CIVIL AVIATION SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED ESKOM 132KV TRANSMISSION POWERLINE FROM MAKONDE SANARI POWERLINE AT TSWERA TO THE NEW MUTSHIKILI SUBSTATION AT THENGWE, THULAMELA LOCAL MUNICIPALITY, LIMPOPO PROVINCE

PRESENTED BY

GWI Aviation Advisory

FINAL

30 AUGUST 2023

Document Control

Document	Civil Aviation Sensitivity Study
File Location	C:\2023 Projects\GWI\DIGES
Project Name	Proposed Tswera-Mutshikile Powerline, Thengwe, Limpopo
Project Number	GWI/8/1/2023
Revision Number	1

Revision History

Revision No.	Date	Prepared By	Reviewed By	Approved for Issue By
1	30/08/2023	J. Heeger	B. Karstadt	B. Karstadt

Issue Register

Distribution List	Date Issued	Number of Copies
DIGES Group	30/08/2023	01

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1 Executive Summary

Appointment of GWI Aviation Advisory

In March 2020, the National Department of Forestry, Fisheries and the Environment (DFFE) published a Protocol that requires Environmental Assessment Practitioners (EAP's) to assess the environmental impact of proposed developments on nearby civil aviation facilities. While the South African Civil Aviation Authority (SACAA) is primarily concerned with civil aviation safety and security, the DFFE is mandated to ensure overall environmental compliance of aviation infrastructure and the impact of proposed new developments on existing infrastructure, particularly radar, within distance limits set out in the Protocol. To this end, it developed a screening tool (Screening Tool) to allow EAP's to undertake a preliminary assessment of the sensitivity of proposed development sites. If the results of this assessment indicate medium or higher sensitivity, then a specialist Civil Aviation Sensitivity Study (CASS) is necessary to verify orrevise the assigned sensitivity level. Should the CASS conclude that the sensitivity of the proposed site is indeed medium or higher, a Civil Aviation Compliance Statement to the satisfaction of the SACAA is then required.

Eskom is proposing to construct a new powerline from the Makonde Sanari powerline at Tswera to the Mutshikili substation at Thengwe, in the Local Municipality of Thulamela, Limpopo Province. There are no aerodromes located within the 8-15 km distances as specified in the Protocol, and no major airports within 35km. The closest active aerodromes, Musina, Louis Trichardt and some airstrips within the Kruger National Park are all further than 35km away. However, using the Screening Tool, a preliminary assessment conducted by DIGES indicated a high sensitivity, primarily due to the perceived risk posed to restricted military airspace above the proposed powerline route. GWI Aviation Advisory (GWI) were thus appointed by DIGES to undertake a CASS to verify or revise the sensitivity assessment and to determine whether a Civil Aviation Compliance Statement is required. The scope of the GWI appointment is restricted to the CASS and associated recommendations. Should the study conclude that the sensitivity is medium or higher,it may be necessary to extend GWI's appointment to include the preparation and approval by the SACAA of a Civil Aviation Compliance Statement.

Analysis Scope and Methodology

The analysis conducted by GWI was in terms of the Protocol, but also included a high- level assessment of potential safety impacts of the powerline on operations at nearby aerodromes, notwithstanding the fact that these are more than 15km away. For this purpose, the study reviewed whether determination of the Obstacle Limitation and Approach Surfaces (OLS) of any aerodromes will be required in accordance with thestandards and recommended practices (SARP's) of the International Civil Aviation Organisation (ICAO), as represented in South Africa by the SACAA, who also publish their own Civil Aviation Regulations and Technical Standards (CARS and CATS). Further, because the construction of electrical infrastructure might give rise to concerns over electro-magnetic (EM) interference, the study also referenced US Federal Aviation Authority (FAA) guidelines on the potential for EM interference on critical aviation systems of aerodromes or navigational infrastructure, by developments close by.

Findings

The findings of the CASS are as follows:

- **Radar Installations**:
  There is no evidence of ground-based civil radar installations closer than 15km or within the 15-35km distance limits of the development site, as set out in the Screening Tool, neither is there any evidence

of any radar equipment within the guidelines recommended by the US FAA (500ft, per Appendix 6.5) within which potential RF interference could occur. Risk of interference is therefore low.

- **Navigational Infrastructure**:
  There is no evidence of any land-based navigational infrastructure within the distance limits set out in the Protocol, although there is an inactive non-directional beacon (NDB) at Thohoyandou, some 30 km south of the site. The risk of RF interference is therefore considered low, based on the applicable FAA distance guideline of 500ft (Appendix 6.5). Risk mitigation is in any event provided through alternative navigation options including GPS-based navigation, which allows most aircraft to navigate via communication links to satellites in stationery orbits above the earth's surface, in which case line-of-sight issues are less relevant.

- **Aerodromes**
  There are no major civilian airports within 35km of the development site and no minor aerodromes within the 8-15km distance limit specified in the Screening Tool.

- **Upper-level Air Corridors and Routes**:
  The closest upper-level air corridor or major air service navigation route is some 46km to the east of the development and is a satellite navigation (RNAV) route that will be unaffected by the development. However, the proposed powerline does lie under restricted airspace known as FAR 71, which is military airspace denoted as "Transvaal Military Middle Flying Area". This airspace is reserved for military operations to and from military aerodromes within Limpopo, but the airspace concerned extends from flight level 105 to flight level 195 i.e. 10 500ft to 19 500ft above mean sea level (AMSL), which is 8 500 ft above the natural ground level at the highest point of the powerline route. Risk is therefore low. In any event, it is debatable whether the provisions of the Protocol apply to military airspace since the Protocol wording refers specifically to 'civil aviation'.

- **Radio and Communications Interference**
  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 6.5). These minima are well below the distance of the proposed powerline from any ground-based communications infrastructure and radio equipment, and the closest navigational infrastructure, which is 30km away at Thohoyandou. Risk of such interference is thus low. In relation topotential RF interference with aircraft overflying the site, the previous discussion on air corridors and routes refers, with risk being low since the restricted airspace lies at least 8 500ft (2 590m) above the site.

- **'Glint and Glare' Risk**
  This consideration (per FAA Guidelines) applies generally to solar PV generation facilities where solar panels may have high reflectivity. In this case, since there are no PV panels installed, the risk to overflying aircraft is low.

- **Obstacle Limitation Surfaces**:

  - **Approach and Take-off/Climb surfaces**
    The powerline route site falls well outside the approach and take-off/climb surfaces of any nearby aerodrome, which generally terminate 2,5km from the aerodrome, and the development is therefore expected to contribute minimal additional risk to safe operations to and from nearby aerodromes.

  - **Inner Horizontal Surface (IHS)**
    The development site falls well outside the IHS footprint of any nearby aerodrome (a 2,5km radius) and is therefore fully compliant with the provisions of the ICAO SARP's.

  - **Conical Surface (CS)**
    The CS's of all nearby aerodromes terminate well before the development site and are therefore not influenced by the proposed project.

- **Existing Obstacles**
  No existing obstacles are noted.

Recommendations

It is recommended that the sensitivity level of the proposed project be amended to ‘low’, in which case no Civil Aviation Compliance Statement will be required.

2 Introduction

2.1 Background

DIGES was appointed to undertake a basic assessment for the proposed construction of a new powerline from the Makonde Sanari powerline at Tswera to the Mutshikili substation at Thengwe, in the Local Municipality of Thulamela, Limpopo Province. The powerline site is approximately 30km north of Thohoyandou, and will comprise pylons of up to 15m high, between which electrical cable is suspended in catenaries.

Figures 2.1 to 2.3 outline the local and regional location of the powerline site relative to potential aerodromes whose operations it may impact, and local airspace.

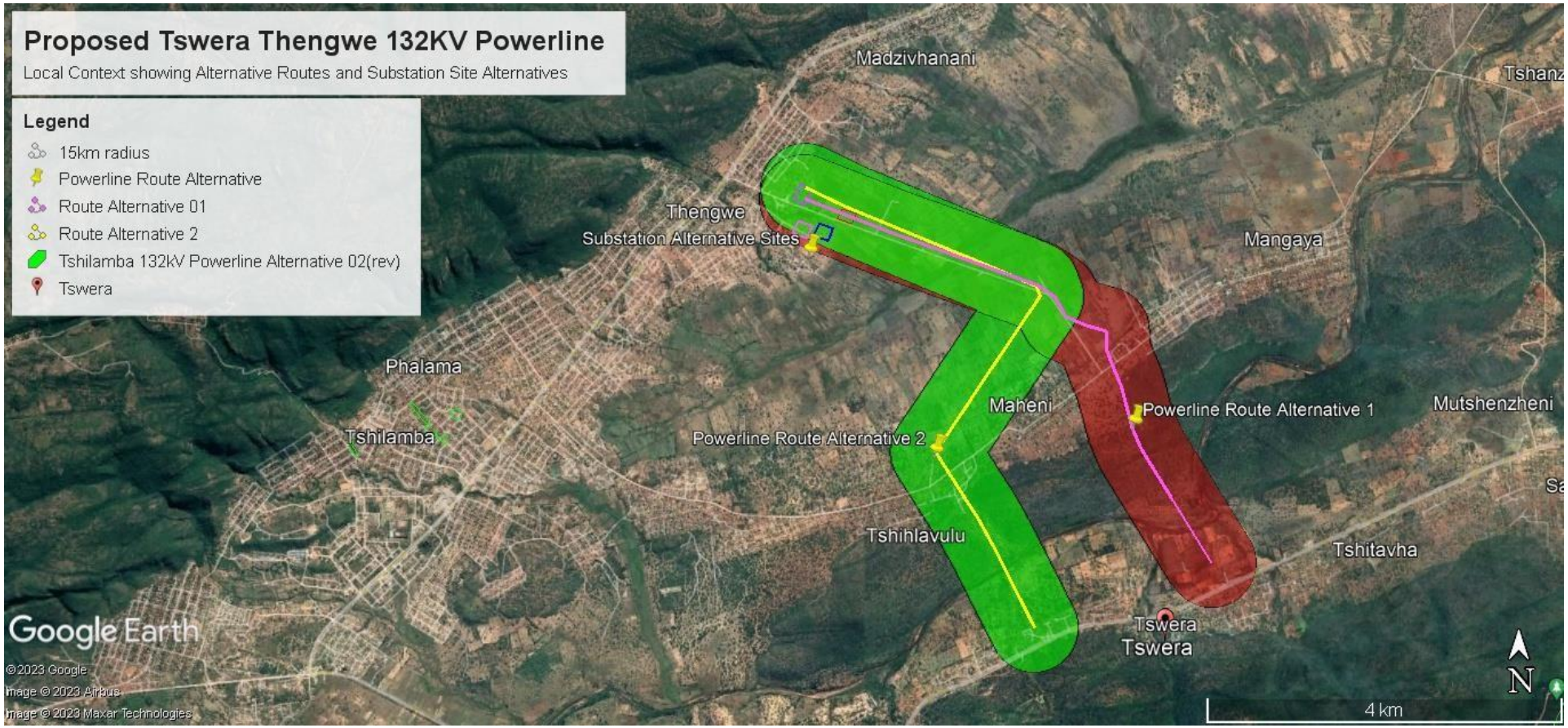

Figure 2-1: Location of Powerline relative to Tswera and Thengwe

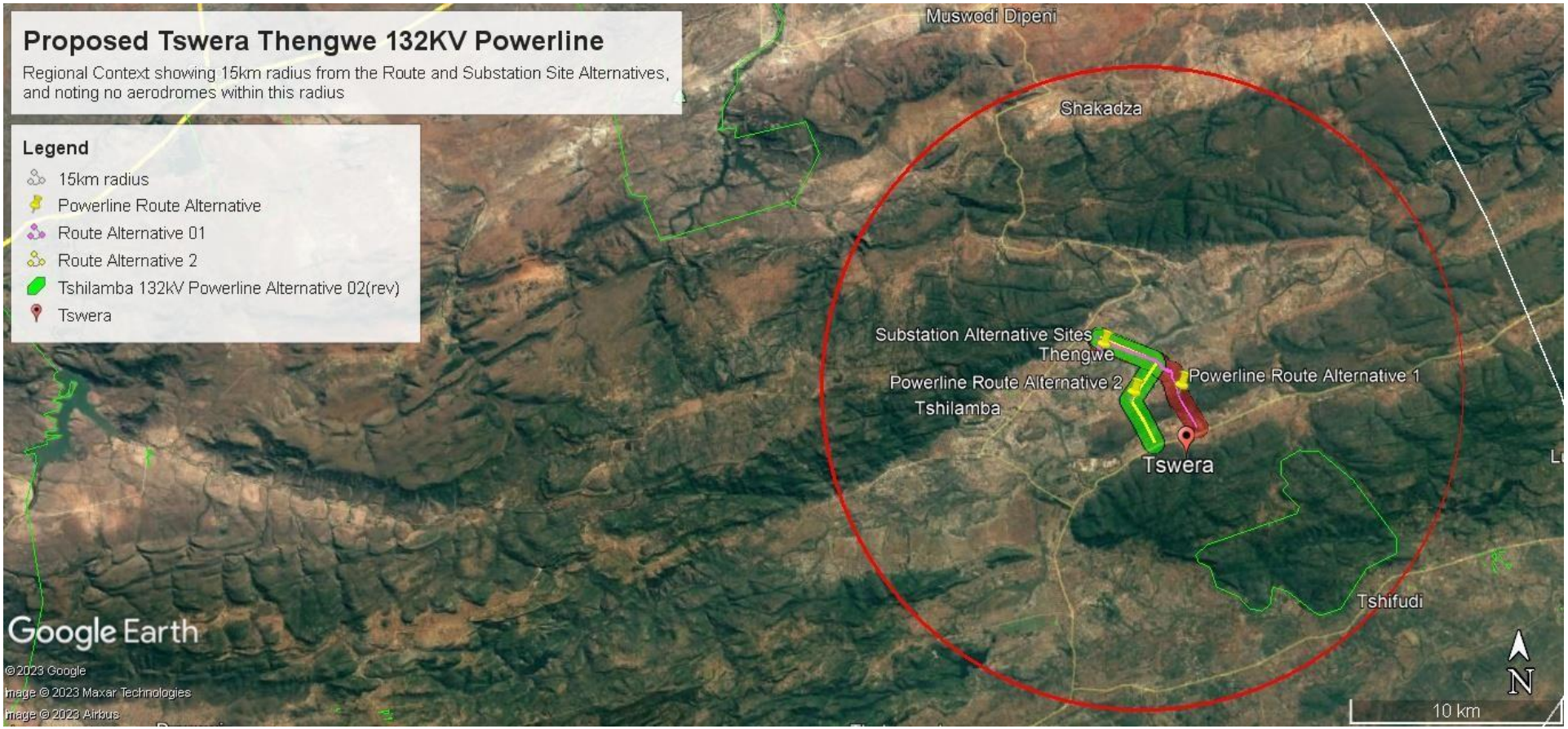

Figure 2-2: Location of Powerline relative to possible Aerodromes within 15km

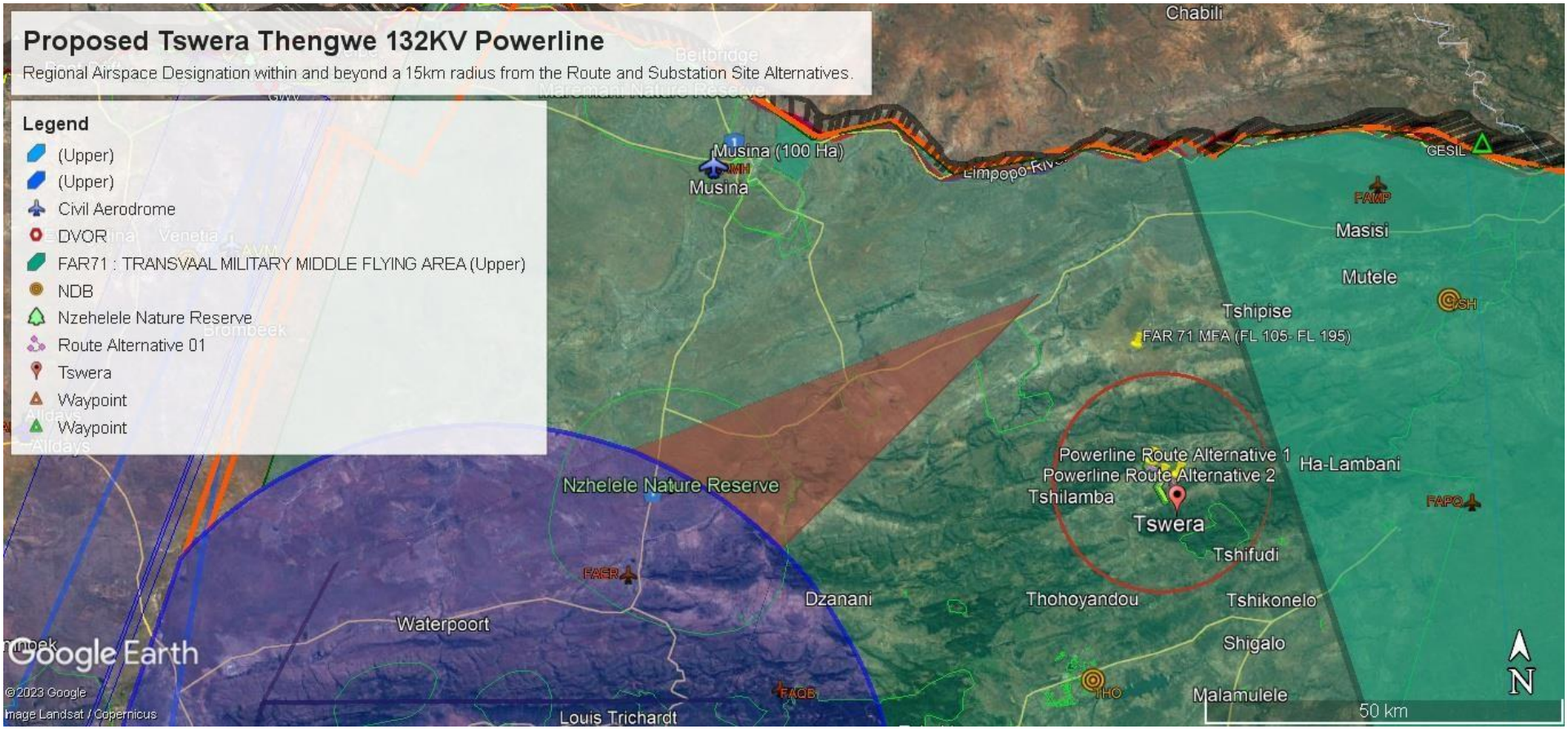

Figure 2-3: Classification of Airspace in the Vicinity of the Development Site

2.2 Environmental Requirements

With reference to an Environmental Authorisation this application shall be submitted in terms of Basic Assessment process. The report takes cognizance of the powerline routing in respect to both incoming and outgoing loops.

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. The main listed activity triggered by the project is construction of a transmission powerline.

In respect of these legal requirements, where a LN2 activity is triggered, the appropriate Environmental Authorisation application process is a Scoping and EIA process. Therefore, a Basic Assessment process must be followed instead of the full Scoping and EIA process.

3 Civil Aviation Specialist Study Requirements

3.1 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 6.4.

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 aerodrome (sic)

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.***

3.2 Initial Assessment

The development site was assessed by DIGES using the Screening Tool and a high sensitivity assigned on account of the potential risk to nearby restricted airspace, being airspace designated 'FAR 71' (Figure 2.3).

Based on this preliminary sensitivity rating, GWI was appointed by DIGES to undertake a CASS to verify or adjust the rating. The credentials of GWI and relevant CV's of resources deployed on the study are attached to this report as Appendix 6.2.

If the CASS determines that a Compliance Statement is required, the mandate of GWI may need to be extended to prepare the Compliance Statement and engage with the SACAA to obtain their comments on and approval of the document.

3.3 Specialist Study Elements

The CASS comprised the following elements:

3.3.1 Airspace Analysis

Using the SACAA Aerodrome Directory and the Aeronautical Information Publication (AIP) information on nearby aerodromes and their license status, airspace classification sourced from the Air Traffic and Navigational Services Corporation (ATNS) and existing topographical data, the development site was overlaid on the airspace classification map of the environs and risks posed to overflying civilian aircraft assessed.

3.3.2 Radar Installation Assessment

Using information available from the SACAA and ATNS, the location of civil aviation radar installations within the guideline distances (per the Protocol) from the development was determined and the risk posed to the operation of these installations assessed.

3.3.3 Obstacle Assessment

Using the ICAO SARP's, relevant OLS's were reviewed and any additional risk to these surfaces presented by the development associated infrastructure (powerlines and communication towers) assessed.

3.3.4 RF Interference

Utilising FAA Guidelines, the potential of RF interference was assessed.

3.3.5 Glint and Glare Assessment

The likelihood was assessed of any construction materials presenting significant glint and glare risk.

3.3.6 Other Potential Impacts

Other potential impacts, for example the risk of explosion on the development site, were assessed.

Based on the above studies, the sensitivity status of the development was determined and amended.

4 Specialist Study Outputs

4.1 Airspace Analysis and Radar Assessment

The SACAA AD information of nearby aerodromes was considered at a high level only since the powerline site falls outside the obstacle limitation surfaces of all of these. However, key considerations are:

- The aerodromes have no navigational aids, radar, runway or airfield lighting to assist approaching aircraft.

- The aerodromes operate under Visual Flight Rules (VFR) and all approaches are initiated in uncontrolled air space (see Glossary), as defined by ATNS as Class G.

- The airspace classification of the environs around the development site is indicated in Figure 2.3.

From Figure 2.3, it was determined that:

- The closest upper-level air corridor or major air service navigation route is some 49km to the east of the development, which is beyond the 35km distance that triggers an assessment. However, the proposed powerline does lie under restricted airspace known as 'FAR 71', which is military airspace denoted as "Transvaal Military Middle Flying Area". This airspace is designated for military operations to and from military aerodromes within Limpopo, but the airspace concerned extends from flight level 105 to flight level 195 i.e. 10 500ft to 19 500ft above mean sea level (AMSL), which is 8 500ft above natural ground level at the highest point of the powerline route. Risk is therefore low. In any event, it is debatable whether the provisions of the Protocol apply to military airspace since the wording refers specifically to 'civil aviation'.

- Notwithstanding the military airspace FAR71, the civilian airspace around the site is uncontrolled (Class G) and use of this airspace is governed by standard Procedures for Air Navigation Services-Aircraft Operations (PANS/OPS) laid down by the SACAA, which is more an operational than an environmental issue, designed primarily to preserve safety.

- There are no nearby civil aviation radar sites that are likely to be affected by the proposed development.

- The closest ground-based navigational equipment is the NDB located 30km south of the site, at Thohoyandou, but this NDB is inactive.

- No aerodromes are located within 15km of the site.

4.2 Obstacle Limitation Surfaces

For any nearby aerodromes, the ICAO SARP's would generally require the following types of OLS (see Figure 4.1) to be determined:

- Conical surface
- Inner horizontal surface
- Approach and take-off/climb surfaces
- Transitional surfaces

While this analysis is mainly concerned with the potential impact, in terms of the 2020 Protocol, of the powerline on operations on existing aviation infrastructure in the area, it is nonetheless similar in scope to an Aviation Safety Study based on the OLS's indicated in Figure 4.1 (extracted from ICAO Annex 14), ICAO Annex 14 - Table 4.1 and Figures 2.1 - 2.3.

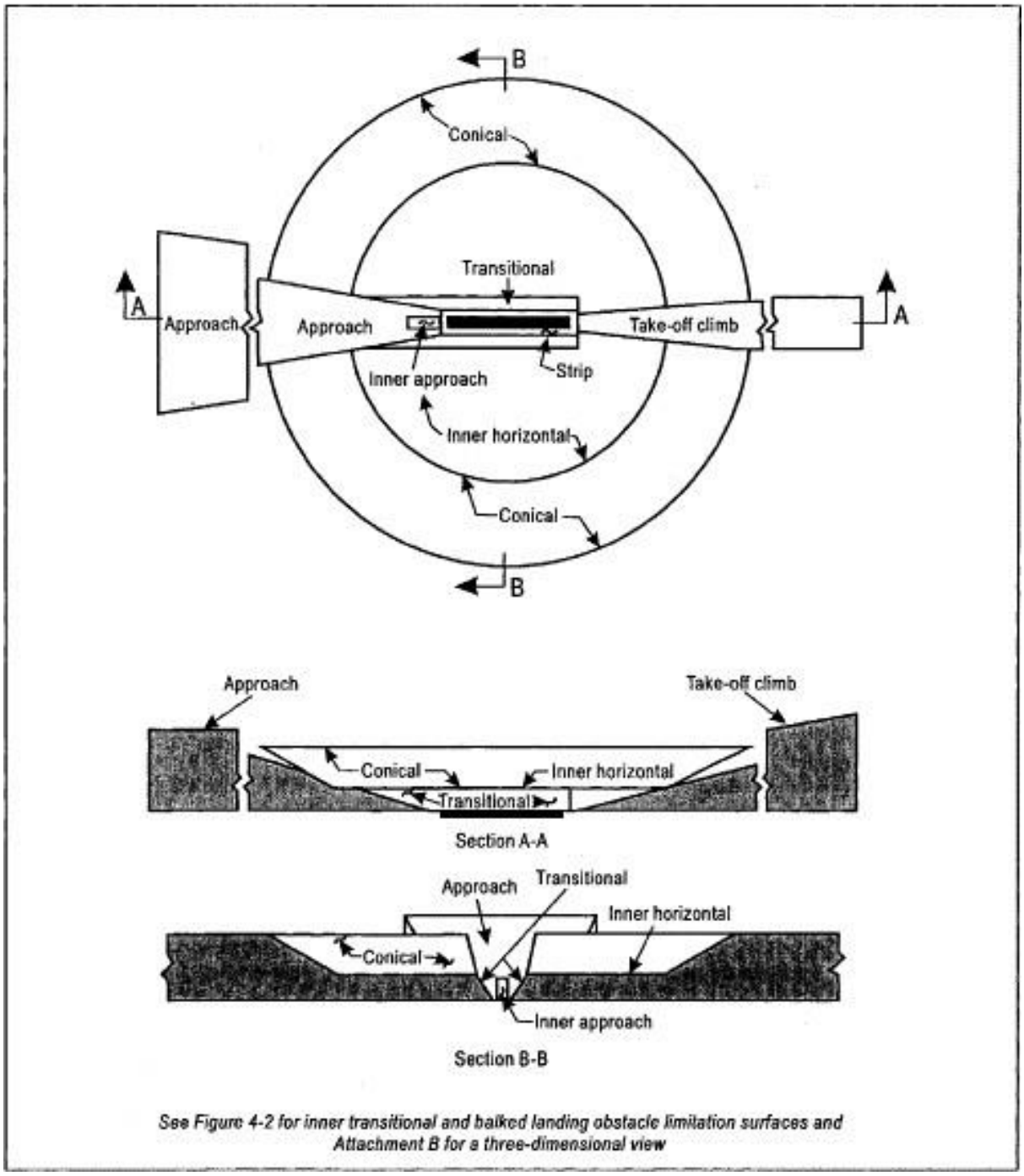

Figure 4-1: ICAO Obstacle Limitation Surfaces

4.2.1 Inner Horizontal Surface

The ICAO SARP's require an IHS that extends horizontally 2 500m from any point on the runway, for a Code 2B aerodrome. In this instance, the powerline site is well beyond the boundary of any IHS likely to be affected, and there is no material influence.

4.2.2 Conical Surface

The powerline is also beyond the limit of the conical surface of any aerodrome likely to be affected, which in any event lies at a significantly higher altitude and would be unaffected by the development.

4.2.3 Approach and Take-off Departure Surfaces

As for the IHS, there are no approach surfaces likely to be affected since these are well beyond the distance at which the powerline could have any material impact.

It has been indicated that the standard height for powerline pylons is 15-35m, but since the distance from any nearby aerodrome is over 15km, the powerline presents low risk to operations. However, for purposes of complying with SACAA safety and operational requirements it may be necessary to consult the SACAA in due course, to ensure compliance with their Technical Standards (CATS) particularly CATS 139.01.30. This standard deals with the requirements to mark potential obstacles with lights or high visibility materials and is orientated towards safety rather than environmental impact.

4.2.4 Transitional Surface

The transitional surface at all aerodromes likely to be affected slopes upwards at an inclination of 20% and reaches an altitude of 20m, 130m from the runway centreline, and is thus not a consideration in this case since all potentially affected aerodromes are beyond 15km away.

4.3 Other Potential Impacts

Electrical infrastructure has the potential to cause radio frequency interference to communications systems between aircraft or navigational system links between ground-based infrastructure and aircraft. In this case, the analysis is based on standard guidelines utilised by the US Federal Aviation Administration (FAA), attached as Appendix 6.5.

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. These minima are well below the distance of the powerline from any ground-based communications infrastructure and radio equipment (over 15km) and the closest NDB (30km to the south). Risk of such interference is thus low.

In relation to potential RF interference with aircraft overflying the site, the previous discussion on air corridors and routes refers. Risk is low since aircraft traversing the site are likely to be at altitudes exceeding 8 500ft (2 569m) above ground level.

5 Recommendations

As specified in the DFFE Protocol, proposed development sites whose sensitivity is low, do not require a Civil Aviation Compliance Statement. For sites whose sensitivity is medium or higher, a Compliance Statement is required.

The analysis contained in this CASS has determined that the powerline and associated ground-based infrastructure would not materially impact radar or navigation infrastructure in the environs, nor present any material additional risks to operations at any nearby aerodromes, within the contemplation of the 2020 Protocol. On this basis, therefore, it is recommended that the Sensitivity Classification of the proposed development be amended to 'low'.

6 Appendices

6.1 Glossary of Terms

The definitions listed below apply to this document. Definitions have been taken from Wikipedia, where applicable.

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	CAN	An indication of runway strength requirements of aircraft, which must not exceed the corresponding Pavement Classification Number (PCN) of the airfield
Airfield Ground Lighting	AGL	Lighting systems on runway, taxiways and apron.
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.
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 gives an overall framework for development. It aims to co-ordinate 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.
Level of Service	LOS	Level of service to passengers as defined in IATA reference documents
Passengers	PAX	Number of passengers
Performance Based Navigation	PBN	New 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

TERM	ACRONYM	DEFINITION
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.
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 takeoff of aircraft".
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
Visual Meteorological Conditions	VMC	Meteorological conditions under which visual sight distances (per SACAA rules) allow flight operations to proceed under VFR, without the necessity to resort to instrument procedures.
Work Breakdown Structure	WBS	A work-breakdown structure in project management and systems engineering, is a deliverable-oriented breakdown of a project into smaller components. A work breakdown structure is a key project deliverable that organizes the team's work into manageable sections.

Table 6-1: Glossary of Terms

6.2 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.

Also refer: www.gwi.co.za

Curriculum Vitae (CV): JBC Heeger

1	PROPOSED POSITION FOR THIS PROJECT	*Aviation and Airport Specialist*			
2	NAME OF PERSON	*Heeger, Jon*			
3	DATE OF BIRTH	*2 May 1955*			
4	NATIONALITY	*South African*			
5	MEMBERSHIP IN PROFESSIONAL SOCIETIES	*Member, Engineering Council of South Africa -ECSA No. 820365 (1982 - 2008)*			
6	EDUCATION	*MBA (Construction Management), University of the Witwatersrand, 1985* *GDE (Construction Management), University of the Witwatersrand, 1985* *BSc. Civil Engineering, University of the Witwatersrand, 1977* *BCom modules (part time): Micro and Transport Economics, UNISA 1978-1980*			
7	OTHER TRAINING	*ACSA/IATA/ICAO- Internal Training & Development programmes (1994-2000)* *Presentor/Attendee at various Aviation Conferences/Seminars (Aviadev, ATNS, BARSA)* *Guest Lecturer for Aerotropolis Institute Africa, UKZN (202-2023)*			
8	LANGUAGES & DEGREE OF PROFICIENCY	Language	Speaking	Reading	Writing
		English	*Excellent*	*Excellent*	*Excellent*
		Afrikaans	*Good*	*Excellent*	*Good*
9	COUNTRIES OF WORK EXPERIENCE	South Africa, Botswana, Ghana, Mozambique, Nigeria, Liberia, China, Kenya, Brazil and Rwanda.			
10	EMPLOYMENT RECORD				
	Independent Expert/Consultant: Airport Planning and development	FROM: *2000*		TO: *2022*	
	Airport Planning/Development Division - Airports Company South Africa Position: Group Manager – Airport developments	FROM: *1996*		TO: *1999*	
	RMB Group (now Eris Properties) Position: General Manager: Developments	FROM: *1984*		TO: *1996*	
	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) *Feasibility Study for a possible freight Aerotropolis in Sedibeng Municipality.* 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) *Master and Land-use plan Review and Pre-Feasibility Study for the re-development of Plettenberg Bay Airport, Bitou Local Municipality.* 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) *Master and Land-use plan Review and Pre-Feasibility Study for the re-development of Margate Airport, Ray Nkonyeni Local Municipality.* 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) *Benchmarkinig Study and Strategy Development for Airlift as a Catalyst for Tourism Growth and Development in the SADC region. (SADC Ministers Council, Secretariat)* 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 Yammousoukro Protocol.

		Reference: Dr Salifou Siddo, AFC Agriculture and Finance Consultants GmbH – **salifou.siddo@afci.de**
		2019/2022 Airport Specialist *Redevelopment Options for Tommy's Field Airport, Postmasburg (Anglo American, SMEC Engineers)* 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 *Pre-Feasibility Study for Proposed Ghana Airports Company Limited Regional Airport, Takoradi, Ghana.* 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 *Revitalization Options for Ulundi Airport, South Africa. Zululand District Municipality. (2017)* 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 *Precinct Planning of Port Elizabeth and East London Airports, ACSA (2018/2020)* 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 *Redevelopment Options for Grand Central Airport, Midrand. Ivora Capital, Old Mutual Properties (2018/9)* 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 *Republic of Kenya National Tourism Strategy (2017)* 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
		Airport Specialist and Business Analyst (SMEC)

		Richards Bay Airport Master Plan, South Africa. City of uMhlathuze (Richards Bay). (2009, 2017, 2021) 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**
		Airport Specialist and Business Analyst *Redevelopment Options for PC Pelser AIrport, Klerksdorp. Matlosana Municipality (2011,2017-19)* 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 Khutlhwayo - 062 692 0590
		Aviation/Airport Specialist and Business Analyst *KZN Treasury Crack Team. KZN Treasury. (2012 – 2013).* Airport Master planning including traffic forecasts and assessment of growth potential for aeronautical and non-aeronautical revenues; Pietermaritzburg, Margate, Newcastle, Ladysmith, Ulundi and Richards Bay Airports. Reference: Mr F Alberts, ED Director, Newcastle Municipality – 082 802 0382
		Airport Specialist and Business Analyst *Proposed New Mkuze Airport. Umhlosinga Development Agency. (2008 to 2013).* 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.
		Business/Aviation Specialist *Maun Airport Expansion. Botswana Civil Aviation Authority. (2005-2010).*

		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
		Consultant Team Leader *Development of new Passenger Terminals and Cargo Facilities at Maputo. Aeroporto du Mozambique. (2007-2012).* 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
		Summary of other airport assignments pre 2007. (1980-2007). • *Team leader – Kruger Mpumalanga International Airport:* Commercialisation Study Proposal. • *Lead Joint Venture partner - Mafikeng Airport IDZ (NW Provincial Government):* Proposed Minerals Cluster and commercial development. • *Team leader – Ghana Civil Aviation Authority*: Accra and Kumasi International airport Master Plans; air platform and non-aeronautical commercialisation (proposal). • *Joint Venture consultant – Ghana Civil Aviation Authority:* Implementation of parking equipment and systems, Kotoka International Airport, Accra, Ghana. • *Transport Economist/Business Analyst – World Bank - Monrovia, Liberia:* Assessment of emergency works required at Roberts International Airport. Validation of traffic forecast, development of business model, scenario planning and economic cost-benefit analysis. • *Team Leader – Department of Civil Aviation, Gaborone, Botswana:* 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. • *Aviation Specialist – Bi Courtney Consortium, Lagos, Nigeria: Preparation of Master Plan proposals for expansion of domestic terminal* ***As Client Development Team Leader***

		• *International Terminal Retail Project – ORTIA Johannesburg (1997)* • *Design Team Leader – Domestic terminal ORTIA (1997)* • *4 300 bay Multi-storey parkade, ORTIA (1996)* • *Chairman, Airport Steering Committee, La Mercy Airport (1997)* • *General Aviation Centre, East London (1998)* • *Terminal upgrades, East London & Port Elizabeth (1998)* • *Refrigerated cargo facility, Cape Town (1997)* • *Precious Commodities handling facility, JIA (1997)* • *In-flight catering facility, Cape Town (1997)*

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: 27/08/2023

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

Day/Month/Year

Full name of authorized representative: JONATHAN BARRY CLIVE HEEGER

6.3 Statement of Independence

Submitted as a separate document

6.4 Government Notice 320 of 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 Regulations[1].

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] The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

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.	**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 EMPr. The assessment must be in accordance with the requirements stipulated by the SACAA.
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.	

	2.4. 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.

6.5 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, 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 FATZ. 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. (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?

While the DFFE Protocol refers specifically to 'radar', 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.

6.6 Relevant Aerodrome Licence(s) and AIP

Not applicable.

6.7 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 in place in …….

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

Table 6-2: Typical ICAO Annexes

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

Airport Reference Code

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):

- 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;

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 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

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