

**CIVIL AVIATION SITE SENSITIVITY VERIFICATION REPORT IN SUPPORT OF AN
ENVIRONMENTAL IMPACT ASSESSMENT FOR THE KIMBERLEY STRENGTHENING PHASE
3 WITHIN JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY, NORTHERN CAPE
PROVINCE AND DR RUTH SEGOMOTSI MOMPATSI DISTRICT MUNICIPALITY, NORTH
WEST PROVINCE**

PREPARED FOR:

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SOUTH AFRICA (NTCSA), A SUBSIDIARY OF ESKOM HOLDINGS SOC LIMITED
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1 General Introduction

1.1 Regulatory Environment

In March 2020, the National Department of Forestry, Fisheries, and the Environment (DFFE), in Government Gazette 43110, published Protocol 320, which requires Environmental Assessment Practitioners (EAPs) to assess the environmental impact of proposed developments on nearby civil aviation infrastructure. The South African Civil Aviation Authority (SACAA) regulates civil aviation safety and security, while the DFFE ensures that the environmental impact of developments on civil aviation infrastructure is acceptable. To this end the Protocol specifies distance limits that trigger site sensitivity verification studies (CASSV's) by civil aviation specialists. To assist EAPs, it developed a screening tool (Screening Tool) to allow them to undertake a preliminary assessment of the site sensitivity of proposed developments. If the results of this assessment indicate medium or higher sensitivity, then a specialist Civil Aviation Site Sensitivity Verification (CASSV) study is necessary to verify or revise the assigned sensitivity level. Should the CASSV conclude that the sensitivity of the proposed site is indeed medium or higher, a Civil Aviation Compliance Statement prepared by the specialist, with comment as necessary from the SACAA, is required.

Once projects are construction-ready, SACAA Regulations and Technical Standards (CARS and CATS) may require additional Aeronautical Studies for developments deemed to present high safety and/or operational risk to nearby aerodromes. CATS 139.01.30, which was amended in March 2023 (SA-CATS2 of 2023 and Amendment 26 of the Civil Aviation Regulations) imposes on aerodrome licence holders¹ the obligation to mitigate risks that obstacles or other issues may present to aerodrome or aircraft operations. Thus, once Environmental Authorisation for proposed developments close to aerodromes has been procured, further engagement with the SACAA is often necessary to obtain approval of obstacles to be constructed and other issues that may have been identified during the CASSV.

Notes: 1. The wording of the SACAA regulation is 'Licence holder' – in the case of unlicensed or registered aerodromes the standard interpretation is that the obligation becomes that of the aerodrome owner.

1.2 Project Background

DIGES Group CC (DIGES), on behalf of the National Transmission Company of South Africa (NTCSA), a subsidiary of Eskom SOC Limited (Eskom), is undertaking an Environmental Impact Assessment and Environmental Management Programme Report ('EIA/EMPr') for the Kimberley Strengthening Project, Phase 3. This project involves the installation of 400kV powerline from Ferrum to Mookodi substations within Northern Cape and North West Provinces.

The proposed route of the 400kV powerline is illustrated in Figure 1, from the Ferrum substation to the Mooikodi substation.

A Screening Tool analysis by DIGES has indicated a high sensitivity of the project on account of its proximity to various aerodromes, including Kathu (FASS), Black Rock (FABP), Kuruman (FAKU) and Vryburg (FAVB), some of which lie inside the 8-15km trigger distance specified in the DFFE Protocol. The powerline route is also close to restricted airspace denoted FAR71, which is military airspace around the Lohatla SANDF facility. GWI Aviation Advisory (GWI) were thus appointed by DIGES to undertake a CASSV.

Should the CASSV confirm that the sensitivity is indeed high, it will be necessary to issue a Civil Aviation Compliance Statement, after further consultation with the SACAA. For this reason, the CASSV study includes elements of an Aeronautical Study in accordance with standard guidelines issued by the SACAA and to conform with accepted professional practice. The study also draws on guidelines of the US Federal Aviation Authority (FAA), the UK Civil Aviation Authority (UKCAA) and various other authorities.

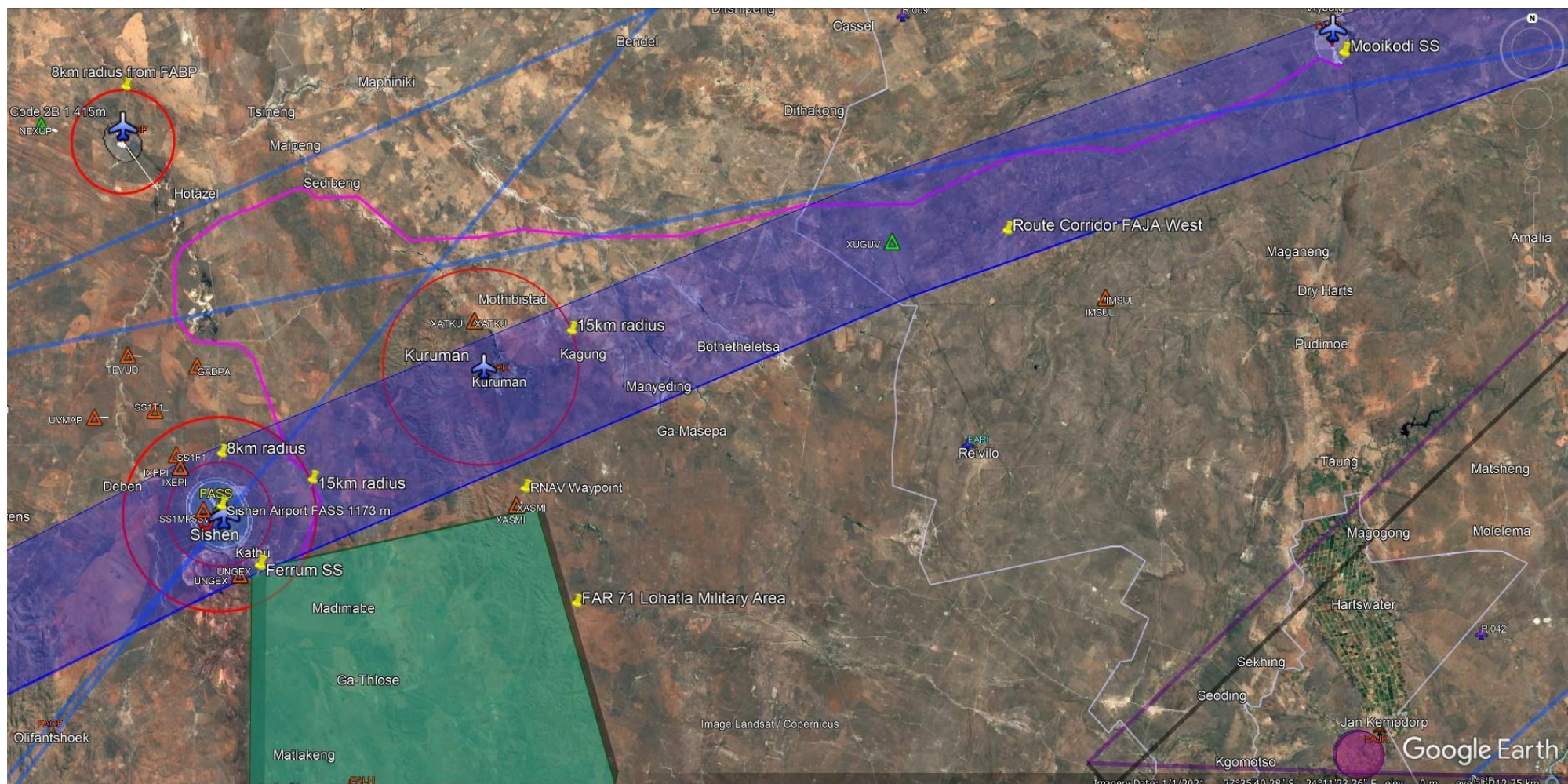


Figure 2: Classification of Airspace affected by the Proposed Powerline and the FAR 71 Restricted Area



Figure 3: Mookodi SS relative to ICAO Obstacle Limitation Surfaces at Vryburg (FAVB)



Figure 4: Ferrum SS relative to ICAO Obstacle Limitation Surfaces near Kathu (FASS)

2 Executive Summary: Kimberley Strengthening Ph. 3

2.1.1 Aeronautical Standards

The main findings of the CASSV are as follows:

- **Obstacles**

The analysis in Section 5.1 concluded that there is no penetration of the powerline into either the ICAO or SACAA 45m obstacle limitation surfaces (OLS's) close to any of the affected aerodromes, nor into the approach and departure surface of the aerodromes (Figures 1 to 4), although the Mookodi substation is relatively close to the Vryburg Approach Surface and may require operational mitigation. The aviation sensitivity in terms of DFFE Protocol 320 is however low.

- **Radar and Navigational Infrastructure**

The proposed sub-project will not materially impact civil aviation radar, navigational, or communications infrastructure in the environs, nor present any material additional risks to operations at the affected aerodrome or within adjacent airspace.

While there is existing navigational infrastructure at Kathu Aerodrome (FASS), some 10km from the Ferrum substation, there is no evidence of other ground-based civil radar installations closer than 35km from the site. This is well outside the 500 ft guideline recommended by the US FAA (per Appendix 9), within which potential RF interference could occur. The civil aviation environmental sensitivity has been assessed as low.

The only ground-based DVOR/DME (see Appendix 9: Glossary of Terms) installation is at Kathu Aerodrome, 10km from the Ferrum substation, and sensitivity is assessed as low.

There are no ground-based NDB (see Appendix 9: Glossary of Terms) installations within 8-15km of the project site, and sensitivity is assessed as low.

- **Civil Aviation Routes: Radio and Communications Interference**

The proposed project does not affect any conventional or satellite-based (GNSS and RNAV – see Glossary

in Appendix 9) route under air traffic control (ATC) of ATNS centres at OR Tambo International Airport (FAOR) (Figure 2).

SACAA CAR Part 171.03.3, PROTECTION OF RADIO SITES states that:

“(ix) VHF / UHF Receivers / Transmitters: Ground-level safeguarding of a circle radius of 91 metres centred on the base of the main aerial tower (or equivalent structure). Additionally, from an elevation of 9 metres on this circle, a 2% (1:50) slope out to a radius of 610 metres.”

The guideline minimum distances prescribed by the FAA for the siting of facilities away from radar, navigational, and other communications devices they could potentially impact range from 250ft to 500ft (Appendix 6.9). These are well below the distance of the proposed development from any ground-based communications infrastructure and radio equipment, the closest of which is beyond 15km, or overflying aircraft. The risk of such interference is thus low.

2.1.2 Environmental

The CASSV findings are that sensitivity is low, and no Civil Aviation Compliance Statement will, therefore, be required for the purposes of environmental authorization.

3 Project Description

Studies by NTCSA have shown that the forecasted growth rate of mining and solar energy developments is expected to exceed the maximum power transfer capability of the transmission network in the Northern Cape. The transmission network supplying the Kimberley area was voltage and thermally constrained under various scenarios and is not sufficient to cater for forecasted future load growth; hence the proposal for a new powerline from the Ferrum substation near Kathu, to the Mookodi substation near Vryburg, some 260km long.

The scope of this portion of the Kimberley Strengthening Phase 3 includes:

- (i) Constructing and operation of Ferrum – Mookodi 400kV line of approximately 260km.
- (ii) Upgrade the Mookodi Substation by installing:
 - 1 x 100MVA busbar reactor at Mookodi 400kV busbar.
 - 1 x 400kV Mookodi feeder bay.
 - 1 x 400kV Line reactor at Mookodi 400kV.
- (iii) Upgrade the Ferrum Substation by installing
 - 1 x 100MVA busbar reactor at Ferrum 400kV busbar.
 - 1 x 400kV Ferrum feeder bay.
 - 1 x 400kV Line reactor at Ferrum 400kV.

The proposed development requires Environmental Authorisation in terms of the National Environmental Management Act (Act 107 of 1998), for which DIGES is the appointed independent Environmental Assessment Practitioner (EAP) for an Environmental Impact Assessment (EIA).

From an aviation perspective, the most sensitive aerodrome is the Vryburg (FAVB) aerodrome, which is 2,46km from the powerline at the closest point, while the Mookodi substation is 452 m beyond the approach path to this aerodrome. Various other points are also within the 8km trigger distance specified by both the DFFE and the SACAA for specialist studies. Thus, using the DFFE screening tool, DIGES assessed the site as having various aviation sensitivities of medium or high. Accordingly, GWI Aviation Advisory (GWI) was appointed to undertake a specialist Civil Aviation Site Sensitivity Verification (CASSV), in accordance with the DFFE Protocol 320 of 2020. Should the CASSV conclude that the site is indeed high risk, further consultation with the SA Civil Aviation Authority (SACAA) will be required to agree on the contents of a Civil Aviation Compliance Statement to be issued by GWI for the purposes of environmental approval by the DFFE.

Assumptions and Limitations

The scope of the study is to undertake the CASSV assessment. While based primarily on the requirements of the DFFE Protocol and the minimum requirements as stipulated on NEMA GNR 982 Appendix 6, the study also references various standards and recommended practices of the International Civil Aviation Organisation (ICAO), the SA Civil Aviation Authority (SACAA) and Air Traffic and Navigational Services SOC Limited (ATNS). These include, inter alia:

- The Civil Aviation Act No. 13 of 2009
- Draft White Paper on Civil Aviation Policy, 2017
- ICAO Annex 14, Volume 1: Aerodrome Design and Operations (see Appendix 9.4 & 9.5)
- SA Civil Aviation Regulations (CARS): Part 139 – Aerodromes and Heliports
- SA Civil Aviation Technical Standards (CATS): SACATS 139.01.30 (26th & 27th Amendments, 2023): Obstacle Limitations and Markings Outside Aerodromes or Heliports (Appendix 9.2)
- Associated provisions of SACATS 139.02.2 – Aerodrome Design Requirements
- ATNS Database of civil aviation airspace in South Africa, August 2024.

4 Scope and Methodology

4.1 Kimberley Strengthening Project – Phase 3: Approach

The Kimberley Phase 3 CASSV was conducted by GWI in terms of the DFFE Protocol, but also references applicable SACAA guidelines. To meet this requirement, GWI Aviation Advisory utilises methodologies as outlined in SACAA document “Technical Guidance Material for conducting Aeronautical Studies or Risk Assessment” effective January 2022 (Appendix 9.3) and notes recent amendments (in March 2023 and April 2024) to the Civil Aviation Regulations, which will affect the operational phase of the project.

In essence, the study comprises the following elements:

- Initiation – Identification of potential impacts and risk issues
- Technical analysis
- Compliance assessment
- Risk/Sensitivity Assessment – Estimation, Evaluation and Control
- Action and Monitoring, including Risk Mitigation (as required).

The study also incorporates various standards and recommended practices (SARPS) of the International Civil Aviation Organisation (ICAO) and the Air Traffic and Navigational Services SOC Limited (ATNS).

In summary, the study arises because the proposed development is within the trigger distances of various aerodromes as described, for which the Screening Tool has indicated high sensitivity. This relates mainly to potential risks associated with penetration of obstacle limitation surfaces and potential interference with communications and navigational equipment and infrastructure.

4.2 Environmental Triggers

An Environmental Authorisation application is required in terms of the Environmental Impact Assessment Regulations (EIA Regulations, 2014) published in Government Notice (GN) No. 982 of 4 December 2014 (as amended by GN No. 571 of June 2021), based on Chapter 5 of the National Environmental Management Act, 1998 (NEMA, Act No. 108 of 1998).

The EIA Regulations, 2014, provide for control over certain listed activities. These listed activities are detailed in Listing Notice 1 (LN1), Listing Notice 2 (LN2), and Listing Notice 3 (LN3), as amended by GN No. 517 of June 2021. The undertaking of activities specified in the Listing Notices is prohibited until Environmental Authorisation has been obtained from the competent authority.

A full description of the listed activities applied for is included in the Application for Environmental Authorisation submitted by DIGES, as appointed EAP.

4.3 DFFE Protocol of March 2020

A ‘Protocol for the specialist assessment and minimum report content requirements for environmental impacts on civil aviation installations’ was gazetted by the DFFE as GN No.320 in the Government Gazette 43110 on 20th March 2020. The Protocol is attached as Appendix 9.6.

In terms of the Protocol, the EAP is required to undertake an initial review of the subject site, utilizing the Screening Tool developed by the DFFE, to assess the potential impact of the proposed development on adjoining civil aviation installations. The Screening Tool uses distance as an indicator of sensitivity.

If the proposed site is:

1. *Between 15 and 35km from a civil aviation radar, or*
2. *Between 15 and 35km from a major civil aviation aerodrome, or*
3. *Between 8 and 15km of other civil aviation aerodromes*

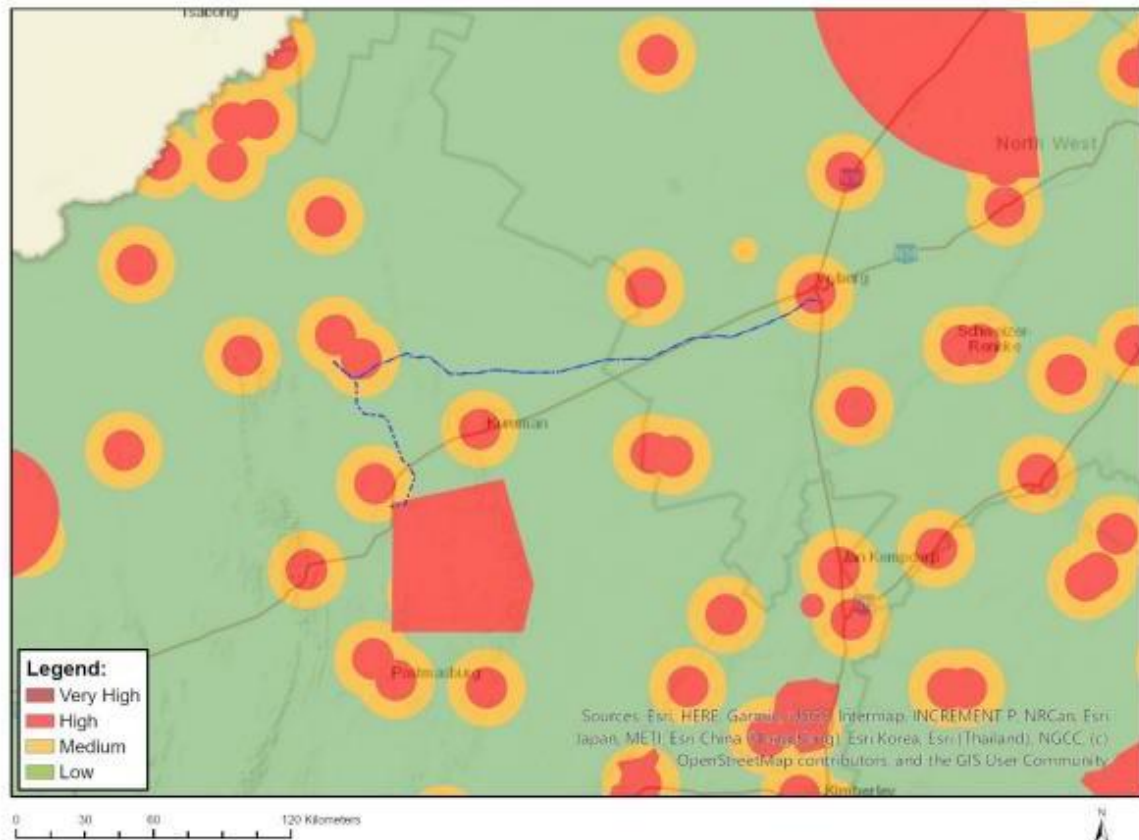
then a sensitivity rating of medium or high is assigned, which triggers a CASS. In terms of the Protocol:

- *If the outcome of (the Specialist’s) site sensitivity verification justifies a sensitivity of medium or higher, then a Civil Aviation Compliance Statement is required.*
- *If the outcome of (the Specialist’s) site sensitivity verification indicates low sensitivity, then there are no further requirements.*

4.4 Initial Assessment

The proposed development was assessed by DIGES Environmental using the Screening Tool and a high sensitivity based on its proximity to aerodromes at Kathu, Black Rock, Kuruman and Vrurg, and its proximity to restricted airspace known as FAR71 – the Lohatla Military area. It should be noted that former Hotazel aerodrome was also included, but that this aerodrome is no longer operative.

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
Low	Low sensitivity
Medium	Within 5 km of an air traffic control or navigation site
Medium	Between 8 and 15 km of other civil aviation aerodrome

Figure 5: DFFE Screening Tool Sensitivity Map

Based on the preliminary sensitivity rating, GWI was appointed to undertake a CASSV to verify or motivate an adjusted rating. The credentials of GWI and relevant CV's of resources deployed on the study are attached to this report as Appendix 9.7. If the CASSV determines that a Compliance Statement is required for environmental purposes, further consultation with the SACAA will be required, to agree the content of such Compliance Statement.

4.5 Specialist Study Elements

The study comprised the following elements:

4.5.1 Obstacle Assessment

Using ICAO Annex 14 and the relevant SACAA CARS/CATS standards, relevant OLS's were reviewed and the risk to these surfaces presented by the proposed development and associated infrastructure assessed.

4.5.2 Airspace Analysis

Using the SACAA Aerodrome Directory and the Aeronautical Information Publication (AIP) information on the aerodromes, airspace classification sourced from the Air Traffic and Navigational Services Corporation (ATNS) and available topographical data, the proposed development site was overlaid on the airspace classification map of the environs and risk posed to aircraft operating in the area assessed.

4.5.3 Radar, Navigation and RF Interference Assessment

Using information available from the SACAA and ATNS, the location of civil aviation radar and other navigational equipment and infrastructure within the guideline distances (per the US FAA) from the proposed development were determined and the risk posed to the operation of these installations assessed.

5 CASSV Outputs

5.1 Obstacle Limitation Surfaces

ICAO requires the determination of various obstacle limitation surfaces (OLS's), which vary according to the aerodrome reference code (ARC) for the affected aerodrome (Figures 6 and 7). An OLS is an imaginary surface in the air which an object may not penetrate unless otherwise motivated through an Aeronautical Study. OLS's vary in size, slope and extent according to the ICAO ARC of the affected aerodrome, which is typically based on runway length and width, referenced to standard atmospheric conditions at sea level (Figure 7). Appendix 9.10 contains further details of the ICAO Annex 14 standards applicable to various ARC's under different infrastructural and operational conditions.

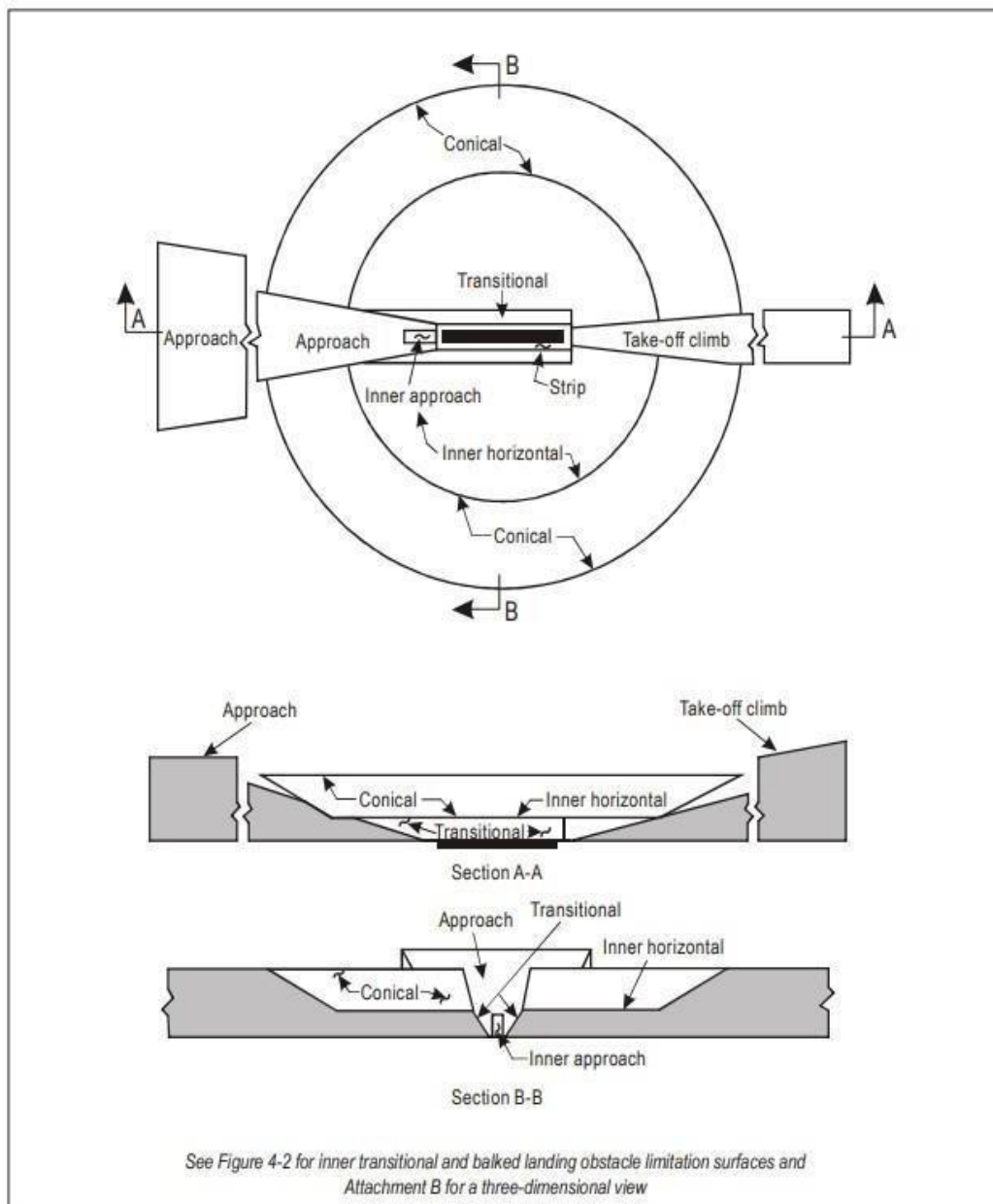


Figure 6: ICAO Obstacle Limitation Surfaces

Table 1-1. Aerodrome reference code
(see 1.6.2 to 1.6.4)

Code element 1	
Code number	Aeroplane reference field length
1	Less than 800 m
2	800 m up to but not including 1 200 m
3	1 200 m up to but not including 1 800 m
4	1 800 m and over
Code element 2	
Code letter	Wingspan
A	Up to but not including 15 m
B	15 m up to but not including 24 m
C	24 m up to but not including 36 m
D	36 m up to but not including 52 m
E	52 m up to but not including 65 m
F	65 m up to but not including 80 m

Note 1.— Guidance on planning for aeroplanes with wingspans greater than 80 m is given in the Aerodrome Design Manual (Doc 9157), Parts 1 and 2.

Note 2.— Procedures on conducting an aerodrome compatibility study to accommodate aeroplanes with folding wing tips spanning two code letters are given in the PANS-Aerodromes (Doc 9981). Further guidance can be found in the manufacturer's manual on aircraft characteristics for airport planning.

Figure 7: ICAO Aerodrome Reference Codes (ARC)

The location of the proposed powerline and termination substations relative to the affected aerodromes and regional airspace is illustrated in Figures 1 to 4 and summarised in Table 1.

Table 1: Obstacle Classification Summary of Affected Aerodromes

Aerodrome	SACAA 8km radius	ICAO IHS	ICAO Approach Surface	Risk
Kathu (FASS)	N	N	N	Low
Black Rock (FABP)	N	N	N	Low
Kuruman (FAKU)	N	N	N	Low
Vryburg (FAVB)	Y	Y	N	Low ¹

Notes: 1: Powerline lies 118m inside the edge of the ICAO IHS; Mookodi substation is 452 m outside the Approach surface to FAVB.

As can be seen, the aerodromes at Black Rock and Kuruman are not affected at all since they are beyond 8km away, and at Kathu (FASS) the only sensitivity is the potential impact of the Ferrum substation, which is located 9,7km from the threshold of Runway 35 at FASS. At this distance, the altitudes of any aircraft

lining up for an approach to FASS will be approximately 388m, and therefore well exceed the SACAA limitation of 45m above the runway surface within 8km of the aerodrome, notwithstanding that the substation is located 41m (1 221m-1180m) higher than the runway threshold.

5.1.1 Vryburg Aerodrome (FAVB) Classification

Based on site visits, the SACAA Aerodrome Directory and AIP information, the status of FAVB is summarised below:

- The aerodrome is unmanned and unlicensed.
- No aerodrome services exist at FAVB and there is no runway centreline or airfield lighting.
- The aerodrome operates under Visual Flight Rules (VFR).
- Vryburg RWY 18/36 is a 1 200x18m tar-surfaced runway in poor condition, classified ICAO Code 2B with RFL (reference field length) slightly over 800m under standard conditions.
- Reference altitude is 3 920ft (1 194m) amsl.
- Based on Google Earth reference standards utilised for the study, the runway bearings are 164° and 344°, with an allowance for a 10% variation in either direction on approaches or departures.
- The circuit at FAVB is 'left-hand', which will take aircraft on the downwind leg over the proposed powerline, but away from the Mooikodi substation (Figure 3).

For a Code 2 non-instrument runway ICAO Annex 14 Ch 4.2 requires the determination of Obstacle Limitation Surfaces (OLS's) as follows:

- Inner horizontal
- Conical
- Approach
- Transitional

5.1.2 Inner Horizontal, Conical, Transitional and SACAA 8km limitation Surfaces

Vryburg (FAVB) is a minor aerodrome at ICAO Code 2B. The nearest runway threshold of the aerodrome is located 2 382m from closest point to the proposed powerline, which at one point is 118m inside the ICAO Inner Horizontal Surface (Figure 3).

ICAO Inner Horizontal Surface (IHS)

By reference to Figure 3 and Appendices 9.4, 9.5 and 9.10 the powerline route is outside the approach surface but as mentioned marginally inside the inner horizontal surface, at a point where the natural ground level is 1 218m amsl relative to a reference altitude of 1 210m on the point of the extended

centreline adjacent to this point. The allowable obstacle height is thus $1\,210 + 45 - 1\,218 = 37\text{m}$ which is marginally higher than the Eskom standard of 35m for pylon heights. Thus, while compliant with ICAO and SACAA standards, mitigation will be required in the form of clear marking of the powerline in accordance with the relevant Technical Standards set out in SA-CATS139. The powerline route also lies within the SACAA 45m general obstacle limitation surface within 8km of the aerodrome and will require similar operational mitigation.

Environmental sensitivity is therefore low, but operational mitigation will be required.

Conical Surface (CS)

The CS of FAVB extends 1 200m beyond the inner horizontal surface, to a total height of 105m above runway level, but this is superseded by the SACAA 8km radius, which imposes a 45m height limit, and the approach/departure surface to the south of the aerodrome.

Transitional Surface

The Transitional Surface for FAVB commences 40m from the runway centreline, at the edge of the (Code 2) runway strip, and slopes upwards at a grade of 20%, at right angles to the runway. This surface governs the height limit for any non-friable objects to a height of 45m above the runway level, beyond which the IHS governs. This occurs 265m from the runway centreline. The powerline route lies outside this range and does not penetrate the transitional surface.

Potential Obstacles within the SACAA 8km Surface

The proposed powerline route lies within the 8km SACAA obstacle limitation surface, which imposes similar constraints to the inner horizontal surface. As described, the safety margin relative to a 35m pylon is thus only 2m which while still low risk environmentally, may pose a safety risk. Thus, once environmental approval is secured and the project is construction-ready, mitigation will be required in terms of an Obstacle Approval application to the SACAA in terms of CA139-27 and marking of the affected portion of the route in accordance with CATS139 to ensure adequate visibility of the powerline to SACAA approval. However, this is a navigation and operational safety (PANS-OPS) rather than an environmental issue.

5.1.3 Approach and Take-off Climb Surfaces to RWY18/36

The critical approach surface is to RWY36, which is a surface 80m wide and commencing 60m from the threshold of RWY36. It then extends south at a slope of 4% and a horizontal divergence of 10% for 2,5km

(ICAO Annex 14 & Figure 3). The closest point of the proposed development is the Mooikodi substation, which while beyond 2,5km from the runway threshold, is 452 m from extended centreline of the runway at the point where the approach surface commences (Figure 3). At this point, aircraft beginning their final approach would be at an altitude of $1\,212 + 4\% \times 2\,500 = 1\,312$ m amsl, which represents an altitude of 106m above ground level. For 35m structures within the substation footprint, this represents a safety margin of 71m, which is less severe than the margin of the powerline relative to the SACAA 45m limit within 8km of the aerodrome.

5.1.4 Risk Assessment

Appendix 9.3 contains SACAA guidelines for assessment of risk, based on (a) the severity of risk associated with an event and (b) the likely consequence. In this case, the most severe event would be an aircraft impacting an obstacle on the powerline route. The assessment thus compares a 'with the development' against a 'without the development' scenario. Based on Table 3, the risk is assessed as '2A'.

Table 2: Risk Assessment Matrix

RISK PROBABILITY		RISK SEVERITY				
		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely Improbable	1	1A	1B	1C	1D	1E

Appendix 9.3 also outlines the range of risk tolerability, as illustrated in Table 4. In this case, the risk is deemed 'tolerable', indicating that risk mitigation will be required in terms of CATS 139.30, relating to the development activities, the marking of obstacles and the issue of Aeronautical Information Circulars (AIC's) or NOTAM's. In the case of aircraft operating near FAVB, the standard operating procedures (PANS/OPS) laid down in the CARS (mainly Part 91) provide for risk mitigation in the event of aircraft failure or other unexpected events, supplemented by the CATS relevant to operating of aircraft close to sites where blasting operations or other risk events are likely to occur. This scenario, however, is only likely during construction or after the development has been completed.

Table 3: Risk Tolerability Matrix

TOLERABILITY LEVEL	ASSESSED RISK INDEX	SUGGESTED CRITERIA
Intolerable	5A, 5B, 5C, 4A, 4B, 3A	Unacceptable in the existing circumstances
Tolerable	5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C	Acceptable based on risk mitigation – may require a Management decision
Acceptable	3E, 2D, 2E, 1A, 1B, 1C, 1D, 1E	Acceptable

5.2 Airspace Analysis, Radar and Communications Assessment

From Figure 2, it was determined that:

- There are no civilian radar facilities within 35km of the proposed prospecting site.
- The airspace around FASS, FAVB, FAKU and FABP is uncontrolled.
- The airspace classification of the environs around the affected aerodromes is as indicated in Figure 2.
- There are no civilian radar facilities at any of the affected aerodromes.
- The closest ground-based navigational equipment is a VOR/DME array near Kathu Aerodrome, some 10 km N of the proposed Ferrum substation.

The risk of any impact of the project on nearby civilian radar installations is thus **low**.

The SACAA AIP information of the affected aerodromes was also assessed, and it was determined that there are no known ground-based navigational aids located within 15km of the development, apart from the VOR/DME and precision approach path indicators at FASS, which provide visual guidance to pilots and are not subjected to potential interference. Risk is thus assessed as 1E.

Table 4: Risk Assessment Matrix

RISK PROBABILITY		RISK SEVERITY				
		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely Improbable	1	1A	1B	1C	1D	1E

Similarly, also using the Appendix 9.3 guidelines, the risk tolerability has been assessed as 'Acceptable'.

Table 5: Risk Tolerability Matrix

TOLERABILITY LEVEL	ASSESSED RISK INDEX	SUGGESTED CRITERIA
Intolerable	5A, 5B, 5C, 4A, 4B, 3A	Unacceptable in the existing circumstances
Tolerable	5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C	Acceptable based on risk mitigation – may require a Management decision
Acceptable	3E, 2D, 2E, 1A, 1B, 1C, 1D, 1E	Acceptable

6 General Recommendations

The analysis contained in this Civil Aviation Site Sensitivity Verification Study has determined:

1. The proposed powerline and supporting infrastructure is compliant with all relevant ICAO Annex 14 and SACAA (CARS and CATS) standards with respect to obstacle limitation surfaces and can, therefore, be supported for purposes of environmental approval.
2. The proposed powerline will not materially impact civilian radar, navigation, or communications infrastructure in the environs, nor present any material additional risks to operations at Kathu, Vryburg, Kuruman or Black Rock Aerodromes.
3. A future Obstacle Approval from the SACAA will be required, but based on the foregoing analysis there is no reason why this would not be granted.
4. Sections of the powerline will need to be marked in compliance with SA-CATS 139.

On this basis, the recommendation of this CASSV is that the environmental sensitivity status of the powerline route be amended to 'low'.

The Way Forward

Once Environmental Authorisation is in place and the detailed design process of the development commences, SACAA Obstacle Approval processes per CA139.27 will need to be complied with and the mitigation measures recommended herein selectively implemented, in consultation with both the Civil Aviation Authority and the users of the Vryburg Aerodrome.

7 Appendices

7.1 Glossary of Terms

The definitions listed below apply to this document.

TERM	ACRONYM	DEFINITION
Aeronautical Flight Information Systems	AFIS	Wind, weather and other operational information available to aircraft operators at airfields that do not have fully-fledged control tower facilities
Aircraft Classification Number	ACN	An indication of runway strength requirements of aircraft, which must not exceed the corresponding Pavement Classification Number (PCN) of the airfield
Aeronautical Information Publication	AIP	A document published and regularly updated by the SA Civil Aviation Authority containing key details and parameters of licensed aerodromes, in accordance with the SA Civil Aviation Regulations.
Aeronautical Information Circular	AIC	A document 'for information only' issued by the SA Civil Aviation Authority containing basic details of aerodromes (usually) registered with the SACAA but not licensed.
Air Traffic Control	ATC	Air traffic control is a system of ground-based services that manages the safe and efficient movement of aircraft within controlled airspace and on the ground at airports. The primary objectives of air traffic control are to prevent collisions between aircraft, provide a safe and orderly flow of air traffic, and ensure efficient utilization of airspace and airport resources.
Air Traffic and Navigational Services SOC Limited	ATNS	A State-owned Enterprise formed in 1993, responsible for overall air traffic and airspace management in South Africa.
Airfield Ground Lighting	AGL	Lighting systems on runway, taxiways, and apron.
Above Mean Sea Level	AMSL	The vertical measurement of an aircraft's altitude or the elevation of a location with reference to the average sea level. It serves as a standard reference point for altitude calculations, providing a consistent baseline for navigation and airspace management.
Civil Aviation Regulations	CARS	A national aviation authority or civil aviation authority is a government statutory authority in each country that maintains an aircraft register and oversees the approval and regulation of civil aviation.
Civil Aviation Technical Standards	CATS	A set of technical standards and industry best practices to be read in conjunction with the CARS.
Distance Measuring Equipment	DME	Electronic distance measuring capability of VHF radio antennae.

Flexible Use of Airspace	FUA	A policy of the SACAA in terms of which airspace is not unnecessarily restricted, allowing more effective use as long as safety standards are not compromised.
General Aviation	GA	Private, recreational, pilot training, and non-scheduled commercial air services
Global Navigational Satellite System	GNSS	Satellite based aircraft navigational systems relying on GPS technology
Integrated Development Plan	IDP	An Integrated Development Plan is a plan for an area that provides an overall framework for development. It aims to coordinate the work of local and other spheres of government in a coherent plan to improve the quality of life for all the people living in an area.
International Civil Aviation Organisation	ICAO	The International Civil Aviation Organization is a specialized agency of the United Nations. It changes the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth.
International Air Transport Association	IATA	The International Air Transport Association is a trade association of the world's airlines. Consisting of 290 airlines, primarily major carriers, representing 117 countries, the IATA's member airlines account for carrying approximately 82% of total available seat miles air traffic.
Instrument Meteorological Conditions	IMC	Weather conditions under which visual operation of aircraft is impossible due to industry visibility limits not being met, which require aircraft to be operated using instrument procedures.
Level of Service	LOS	Level of service to passengers as defined in IATA reference documents
Obstacle Limitation Surfaces	OLS	A set of imaginary planes or surfaces above the ground that sets limits beyond which ground-based objects may not penetrate, to preserve the operational safety of aircraft, as laid down in ICAO reference material, particularly Annex 14.
Passengers	PAX	Number of passengers
Performance Based Navigation	PBN	ICAO recommended policy to improve air traffic management through increased reliance on satellite-based navigation systems and thereby reduce aircraft-based carbon footprint through reduction in approach and 'hold' times of arriving aircraft.
South African Civil Aviation Authority	SACAA	The South African Civil Aviation Authority is the South African national aviation authority, overseeing civil aviation and governing investigations of aviation accidents and incidents.
Safety Health, and Environment	SHE	Safety Health and Environment
Service Level Agreement	SLA	A service-level agreement (SLA) is a commitment between a service provider and a client. The most common component of an SLA is that the services should be provided to the customer as agreed upon in the contract.

TERM	ACRONYM	DEFINITION
Request for Information	RFI	A request for information is a common business process whose purpose is to collect written information about the capabilities of various suppliers. Normally it follows a format that can be used for comparative purposes. An RFI is primarily used to gather information to help make a decision on what steps to take next.
Request for Proposal	RFP	A request for proposal is a document that solicits proposal, often made through a bidding process, by an agency or company interested in procurement of a commodity, service, or valuable asset, to potential suppliers to submit business proposals.
Remote Navigation	RNAV	Satellite based navigation systems similar to GNSS
Runway	RWY	According to the International Civil Aviation Organization, a runway is a "defined rectangular area on a land airport prepared for the landing and take-off of aircraft."
Standards and Recommended Practices	SARPS	A set of industry norms, published by ICAO and other recognised industry bodies, that determine best-practice processes and procedures as distinguished from strict regulatory requirements.
Threshold	THD	The defined end of a runway is marked in accordance with ICAO SARPS.
Visual Flight Rules	VFR	Visual flight rules are a set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.
Very high-frequency omnidirectional radio antenna	VFOR	Radio antenna that provides position and directional vectoring capability to aircraft. NDB is a non-directional radio beacon.
Visual Meteorological Conditions	VMC	Meteorological conditions under which visual sight distances (per SACAA rules) allow flight operations to proceed under VFR without the necessity of resorting to instrument procedures.
Work Breakdown Structure	WBS	In project management and systems engineering, a work breakdown structure is a deliverable-oriented breakdown of a project into smaller components. It is a key project deliverable that organizes the team's work into manageable sections.

7.2 26th Amendment – CATS 139.01.30

139.01.30

(1) A holder of an aerodrome licence shall monitor a concerned aerodrome and its surroundings to assess permanent or temporary obstacle limitation and penetration surfaces, to establish if any obstacle has an impact on the safety of aircraft operations at such aerodrome.

(2) If an assessment referred to in subregulation (1) identifies any obstacle that negatively impacts on aircraft safety, a holder of an aerodrome licence shall take appropriate action to mitigate the risk and restrict or remove such obstacle.

(3) A holder of an aerodrome licence shall not erect or allow to be erected, without the prior approval of the Director, a building, structure, or object which projects above a slope of 1 in 20 and which is within 3 000 m measured from the nearest point on a boundary of such aerodrome or heliport.

(4) An object, whether temporary or permanent, which projects above the obstacle limitation surfaces within a radius of 8 km as measured from an aerodrome reference point shall be marked as prescribed in Document SA-CATS 139.

(5) An object, whether temporary or permanent, which projects above the obstacle limitation surfaces beyond a radius of 8 km and constitutes a potential hazard to aircraft, shall be marked as prescribed in Document SA-CATS 139.

(6) A holder of an aerodrome licence shall not erect or allow to be erected, without the prior approval of the Director, a building or object which constitutes an obstruction or potential hazard to an aircraft operating in a navigable airspace in the vicinity of an aerodrome, or navigation aid, or which will adversely affect the performance of a radio navigation or ILS.

(7) A holder of an aerodrome licence shall not erect or allow to be erected, without the prior approval of the Director, an object higher than 45 m above the

mean level of a landing area or within 8 km measured from the nearest point on a boundary of an aerodrome.

(8) A holder of an aerodrome licence shall not erect or allow to be erected, without the prior approval of the Director a building, structure, or object which projects above a slope of 1 in 20 and which is within 3 000 m measured from the nearest point on a boundary of an aerodrome or heliport.

(9) A holder of an aerodrome licence shall not erect or allow to be erected, without the prior approval of the Director, a building, structure or other object which will project above the obstacle limitation surfaces of an aerodrome or heliport.

(10) A person or authority involved in land development, shall not compromise air safety by authorising or developing any land or erecting a building or obstacle on such land.”;

(d) the insertion in Subpart 2 in the arrangements of regulations of the following Subpart:

“SUBPART 2: LICENSING AND OPERATION OF AERODROMES

- 139.02.1 Requirements for licence
- 139.02.2 Application for licence or amendment thereof
- 139.02.3 Processing of application for licence or amendment thereof
- 139.02.4 Adjudication of application for licence or amendment thereof
- 139.02.5 **[[Issuing]** Issuance of licence
- 139.02.6 Period of validity
- 139.02.7 Transferability
- 139.02.8 Renewal of licence
- 139.02.9 Licence of intent
- 139.02.10 Aerodrome design requirements

7.3 SACAA Technical Guidance Material: Aeronautical Studies



TECHNICAL GUIDANCE MATERIAL for Conducting Aeronautical Studies or Risk Assessment Advisory Circular

SUBJECT: GUIDANCE ON CONDUCTING AERONAUTICAL STUDIES OR RISK ASSESSMENT

EFFECTIVE DATE: 11 JANUARY 2022

APPLICABILITY

An Aeronautical study or risk assessment may be carried out when aerodrome standards cannot be met as a result of development. Such a study is most frequently undertaken during the planning of a new airport or during the certification of an existing aerodrome.

PURPOSE

An aeronautical study is conducted to assess the impact of deviations from the aerodrome standards specified in Volume I to Annex 14 to the Convention on International Civil Aviation, SACAR 139 and Part 11, to present alternative means of ensuring the safety of aircraft operations, to estimate the effectiveness of each alternative and to recommend procedures to compensate for the deviation.

1. REFERENCE:

- i. ICAO Annex 14 – Volume 1
- ii. ICAO Doc 9774 -Manual on Certification of Aerodromes
- iii. ICAO Doc 9734 - Safety Oversight Manual
- iv. ICAO Doc 9859 -Safety Management Manual
- v. Civil Aviation Regulation Part 11- Subpart 4 Procedure for granting of Exemptions and Recognition of Alternative means of Compliance
- vi. Civil Aviation Regulation Part 139 -Aerodromes and Heliports
- vii. Civil Aviation Regulation Part 140 -Safety Management

2. TERMS AND ABBREVIATIONS:

TERM	DEFINITION
Risk mitigation	The process of incorporating defences or preventive controls to lower the severity and/or likelihood of a hazard's projected consequence.
Safety risk -	The predicted probability and severity of the consequences or outcomes of a hazard.

ABBREVIATION	DESCRIPTION
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TGM: Conducting aeronautical studies or risk assessment

New: 11 January 2022

Page 1 of 8

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nal		Likely to occur sometimes (has occurred frequently)	4
Remote		Unlikely to occur, but possible (has occurred rarely)	3
Improbable		Very unlikely to occur (not known to have occurred)	2
Extremely improbable		Almost inconceivable that the event will occur	

Table1: Safety Risk Probability

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RISK PROBABILITY	RISK SEVERITY			Minor D	Negligible E
	Catastrophic A	Hazardous B	Major C		
Frequent	5A	5B	5C	5D	5E
Occasional	4A	4B	4C	4D	4E
Remote	3A	3B	3C		
Improbable	2A	2B	2C	2D	2E
Extremely improbable	1A	1B	1C	1D	1E

Table 3: Risk Assessment Matrix Table

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TOLERABLE	ASSESSED RISK INDEX	SLIR3GESim CJRI1BIA
Intolerable	5A, 5B, 5C 4A, 4B, 3A	platie in lh! 11Slin1J CIFell
Tolerable	5D, 5E 4C, 4D, 1E 313, M, 30 28, 2C	...llIG:::ed ...mi ioo re:pie ... I!fit
Intolerable	1c, 2D, 2E, 1B, 1C, 11), 1E	Acceptable

Table 4: Safety Risk Tolerability Matrix

1. Empirical Analysis of the Risk Assessment Process
 A general risk assessment process is defined as a systematic process of identifying, analyzing, and evaluating risks. The process involves the following steps:

1.1. Identification of Risks
 This step involves identifying the potential risks associated with the project. It is a continuous process that occurs throughout the project lifecycle. The identification of risks is based on the following factors:

1.1.1. Identification of Risks
 The identification of risks is based on the following factors:

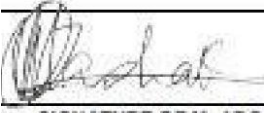
1.1.1.3. Identification of Risks
 The identification of risks is based on the following factors:

1.1.1.4. Identification of Risks
 The identification of risks is based on the following factors:

1.1.1.5. Identification of Risks
 The identification of risks is based on the following factors:

1.1.1.6. Identification of Risks
 The identification of risks is based on the following factors:

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7.4 ICAO Annex 14: Table 4-1

Table 4-1. Dimensions and slopes of obstacle limitation surfaces — Approach runways

APPROACH RUNWAYS										
Surface and dimensions ^a (1)	RUNWAY CLASSIFICATION								Precision approach category	
	Non-instrument				Non-precision approach			Code number	Code number	Code number
	1	2	3	4	1,2	3	4			
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CONICAL										
Slope	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Height	35 m	55 m	75 m	100 m	60 m	75 m	100 m	60 m	100 m	100 m
INNER HORIZONTAL										
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m
Radius	2 000 m	2 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m
INNER APPROACH										
Width	—	—	—	—	—	—	—	90 m	120 m ^c	120 m ^c
Distance from threshold	—	—	—	—	—	—	—	60 m	60 m	60 m
Length	—	—	—	—	—	—	—	900 m	900 m	900 m
Slope	—	—	—	—	—	—	—	2.5%	2%	2%
APPROACH										
Length of inner edge	60 m	80 m	150 m	150 m	140 m	280 m	280 m	140 m	280 m	280 m
Distance from threshold	30 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%	15%	15%
First section										
Length	1 600 m	2 500 m	3 000 m	3 000 m	2 500 m	3 000 m	3 000 m	3 000 m	3 000 m	3 000 m
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%
Second section										
Length	—	—	—	—	—	3 600 m ^b	3 600 m ^b	12 000 m	3 600 m ^b	3 600 m ^b
Slope	—	—	—	—	—	2.5%	2.5%	3%	2.5%	2.5%
Horizontal section										
Length	—	—	—	—	—	8 400 m ^b	8 400 m ^b	—	8 400 m ^b	8 400 m ^b
Total length	—	—	—	—	—	15 000 m	15 000 m	15 000 m	15 000 m	15 000 m
TRANSITIONAL										
Slope	20%	20%	14.3%	14.3%	20%	14.3%	14.3%	14.3%	14.3%	14.3%
INNER TRANSITIONAL										
Slope	—	—	—	—	—	—	—	40%	33.3%	33.3%
BALKED LANDING SURFACE										
Length of inner edge	—	—	—	—	—	—	—	90 m	120 m ^c	120 m ^c
Distance from threshold	—	—	—	—	—	—	—	c	1 800 m ^d	1 800 m ^d
Divergence (each side)	—	—	—	—	—	—	—	10%	10%	10%
Slope	—	—	—	—	—	—	—	4%	3.33%	3.33%

a. All dimensions are measured horizontally unless specified otherwise.

b. Variable length (see 4.2.9 or 4.2.17).

c. Distance to the end of strip.

d. Or end of runway whichever is less.

e. Where the code letter is F (Table 1-1), the width is increased to 140 m except for those aerodromes that accommodate a code letter F aeroplane equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

Note.— See Circulars 301 and 345, and Chapter 4 of the PANS-Aerodromes, Part I (Doc 9981) for further information.

7.5 ICAO Annex 14: Table 4-2

Table 4-2. Dimensions and slopes of obstacle limitation surfaces

RUNWAYS MEANT FOR TAKE-OFF

Surface and dimensions ^a (1)	Code number		
	1 (2)	2 (3)	3 or 4 (4)
TAKE-OFF CLIMB			
Length of inner edge	60 m	80 m	180 m
Distance from runway end ^b	30 m	60 m	60 m
Divergence (each side)	10%	10%	12.5%
Final width	380 m	580 m	1 200 m 1 800 m ^c
Length	1 600 m	2 500 m	15 000 m
Slope	5%	4%	2% ^d
a. All dimensions are measured horizontally unless specified otherwise. b. The take-off climb surface starts at the end of the clearway if the clearway length exceeds the specified distance. c. 1 800 m when the intended track includes changes of heading greater than 15° for operations conducted in IMC, VMC by night. d. See 4.2.24 and 4.2.26.			

7.6 DFFE Protocol 320

Published in Government Notice No. 320 GOVERNMENT GAZETTE 43110 20 MARCH 2020
GAZETTED FOR IMPLEMENTATION

CIVIL AVIATION

PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON CIVIL AVIATION INSTALLATIONS

1. SCOPE

This protocol provides the criteria for the specialist assessment and minimum report content requirements for impacts on civil aviation installations for activities requiring environmental authorisation. This protocol replaces the requirements of Appendix 6 of the Environmental Impact Assessment Regulations¹.

The assessment and reporting requirements of this protocol are associated with the level of sensitivity identified by the national web based environmental screening tool (screening tool).

The screening tool can be accessed at: <https://screening.environment.gov.za/screeningtool>.

2. SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS

Prior to commencing with a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool must be confirmed by undertaking a **site sensitivity verification**.

- 2.1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or specialist with expertise in radar.
- 2.2. The site sensitivity verification must be undertaken through the use of:
 - (a) a desk top analysis, using satellite imagery;
 - (b) a preliminary on-site inspection; and
 - (c) any other available and relevant information.
- 2.3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
 - (a) confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool, such as new developments or infrastructure etc.;
 - (b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and
 - (c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

3. SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

TABLE 1: ASSESSMENT AND REPORTING OF IMPACTS ON CIVIL AVIATION INSTALLATIONS

1. General Information

- 1.1. An applicant intending to undertake an activity identified in the scope of this protocol for which a specialist assessment has been identified on the screening tool:
 - 1.1.1. on a site identified as being of:

1.1.1.1. "very high", "high" or "medium" sensitivity for civil aviation, must submit a Civil Aviation Compliance Statement; or 1.1.1.2. "low" sensitivity, no further assessment requirements are identified. 1.1.2. on a site where the information gathered from the site sensitivity verification differs from the designation of "very high", "high" or "medium" sensitivity on the screening tool and it is found to be of a "low" sensitivity, no further assessment requirements are identified; 1.1.3. similarly, on a site where the information gathered from the initial site sensitivity verification differs from the designation of "low" sensitivity on the screening tool and it is found to be of a "very high", "high" or "medium" sensitivity, a Civil Aviation Compliance Statement must be submitted; and 1.1.4. If any part of the proposed development footprint falls within an area of "very high", "high" or "medium" sensitivity, the assessment and reporting requirements prescribed for the "very high", "high" and "medium" sensitivity apply to the entire footprint. In the context of this protocol, development footprint means the area on which the proposed development will take place and includes any area that will be disturbed.	
VERY HIGH SENSITIVITY RATING - high likelihood for significant negative impacts on the civil aviation installation that cannot be mitigated. In-depth assessment of the potential impacts are likely to be required before development can be considered in these areas. HIGH SENSITIVITY RATING - potential for negative impacts on the civil aviation installation that can potentially be mitigated. Further assessment may be required to investigate potential impacts and mitigation measures. MEDIUM SENSITIVITY RATING - low potential for negative impacts on the civil aviation installation, and if there are impacts there is a high likelihood of mitigation. Further assessment of the potential impacts may not be required.	2. Civil Aviation Compliance Statement 2.1. The compliance statement must be prepared by an environmental assessment practitioner or a specialist with expertise in radar. 2.2. The compliance statement must: 2.2.1. be applicable to the preferred site and the proposed development footprint; 2.2.2. confirm the sensitivity rating for the site; and 2.2.3. indicate whether or not the proposed development will have an unacceptable impact on civil aviation installations. 2.3. The compliance statement must contain, as a minimum, the following information: 2.3.1. contact details of the environmental assessment practitioner or the specialist, their relevant qualifications and expertise in preparing the statement, and a curriculum vitae; 2.3.2. a signed statement of independence by the environmental assessment practitioner or specialist; 2.3.3. a map showing the proposed development footprint (including supporting infrastructure) overlaid on the civil aviation sensitivity map generated by the screening tool; 2.3.4. a comment, in writing, from the South African Civil Aviation Authority (SACAA), which may include inputs from the Obstacle Evaluation Committee (OEC), if appropriate, confirming no unacceptable impact on civil aviation installations; and 2.3.5. should the comment from the SACAA indicate the need for further assessment, a copy of the assessment report and mitigation measures is to be attached to the compliance statement and incorporated into the Basic Assessment Report or Environmental Impact Assessment Report with mitigation and monitoring measures identified included in the EMP. The assessment must be in accordance with the requirements stipulated by the SACAA.

	2.4. A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.
LOW SENSITIVITY RATING - No significant impacts on the civil aviation installation are expected in low sensitivity areas. It is unlikely for further assessment and mitigation measures to be required.	No requirement identified.

7.7 Resumes of Key Resources

Mr Basil Karstadt – PrCPM, BTech (SACPCMP). Basil is a professional project and construction manager who has specialized for nearly 30 years in the delivery of infrastructure projects, mainly for Public Sector clients in remote and developing areas. In aviation, from 2013 he led the KZN Provincial Treasury 'Crack Team' that was responsible for Provincial intervention in the municipal airport space and drove the KZN Regional Airport strategy, which ensured appropriate expenditure on upgraded infrastructure at many of KZN's municipal airports.

Mr Jon Heeger – Pr Eng, MBA, BSc (Eng). Formerly a property development manager in the RMB Group and Group Development Manager at ACSA from 1996, Jon has since become widely recognized as a leading 'regional airport' expert, specializing in turnaround strategies for former Municipal and GA airports. He also regularly acts as Guest Lecturer for the University of KZN and is active in the seminar and conference space as a host and moderator on a wide variety of airport development strategies and aviation topics.

Mr Sibusiso Nkabinde – PD (SA), Dip (BA), Air Traffic Control. Sibusiso is a seasoned professional with over 23 years experience in Air traffic Management, including Aeronautical Information Management, Aerodrome and Approach Air Traffic Control, Air Traffic Control Instruction & Examination, Air Traffic Services Management, Executive Leadership in Aeronautical Search & Rescue, Aerospace Medicine (ATC Ergonomics) and Governance. He is a full Professional Member of the Director's Association of South Africa and has notably represented South Africa in CANSO Task Teams, ICAO meetings, and South Atlantic ATM/CNS forums, focusing on Air Traffic Management System harmonization and interoperability.

Also refer: www.gwi.co.za | www.av-innovate.com

Curriculum Vitae (CV): JBC Heeger

1	PROPOSED POSITION FOR THIS PROJECT	<i>Aviation and Airport Specialist</i>
2	NAME OF PERSON	<i>Heeger, Jon</i>
3	DATE OF BIRTH	<i>2 May 1955</i>
4	NATIONALITY	<i>South African</i>
5	MEMBERSHIP IN PROFESSIONAL SOCIETIES	<i>Member, Engineering Council of South Africa -ECSA No. 820365 (1982 - 2008)</i>
6	EDUCATION	<i>MBA (Construction Management), University of the Witwatersrand, 1985</i> <i>GDE (Construction Management), University of the Witwatersrand, 1985</i>

		<i>BSc. Civil Engineering, University of the Witwatersrand, 1977</i> <i>BCom modules (part time): Micro and Transport Economics, UNISA 1978-1980</i>			
7	OTHER TRAINING	<i>ACSA/IATA/ICAO- Internal Training & Development programmes (1994-2000)</i> <i>Presentor/Attendee at various Aviation Conferences/Seminars (Aviadev, ATNS, BARS)</i> <i>Guest Lecturer for Aerotropolis Institute Africa, UKZN (202-2023)</i>			
8	LANGUAGES & DEGREE OF PROFICIENCY	Language	Speaking	Reading	Writing
		<i>English</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>
		<i>Afrikaans</i>	<i>Good</i>	<i>Excellent</i>	<i>Good</i>
9	COUNTRIES OF WORK EXPERIENCE	<i>South Africa, Botswana, Ghana, Mozambique, Nigeria, Liberia, China, Kenya, Brazil and Rwanda.</i>			
10	EMPLOYMENT RECORD				
	Independent Expert/Consultant: Airport Planning and development	FROM: <i>2000</i>		TO: <i>2022</i>	
	Airport Planning/Development Division - Airports Company South Africa Position: Group Manager – Airport developments	FROM: <i>1996</i>		TO: <i>1999</i>	
	RMB Group (now Eris Properties) Position: General Manager: Developments	FROM: <i>1984</i>		TO: <i>1996</i>	

	SA Transport Services Position: Civil Engineer – Rail Infrastructure	FROM: 1977	TO: 1983
11	WORK UNDERTAKEN THAT BEST ILLUSTRATES YOUR CAPABILITY TO HANDLE THIS ASSIGNMENT		
		2022/3 Airport/Aviation Specialist (ongoing) <i>Feasibility Study for a possible freight Aerotropolis in Sedibeng Municipality.</i> Passenger and freight demand assessment and catchment area determination; engagement with airline/charter operators and freight forwarders. Status quo review of existing airport infrastructure and compliance check with ICAO Annex 14, IATA and SACAA SARP's (safety, security, health and safety).	
		Assessment of non-aeronautical revenue opportunities. Surface connectivity assessment and pre-planning for improved access onto Provincial roads system, based on Provincial Master Plans and IDP's. Identification of gaps and opportunities for innovation in airlift development, particularly RPAS (Remote Piloted Aircraft Systems, UAV's or drones) in commercial and law enforcement operations. Reference: Mr Tebogo Mutlaneng, Project Manager, Vaal Aerotropolis Study, Sedibeng District Municipality – tebogom@sedibeng.gov.za	

		2022/3 Airport/Aviation Specialist (ongoing) <i>Master and Land-use plan Review and Pre-Feasibility Study for the re-development of Plettenberg Bay Airport, Bitou Local Municipality.</i> Route analysis and passenger demand assessment; engagement with airline/GA operators. Status quo review of airport infrastructure and compliance check with ICAO Annex 14, IATA and SACAA SARP's (safety, security, health and safety). Diversification strategy for non-aeronautical revenue development. Surface connectivity assessment and pre-planning for new airport entrance and improved access onto Provincial roads system, including e-hailing options. Identification of gaps and opportunities for innovation in airlift development, particularly RPAS (Remote Piloted Aircraft Systems, UAV's or drones) in maritime patrol, commercial and law enforcement operations. Reference: Mr M Memani, Municipal Manager, Bitou Local Municipality – mmemani@plett.gov.za
		2022 Airport/Aviation Specialist (ongoing) <i>Master and Land-use plan Review and Pre-Feasibility Study for the re-development of Margate Airport, Ray Nkonyeni Local Municipality.</i> Route analysis and freight/passenger demand assessment; engagement with airline/charter

		operators. Status quo review of airport infrastructure and compliance check with ICAO Annex 14, IATA and SACAA SARP's (safety, security, health and safety). Diversification strategy for non-aeronautical revenue development. Multi-modal connectivity assessment and pre-planning for new airport entrance and improved access onto Provincial road system, including public transport options. Identification of gaps and opportunities for innovation in airlift development, particularly RPAS (Remote Piloted Aircraft Systems, UAV's or drones) in maritime patrol and law enforcement operations. Reference: Ms Volanda van Rensburg, Airport Manager, Margate Airport, Ray Nkonyeni Local Municipality – yolanda.vanrensburg@rnm.gov.za
		2022 Aviation Specialist (ongoing) <i>Benchmarking Study and Strategy Development for Airlift as a Catalyst for Tourism Growth and Development in the SADC region. (SADC Ministers Council, Secretariat)</i> Route analysis and passenger surveys, route/frequency assessment with airline/charter operators. Assessment of scheduled and non-scheduled fleet mix and status quo review of airport infrastructure within the SADC region and compliance with ICAO Annex 14, IATA and client service levels standards/policies (security, health and safety). Review of Bilateral Air Service Agreements for International and Regional movements within SADC, identification of gaps and opportunities for innovation in airlift development. Status assessment of the progress of the SAATM initiative through the African Civil Aviation Commission and assessment of the status of the Yamoussoukro Protocol. Reference: Dr Salifou Siddo, AFC Agriculture and Finance Consultants GmbH – salifou.siddo@afci.de

		2019/2022 Airport Specialist <i>Redevelopment Options for Vryburg Airport, Vryburg (Anglo American, SMEC Engineers)</i> Passenger surveys, traffic forecasting and route/frequency assessment with airline/charter operators. Assessment and agreement of critical design aircraft, runway and terminal planning to ICAO Annex 14, IATA and client service levels standards/policies (security, health and safety) for three site options; commercial land use options for airport precinct, Airport Master Plan including assessment of growth potential for aeronautical and commercial revenues. Assessment of airspace class and options development for navigational and ATC protocols. Input into EIA and noise footprint; Feasibility Study for integrated airport precinct and site options analysis. Reference: Mr B Strauss (Kumba) – 082 904 9300 abraham.strauss@angloamerican.com
		2019/2020: Airport Specialist <i>Pre-Feasibility Study for Proposed Ghana Airports Company Limited Regional Airport, Takoradi, Ghana.</i> Airport catchment area determination, traffic forecasting and route/frequency assessment. Engagement with GACL on Airport Master Plan and critical aircraft determination. Data gathering including meteorological/wind, runway length calculations and specification, obstacle limitation surface assessment, assessment of land use options for airport precinct, Airport Master plan including assessment of growth potential for aeronautical and JIT freight revenues. Terminal planning including peak hour assessment. Feasibility Study for integrated airport precinct.
		Airport Specialist and Business Analyst <i>Revitalization Options for Ulundi Airport, South Africa. Zululand District Municipality. (2017)</i> Land use options for airport precinct, update of the Airport Master plan including traffic analysis and

		assessment of growth potential for aeronautical and freight revenues. Feasibility Study for integrated airport precinct. Reference: Ms Thembi Hadebe - 082 902 6029
		Commercial/Airport Specialist <i>Precinct Planning of Port Elizabeth and East London Airports, ACSA (2018/2020)</i> Advise on commercial land use options for airport precinct, assessment of current traffic in relation to previous forecasts insofar as this may impact on commercial and cargo potential/growth. Assessment of other exogenous developments that may impact growth at both airports (e.g. Coega and ELIDZ). Reference: Mr L Tilana (ACSA)
		Airport Specialist and Business Analyst <i>Redevelopment Options for Grand Central Airport, Midrand. Ivora Capital, Old Mutual Properties (2018/9)</i> Land use options for airport precinct, update of the Airport Master plan including traffic analysis and assessment of growth potential for aeronautical and non-aeronautical revenues. Pre-Feasibility Study for integrated airport precinct and potential for use of drones for fast-moving commodity/freight delivery. Reference: Mr C Duminy - 083 633 6909
		Aviation Specialist <i>Republic of Kenya National Tourism Strategy (2017)</i> Analysis of existing route networks and traffic distribution and associated potential for international and domestic traffic/freight. Alignment of tourism priorities with airport and airlift strategies as between Ministry of Tourism, KAA, KCAA and stakeholder airlines including Kenya Airways, Fly540, Kenya Express and many non-scheduled operators. Assessment of likely impact of early adoption of SAATM on traffic within Kenya. Ref: Hon Najib Balala, Cabinet Secretary, Tourism

		<i>Airport Specialist and Business Analyst (SMEC)</i> <i>Richards Bay Airport Master Plan, South Africa. City of uMhlathuze (Richards Bay). (2009, 2017, 2021)</i> Site assessment, land use options and Airport Master plan including traffic forecast, critical aircraft determination and assessment of growth potential for aeronautical, freight and non-aeronautical revenues. Pre-Feasibility Study for new airport. Reference: Ms B Strachan – strachanb@umhlathuze.gov.za
		<i>Airport Specialist and Business Analyst</i> <i>Redevelopment Options for PC Pelser Airport, Klerksdorp. Matlosana Municipality (2011,2017-19)</i> Land use options for airport precinct, update of the Airport Master plan including traffic analysis and assessment of growth potential for aeronautical and non-aeronautical revenues. Pre-Feasibility Study for integrated airport precinct. Reference: Mr A Khutlwayo - 062 692 0590
		<i>Aviation/Airport Specialist and Business Analyst</i> <i>KZN Treasury Crack Team. KZN Treasury. (2012 – 2013).</i> Airport Master planning including traffic forecasts and assessment of growth potential for aeronautical and non-aeronautical revenues; Pietermaritzburg, Margate, Wonderboom National, Ladysmith, Ulundi and Richards Bay Airports. Reference: Mr F Alberts, ED Director, Wonderboom National Municipality – 082 802 0382
		<i>Airport Specialist and Business Analyst</i> <i>Proposed New Mkuze Airport. Umhlozinga Development Agency. (2008 to 2013).</i> Feasibility study for the Mkuze Regional Airport as a catalyst for socio-economic upliftment of the

		Umkhanyakude District, including potential for local airfreight of agricultural produce.
		<i>Business/Aviation Specialist</i> <i>Maun Airport Expansion. Botswana Civil Aviation Authority. (2005-2010).</i> Preparation and validation of traffic forecasts, developing a business model, scenario planning and economic cost-benefit analysis for period 2005-2030. Development of new terminal concept designs and detailed landside Master planning including parking areas and non-scheduled operator FBOs
		<i>Consultant Team Leader</i> <i>Development of new Passenger Terminals and Cargo Facilities at Maputo. Aeroporto du Mozambique. (2007-2012).</i> Design review and construction supervision consultant for the new Domestic and International Terminals at Maputo International Airport. Review of contractor-produced traffic forecast, design brief and design proposals, level-of-service analysis and value management. Reference: Mr A Tuendue, CEO, ADM
		<i>Summary of other airport assignments pre 2007. (1980-2007).</i> • <i>Team leader – Kruger Mpumalanga International Airport: Commercialisation Study Proposal.</i> • <i>Lead Joint Venture partner - Mafikeng Airport IDZ (NW Provincial Government): Proposed Minerals Cluster and commercial development.</i> • <i>Team leader – Ghana Civil Aviation Authority: Accra and Kumasi International airport Master Plans; air platform and non-aeronautical commercialisation (proposal).</i> • <i>Joint Venture consultant – Ghana Civil Aviation Authority: Implementation of parking equipment</i>

		and systems, Kotoka International Airport, Accra, Ghana. • <i>Transport Economist/Business Analyst – World Bank - Monrovia, Liberia:</i> Assessment of emergency works required at Roberts International Airport. Validation of traffic forecast, development of business model, scenario planning and economic cost-benefit analysis. • <i>Team Leader – Department of Civil Aviation, Gaborone, Botswana:</i> Design review and development of alternate designs for new passenger terminal, including development and validation of traffic forecasts and preparation of facilities/ architectural design brief. • <i>Aviation Specialist – Bi Courtney Consortium, Lagos, Nigeria:</i> Preparation of Master Plan proposals for expansion of domestic terminal As Client Development Team Leader • <i>International Terminal Retail Project – ORTIA Johannesburg (1997)</i> • <i>Design Team Leader – Domestic terminal ORTIA (1997)</i> • <i>4 300 bay Multi-storey parkade, ORTIA (1996)</i> • <i>Chairman, Airport Steering Committee, La Mercy Airport (1997)</i> • <i>General Aviation Centre, East London (1998)</i> • <i>Terminal upgrades, East London & Port Elizabeth (1998)</i> • <i>Refrigerated cargo facility, Cape Town (1997)</i> • <i>Precious Commodities handling facility, JIA (1997)</i> • <i>In-flight catering facility, Cape Town (1997)</i>
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CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



Date: 25/07/2024

*[Signature of staff member or authorized
representative of the staff]*

Day/Month/Year

Full name of authorized representative: JONATHAN BARRY CLIVE HEEGER

1	PROPOSED POSITION FOR THIS PROJECT	<i>Air Traffic Management Specialist</i>
2	NAME OF PERSON	<i>Nkabinde, Sibusiso</i>
3	DATE OF BIRTH	<i>1 July 1981</i>
4	NATIONALITY	<i>South African</i>
5	MEMBERSHIP IN PROFESSIONAL SOCIETIES	<i>Professional Member, Director's Association of South Africa. No 2303/18. 2023 to current</i>
6	EDUCATION	<i>MBA, University of Witwatersrand, 2020 - current</i> <i>Diploma (Business Administration), Management College of South Africa, 2014</i> <i>Cert (Executive Management), University of La Verne, 2022</i>
7	OTHER TRAINING	<i>Introduction to Safety Management Systems for ATNS Operational Personnel, 2021</i> <i>Approach Control (Procedural and Radar) Rating, SACAA, 2012</i> <i>Approach Control (Procedural) Rating, SACAA, 2007</i> <i>Aerodrome Control Rating, SACAA, 2004</i> <i>PBN Implementation, ICAO, 2013</i> <i>Presenter/Attendee at various Aviation Conferences/Seminars/Committees (ATNS, ACSA, SACAA, CANSO, ICAO, AFRAA, SASAR, OPSCOM, CARCOM)</i>

		<i>Guest Lecturer on ATC Ergonomics in Aerospace Medicine, SACAA (2018 - current)</i>			
8	LANGUAGES & DEGREE OF PROFICIENCY	Language	Speaking	Reading	Writing
		<i>English</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>
		<i>Afrikaans</i>	<i>Fair</i>	<i>Fair</i>	<i>Fair</i>
		<i>Zulu</i>	<i>Good</i>	<i>Good</i>	<i>Fair</i>
9	COUNTRIES OF WORK EXPERIENCE	<i>South Africa</i>			
10	EMPLOYMENT RECORD				

	Manager: Air Traffic Services – OR Tambo International Airport, ATNS	FROM: 2016	TO: 2023
	Head: Aeronautical Search and Rescue, South African Search and Rescue Organization (DoT)	FROM: 2016	TO: 2019
	Manager Air Traffic Services – King Shaka International Airport, ATNS	FROM: 2012	TO: 2016
	Air Traffic Controller, ATNS	FROM: 2005	TO: 2012
11	WORK UNDERTAKEN THAT BEST ILLUSTRATES YOUR CAPABILITY TO HANDLE THIS ASSIGNMENT		
		2020/3 Project Manager <i>Air Traffic Management Operational Performance Dashboard at OR Tambo Air traffic Services Unit.</i> Dashboard Development: Lead the design, development, and implementation of an Air Traffic Management Operational Performance Dashboard for OR Tambo Air Traffic Services Unit. Collaborate with stakeholders to define key performance indicators (KPIs) and metrics for operational, safety, and administrative aspects of air traffic services. Data Integration: Integrate data from various sources to create a unified and real-time view of operational performance. Ensure seamless integration of metrics related to safety, efficiency, and administrative processes for comprehensive reporting.	

		Metrics Analysis: Analyse performance metrics to identify trends, areas for improvement, and opportunities for optimization. Provide actionable insights to enhance operational efficiency, safety protocols, and administrative procedures. Management Reporting: Develop regular and ad-hoc reports for management, presenting key findings and performance metrics. Collaborate with leadership to communicate complex data in a clear and concise manner. Quality Assurance: Implement quality assurance processes to validate data accuracy and reliability within the Operational Performance Dashboard. Conduct regular audits to ensure the integrity of the performance metrics. Stakeholder Collaboration: Collaborate with air traffic controllers, safety officers, and administrative staff to gather relevant data and insights. Engage with management to understand their reporting needs and provide tailored solutions. Reference: Josia Manyakoana, COO - ATNS josiam@atns.co.za
		2012/233 Manager: Air Traffic Services <i>Air Traffic Service Unit Approval of Obstacles in Controlled Airspace</i> Obstacle Assessment: assessment of each obstacle applied for in terms of its height, location, and potential impact on air traffic operations, considering factors such as the obstacle's proximity to flight paths, airports, and navigation aids. Safety Standards and Regulations: Ensuring that the proposed obstacles comply with safety standards and regulations set by the aviation authorities including adherence to height restrictions, lighting requirements, and other safety measures aimed at preventing collisions. Risk Mitigation Strategies: Development and implementation of ATM strategies to mitigate risks posed by any existing obstacles.

		Documentation and Approval Process: Documenting the obstacle assessment process, including details of each obstacle, the corresponding risk assessment, and any mitigation strategies employed. Monitoring and Compliance: Following approvals, ensuring that implemented measures are consistently maintained, including the identification of any changes in the airspace environment that impacts on the Obstacle limitations. Communication with Air Traffic Controllers: Communicating obstacles to air traffic controllers, ensuring that they have up-to-date information about the controlled airspace. Reference: Josia Manyakoana, COO - ATNS josiam@atns.co.za
		2005/12 Air Traffic Controller <i>Aerodrome, Approach Procedural and Approach Radar Air Traffic Control.</i>

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



ate: 25/07/2024

 [Signature of staff member or authorized
 representative of the staff]

 Day/Month/Year

Full name of authorized representative: SIBUSISO WELCOME NKABINDE

7.8 Statement of Independence

I, Jonathan Barry Clive Heeger declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements 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 National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols") and in Government Notice No. 1150 of 30 October 2020.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and;
- the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of section 24F of the NEMA Act.



Signature of the Specialist

GWJ Aviation Advisory:

26 Jul 2024

Date

I, Sibusiso Welcome Nkabinde declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements 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 National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. “the Protocols”) and in Government Notice No. 1150 of 30 October 2020.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing –
 - any decision to be taken with respect to the application by the competent authority; and;
 - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of section 24F of the NEMA Act.



Signature of the Specialist

GWI Aviation Advisory:

26 Jul 2024

Date

7.9 FAA Guidelines on EM Interference

For proposed projects off, but close to airport property, the methodology considers three key questions:

Does the project height penetrate airspace?

The FAA has certain criteria to determine this, but in the SA scenario we substitute ICAO Annex 14 and any additional provisions of the SACAA Regulations (CATS 139.30), where these are more onerous. This would typically involve a desktop analysis of the aerodrome or airfields closest to the project site – in this case only FAWB. Airfields further than 8km away are generally not affected, unless approach or departure corridors pass directly over the site and there are precision navigation approaches in play, where aircraft have very 'flat' approach paths of 2,0%. (There might be military considerations here, too, but these in fact are excluded from the provisions of the DFFE Protocol).

Is the Project Design/Orientation likely to cause reflectivity concerns?

For solar PV projects consideration is given to 'glint' and 'glare' issues that might cause 'flash blindness' arising from both specular and diffused reflections. This is important for solar PV projects, but for the other proposed facilities it may be necessary to consider any potential effects of construction materials (roof) and other potentially reflective components. Depending on the proposed site layout, a geometric analysis based on the changing azimuth and bearing of the sun through the year, at key times during the day where air traffic is likely to be impacted, is sufficient for this purpose.

Is the Project likely to Interfere with Communications Systems, Operations and/or Flight Standards/Procedures?

The DFFE Protocol for environmental civil aviation studies refers specifically to 'radar'; however the FAA precedent document also looks at potential interference on all types of communications equipment, which is prudent. Thus, consideration is given to, inter alia:

Location of radar facilities Location of Control Tower(s)

Location of (remaining) ground based NDB's (since these are being phased out)

Location of VOR/DME installations that could be affected by the potential of the project (or key components thereof) to generate EM radiation that could perhaps affect these. Based on FAA guidelines, these distances are generally quite small, and are not usually a cause for concern.

Finally, as part of the 'operational' aspect, a review would be undertaken of existing flight corridors, RNAV and VFR routes, approaches in the area and published airport/airfield procedures, circuits, etc., to assess the potential of the proposed project to negatively impact on any of these at a material risk level i.e. more severe than 'low'. If so - and only in such case – would the matter need to be escalated to the SACAA for further analysis or review, in terms of the DFFE Protocol.

7.10 ICAO Standards and Recommended Practices (SARPS)

All infrastructure proposals and developments will be implemented in accordance with standards and recommended practices of the International Civil Aviation Organisation (ICAO) and the SA Civil Aviation Authority (SACAA), as contained in the Civil Aviation Regulations (CARS), as well as relevant SANS standards, planning policies and by-laws.

Other stakeholders in the civil aviation space may need be consulted including the SACAA and ATNS.

Airport geometrics are determined in accordance with International Standards and Recommended practices (SARPS). These standards are included in the following documents (as updated by ICAO from time to time):

Relevant ICAO Annexes

Annex 14	Airport Planning
Annex 10	Aeronautical communications
Annex 17	Security
Doc 8991	Manual on Air Traffic Forecasting
Doc 8261	Airport Economics Manual

- ICAO, Annex 14 “International Standards and Recommended Practices for Airports”;
- ICAO, Airport Design Manual part 1: Runways;
- ICAO, Airport Design Manual part 2: Taxiways, Aprons and Holding Bays;
- ICAO, Airport Design Manual part 3: Pavements;
- ICAO, Airport Design Manual part 4: Visual Aids;
- ICAO, Airport Design manual part 5: Electrical Systems;
- ICAO, Airport Design Manual part 6: Frangibility;
- ICAO, Airport Services Manual, part 1: Rescue and Fire Fighting;
- ICAO, Airport Services Manual, part 3: Bird Control and Reduction;
- ICAO, Airport Services Manual, part 6: Control of Obstacles.

Airport Reference Code

ICAO Annex 14 assigns an Airport Reference Code (Code number and letter), which is a simple method for matching the characteristics of airport facilities to those of aircraft intended to operate at the airport. The code number is used to classify the runway length, referenced to sea level under ‘standard’ atmospheric conditions; the code letter is used to classify the main part of the airside layout, based mainly on aircraft wingspan, although more recent editions also use landing gear geometry as a reference.

CODE ELEMENT 1		CODE ELEMENT 2	
Code number	Aeroplane Reference Field Length	Code Letter	Wing span
1	Less than 800	A	Up to but not including 15m
2	800m up to but not including 1200m	B	15m up to but not including 24m
3	1200m up to but not including 1800m	C	24m up to but not including 36m
4	1800m and over	D	36m up to but not including 52m
		E	52m up to but not including 65m
		F	65m up to but not including 80m