

BASIC ASSESSMENT AND SCREENING REPORT
FOR ENVIRONMENTAL AUTHORIZATION FOR THE
PROPOSED MOKOPANE & SEKURUWE WATER
TREATMENT SERVICES

OLIFANTS MANAGEMENT MODEL PROGRAMME BULK RAW WATER STUDY PHASE (OMMP-BRWSP)

**MOKOPANE & SEKURUWE WATER TREATMENT WORKS
(WTW) IN THE LIMPOPO PROVINCE OLS ASSESSMENT**

**Lebalelo Water Users Association (LWUA), on behalf of the
Department of Water and Sanitation (DWS)**

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1 Introduction

The intent of this report is to communicate the findings of a conceptual Obstacle Limitation Surface (OLS) assessment conducted to determine any foreseeable airspace/ civil aviation aerodrome impact posed by the new Mokopane and Sekuruwe Water Treatment Works, proposed in the Limpopo Province, to the Potgietersrus Airport (FAQR) and Shikwaru Lodge Airstrip (R081). The Mokopane Water Treatment works is approximately 5.4km North-East of the Potgietersrus Airport and 13.6km North-East of the Shikwaru Lodge Airstrip as depicted in Figure 1 below. Two alternatives for the Mokopane site is being considered in terms of environmental impact. The Mokopane site located on the steep terrain is referred to as the "**Alternative Site**", while the site on the less steep land is the "**Preferred Site**" (see Figure 2 below). The Sekuruwe site is approximately 30.7km North-North-West of the Mokopane site.

The OLS analysis conducted is based on International Civil Aviation Organization (ICAO) Annex 14 Standards and Recommended practices, the ICAO Airport Services Manual (Doc 9137) Part 6 and the SACAA Technical Standards and Guidance Material. The findings of this report are to be considered in addition to the South African Civil Aviation Authorities (SACAA) requirements.

The content of this report does not include Air Traffic Navigation Services (ATNS) requirements or radar interference considerations. The client should approach ATNS directly for the related evaluation.

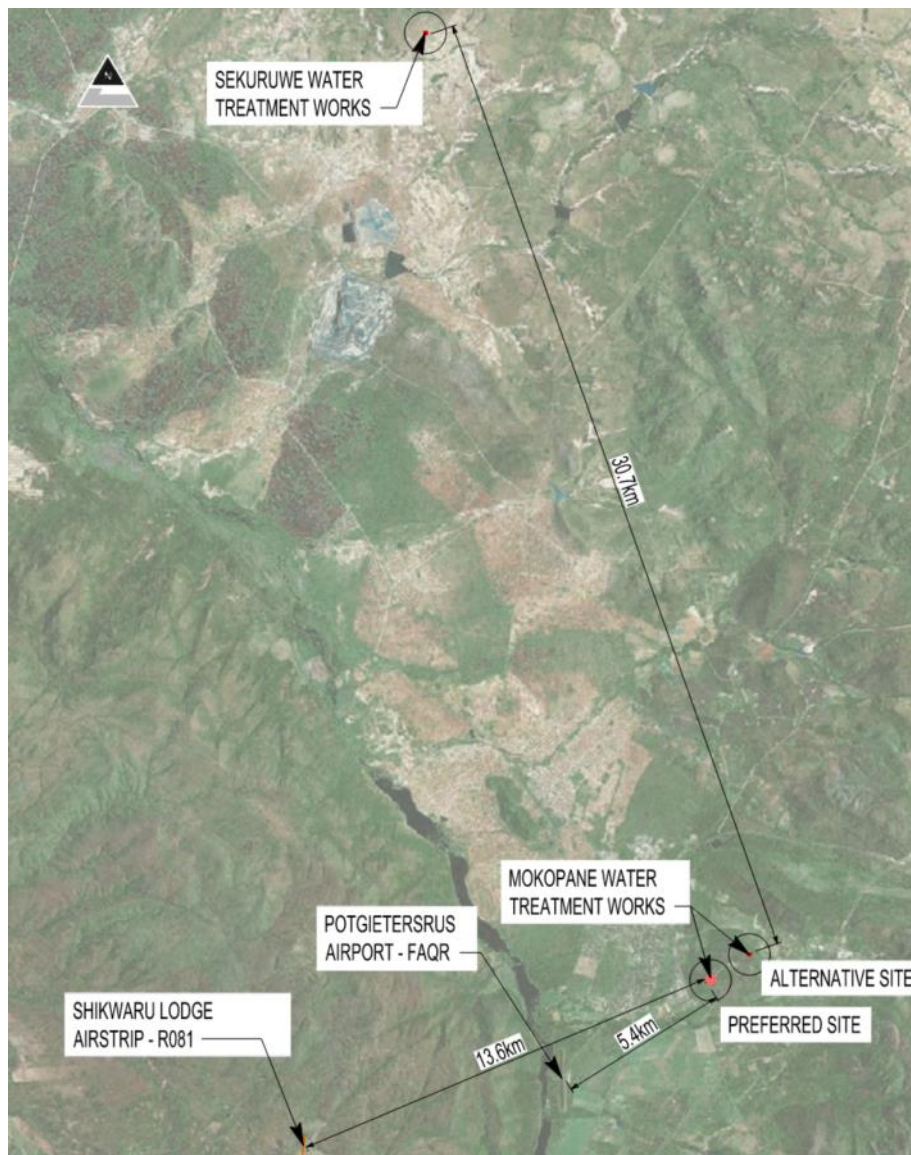


Figure 1: Locality map



Figure 2: Mokopane Preferred and Alternative Site

2 Obstacle Limitation Surface Assessment

The OLS are series of surfaces that define the limits to which objects may project into airspace around aerodromes which are required to be maintained free from obstacles. Defining and assessing the OLS ensure that the intended aeroplane operations at the aerodromes are conducted safely and prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes. Figure 3 illustrates the different OLS surfaces. The dimension of certain features is determined by the aircraft size for which the aerodrome is intended as well as the runway threshold positions.

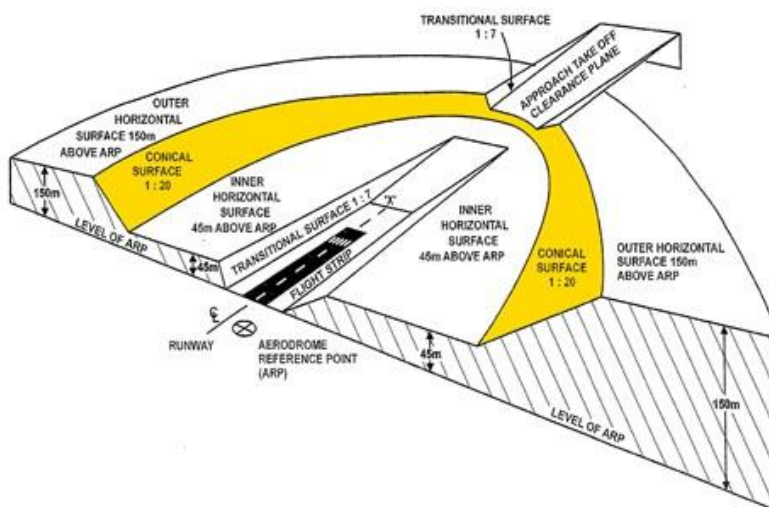


Figure 3: OLS illustration

2.1 OLS Assessment

Figure 4 illustrates the interaction of the Mokopane site with the OLS for Potgietersrus Airport and Shikwaru Lodge Airstrip.

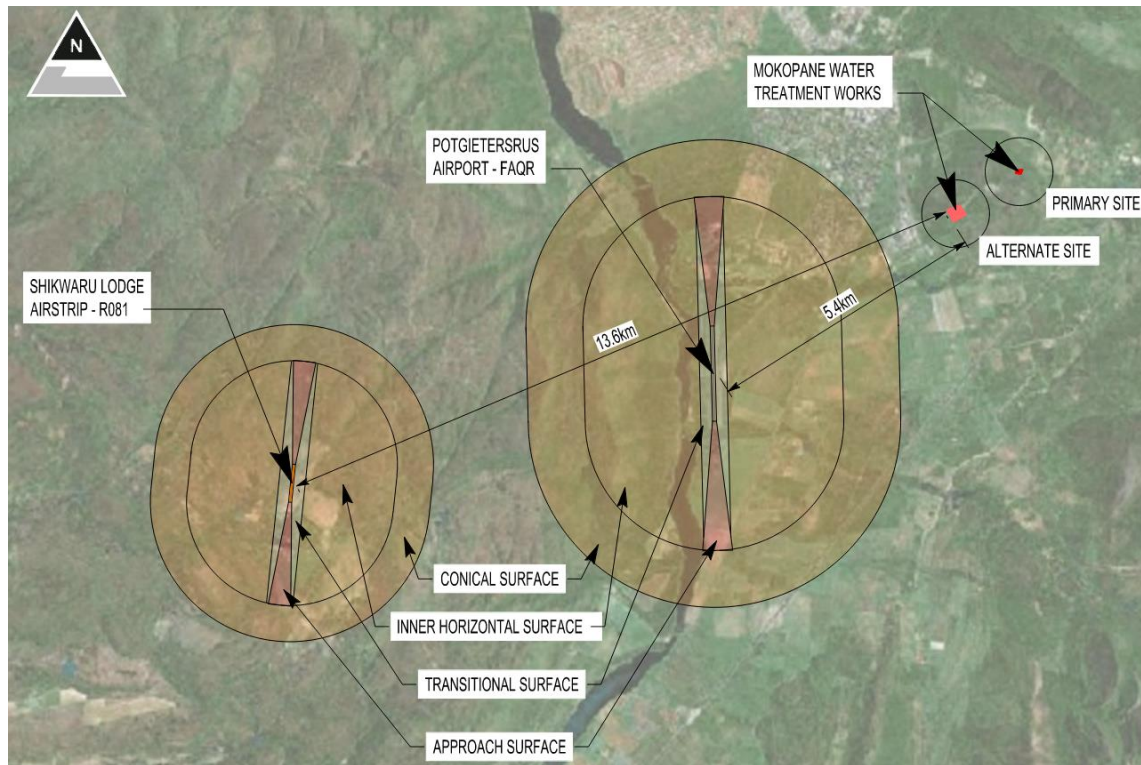


Figure 4: Potgietersrus Airport and Shikwaru Airstrip Obstacle Limitation Surfaces

2.1.1 Assumptions and Considerations

The following assumptions and considerations were applied during the OLS assessment as depicted in Table 1 and

Table 2:

Table 1: Assessment assumptions and considerations (Potgietersrus Airport - FAQR)

Assumption/Consideration	Reference
Airfield operational status	Unlicensed (Un-operational) ATNS Airspace (RSA DATA - 13JULY2023.kmz) https://ourairports.com/airports/FAQR/
Runway length	01/19 – 1762 m https://ourairports.com/airports/FAQR/
Runway width	15 m Visual observation - Bing Maps
Aerodrome reference code	2A ICAO Annex 14 Volume 1 Table 3.1
Aerodrome instrumentation category	Non-Instrument Visual observation - Bing Maps
Aerodrome reference elevation	1067 m https://ourairports.com/airports/FAQR/

Table 2: Assessment assumptions and considerations (Shikwaru Lodge Airstrip- R081)

Assumption/Consideration		Reference
Airfield operational status	SACAA Registered Aerodromes (Operational)	ATNS Airspace (RSA DATA - 13JULY2023.kmz) https://shikwaru.co.za/fly-in/
Runway length	01/19 – 700 m	https://shikwaru.co.za/fly-in/ Visual observation - Bing Maps
Runway width	15 m	Visual observation - Bing Maps
Aerodrome reference code	1A	ICAO Annex 14
Aerodrome instrumentation category	Non-Instrument	Visual observation - Bing Maps
Aerodrome reference elevation	1250m	https://shikwaru.co.za/fly-in/

According to ICAO Annex 14, paragraph 4.2.1, the following surfaces are considered for a non-instrument approach runway:

- Transitional Surfaces
- Approach Surfaces
- Inner Horizontal Surface
- Conical Surface

A brief description of each surface with assessment findings is presented in the following sections. The reader is referred to ICAO Annex 14 for more information.

2.1.2 Transitional Surfaces

A complex surface along the side of the strip and part of the side of the approach surface, that slopes upwards and outwards to the inner horizontal surface. The limits of a transitional surface comprise a lower edge beginning at the intersection of the side of the approach surface with the inner horizontal surface and extending down the side of the approach surface to the inner edge of the approach surface and from there along the length of the strip parallel to the runway centre line and an upper edge located in the plane of the inner horizontal surface.

The Transitional surface slope is 20% for a code number 1 and 2, from the defined lower edge up to the Inner Horizontal Surface.

As illustrated in Figure 4, the proposed Mokopane sites is situated outside the Transitional Surfaces. Thus, no protrusions are anticipated in the Transitional Surfaces.

2.1.3 Approach and Take-off Climb Surfaces

This is an inclined plane or combination of planes, preceding the runway threshold. The limits of the approach surface comprise; an inner edge of specified length, horizontal and perpendicular to the extended centre line of the runway and located at a specified distance before the threshold, two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centre line of the runway, and an outer edge parallel to the inner edge.

For the code 1 non-instrument runway conditions, the Approach surface precedes both thresholds by 30 m. The details of the surface are summarised in Table 3 below:

Table 3: Approach and take-off surface parameters

	Code 1		Code 2	
	Approach Surface	Take-Off Surface	Approach Surface	Take-Off Surface
Length of Inner Edge	60 m	60 m	80 m	80 m
Divergence (each side)	10%	10%	10%	10%
First Section Length	1600 m	1600 m	2500 m	2500 m
First Section Slope	5%	5%	4%	4%
Second Section Length	N/A	N/A	N/A	N/A
Second Section Slope	N/A	N/A	N/A	N/A
Horizontal Section Length	N/A	N/A	N/A	N/A
Horizontal Section Slope	N/A	N/A	N/A	N/A
Total length	1600 m	1600 m	2500 m	2500 m

As illustrated in Figure 4, the proposed Mokopane sites is situated outside the Approach and Take-off Climb Surfaces. Thus, no protrusions are anticipated in the Approach and Take-off Climb Surfaces.

2.1.4 Inner Horizontal Surface

The Inner Horizontal surface is a surface located in the horizontal plane at a specified height above an aerodrome, the radius of which is specified and measured from a reference point on the aerodrome. Code 1 has a radius of 2000m and code 2 a radius of 2500m. The elevation of the surface is measured 45 m from a defined elevation datum for such a purpose.

Figure 4 shows that the Mokopane sites line is situated outside the Inner Horizontal Surface. Thus, no protrusions are anticipated in the Inner Horizontal Surface.

2.1.5 Conical Surface

This surface slopes upwards and outwards from the periphery of the Inner Horizontal Surface. The upper limit is specified as a height above the Inner Horizontal Surface.

For a non-instrument approach code number 1 runway, the Conical Surface is at 35 m above the Inner Horizontal Surface. For a non-instrument approach code number 2 runway, the Conical Surface is at 55 m above the Inner Horizontal Surface. The divergence slope from the lower plane coincident with the Inner Horizontal Surface is 5% in both cases.

No protrusions to the Conical Surface are anticipated as there are no protrusions anticipated in the Inner Horizontal Surface.

2.2 Potgietersrus Airport

The conditions of the aerodrome facility identified at Potgietersrus Airport as illustrated in Figure 1 is unknown. The desktop (online) visual inspection of the facility warrants the assumption that the facility is un-operational, supported by online forums such as <https://ourairports.com/airports/FAQR/>. The non-operational status assumption of the facility, in addition to the distance of the facility to the proposed Mokopane sites, indicate that no airspace activities in the Obstacle Limitation Surface of the facility will be affected.

2.3 Shikwaru Lodge

The conditions of the aerodrome facility identified at Shikwaru Lodge as illustrated in Figure 1 is unknown. The visual inspection of the facility warrants the assumption that the facility is operational for fly-in guests as supported by the lodge website <https://shikwaru.co.za/fly-in/>. The distance of the facility to proposed Mokopane sites, indicate that no airspace activities in the Obstacle Limitation Surface of the facility will be affected.

2.4 Conclusions and Recommendations

The undertaking of this high-level concept OLS assessment indicate that the proposed Mokopane sites does not protrude the OLS of the Potgietersrus Airport nor the Shikwaru Lodge airfield.

3 Civil Aviation Compliance Assessment

3.1 Introduction

Government Notice No. 320 of 20 March 2020 stipulates the protocol for assessment and minimum report content for impacts on civil aviation installations, for activities that require environmental authorisation. The reporting requirements are associated with the level of sensitivity as identified by the National Screening Tool, which sensitivity level determines the requirement for the CAA compliance statement. A site sensitivity verification assessment must confirm or dispute the current use of the land and the environment sensitivity as identified by the screening tool.

An assessment was conducted from the information provided and from available aerial imagery to identifying possible nearby civil aviation installations with the potential of being impacted.

3.2 DFFE Screening Tool

Figure 5 and Figure 6 illustrate the planned infrastructure footprint overlaid on the civil aviation sensitivity map as generated by the DFFE screening tool for the Potgietersrus Airport and the Shikwaru Lodge airfield, respectively.

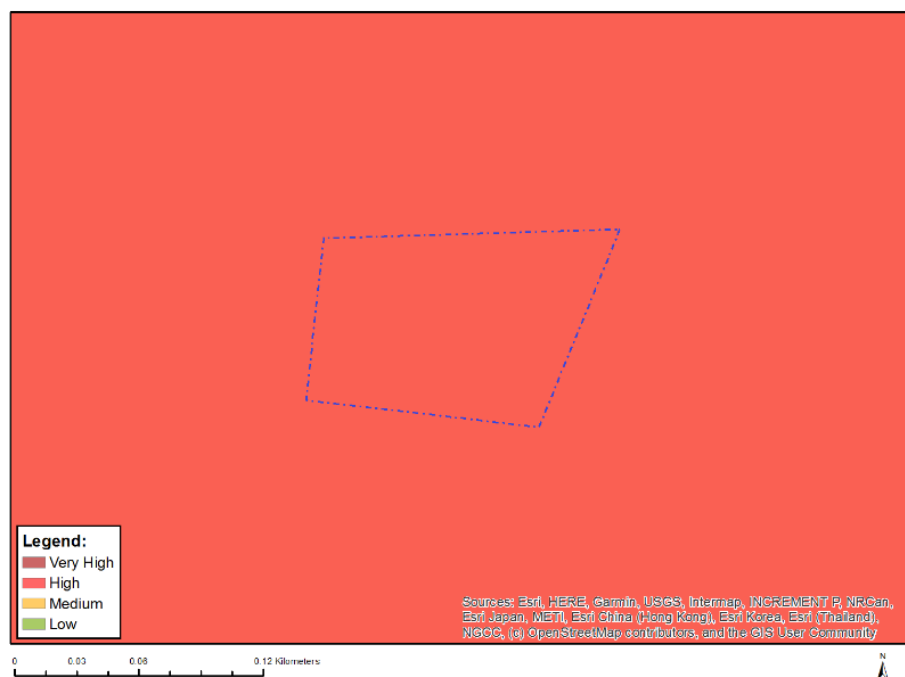
3.2.1 Mokopane WTW

Findings illustrated in Figure 5 indicate a high sensitivity feature of the planned infrastructure in relation to Potgietersrus Airport being within 8km of the aerodrome. Our analysis shows agreement with high sensitivity with the aerodrome due to the proximity.

The OLS assessment conducted however anticipates no interaction between the proposed Mokopane sites and the OLS of Potgietersrus Airport.

The high sensitivity noted for dangerous and restricted airspace is not covered in this report.

MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Within 8 km of other civil aviation aerodrome
High	Dangerous and restricted airspace as demarcated
Medium	Between 15 and 35 km from a civil aviation radar

Figure 5: Map of relative civil aviation theme sensitivity (OMMP-BRWSP - Mokopane-LWUA-2023-07-10 07-59)

Table 4 shows a summary of the assessment for the Site.

Table 4: Screening tool summary for Mokopane WTW

Sensitivity	Sensitivity Features	Mitigations of Identified Sensitivities
1. High	Within 8 km of other civil aviation aerodrome	a. The Design Report: Sekuruwe Water Treatment Works, Document ID 10691, Revision 4, states in Paragraph 5.3 that the structure will be three storeys. The proposed structure will not extend above existing structures, and therefore does not constitute a new obstacle. b. The SA AIP1 states in ENR 1.1, General Rules, paragraph 1.1.1: Minimum heights: shall be flown over built-up areas or over an open-air assembly

¹ SA Aeronautical Information Publication, En-Route

		of persons at a height less than 1 000 feet above the highest obstacle, within a radius of 2000 feet from the aircraft. There is on hazard for civil aviation.
2. High	Dangerous and restricted airspace as demarcated	The nearest restricted / dangerous airspace is the Lowveld Information sector that provides flight information services to flights above 1500 feet (457,2 meters). This airspace is situated well above the intended structure (s).
3. Medium	Between 15 and 35 km from a civil aviation radar	The nearest civil aviation radar is situated at Mokopane. The proposed structure will not pose any functional hazard to the functioning of the radar due to the limited height of the proposed structure.

3.2.2 Sekuruwe WTW

Findings illustrated in Figure 6 indicate a high sensitivity noted for dangerous and restricted airspace which is not covered in this report.

Furthermore, no OLS protrusions are anticipated at Shikwaru Lodge airfield due to the distance, ~13.6 km, and the high-level OLS analysis conducted.

MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Dangerous and restricted airspace as demarcated

Figure 6: Map of relative civil aviation theme sensitivity (OMMP-BRWSP- Sekuruwe - LWUA-2023-07-10 03-59)

Table 5 shows a summary of the assessment for the Site.

Table 5: Screening tool summary for Sekuruwe WTW

Sensitivity	Sensitivity Features	Mitigations of Identified Sensitivities
High	Dangerous and restricted airspace as demarcated	The nearest restricted / dangerous airspace is the Lowveld Information sector that provides flight information services to flights above 1500 feet (457,2 meters). This airspace is situated well above the intended structure (s).

3.3 Conclusions and Recommendations

Although the planned infrastructure falls within the high sensitivity rating for the proposed site being within 8km of a civil aviation aerodrome, it is not foreseen that these civil aviation installations are impacted by the planned activities with consideration of the OLS of the Potgietersrus Airport and the Shikwaru Lodge airfield.

This analysis does not include ATNS requirements, airspace studies or radar interference considerations. If deemed necessary by the CAA, the client should approach ATNS directly for the related evaluation.

4 Qualifications and Expertise

This report was compiled and reviewed by the following professionals:

Roles	Names - Titles	Experience Summary	Qualification and Affiliations
Approver	Natanya Whitehorn - <i>Environmental Assessment Practitioner</i>	Natanya is as an environmental assessment practitioner (EAP) at Zutari. 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 facilitated 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 her role as Project Manager (Environmental Lead) on various 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).	• Environmental Assessment Practitioners Association of South Africa (EAPASA) • Geo-Information Society of South Africa (GISSA) • International Association for Impact Assessment (IAIASa) • BA (Hons) Geography • BA Geography and Environmental Management
Verifier	Zinzi Portia Xakayi – Environmental Consultant	Zinzi Portia is an environmental consultant at Zutari. She has experience in the compilation of Environmental Management Programmes (EMPrs), basic assessment reports (BARs), and environmental screening reports. She has also assisted in undertaking public participation processes for renewable energy projects in the Limpopo and Gauteng Provinces and for a Green building project in the Mpumalanga province. Zinzi has previous working experience in geo-informatics and geographic information systems (GIS). She has two years of experience working with GIS, which she has gained whilst working on projects for the private sector. she has specialised in spatial analysis, data processing and mapping while her technical responsibilities include inter alia the evaluation of data, digitising,	• Golden Key International Honour Society (GKIHS) • Geo-Information Society of South Africa (GISSA) • International Association for Impact Assessment (IAIASa)

		editing, and converting spatial data and non-spatial data from various formats and manipulating data in Esri ArcMap, GeoMedia and QGIS. Since joining Zutari, she has worked extensively on renewable energy projects, during which she assisted in compiling basic assessment reports, environmental management programmes and undertaking the public participation process. She is also involved in various feasibility screenings for photovoltaic (solar PV) projects in the Limpopo Province and works as an environmental compliance officer (ECO) for green buildings projects in Gauteng.	• BSc (Hons) Geography and Environmental Science • BSc Geography
Reviewer	Wynand Schoeman – <i>Aviation Expertise Lead</i>	Wynand is an aviation specialist with over 20 years of working experience. He has been involved in numerous diverse projects in South Africa, Angola, Mozambique, Lesotho, Zambia and the Philippines Islands; ranging from civil engineering infrastructure related projects to airports and urban areas, mass earthworks, water supply and reticulation, and supervision and project management for multi-level buildings. As the Airfield Lead, his role focuses on obtaining a better understanding of the complex system that forms airports. He has provided a master plan for a greenfields airport in Nigeria and various services to the Airports Company South Africa (ACSA) which included working with International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs), national aviation regulations and technical standards.	• Engineering Council of South Africa (ECSA) – Professional Engineer • Engineering Honours – Technology Management • Bachelor in Engineering - Civil
Author	Preston Padayachee – Airport Engineer	Preston is a civil engineer at Zutari with 4 years airport working experience. He has gained experience in airport master planning and design in South Africa, Nigeria and Rwanda. This includes geometric design of roads for windfarms and airport infrastructure according to the relevant standards. In addition, analysing the Obstacle Limitation Surfaces of airports according to the International Civil Aviation Organisation (ICAO) Annex 14.	• Engineering Council of South Africa (ECSA) – Candidate Engineer • Bachelor of Science in Engineering - Civil
External Author	Hein Reid	An air traffic controller with over 40 years of radar specialization brings unparalleled expertise to their role. They excel in deploying radar equipment, using radar-derived information, and applying their knowledge to ensure the safe and efficient flow of air traffic. Additionally, their qualifications make them well-suited for conducting environmental impact assessments in situations where radar expertise is essential to evaluate potential impacts on the defence aspect of the environment.	• CV Available upon request

Appendix A

Curriculum Vitae

In diversity there is beauty and
there is strength.

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