affiliation-based preference in terms of jobs should be very clear and justifiable. This means that residents of the relevant Local Municipalities (sensitivity was raised if only Ward 9 and/or 10 would benefit) or those under one of the eight chieftaincies need to understand how opportunities are to be distributed.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Medium term	Impact will last between 5 and 10 years
Extent	Regional	Impacts felt at a regional / provincial level	Regional	Impacts felt at a regional / provincial level
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce

Significance	Major - negative	Minor - positive
Comment on significance	Currently, job preferences will be focused on beneficiaries of the land claim (who might fall within either the Thaba Chweu or Bushbuckridge Local Municipalities), at 60%. The remaining 40% could be open for the rest of South Africa.	
Cumulative impacts	This impact is not an impact of the project per se (except perhaps if expectations were created in earlier project stages when the project first entered the public domain some years ago). Rather, it is a cumulative impact because of the generally low unemployment rate in the TCLM and BLM and the marketing of the project as a development that would provide to socio-economic benefits. Therefore, local communities (beyond the CPAs) might look to developments such as these to plug socio-economic gaps.	

6.11.3.3 Impact due to the possibility of delays in project progress

Project phase	Construction			
Impact	Delays in project progress during construction, and subsequent delays in opening caused by disruption/community unrest			
Description of impact	Disruption to site activities, traffic, and nearby activities in town if not enough information provided, inadequate job or procurement opportunities or other benefits. If site activities are disrupted, it can lead to delays during the construction phase such that the opening date (start of operational phase) is delayed.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Consistent communication and dissemination of information to stakeholders must take place. In addition, TCLM law enforcement and SAPS should be made aware of potential disruption. Building a relationship with them and placing them on high alert if such activities are imminent at any phase of the project is key. This could prevent or at least reduce the time or the extent of the disruption.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Negligible - negative	
Comment on significance	The implementation of effective and consistent communication is expected to lower the impact from minor to negligible.			

6.11.3.4 Impact on important social areas

Project phase	Construction	
Impact	Impacts on sacred areas or areas with heritage, cultural, or religious significance	
Description of impact	Although no sacred areas were identified during consultations, a slight possibility exists that heritage finds might occur during construction activities.	
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts

Potential mitigation	Implementation of chance heritage finds procedure during construction; toolbox talks during construction with examples and pictures.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Brief	Impact will not last longer than 1 year	Immediate	Impact will self-remedy immediately
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Very low	Natural and/ or social functions and/ or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	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	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Low	Judgement is based on intuition	Low	Judgement is based on intuition
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Low	The resource is not damaged irreparably or is not scarce
Significance	Negligible - negative		Negligible - negative	
Comment on significance	The significance is calculated as negligible mainly due to the fact that no sacred areas are known to exist within the direct project site footprint.			

6.11.3.5 Impact of increased demand for the taxi and transport industry

Project phase	Operation			
Impact	Increased business for mini-bus taxis as mini-tour buses or transport for curio vendors			
Description of impact	Local taxi associations might benefit from the development if it is used as a platform from which to market mini tours of the Panorama route, departing from the Skywalk. Additional business might be available to taxis if transport can be provided to curio vendors between Graskop (home) and the Skywalk. This will also provide a reliable form of transportation to curio vendors, who currently struggle with it on peak-days.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	Since the impact is positive, no mitigation is envisaged. However, the initiatives suggested should be workshopped with taxi associations and potentially owners, so that they are aware of the stringent safety requirements that will be expected in such an operation by the developer/investor. It must be made very clear what the benefits of roadworthiness and other standards are.			
Assessment	Without mitigation		With mitigation	
Nature	Positive		Positive	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	High	Natural and/ or social functions and/ or processes are notably altered

Probability	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	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - positive		Minor - positive	
Comment on significance	The expected increase in vendors would directly result in an increase in the demand for transport to and from the development, which is expected to be a positive impact to the transport industry.			

6.11.3.6 Impact of discomfort between different sections within the transport industry

Project phase	Operation			
Impact	Increased traffic and discomfort between mini-bus taxis and between taxis and tourist buses			
Description of impact	The three local taxi associations (Sabie, Graskop and Bushbuckridge Taxi Associations) are concerned that they might lose out financially if they are charged for entrance or cannot gain entrance to the development to drop off and pick up passengers. Instead, they expect to benefit from the development through increased passenger turnover. Unmanaged expectations on the number of taxis that can stop at the development and for how long might exist, since taxis wait to fill up before they depart. This might cause additional traffic impacts or discomfort between mini-bus taxis and large tourist bus operators.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	Taxi associations can be informed with relative ease on the planned entrance charges, namely that none are envisaged for buses and taxis and that there will be drop-off spaces. However, the number of drop-off spaces needs to be very clearly defined to ensure that there are no undue expectations as to the number of taxis that can stop at the development and for how long. This will have to be based on a projected potential number of increased visitors, so that the motivation for all decisions made is clear to all stakeholders.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Regional	Impacts felt at a regional / provincial level
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Low	Judgement is based on intuition
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention

Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - positive	
Comment on significance	This potentially negative impact can be turned positive if taxi associations are engaged timeously and informed of the planned processes where they might play a role. Increased passenger turnover will have a positive impact on the taxi associations as long as it does not lead to conflict caused by misinformation.			
Cumulative impacts	Currently, passenger demand is lower than the supply (especially for the Bushbuckridge Taxi Association). This is caused by the need for taxis to fill up before departing, causing people to rather hitch-hike. Although the project is closer to the Graskop area than Bushbuckridge, all three taxi associations' taxis could potentially transport passengers to and from the site. Therefore, the reduction in passengers making use of mini-bus taxis over the past two odd years increases the expectation from new developments such as the Skywalk to alleviate this pressure.			

6.11.3.7 Impact of increased sales and benefits of vendors

Project phase	Operation			
Impact	Expected increased sales and benefits for all curio vendors, not just those currently at God's Window and increased competition.			
Description of impact	Curio vendors from other sites (such as the Pinnacle, Lowveld View and Wonderview) coming to the development could create competition at the site.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Workshop potential benefits and limitations on number of allowable stalls (to be confirmed during detailed design phase) with the curio sellers. Liaise with MTPA to improve marketing of entire Panorama route to reduce competition and to provide improved protection from theft and inclement weather at other sites. Open "recruitment" process could also be considered, with a weighted scoring system where preference is given to current GW curio vendors and the quality and uniqueness of the product to ensure variety. Workshopping will also provide a platform to gauge the appetite for changing or diversifying the articles sold. A further enhancement could be alternative skills development and the creation of diversified income streams. From the acquisition of new skills and community-based projects, curio vendors can supplement their income with new forms of revenue.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Minor - positive	
Comment on significance	With the proper and effective management of the expected increase in competition between vendors, the potentially negative impact may result in a positive impact of increased economic benefit.			

6.11.3.8 Impact of reduction in business for other business owners in the area

Project phase	Operation			
Impact	Prioritisation of God's Window Skywalk by tourists might reduce business elsewhere			
Description of impact	If more tourists are attracted to the Skywalk, it is feared by many stakeholders (including curio vendors and local business owners) that fewer people will support them, as they would rather spend time and money at the Skywalk.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Engage TCLM and/or DBSA to improve attractiveness of town and road conditions in Graskop. Engage MTPA to develop day-tours from the Skywalk (currently, a day pass is regarded not justified due to a lack of activity). Use Skywalk as a platform to market local businesses and other points on the Panorama route. Collaborate with other local businesses that provide activities in the area. Provide information on projected increase in visitors to area (as opposed to reduced spend per capita).			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - positive	
Comment on significance	With the implementation of mitigation measures such as using the Skywalk development as a platform to market local businesses and other points on the Panorama route, and by collaborating effectively with other local businesses that provide activities in the area, the project has the potential to contribute positively to the surrounding businesses.			
Cumulative impacts	Another development in the area is thought to have had this effect on Graskop and that it did not create the promised "local benefits/prosperity". Therefore, the perception (belief) already exists that the Skywalk will necessarily have the same impact.			

6.11.3.9 Impact of increased security and protection for vendors

Project phase	Operation			
Impact	Increased security and protection from theft and inclement weather for curio vendors			
Description of impact	If curio vendors who are currently selling wares at God's Window can now sell it inside the new development, they will be afforded more protection from the theft of their stock, as the current security measures are thought to be inadequate. Inclement weather also affects the current stalls, so the newly constructed development would provide improved roofing, waterproofing and other elements of more sound buildings.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	The new God's Window Skywalk will provide an area for local curio vendors with better security, visibility and protection from the elements. No mitigation is therefore needed, but positive impacts can be enhanced by workshopping further preferences with curio vendors to ensure that any other as-yet unknown negative current circumstances can be mitigated.			

Assessment	Without mitigation		With mitigation	
Nature	Positive		Positive	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - positive		Minor - positive	
Comment on significance	The significance remains unchanged since there are no mitigation measures necessary for this positive impact, but the positive impact can be enhanced as described above.			

6.11.3.10 Impact of litter, destruction and nuisance

Project phase	Operation			
Impact	Litter, destruction and nuisance			
Description of impact	Curio vendors, Graskop businesses and ward committee members are concerned that the new development will lead to increase litter at God's Window, compounded by increased noise and nuisance due to the increase in movement.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Onsite security and fines could be implemented as litter prevention measure (especially tossing litter into unreachable places) as in the case of the Gautrain, where eating is prohibited, and persons can be fined if they do. Site to be regularly cleaned, potentially using a local cleaning company. Local cleanliness custodians or tour guides can also be trained and appointed to ensure that littering is prevented. Publicly available information (such as during legislated Public Participation Process) to show why the need for a noise impact assessment was excluded from specialist studies, as well as the litter prevention measures that will be put in place. The anticipated noise impacts should be placed in context of existing noise generated by, for instance, truck in the area.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Very low	Natural and/ or social functions and/ or processes are slightly altered

Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	Recommended mitigation measures will potentially reduce the possibility of destruction of property, littering and general nuisance impacts of/from the development.			

6.11.3.11 Impact on economic benefit if vendors need to pay rent

Project phase	Operation			
Impact	Curio vendors might lose more money than they make if they have to pay rent at the new development			
Description of impact	Curio vendors expressed fear that new stall sizes might be inadequate, that they might be awkwardly laid out, that they might not be visible, and they might be charged unreasonable amounts to rent stalls inside the new development, which will lead to decreased net income for them. This impact will be felt especially during low or off-peak seasons.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	Census of each curio seller's space requirements to gauge typical sizes needed. Develop various space options available for rent based on census outcome (with closer-to-ideal display and storage areas, and no partitions between vendors if corresponding with census results). Locate curio market right after entrance area(s) to increase visibility. Clear communication on benefits to having a stall inside despite the rental charge (improved display area, security, weatherproof stall, etc.). Workshop potential options for rental payments (e.g., stall size or turnover-based, or a weighted combination) with curio sellers (rental rates are still undetermined and the final number of available stalls will depend on this.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	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	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge

Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - positive	
Comment on significance	The implementation of mitigation measures is expected to change the minor negative impact to a minor positive impact.			

6.11.3.12 Impact on local SMMEs due to lack of involvement during construction

Project phase	Construction			
Impact	Lack of involvement of local SMMEs during the operation phase could lead to project disruption and poor Social Licence to Operate			
Description of impact	A local business chamber that represents various local business forums expressed a desire to benefit from the project and indicated potential disruption to the project in the absence thereof.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Liaise with local business forums on what skills and expertise local SMMEs could provide. Very clear communication/ information dissemination on the number, type, duration and nature of available business opportunities, and criteria (e.g., safety requirements and price requirements) to apply for contracts must be well-publicised through appropriate communication channels well before the construction phase commences to manage expectations. Enterprise development could take place through business finance training, online marketing to increase visibility to international tourists who plan their holidays based on what they see online, registration of businesses, etc. This could assist enterprises who are not able to provide goods or services to the proposed project. These options could be discussed during workshops, during which the fact that quality cannot be compromised on as, the higher the quality (and compliance) of the product/service and integrity of the company, the better the chances of attracting business opportunities from other clients as well, and not only the Skywalk.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Municipal area	Impacts felt at a municipal level
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - positive	
Comment on significance	The potential negative impact of not involving local SMMEs in the project could be turned positive by implementing the recommended mitigation measures.			

6.11.3.13 Impact on local SMMEs due to lack of involvement during operation

Project phase	Operation			
Impact	Lack of involvement of local SMMEs during the operation phase could lead to project disruption and poor Social Licence to Operate			
Description of impact	A local business chamber that represents various local business forums expressed a desire to benefit from the project and indicated potential disruption to the project in the absence thereof.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Liaise with local business forums on what skills and expertise local SMMEs could provide. Very clear communication/ information dissemination on the number, type, duration and nature of available business opportunities, and criteria (e.g., safety requirements and price requirements) to apply for contracts must be well-publicised through appropriate communication channels well before the construction phase commences to manage expectations. Enterprise development could take place through business finance training, online marketing to increase visibility to international tourists who plan their holidays based on what they see online, registration of businesses, etc. This could assist enterprises who are not able to provide goods or services to the proposed project. These options could be discussed during workshops, during which the fact that quality cannot be compromised on as, the higher the quality (and compliance) of the product/service and integrity of the company, the better the chances of attracting business opportunities from other clients as well, and not only the Skywalk.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Municipal area	Impacts felt at a municipal level
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - positive	
Comment on significance	The potential negative impact of not involving local SMMEs in the project could be turned positive by implementing the recommended mitigation measures.			

6.11.3.14 Impact of unfair distribution of employment opportunities during construction

Project phase	Construction			
Impact	Unfair distribution of employment opportunities			
Description of impact	(Fear that) local employment/business opportunity distribution might be manipulated by "business forums/political interference/land claimants" such that the people who need it most will not benefit. This could lead to delays, and unfair benefit-, job-, and opportunity-distribution (and protest action).			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	The applicant must ensure that very targeted messaging on the role of CPAs (the importance of the Blyde Valley 04 CPAs in the land claims process), tribal history, status on			

	progress of land claims (restitution), and land ownership is distributed ongoing. The limitations to the number of jobs created and opportunities available must be timeously communicated publicly - if a 40:60 split exists between land claim beneficiaries vs rest of South Africa in terms of legislation of Protected Areas, this can be justified with relative ease. Targeted messaging on the benefits of the project and the Private Public Partnership (PPP) for co-management between MTPA and the Blyde Valley 04 CPAs must be developed and disseminated, as well as targeted communication and messaging on the project's "story" over time. Engage relevant stakeholders/officials within Local Municipalities regularly to ensure that the same understanding is reached. TCLM to be duly informed on project developments at different times. At the time of writing the SIA, it was reported that conversations with TCLM officials were imminent, and that LED and councillor engagements commenced. Information on how contracts are awarded; dividends; job applicant requirements; etc. must also be provided when the 30-day PPP-period commences.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Regional	Impacts felt at a regional / provincial level	Regional	Impacts felt at a regional / provincial level
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	The extent of the impact is rated as Regional, as the tribal areas that form part of the land claims areas are spread across two Local Municipalities (Thaba Chweu and Bushbuckridge).			

6.11.3.15 Impact of unfair distribution of employment opportunities during operation

Project phase	Operation	
Impact	Unfair distribution of employment opportunities	
Description of impact	(Fear that) local employment/business opportunity distribution might be manipulated by "business forums/political interference/land claimants" such that the people who need it most will not benefit. This could lead to delays, and unfair benefit-, job-, and opportunity-distribution (and protest action).	
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	The applicant must ensure that very targeted messaging on the role of CPAs (the importance of the Blyde Valley 04 CPA body in the land claims process), tribal history, status on progress of land claims (restitution), and land ownership is distributed ongoing. The limitations to the number of jobs created and opportunities available must be timeously communicated publicly - if a 40:60 split exists between land claim beneficiaries vs rest of	

	South Africa in terms of legislation of Protected Areas, this can be justified with relative ease. Targeted messaging on the benefits of the project and the Private Public Partnership (PPP) for co-management between MTPA and the Blyde Valley 04 CPAs must be developed and disseminated, as well as targeted communication and messaging on the project's "story" over time. Engage relevant stakeholders/officials within Local Municipalities regularly to ensure that the same understanding is reached. TCLM to be duly informed on project developments at different times. At the time of writing the SIA, it was reported that conversations with TCLM officials were imminent, and that LED and councillor engagements commenced.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	The potential impact is expected to decrease from minor to negligible with the implementation of mitigation measures.			

6.11.3.16 Impact of increased traffic in the surrounding areas during construction

Project phase	Construction		
Impact	Increased traffic during construction phase around God's Window and in Graskop		
Description of impact	Trucks and other construction related vehicles will increase traffic on the road passing God's Window, subsequently affecting Graskop town. Although it is not envisaged that construction will have significant impacts on adjacent landowners, there may be minor impacts such as increased traffic on shared roads due to construction.		
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts	
Potential mitigation	Findings and mitigations of increased traffic (outcomes of the Traffic Impact Assessment [TIA]) should be included in the Public Participation Process and communications done by the Applicant. Public notifications of start-dates of construction (and therefore increased traffic) must be communicated by the Applicant. Consultation with Local or District traffic authorities is key to ensure that the necessary support and diversions, if necessary, are provided. There should be clear communication with adjacent landowners to provide regular updates on project progress and what is to be expected.		
Assessment	Without mitigation		With mitigation

Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - negative	
Comment on significance	Although the anticipated traffic impact is unavoidable to some extent, the irritation thereof can be reduced somewhat if the right authorities are engaged, and their support received timeously.			

6.11.3.17 Impact of increased traffic in the surrounding areas during operation

Project phase	Operation			
Impact	Increased traffic around site and in Graskop during peak holiday periods			
Description of impact	Visitors to the Skywalk might park along the side of the road, as it is alleged that "people are reluctant to pay for parking". This could lead to increased traffic on site as well as in the town of Graskop. There may be a significantly greater number of tourists visiting the site in any case, impacting traffic on shared roads. This could be a positive impact if it leads to more time being spent in Graskop, thereby increasing the chances of more local spend.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Findings and mitigations of increased traffic (outcomes of the Traffic Impact Assessment [TIA]) should be included in the Public Participation Process and communications done by the Applicant. Consultation with Local or District traffic authorities is key to ensure that the necessary support and diversions, if necessary, are provided. There should be clear communication with adjacent landowners to provide regular updates on project progress and what is to be expected.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention

Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	Some stakeholders indicated that the increased traffic would lead be perceived as disturbance, whereas another camp stated that they would not mind it, as it will feel like there is more of a bustle in Graskop. Despite the opinion of the latter group, the impact is rated as negative, as this would require more effort to mitigate. Although the anticipated traffic impact is unavoidable to some extent, the irritation thereof can be reduced somewhat if the right authorities are engaged, and their support received timeously.			

6.11.3.18 Impact of reduced spend in Graskop during construction

Project phase	Construction			
Impact	Reduced spend in Graskop during construction of Skywalk caused by fewer visitors			
Description of impact	Closure during construction might cause a dip in visitors to Graskop and the income to MTPA will be impacted.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Market Wonder View as alternative lookout in interim – timeously provide information on internet. Engage MTPA to promote/market/enhance Panorama route and Wonder View. Virtual Reality platform at God's Window. Keep hiking trails open (to be determined if possible).			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	The post-mitigation Intensity is rated as low, as the local businesses could increase online marketing prior and during to the construction phase, so that Graskop becomes an attraction in its own right and not just as a spot visited on the way to or from God's Window. As for the other assessment criteria, they are kept as is, as the impact is unavoidable (albeit temporary) if there is a construction phase.			
Cumulative impacts	Most Graskop businesses have suffered losses during the COVID-19 pandemic. Although they are reporting slight improvements in business, they have by no means recovered. The impact of the closure of God's Window might serve as an additional "knock" and will have to be considered.			

6.11.3.19 Impact related to the safety of the Skywalk structure

Project phase	Operation
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Impact	Safety of Skywalk structure			
Description of impact	Stakeholders are concerned about the safety of the structure itself and of the Skywalk on misty days.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	Include safety measures in FAQ leaflet, such as closure of Skywalk on days or during times of low visibility, and safety of structure and facilities by making engineering/structural designs for safety approachable in information pieces, PPP etc.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Negligible - negative	
Comment on significance	The implementation of safety measures is expected to reduce this impact to negligible.			

6.11.3.20 Impact of availability of emergency services

Project phase	Operation			
Impact	Current emergency services might not be able to handle emergencies if they occur on site.			
Description of impact	Current emergency and disaster services might not be able to handle emergencies if they occur on site. Some stakeholders are concerned particularly about the safety of people who have consumed alcohol.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Engage TCLM Emergency Services & Safety Directorate on Disaster Management and Emergency Services (incl. fire) on capacity for search and rescue, evacuation, medical emergencies etc. Include emergency and safety measures of development in FAQ. Include emergency and disaster management discussions in engagements with TCLM when discussions are held on bulk and spatial planning. Reach out to District if TCLM services are not up to standard.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years

Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	Proper planning and involvement of municipal leaders will lower the intensity of the potential impact. The significance remains unchanged as minor negative.			

6.11.3.21 Impact on existing water sources

Project phase	Construction			
Impact	Impacts on current water sources			
Description of impact	It is alleged that the current water sources available in the area are already being used to full capacity. Furthermore, it is feared that wetlands will be affected as boreholes (or similar) are drilled during or prior to construction.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Engage TCLM/IDP to determine state of water, find alternative water sources. Include water-focused (section in) an FAQ or information piece developed by the Applicant on the fact that water might be sourced from boreholes, whether the search for water sources has been successful thus far, how much water will be needed during construction and operation, what the expected yield from these boreholes is anticipated, whether it is adequate and if not, how it will be supplemented, whether the necessary authorisations are in place, how wetlands will be protected (if at all present), where sewage will be pumped to, how much will be generated and how it will be treated.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Likely	The impact may occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention

Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	If another water source can be located, this impact can be reduced substantially.			

6.11.3.22 Impact on expected potential benefit of land claim beneficiaries

Project phase	Operation			
Impact	Land claim beneficiaries might not benefit from the Skywalk as expected, leading to frustration with certain leadership structures			
Description of impact	Beneficiaries who are not in regular contact with CPA land claimant representatives or the Blyde Valley 04 CPA-board members want to know when and if they will ever benefit from any initiatives that the CPAs are involved in. This stems from an expectation that might have existed when the project was due to start some years ago. There might also be misinformation or a lack of information, as no benefits have as yet accrued from any developments since the land claims process commenced.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	It is key to involve the CPAs in all public meetings, focus groups, workshops or any other public engagements. Clear messaging must be developed to clarify the role of the CPAs and the benefit structure to land claimants, beneficiaries and the local community as it falls under Wards, Tribal Authorities, within and outside of the beneficiary register.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Brief	Impact will not last longer than 1 year
Extent	Regional	Impacts felt at a regional / provincial level	Regional	Impacts felt at a regional / provincial level
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	The extent of the impact is rated as Regional, as the tribal areas that form part of the land claims areas are spread across two Local Municipalities (Thaba Chweu and Bushbuckridge). The post-mitigation Duration rating is reduced as the benefit structure can be communicated and explained to beneficiaries fairly easily. It must be noted, however, that communication with beneficiaries will have to be ongoing for a few years to come, especially if the development's operation phase commences.			
Cumulative impacts	As described above, benefits have not accrued to land claim beneficiaries, as the project has been delayed for years. This causes a lot of frustration, simply because of the time that has elapsed. This is why ongoing engagement and updates are key in ensuring that all land claimant beneficiaries understand what project progress has been to date (including the numerous approvals and upfront planning that is required before construction can even commence), AND how the benefit structure might work so that expectations are kept			

	realistic. If there is no sound benefit structure or plan yet, this must be clear too - again, to manage expectations and to ensure that further frustration is avoided.
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6.11.3.23 Impact on the benefit of vulnerable groups

Project phase	Construction			
Impact	Vulnerable groups might be left behind			
Description of impact	Vulnerable groups, such as the elderly, disabled, illiterate, and women, might feel "left" behind in the project, as they do not have access to or understand the information that is available as part of this project. They might also not be reachable to disseminate information, further robbing denying the opportunity to contribute to or at least understanding the nature of the project and how it could benefit them, albeit indirectly.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	Provide FAQ / information in an understandable format and using the communication channels preferred by these groups. Translate all documents to Sepulana (or Sepedi). Proactive, in-person communication (such as meetings) is better than passive, one-way communication (such as SMSs, posters, newspaper ads, etc.) to ensure that these stakeholders are reached.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Brief	Impact will not last longer than 1 year	Medium term	Impact will last between 5 and 10 years
Extent	Regional	Impacts felt at a regional / provincial level	Regional	Impacts felt at a regional / provincial level
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Minor - negative		Minor - positive	
Comment on significance	The extent of the impact is rated as Regional, as the tribal areas that form part of the land claims areas are spread across two Local Municipalities (Thaba Chweu and Bushbuckridge). The impact can be turned positive in that all Interested and Affected Parties (I&APs), including those who are hard to reach, will get an opportunity to really understand how the project works, so that they can give the necessary input if they can or want to. This can also enable them to become involved in the project over a longer term than just the pre-construction Public Participation Period (PPP) as potential beneficiaries to the project.			

6.11.3.24 Impact on the pristine environment of God's Window during construction

Project phase	Construction
Impact	Environmental impact of development on "pristine" God's Window site
Description of impact	Numerous stakeholders are concerned that the project will have an irreversible environmental impact on the God's Window site. Concerns on impacts on indigenous or endemic vegetation, fauna, wetlands, heritage, and water were raised on various occasions.

Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	Various environmental mitigation measures have been developed by specialists and are listed in the EMPr that must be used in both the construction and operation phases of the project. The contractor and their sub-contractors must be very clear on the sensitive natural area they work in - the temporal nature of the "construction phase" does not mean that natural impacts are less severe. Understandable toolbox talks must be done with construction workers. Environmental auditing should be included in the conditions to the Environmental Authorisation and the EMPr included in the contractor's Terms of Reference.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Likely	The impact may occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	The development of a rigorous EMPr and the implementation thereof is expected to reduce the impact from minor to negligible negative. An objective of the architecture and project plan is indeed to celebrate the beauty of the area and therefore care is and will be taken to limit the disturbance and negative impacts.			
Cumulative impacts	The God's Window site is currently not as pristine as the impression that exists, as there is a lot of litter. Furthermore, <i>Zama zamas</i> (informal miners) are reportedly polluting protected areas within the Blyde River Canyon Reserve to the north of God's Window. Currently, they are known to operate in Simile, but it has not yet been determined whether their activities will have a cumulative impact on the natural environment. Further information on this can be sought through engagements with TCLM law enforcement. Outcomes on whether there is indeed a cumulative impact should be provided to I&APs, as they have raised the concern.			

6.11.3.25 Impact on the pristine environment of God's Window during operation

Project phase	Operation	
Impact	Environmental impact of development on "pristine" God's Window site	
Description of impact	Numerous stakeholders are concerned that the project will have an irreversible environmental impact on the God's Window site. Concerns on impacts on indigenous or endemic vegetation, fauna, wetlands, heritage, and water were raised on various occasions.	
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts

Potential mitigation	Various environmental mitigation measures have been developed by specialists and are listed in the EMPr that must be used in both the construction and operation phases of the project. The employees and companies that will work at the Skywalk (and the visitors thereto) must be very clear on the sensitive natural area they are in. Understandable induction must be done with workers. Environmental auditing should be included in the conditions to the Environmental Authorisation and the EMPr included in the Terms of Reference of companies who conduct business at the Skywalk.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	Although there are parts of the site footprint that will be permanently altered, the most sensitive parts thereof are being incorporated into the detailed design such that it is not modified. This also goes for timing of migration patterns of certain animals.			
Cumulative impacts	<i>Zama zamas</i> (informal miners) are reportedly polluting protected areas within the Blyde River Canyon Reserve to the north of God's Window. Currently, they are known to operate in Simile, but it has not yet been determined whether their activities will have a cumulative impact on the natural environment. Further information on this can be sought through engagements with TCLM law enforcement. Outcomes on whether there is indeed a cumulative impact should be provided to I&APs, as they have raised the concern.			

6.11.3.26 Impact related to socio-economic benefits not available to all

Project phase	Operation			
Impact	Socio-economic benefits of the Project might not be felt by all who expect it			
Description of impact	Local farmers expect sponsorship, marketing and business growth assistance from the project.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Procuring fresh produce from local farmers or providing space from them to sell their produce at Skywalk could be recommended, but the feasibility thereof would have to be investigated during more advanced project planning stages. Again, it is very important that, if there is no direct benefit to be had by certain stakeholder groups, this will have to be communicated timeously, along with a breakdown of exactly what the limitation is on any opportunities for business or value-add that might come from the Project.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years

Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - negative	
Comment on significance	Although the negative impact can be turned positive by including farmers directly in the project, it is unclear whether this is at all a possibility. If not, the best course of action would be to ensure that all stakeholders are timeously informed of any opportunities for training, sponsorship, employment or any other support if it is available – <i>or not</i> .			
Cumulative impacts	This impact is not an impact of the project per se. Rather, it is a cumulative impact because of the generally poor conditions under which the farmers in this forum work, as well as reported lack of support that they receive for agricultural activities from government. Therefore, they might look to developments such as these to plug institutional gaps and decreased sales as a result of rising costs and the COVID-19 pandemic.			

6.11.3.27 Impact of criminals targeting international tourists

Project phase	Operation			
Impact	Tourists targeted by criminals			
Description of impact	International tourists might be targeted by criminals, making the site less popular and lucrative.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Engage SAPS, TCLM law enforcement, and private security at Skywalk and surrounds			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge

Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	Mitigation measures decrease the intensity and likelihood, lowering the impact to negligible.			
Cumulative impacts	Tourists are known to be targeted by criminals in South Africa. It is not uncommon. Formal tours through tourist agencies provide some security from this but might have a cumulative negative impact on local businesses, especially in the transport sector, who look to the Skywalk as an opportunity to increase business.			

6.11.3.28 Impact of unfair advantages for some tribal councils

Project phase	Operation			
Impact	Some Tribal Councils expect to benefit and receive favourable preferential treatment from the project			
Description of impact	Tribal councils expressed a desire to receive an annual benefit from the project much like the dividends that might accrue to the land claimants based on their partnership with MTPA. The councils also feel that those under their jurisdictions should be first in line for job opportunities and not be charged entrance fees. If not appropriately mitigated and managed continuously, this might lead to project delays or stoppages of future projects associated with the Applicant.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Clear, defensible narrative (key message) on why land claimants should receive 60% of all opportunities (as opposed to those under tribal leadership). Regular engagement with the Tribal Councils by the Applicant is necessary to ensure that they are well-informed and versed on the process. Determine how additional benefits could impact the larger community.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Regional	Impacts felt at a regional / provincial level	Regional	Impacts felt at a regional / provincial level
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention

Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	The extent of the impact is rated as Regional, as the tribal areas that form part of the land claims areas are spread across two Local Municipalities (Thaba Chweu and Bushbuckridge).			
Cumulative impacts	This impact is not an impact of the project per se (except perhaps if expectations were created in earlier project stages when the project first entered the public some years ago). Rather, it is a cumulative impact because of the generally low unemployment rate in the TCLM and BLM, as well as the legal status of the Tribal Councils. Therefore, they might look to developments such as these to plug socio-economic gaps.			

6.11.3.29 Impact on demographics of the area

Project phase	Construction			
Impact	Demographic impacts			
Description of impact	Influx of construction workers, job-seekers near the construction site, and spread of informal settlements near the construction site.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Clear upfront communication on the number and type of jobs, as well as the channel through which applications are to be done are key information that will have to be communicated at least two months before construction starts. TCLM law enforcement and SAPS should be made aware of potential squatting. Engagement with the TCLM is also key to inform them of the presence of any construction workers that would have an impact on the local infrastructure, if applicable.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	Mitigation measures are expected to decrease the impact to negligible.			

6.11.3.30 Impact of socially related illness associated with demographics

Project phase	Construction
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Impact	Social concomitants associated with demographic impacts			
Description of impact	Social ills associated with construction-related in-migration include the spread of HIV/AIDS, teenage pregnancies, and prostitution.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Clear upfront communication on the number and type of jobs will have to be communicated at least two months before construction starts. Information on sexual health could be provided by the contractor as ongoing communication or Toolbox Talks. TCLM law enforcement and SAPS should be made aware of potential influx of job seekers or employees. Engagement with the TCLM is also key to inform them of the presence of any construction workers that would have an impact on the local infrastructure, if applicable.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	Mitigation measures are expected to decrease the significance to negative by lowering the duration, extent, probability and intensity of the impact.			

6.11.4 Conclusion and recommendations

The God's Window project concerns a variety of stakeholders including multiple government bodies, on national, provincial and local level, parastatals, adjacent landowners, tribal authorities and a host of I&APs. Without regular and transparent communication processes and a clear channel through which stakeholders can raise grievances, lack of communication could become a serious risk to the project. This may lead to misalignment, unrest, and delay the completion of the project or its smooth functioning.

Zutari suggests frequent and consistent communication with the various stakeholders based on structured Stakeholder Engagement Planning.

Zutari further recommends that initial engagements provide clear explanations to community stakeholders regarding why certain processes are being undertaken again and what the status and timeline of the project is envisioned to be. This will help alleviate any fatigue or confusion.

An upgrade to God's Window will hopefully mean more tourists and activity in the area and hence a concomitant increase in the chances of harnessing future economic benefits as a result of this. This may be through increased indirect employment or income generating activities related to tourism in the area in and around God's Window.

There is potential for further alignment between the various stakeholders to ensure that the project's potential for positive impact is maximised. Tourism is emerging as a major contributor to Ehlanzeni's GDP. If IDP projects are aligned with the private sector to capitalise on the increase in tourism related opportunities, this will maximise economic benefits.

6.12 Traffic Impact

The development site currently has one access point. The intersection of the development access and R534 operates as a priority-controlled T-junction with the access road controlled by a stop sign. The access entrance is currently controlled with the use of a boom gate. This boom gate, however, is not electronically controlled but rather controlled by a security guard. To get through the boom gate, individuals need to pay a fee using cash or card to the security guard which was observed during a site visit to cause notable delays. The slow processing time results in long queues at the gate which overflow onto the R534 as there currently is not enough stacking space (Figure 6-).



Figure 6-39: Existing access point at God's Window (photo taken 11 February 2022)

The road network that is likely to be affected by the new development can be described as follows:

- The **R534** is a Class 4 district collector off which the site gains access. This road is a single-carriageway road with one lane in each direction. The road is approximately 15 km long and runs in the form of a loop and connects to the R532 at two points which are approximately 6 km apart.
- The **R532** is the road that connects with the R534 which eventually leads to the site. This road is a Class 2 Regional Distributor. It is a single-carriageway road and travels mostly in a north south direction from its intersection with the R36 near Draasloot in Limpopo to its intersection

with the R37 near Sabie in Mpumalanga. Along its path, the R532 passes Sabie, Graskop, Moremela and Leroro-A. Its connection to the R36 leads to the N1 near Bandelierkop in Limpopo. Furthermore, the R532 connection with the R37 leads to the N4 near Mbombela in Mpumalanga.

- The **R533** is also a Class 2 Regional Distributor. It is a single-carraigeway road that travels mostly in an east west direction from its intersection with the R36 near Ohrigstad, Limpopo to its intersection with the R40 in Bushbuckridge. Along its path, the R533 only passes through/by Pilgrimsrest, Graskop and Bushbuckridge. Its connection with the R40 leads to the N4 near Mbombela in Mpumalanga. Furthermore, the R533 connection with the R36 leads to the N1 near Bandelierkop in Limpopo as well the N17 near Ermelo in Mpumalanga.

Outlined below are the intersections, in addition to the development access intersection with R534, that are likely to be affected by the traffic generated by the proposed development. The intersections were considered based on the possible routes that may be used to access the site.

The following intersections were considered:

- ▶ **R534/R532 Intersection 1:** This intersection is a priority controlled T-junction with R534 controlled by a stop sign. All the approaches have one lane in each direction. However, the north western approach (R532) has an additional shared short left-turn and through lane.
- ▶ **R534/R532 Intersection 2:** Similar to the previous intersection, this intersection operates as a priority controlled T-junction with R534 controlled by a stop sign. The all approach have one lane in each direction. In addition, the south eastern approach (R532) has one shared right-turn and through lane and the north western approach (R532) has a shares one short left-turn and through lane.
- ▶ **Main Street/Main Street/Louis Trichardt Avenue intersection:** This intersection operates as a 4-legged all-way stop-controlled intersection. The eastern, northern and western approaches all have one lane each direction. The southern approach has one left-turn lane, one shared right-turn and through lane, and one receiving lane.
- ▶ **Main Street/R532/Richardson Avenue:** This intersection operates as a 4-legged all-way stop-controlled intersection. The eastern and western approaches both have one lane in each direction. However, the southern and northern approaches have two lanes in each direction which include one shared left-turn and through lane, and one shared right-turn and through lane.

All the traffic to and from God's Window from other areas passing through Graskop Town pass the last two intersections located in the heart of the town's Central Business District (CBD).

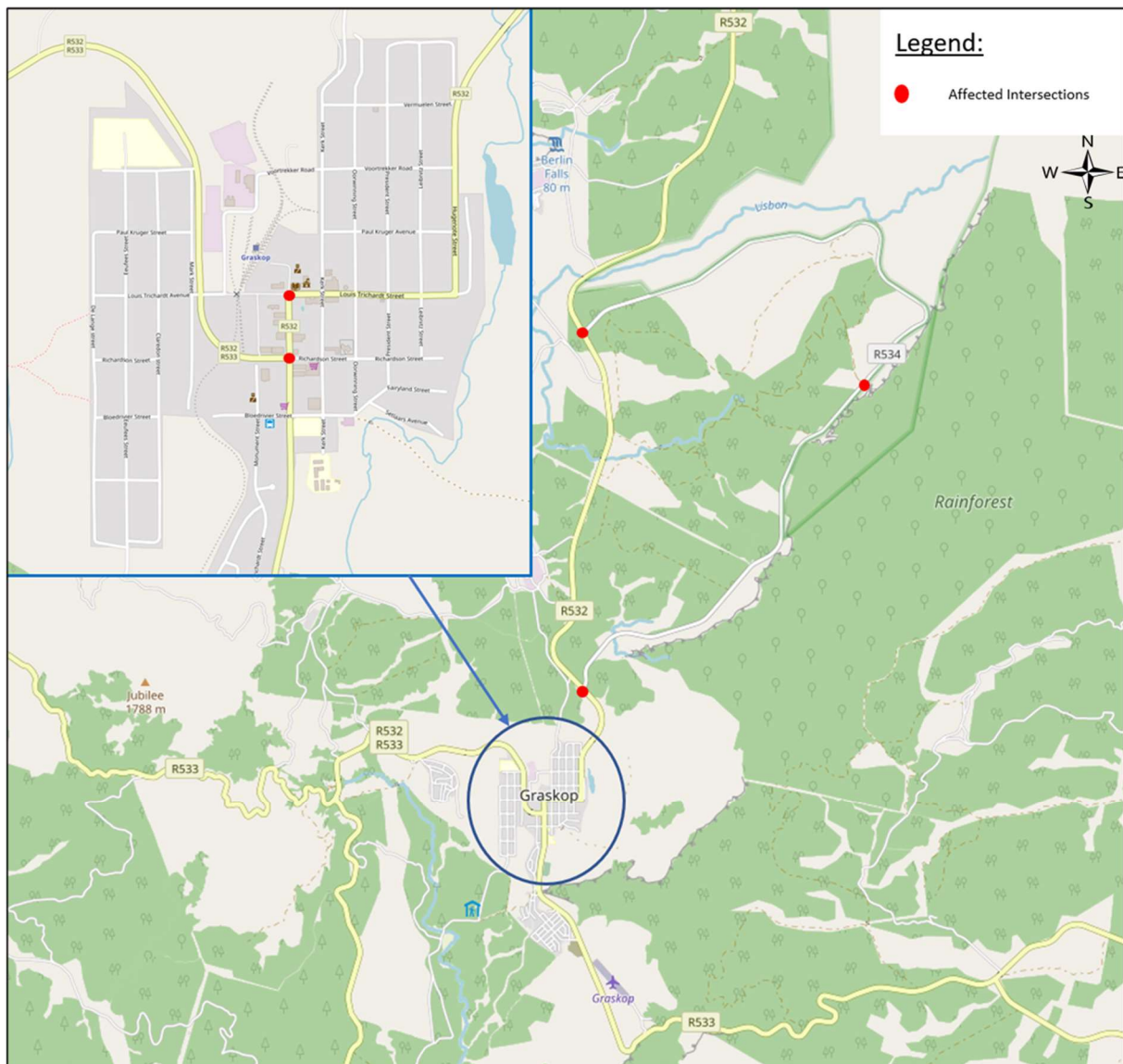


Figure 6-40: Affected intersections (Source: Open Street maps)

It is anticipated that the development will attract approximately 1100 people per day including employees (accommodation schedule proposed by the project team). The proposed access to the site is to be situated at the existing location. As per the site plan, the parking is to be completely redeveloped to consist of the following bays:

- ▶ 160 visitor parking bays;
- ▶ 14 taxi parking bays;
- ▶ 6 bus parking bays; and
- ▶ 20 staff parking bays.

As per the accommodation schedule proposed by the project team, the number of visitors and employees that each of the proposed areas are expected to attract are outlined below:

- ▶ Tourist centre: 1047 people per day;
- ▶ Corporate retreat: 24 people per day; and
- ▶ Exclusive retreat: 18 people per day.

The modal split at God's Window was obtained from a Traffic Impact Assessment that was conducted in 2013. This Traffic Impact Assessment was done as part of the previous EIA process for the proposed

skywalk at God's Window. The modal split was based on an assessment of a vehicle occupancy survey that was done.

The following values are estimates of the vehicle occupancies based on the previous TIA conducted by WSP in 2013. The occupancies were determined from the traffic surveys that were conducted:

- ▶ Light Vehicle – 2.87 persons/vehicle;
- ▶ Minibus Taxis – 10 persons/vehicle; and
- ▶ Buses - 53.1 persons/vehicle.

6.12.1 Impact assessment

The traffic impact of the proposed development on the adjacent road network focuses on determining the vehicular trips generated by the development activities during construction and operation phases, and investigating traffic engineering issues and concerns on road capacity, road safety, public transportation, and non-motorised transport within the study area.

Project phase	Construction			
Impact	Increase traffic volumes resulting in a reduction in road capacity			
Description of impact	During the construction phase, several heavy vehicles will be used to transport the construction equipment and material, and construction workers are expected to access the site by private cars and public transport vehicles. The additional vehicles on the road network are expected to increase traffic volumes on the road and reduce the existing road capacity.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	The capacity analysis showed that the road network is operating well below capacity on normal days and the impact of the additional traffic is expected to be negligible. It is anticipated that construction will not take place on abnormal days (long weekend and December holidays). Therefore, no mitigation measures are required.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Negligible	Natural and/ or social functions and/ or processes are negligibly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	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	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Negligible - negative		Negligible - negative	

Project phase	Construction	
Impact	Increased road safety risk	
Description of impact	The speed variation between the heavy vehicles and the light vehicles may lead to aggressive behaviour from light vehicles which could result in an accident	
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts

Potential mitigation	<ul style="list-style-type: none"> Ensure heavy vehicles and abnormal load vehicles comply with limitations on vehicle dimensions and axle, vehicle masses and safety standards set out in the Road Traffic Act, 1996 (Act No 93 of 1996) and the National Road Traffic Regulations, 2000 for vehicle using a public road. Discourage routing of heavy vehicle traffic through populated area. Avoid transporting abnormal load during peak periods. Heavy vehicle drivers should attend a specialised road safety and driving course that sensitises them to the impact that they have on driving conditions for other road users. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Regional	Impacts felt at a regional / provincial level	Regional	Impacts felt at a regional / provincial level
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Negligible - negative	

Project phase	Construction			
Impact	Deterioration of road conditions			
Description of impact	The presence of heavy construction vehicles on road network is likely to accelerate the deterioration of these roads			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Ensure heavy vehicles and abnormal load vehicles comply with limitations on vehicle dimensions and axle, vehicle masses and safety standards set out in the Road Traffic Act, 1996 (Act No 93 of 1996) and the National Road Traffic Regulations, 2000 for vehicle using a public road.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce

Significance	Minor - negative	Negligible - negative
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Project phase	Construction			
Impact	Increase public transport and NMT activity			
Description of impact	The construction phase is expected to generate a significant number of public transport and NMT users which will require additional public transport services and result in increased pedestrian activity in the vicinity of the site.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	A construction traffic management plan will be required to give guidance on provision of temporary public transport and NMT infrastructure requirements during construction. Regular pedestrian and cycling activity awareness for staff working on site during all construction, as part of regular Health and Safety briefings.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Very low	Natural and/ or social functions and/ or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	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	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Negligible - negative		Negligible - positive	

Project phase	Construction			
Impact	Disturbance for community of Graskop			
Description of impact	There is a possibility of there being noise pollution, air pollution and vibrations experienced by the Graskop residents while they are at home			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Ensure that heavy vehicles do not travel in the early and late hours of the day			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Very low	Natural and/ or social functions and/ or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	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	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge

Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Negligible - negative		Negligible - negative	

Project phase	Operation			
Impact	Increase traffic volumes resulting in a reduction in road capacity			
Description of impact	The additional traffic generated by the development is expected to have a negligible impact of the road network on normal days. However, the intersection of Main Street and R532 and Richardson Avenue in Graskop is currently operating over capacity during abnormal days and will worsen during the operational phase.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Make use of pointsman at the intersection in Graskop during abnormal days			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Negligible - positive	

Project phase	Operation			
Impact	Increased road safety risk			
Description of impact	Vehicles travelling along the R534 in the vicinity of the development site were observed to be speeding which may result in accidents at the development access.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Introduce traffic calming measures along R534 in the vicinity of the site access			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Long term	Impact will last between 10 and 15 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	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
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Negligible - negative	

Project phase	Operation			
Impact	Increase public transport and NMT demand			
Description of impact	The operation phase is expected to generate a notable number of public transport vehicle trips which will be accommodate by the proposed public transport facilities on site. It is expected that the development will generate few NMT trips			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Sidewalk is recommended along the development site frontage.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Very low	Natural and/ or social functions and/ or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	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	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Negligible - negative		Negligible - negative	

6.12.2 Conclusion and recommendations

The following points summarise the findings and recommendations of the study:

- ▶ The future proposed development is expected to attract 1 089 visitors and 161 employees per day. On this basis, the proposed development is expected to generate about 60 vehicle trips during peak hour of a normal day that does not fall in December or over a long weekend which are considered to be abnormal days.
- ▶ The existing development generates an average of 78 vehicle trips per hour on a normal day, based on a traffic count that was done on a Friday and a Saturday in June 2020. June falls on the shoulder season between peak and off peak months at the development. It is therefore considered to represent the average demand at the existing development for a year.

- ▶ Since the proposed development peak hour volumes were found to be less than the existing average demand, a sensitivity analysis was conducted to test a wide range of scenarios pertaining to the traffic volumes generated by the proposed development. The scenarios included the following:
 - Low growth scenario – No additional trips are generated at the proposed development.
 - Medium growth scenario- The proposed development will attract a magnitude of additional trips that is equivalent to 50 % of the current trips at the site.
 - High growth scenario- The proposed development will attract a magnitude of additional trips that is equivalent to 100 % of the current trips at the site.
- ▶ For normal days, the capacity analysis indicated that all intersections in the study area are currently operating at acceptable level of service and will continue to operate acceptably in the future for all proposed development growth scenarios tested.
- ▶ For Abnormal days, except for the intersection of Main Street and R532 and Richardson Avenue in Gaskop, all intersections in the study area are operating at an acceptable level of service and are expected to continue to operate similar level of service in the future for all growth scenarios tested.
- ▶ The intersection Main Street and R532 and Richardson Avenue is currently operating at an unacceptable level of service during abnormal days and will worsen in the future if not signalised. It is the local municipality is responsibility to upgrade roads to accommodate existing traffic demand and traffic background growth. However, it should be noted that the frequency of abnormal days are far less than normal days and signalization of the intersection may be deemed not necessary.
- ▶ The existing access off the R534 will be used and will require no additional road upgrades the existing capacity is expected to accommodate all future growth scenarios tested.
- ▶ As per the proposed entrance layout, the development will have two inbound lanes and two outbound lanes at the access. The queuing analysis results at the access indicated two inbound lanes and two outbound lanes would be adequate for normal days for all growth scenarios tested. The medium and high growth scenarios for abnormal days would require 3 and 4 inbound lanes respectively. The proposed two inbound lane would be able to handle about 15% development growth of the existing abnormal day demand.
- ▶ For the ease of movement of the public transport vehicles to conduct drop offs and pick ups, it is recommended that there be two inbound lanes into the site, from the intersection of the development access with R534, whereby one will be for public transport vehicles and the other for light vehicles entering their designated parking areas.
- ▶ To promote a safe environment for NMT users, a 2m wide sidewalk is recommended along the development frontage on. It is also recommended that separate gates for NMT users be provided at a convenient location, at the development access..
- ▶ An assessment was made of the environmental significance of traffic impacts. Although the overall impacts were determined as minor or having negligible impact, the following mitigation measures aimed at minimising any traffic impact caused by the project are recommended to be implemented by the developer:
 - Ensure heavy vehicles and abnormal load vehicles comply with limitations on vehicle dimensions and axle and vehicle masses and safety standards set out in the Road Traffic Act, 1996 (Act No 93 of 1996) and the National Road Traffic Regulations, 2000 for vehicle using a public road.
 - Discourage routing of construction heavy vehicle traffic through populated area.
 - Avoid transporting abnormal load during peak periods.
 - Drivers of all heavy vehicles be required to attend a specialised road safety and driving course that sensitises them to the impact that they have on driving conditions for other road users.
 - Provide regular pedestrian and cycling activity awareness for staff working on site during all construction, as part of regular Health and Safety briefings.

Provided that the above comments and recommendations are adhered to, the proposed application can be supported from a traffic engineering perspective.

7 CONCLUDING STATEMENTS

The potential impacts associated with the proposed God’s Window tourist development are discussed in detail in Section 6. In summary, the significance of potential impacts range from major negative to moderate positive for construction related impacts and major negative to minimal positive for operational impacts. With mitigation measures in place as set out in Section 6 and detailed in the EMPr (Annexure G), post mitigation impacts are anticipated to be moderate negative to minimal positive in significance.

7.1 Impact summary

The below sections provide a concise summary of the impact assessments in individual summary tables to show the impact significance before and after mitigation.

7.1.1 Social Impact

From a social perspective, the project will mean more tourists and activity in the area and thereby a much-needed increase in the opportunity to harness the future economic benefits. This will be through increased job creation and other income generating activities related to tourism in the area. A number of negative socio-economic impacts could also arise from the project, as detailed in Section 6.11. The below table illustrates how the implementation of mitigation measures not only reduces many of the negative impacts, but also results in positive impacts in many cases.

Table 7-1: Social and socio-economic impact summary table

Project phase	Impact	Without mitigation	With mitigation
		Significance	Significance
Construction	Livelihood impact on curio vendors	Moderate - negative	Minor - negative
Operation	Expectation of job opportunities	Major - negative	Minor - positive
Construction	Delays in project progress during construction, and subsequent delays in opening caused by disruption/community unrest	Minor - negative	Negligible - negative
Construction	Impacts on sacred areas or areas with heritage, cultural, or religious significance	Negligible - negative	Negligible - negative
Operation	Increased business for mini-bus taxis as mini-tour buses or transport for curio vendors	Minor - positive	Minor - positive
Operation	Increased traffic and discomfort between mini-bus taxis and between taxis and tourist buses	Minor - negative	Minor - positive
Operation	Expected increased sales and benefits for all curio vendors, not just those currently at God's Window and increased competition.	Moderate - negative	Minor - positive
Operation	Prioritisation of God's Window Skywalk by tourists might reduce business elsewhere	Minor - negative	Minor - positive
Operation	Increased security and protection from theft and inclement weather for curio vendors	Minor - positive	Minor - positive
Operation	Litter, destruction and nuisance	Minor - negative	Negligible - negative
Operation	Curio vendors might lose more money than they make if they have to pay rent at the new development	Minor - negative	Minor - positive

Project phase	Impact	Without mitigation	With mitigation
		Significance	Significance
Construction	Lack of involvement of local SMMEs during the operation phase could lead to project disruption and poor Social Licence to Operate	Minor - negative	Minor - positive
Operation	Lack of involvement of local SMMEs during the operation phase could lead to project disruption and poor Social Licence to Operate	Minor - negative	Minor - positive
Construction	Unfair distribution of employment opportunities	Minor - negative	Negligible - negative
Operation	Unfair distribution of employment opportunities	Minor - negative	Negligible - negative
Construction	Increased traffic during construction phase around God's Window and in Graskop	Minor - negative	Minor - negative
Operation	Increased traffic around site and in Graskop during peak holiday periods	Minor - negative	Minor - negative
Construction	Reduced spend in Graskop during construction of Skywalk caused by fewer visitors	Minor - negative	Minor - negative
Operation	Safety of Skywalk structure	Minor - negative	Negligible - negative
Operation	Current emergency services might not be able to handle emergencies if they occur on site.	Minor - negative	Minor - negative
Construction	Impacts on current water sources	Minor - negative	Negligible - negative
Operation	Land claim beneficiaries might not benefit from the Skywalk as expected, leading to frustration with certain leadership structures	Minor - negative	Minor - negative
Construction	Vulnerable groups might be left behind	Minor - negative	Minor - positive
Construction	Environmental impact of development on "pristine" God's Window site	Minor - negative	Negligible - negative
Operation	Environmental impact of development on "pristine" God's Window site	Minor - negative	Minor - negative
Operation	Socio-economic benefits of the Project might not be felt by all who expect it	Minor - negative	Minor - negative
Operation	Tourists targeted by criminals	Minor - negative	Negligible - negative
Operation	Some Tribal Councils expect to benefit and receive favourable preferential treatment from the project	Moderate - negative	Minor - negative
Construction	Demographic impacts	Minor - negative	Negligible - negative
Construction	Social concomitants associated with demographic impacts	Minor - negative	Negligible - negative

7.1.2 Terrestrial Ecology Impact

Anticipated impacts to botanical ecology of the site result mainly due to the project being situated within a protected area which comprises largely of natural vegetation that range from medium to high sensitivity. The vegetation further includes sensitive and unique habitats, and several plant species of

conservation concern were confirmed to occur or are highly likely to be present. The negative botanical impacts will mainly be associated with disturbance and loss of vegetation of medium sensitivity for the main development footprint and removal and edge effects of the very-high sensitivity *Aloe arborescens-Clivia caulescens* cliff edge vegetation.

From a faunal perspective habitat integrity and diversity is considered to be moderately high to high for most of the study area. The uplands on the plateau adjacent the focus area have reduced integrity as a result of the high degree of forestry which limit the connectivity in the landscape channelling fauna through the focus area. Thus, the focus area remains an important conduit for faunal movement along this valuable landscape feature. Although no SCCs were observed during the field assessments, the variation in the habitat units ensures that niche habitats will be available to most habitat selective, secretive and rare fauna. Only the Transformed habitat offers reduced integrity and species diversity. This location has been degraded by human infrastructure development and has reduced faunal habitat and diversity. As the study area preserves valuable habitat with a high degree of faunal diversity, it maintains valuable ecosystem services and functions and as such is of high conservation value. The proposed design will sever an important movement corridor along the escarpment edge while increasing anthropogenic disturbances. As the focus area is situated within a Protected Area it has its primary goal to meet biodiversity needs and as such it is considered important that important dispersal processes are maintained through the inclusion of a minimum 15m buffer into the existing design, as well as the development of a connected roof garden to recreate a semblance of habitat connectivity between the north and south of the building. This recommendation has been considered in the project design as included in this report.

Table 7-2: Terrestrial biodiversity impact summary table

Project phase	Impact	Without mitigation	With mitigation
		Significance	Significance
Construction	Loss of Habitat and altered faunal species diversity	Moderate - negative	Minor - negative
Operation	Loss of Habitat and altered faunal species diversity	Major - negative	Moderate - negative
Construction	Impact on faunal SCC	Moderate - negative	Minor - negative
Operation	Impact on faunal SCC	Major - negative	Moderate - negative
Construction	Destruction of natural vegetation of medium sensitivity	Major - negative	Moderate - negative
Operation	Destruction of natural vegetation of medium sensitivity	Moderate - negative	Moderate - negative
Construction	Destruction of natural vegetation of high and very high sensitivity	Major - negative	Moderate - negative
Operation	Destruction of natural vegetation of high and very high sensitivity	Moderate - negative	Minor - negative
Construction	Removal / Destruction of protected plants and plants of conservation concern	Major - negative	Moderate - negative
Operation	Removal / Destruction of protected plants and plants of conservation concern	Major - negative	Moderate - negative
Construction	Potential increase in invasive vegetation, including alien species and indigenous encroacher species	Moderate - negative	Minor - positive
Operation	Potential increase in invasive vegetation, including alien species and indigenous encroacher species	Minor - negative	Negligible - positive
Construction	Clearing of land for construction camps and potential pollution of the soil and water	Minor - negative	Negligible - negative

Project phase	Impact	Without mitigation	With mitigation
		Significance	Significance
Construction	Compaction and destruction of soils	Minor - negative	Negligible - negative
Construction	Destruction of unique rocky habitats and trees	Minor - negative	Minor - negative
Operation	Modification of the natural vegetation	Minor - negative	Minor - negative
Construction	Impact on ecological processes	Major - negative	Minor - negative
Construction	Impact on ecological processes	Major - negative	Minor - negative

7.1.3 Aquatic Ecology Impact

Watercourses within the vicinity of the study area serve to improve habitat within and potentially downstream of the study area through the provision of various ecosystem services. Many of these functional benefits therefore contribute directly or indirectly to increase biodiversity within the study area as well as downstream of the study area through provision and maintenance of appropriate habitat and associated ecological processes.

Findings of the VEGRAI vegetation assessment conducted on riparian units identified within the study area indicated that riparian habitat associated with the study area were regarded as being in a largely natural state (i.e. Ecological Category A/B).

Any developmental activities in a natural system will have an impact on the surrounding environment, usually in a negative way.

Impact considerations identified sedimentation, increased erosion, water quality deterioration, increase in alien vegetation species as well as an altered hydrological regime as the major potential impacts during the construction and operational phases. Several preliminary general and specific mitigation measures were proposed in order to reduce negative impacts and incorporate some potentially positive impacts from the proposed development.

Table 7-3: Freshwater biodiversity impact summary table

Project phase	Impact	Without mitigation	With mitigation
		Significance	Significance
Construction	Sedimentation of watercourse	Moderate - negative	Negligible - negative
Construction	Erosion	Moderate - negative	Negligible - negative
Construction	Alien Invasive Vegetation	Moderate - negative	Minor - positive
Construction	Water Quality Deterioration	Moderate - negative	Negligible - negative
Operation	Altered Hydrologic Regime	Moderate - negative	Negligible - negative
Operation	Water Quality deterioration	Moderate - negative	Minor - positive

7.1.4 Visual Impact

The potential landscape and visual impacts will be both positive and negative. With reference to the most recent architectural design concept, negative impacts are most likely associated with the construction stage of the project whereas impacts during the operational phase will potentially be twofold i.e., the existing sense of place and landscape character of the site will be permanently altered, but the new Skywalk will provide the user with an improved viewing experience.

For normal days, the capacity analysis conducted during the traffic impact assessment indicated that all intersections in the study area are currently operating at acceptable level of service and will continue to operate acceptably in the future for all proposed development growth scenarios tested.

Table 7-4: Visual and landscape impact summary table

Project phase	Impact	Without mitigation	With mitigation
		Significance	Significance
Construction	Impact on landscape character and sense of place	Minor - negative	Negligible - negative
Operation	Impact on landscape character and sense of place	Negligible - negative	Negligible - negative
Decommissioning	Impact on landscape character and sense of place	Negligible - negative	Negligible - negative
Construction	Impact on visual intrusion and VAC	Negligible - negative	Negligible - negative
Operation	Impact on visual intrusion and VAC	Minor - negative	Negligible - negative
Decommissioning	Impact on visual intrusion and VAC	Negligible - negative	Negligible - negative
Construction	The visibility and presence of the cleared PV facility and associated infrastructure. (Glint and glare and industrialisation of views)	Minor - negative	Negligible - negative
Operation	Visual Exposure and Visibility Impacts	Minor - negative	Negligible - negative
Decommissioning	Visual Exposure and Visibility Impacts	Negligible - negative	Negligible - negative
Construction	Impacts due to night time lighting	Negligible - negative	Negligible - negative
Operation	Impacts due to night time lighting	Minor - negative	Negligible - negative
Decommissioning	Impacts due to night time lighting	Negligible - negative	Negligible - negative

7.1.5 Traffic Impact

The intersection of Main Street and R532 and Richardson Avenue is currently operating at an unacceptable level of service during abnormal days and will worsen in the future if not signalised. It is the local municipality's responsibility to upgrade roads to accommodate existing traffic demand and traffic background growth. However, it should be noted that the frequency of abnormal days are far less than normal days and the signalization of the intersection may be deemed unnecessary. As such, it is recommended that arrangements be made with the local municipality that pointsmen direct traffic at this intersection during abnormal days. The existing access off the R534 will be used and will require no additional road upgrades to the existing capacity is expected to accommodate all future growth scenarios tested. For the ease of movement of the public transport vehicles to conduct drop offs and

pickups, it is recommended that there be two inbound lanes into the site, from the intersection of the development access with R534, whereby one will be for public transport vehicles and the other for light vehicles entering their designated parking areas.

Table 7-5: Traffic impact summary table

Project phase	Impact	Without Mitigation	With Mitigation
		Significance	Significance
Construction	Increase traffic volumes resulting in a reduction in road capacity	Negligible - negative	Negligible - negative
Construction	Increased road safety risk	Minor - negative	Negligible - negative
Construction	Deterioration of road conditions	Minor - negative	Negligible - negative
Construction	Increase public transport and NMT activity	Negligible - negative	Negligible - positive

7.1.6 Heritage and Palaeontological Impact

No archaeological / heritage features of significance or graves were identified in the project area.

Archaeological material or graves are not always visible during a field survey and therefore some significant material may only be revealed during construction activities. It is therefore recommended that the developers be made aware of this possibility and when human remains, clay or ceramic pottery etc. are observed, a qualified archaeologist must be notified and an assessment be done.

The geological structures suggest that the rocks are much too old to contain body fossils. Since there is an extremely small chance that trace fossils such as stromatolites were present and may be disturbed a Fossil Chance Find Protocol has been added to the EMPr.

7.2 Conclusion and recommendations

The recommended mitigation measures, many of which have been considered in the engineering design, will reduce negative impacts.

The 15m setback of the building from the cliff edge will serve as an ecological corridor to prevent the disconnection of the surrounding habitats for faunal species. This vegetated corridor was subsequently determined to be a potential fire hazard and prompted the engineering team to design a bespoke solution to limit the risk of fire to an acceptable (and legal) level, while maintaining the objective of the ecological corridor initiative, since a vegetation free zone of at least 5m is generally implemented around buildings situated within natural and vegetated areas. Since this would have resulted in the nullification of the objective of the ecological corridor to connect the surrounding habitats for faunal movement, the fire management plan was revised to include a tailored approach to managing the fire risk in this unique development. As a result, the installation of sprinklers to create a “wetter” vegetation within the ecological corridor was approved which negates the need for unvegetated areas. Figure 7-1 illustrates the design has been suggested for implementation. Refer to section 4.2.9 for details on the fire management proposed for the project.

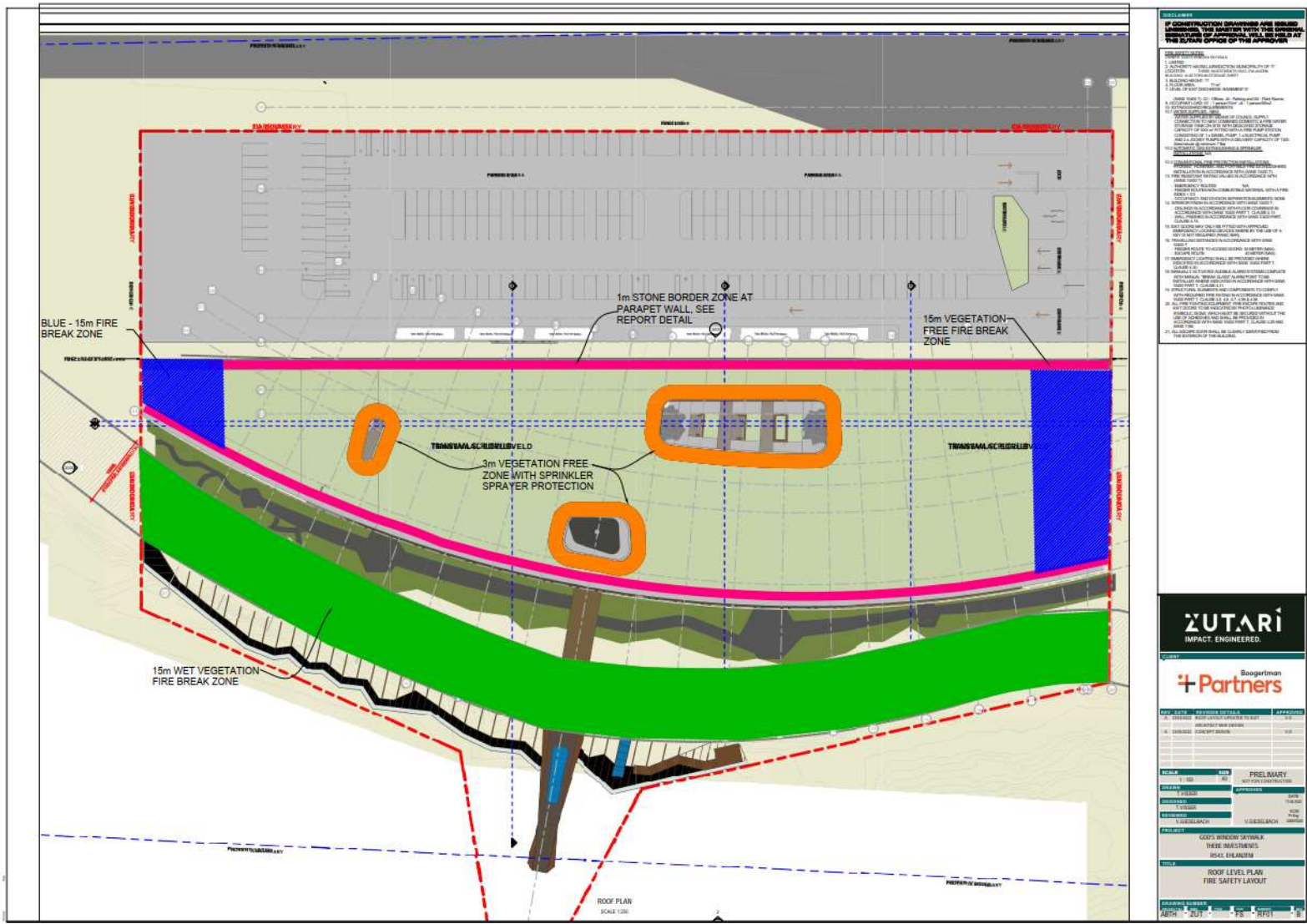


Figure 7-1: Proposed fire management plan

The foundation designs endeavor to limit impermeable surfaces. The “green” roof with sub-infrastructure drainage linked to the foundation via pillar drainage will significantly reduce impacts on surface and subsurface drainage and daylighting hydrological regimes. Rainwater from the building roof will be released into the environment in a controlled manner to further encourage recharging of the potential sub-surface flows. The development hydrology will thus mimic the site’s hydrogeology (filling and spilling) though allowing water to potentially recharge through cracks underneath the foundation with excess overflow directed towards Riparian 1 for further attenuation and diffuse release.

The incorporation of the ecological corridor through the rooftop garden atop the arched roof design (at a natural grade from the eastern to western sides) would therefore also mimic preconstruction hydrological conditions in order to maximise hydrological support to watercourses via historic flow paths and also aims to restore some of these lost flow-paths as a result of historic infrastructure in the vicinity of the terrain.

The new parking area is to be laid with permeable block paving. Rainwater will infiltrate through the permeable concrete blocks into a sub-base comprising of stone layers and will encourage recharging of the sub-surface flow. Rainwater which does not infiltrate through the paving blocks will run overland and will be channelled into a stormwater attenuation pond. Stormwater discharged from the attenuation pond into the natural environment in a controlled manner to not exceed the pre-development peak flows, which will also encourage recharging of the sub-surface flow.

By mitigating the alteration of the hydrological regime and the potential for erosion and sedimentation, the floral and faunal biodiversity impacts related to these aspects are also expected to be improved.

It is further recommended that Riparian 1 be considered for rehabilitation to include attenuation, infiltration and diffuse release mechanisms which can promote artificial wetland conditions capable of polishing stormwater and/or treated sewage effluent. This must be done in collaboration with the specialist.

From a socio-economic perspective, the benefits of the project to the local community are considerably high. In a country where employment numbers and household incomes are devastatingly low, the need for sustainable development is continuously increasing. While the need to preserve and conserve the biodiversity, especially within a protected area is important, it cannot outweigh the social needs of the local community. As such, ecological mitigation measures have been proposed to reduce the significance of the negative impacts.

In conclusion, it is the EAPs recommendation that the project be approved for development on condition that the feasible mitigation measures and EMP requirements be incorporated into the final detailed designs and implemented by the Applicant.

7.3 Recommendations for inclusion into EA conditions

All identified protected species may not be removed or disturbed without the approval from the relevant authorities by means of a floral permit application.

All SCCs that need to be removed from the development footprint must be done so by a botanical specialist and either kept in a nursery for re-use during rehabilitation or be transferred to the surrounding environment.

An Environmental Control Officer (ECO) who holds a qualification in an environmental related field and has at least 2 years of experience must be appointed. The ECO should preferably be on site daily during the construction phase and provide monthly reports to the CA on the project’s compliance to the EA and EMP.

Rehabilitation of the project footprint must be done in a phased approach to prevent any completed area from remaining without topsoil and vegetation for unnecessarily long periods.

A 15m ecological corridor between the visitor’s centre and the edge of the cliff must be maintained in addition to the proposed vegetated roof to provide habitat connectivity.

The parking area is to be laid with permeable block paving with a sub-base of stone layers.

There should be a dense planting strip between the R534 and the parking area, this not only screens the building, but also creates a 'green tunnel effect' with views opening up when entering the complex which are in line with the landscape's character.

The proposed upgrading of the footpaths must be limited to the existing footprint as far as possible, with any construction related impacts rehabilitated in a phased approach.

The development fencing, which is required for security purposes, should not create a barrier for faunal species to utilise the ecological and rooftop corridors.

7.4 Way Forward

The God's Window project concerns a variety of stakeholders including multiple government bodies, on national, provincial and local level, parastatals, adjacent landowners, tribal authorities and a host of interested and affected parties. Without regular and transparent communication processes and a clear channel through which stakeholders can raise grievances, lack of communication could become a serious risk to the project. This may lead to misalignment, unrest, and delay the completion of the project or its smooth functioning. As such, the next step entails a rigorous 30-day Public Participation Process to provide an opportunity to all stakeholders to comment on the proposed project by reviewing this BAR and its associated documents. The proposed Public Participation Process is structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to voice any issues of concern at various stages throughout the environmental BA and WULA processes.

The objectives of the Public Participation Process are to provide information to the public, identify key issues and concerns at an early stage, respond to the issues and concerns raised, provide a review opportunity, and to document the process properly. The Public Participation Process will be managed to meet these objectives. Any comments, concerns, issues or frequently asked questions revealed during the Public Participation Process will be included in the BA report's comments and response report and the SIA before it's finalisation for submission to the CA for decision making.

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Annexure A – Details of the EAP

Annexure B – Authority Communications

Annexure C – Public Participation Documents

Annexure D – Specialist Reports

Annexure E – DFFE Screening Tool

Annexure F – Impact Assessment Methodology

Annexure G – EMPr

Annexure H – Site photos

Annexure I – Maps and Facility Illustrations

In diversity there is beauty
and there is strength.

MAYA ANGELOU

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