PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10017

Figure 1: The file picture of the Cessna 182P, ZS-MZV. (Source: Aircraft owner and pilot)

Description:

On Monday morning, 28 June 2021 at 0740Z, a Cessna 182P aircraft with registration ZS-MZV took off from Hoedspruit Civil Aerodrome (FAHT) with the intention to land at Rand Aerodrome (FAGM). On-board the aircraft were the pilot and three passengers. The aircraft was cleared to land Runway 35 at FAGM by air traffic control (ATC) but the pilot opted for a go-around due to an unstable approach. While positioning for a second approach, the engine stopped in operation and the pilot executed a forced landing in a swampland. At the time of the accident, visual flight rules (VFR) prevailed during daylight. The pilot had filed a flight plan for the flight and was allocated a squawk code prior to take-off. The flight was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

DESCRIPTION OF ACCIDENT

Reference number	**:** CA18/2/3/10017
Name of owners	**:** Mike Zulu Victor (Pty) Ltd
Type of operation	**:** Private (Part 91)
Manufacturer	**:** Cessna Aircraft Company
Model	**:** Cessna 182P
Nationality	**:** South African
Registration marks	**:** ZS-MZV
Place	**:** Swampland area in Wadeville, Gauteng Province
Date	**:** 28 June 2021
Time	**:** 0925Z

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and ***not to apportion blame or liability****.*

Any person who has information concerning this accident should contact the Accident and Incident Investigations Division (AIID) on AIIDinbox@caa.co.za

Investigation Process:

The AIID was informed of an accident involving a Cessna 182, which occurred in a wetland (swampland) area in Wadeville on 28 June 2021. The accident was notified to the AIID investigator-on-call (IOC).

The AIID has appointed an investigator-in-charge. Notifications were sent to the State of Manufacture and Design, National Transportation Safety Board. The State did not assign an accredited representative to this investigation. The AIID will lead the investigation and issue the final report.

The information contained in this preliminary report is derived from the factual information gathered during the on-going investigation into the occurrence. Later, an interim report or the final report may contain altered information in case new evidence is found during the on-going investigation that require changes to the information depicted in this report.

The AIID reports are made available to the public at:
http://www.caa.co.za/Pages/Accidents%20and%20Incidents/Aircraft-accident-reports.aspx

Notes:

1. Whenever the following words are mentioned in this report, they shall mean the following:

    - Accident – this investigated accident
    - Aircraft – the Cessna 182P involved in this accident
    - Investigation – the investigation into the circumstances of this accident
    - Pilot – the pilot involved in this accident
    - Report – this accident report

2. Photos and figures used in this report were obtained from different sources and may be adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report are limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or the addition of text boxes, arrows or lines.

Disclaimer:

Abbreviations	Description
AFM	Aircraft Flight Manual
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
AMSL	Above Mean Sea Level
ATC	Air Traffic Control
˚C	Degrees Celsius
CAR	Civil Aviation Regulations
CCTV	Close Circuit Television
CVR	Cockpit Voice Recorder
FAGM	Rand Aerodrome
FAHT	Hoedspruit Civil Aerodrome
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
IOC	Investigator-on-call
kg	Kilograms
kts	Knots
lbs	Pounds
m	Metre
METAR	Meteorological Routine Aerodrome Report
MHz	Megahertz
mph	Miles per Hour
MPI	Mandatory Periodic Inspection
MTOW	Maximum Take-Off Weight
nm	Nautical Miles
PIC	Pilot-in-command
PPL	Private Pilot Licence
QNH	Barometric Pressure Adjusted to Sea Level (Query Nautical Height)
qts	Quarts
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
SSR	Secondary Surveillance Radar
TBO	Time Between Overhaul
US	United States
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VHF	Very High Frequency
Z	Zulu (Term for Coordinated Universal Time – Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 On Friday 25 June 2021, the pilot and three passengers on-board a Cessna 182P with registration ZS-MZV took off from Rand Aerodrome (FAGM) to a private game reserve located 12 nautical miles (nm) north-east of Hoedspruit Civil Aerodrome (FAHT). According to the pilot, the duration of the flight was one hour and 54 minutes (1.9 hours). On Monday morning, 28 June 2021, the pilot accompanied by the same three passengers took off from the private game reserve (gravel runway) and flew to FAHT where they landed on Runway 35 before taxiing to the apron area to uplift fuel. According to the fuel service provider, the pilot instructed him to add 50 litres to the left tank and 5 litres to the right tank of the aircraft.

1.1.2 The pilot filed a flight plan for the private flight from FAHT to Rand Aerodrome (FAGM). According to a close circuit television (CCTV) footage obtained from FAHT, the pilot and his three passengers took off from Runway 35 at 0740Z. The pilot was allocated a squawk code (# 7342) by air traffic control (ATC) and the aircraft was tracked on Secondary Surveillance Radar (SSR). It was observed flying at 8 500 feet (FL085). At 0834Z as the aircraft was abeam Loskop Dam to its left, the pilot commenced with his descent to 6 500 feet.

1.1.3 According to the pilot (who was also the owner of the aircraft) the fuel gauges of the aircraft were erratic throughout the flight; the gauges were fluctuating between ¼ tank remaining and full tank. He further stated that the left tank drained quicker then the right tank, hence, he switched the fuel selector to the right tank during cruise flight. During descent, he selected “BOTH” tanks for landing. He approached FAGM from the north-west and was cleared to land Runway 35 at 0921Z by ATC who provided the prevailing wind conditions to be 360° at 16 knots (kts). The pilot joined on a left downwind for landing and opted for 20° of wing flaps due to strong wind conditions.

1.1.4 Approximately 100 metres (m) from the threshold of Runway 35 while flying between 70 and 75 miles per hour (mph), a gust of wind led to an unstable approach and the pilot opted for a go-around. He climbed to a circuit altitude of 6 500 feet and turned left to rejoin on a left downwind for Runway 35. The pilot decided to extend his downwind leg to give himself additional space and time to set up the approach again as gusty wind conditions prevailed at the time. However, midway down the left downwind for Runway 35 he loss engine power and the engine revolutions per minute (rpm) gauge started to fluctuate. The pilot stated that he started with fault-finding procedures, checking the fuel gauges first, which were still giving erratic indications; he then cycled the fuel selector lever between BOTH tanks and the right tank. The mixture was leaned for landing and, shortly thereafter, the engine stopped.

1.1.5 The pilot then sought and identified an open field in front of him (30° to his left and 30° to his right). He then decided to land on the identified open piece of swampland. Thereafter, he broadcasted 'Mayday Mayday Mayday' on the FAGM tower frequency and selected full wing flaps for landing, as well as switched off the master switch. He then instructed his passengers to assume the brace position and unlatched the doors prior to touchdown.

1.1.6 The aircraft came to rest in a left-wing low attitude facing in a southerly direction in a densely reed area. No persons on-board the aircraft were injured, but the aircraft was substantially damage during the accident sequence. Following the Mayday call, a helicopter that was busy with training at FAGM was dispatched to the scene by ATC. The helicopter landed near the accident site and the pilot flew the passengers and the accident helicopter pilot to FAGM, two at a time.

1.1.7 The accident occurred during daylight at Global Positioning System (GPS) position determined to be: 26˚17'18.20" South 028˚10'19.40" East at an elevation of 5 047ft.

Figure 2: Google Earth overlay with the yellow dots indicating the radar track flown by ZS-MZV.

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total on-board	Other
Fatal	-	-	-		-
Serious	-	-	-		-
Minor	-	-	-		-
None	1	-	3	4	-
Total	**1**	**-**	**3**	**4**	**-**

1.3 Damage to Aircraft

1.3.1 The aircraft was substantially damaged during the accident sequence.

Figure 3: The aircraft as it came rest on a swampland.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

1.5.1 Pilot-in-command (PIC)

Nationality	South African	Gender	Male	Age	31
Licence Number	**********	Licence Type	Private Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	31 August 2024 (Class 2)				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	115.5
Total Past 90 Days	43.7
Total on Type Past 90 Days	42.7
Total on Type	42.7

1.6 Aircraft Information

1.6.1 Airframe:

Type	Cessna 182P	
Serial Number	182-61343	
Manufacturer	Cessna Aircraft Company	
Year of Manufacture	1991	
Total Airframe Hours (at time of the incident)	3 960.3	
Last MPI (hours & date)	3 932.1	20 August 2020
Hours Since Last MPI	28.2	
C of A (issue date)	7 June 1991	
C of A (expiry date)	30 June 2021	
C of R (issue date) (Present Owner)	28 May 2021	
Operating Categories	Standard Normal (Aeroplane)	

Engine:

Type	Continental O-470-R
Serial Number	222471-72R
Hours Since New	3 960.3
Hours Since Overhaul	979.6

Propeller:

Type	McCauley 2A34C201
Serial Number	723704
Hours Since New	3 960.3
Hours Since Overhaul	979.6

1.6.2 Weight and Balance

Item	Weight (lbs)	Arm (inches)	Moment (lbs x inches)
Aircraft empty weight	1 828	36.57	66 848
Pilot and front passenger	384	37.00	14 208
Second row passengers	227	74.10	16 820
Baggage (Area A)	25	96.7	2 418
Baggage (Area B)	20	114.8	2 296
Zero fuel weight	**2 484**	**41.3**	**102 590**
Fuel (36 US Gallons at 6lb/Gal.)	216	48.10	10 380
Take-off weight	**2 700**	**41.8**	**112 970**

According to the aircraft flight manual (AFM), the maximum take-off weight (MTOW) for this aircraft type is 2 950 lbs (1 330kg).

According to the aircraft maintenance organisation (AMO) that conducted the last re-weigh of the aircraft on 21 August 2017, the aircraft was weighed with 10 quarts of engine oil (in the engine). The fire extinguisher, first aid kit and signal strips were in the cabin. There was no fuel in the tanks and the aircraft was also not fitted with wheel spats at the time.

The passenger weights, baggage and fuel quantity that was on-board the aircraft prior to take-off from FAHT was provided by the pilot in his weight and balance calculations that were made available to the investigator.

1.7 Meteorological Information

1.7.1 The meteorological routine aerodrome report (METAR) for FAGM on 28 June 2021 at 0900Z was as follow: FAGM 280900Z 35020KT CAVOK 17/M01 Q1026=

Wind Direction	350˚	Wind Speed	20 knots	Visibility	+ 10 km
Temperature	17˚C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	-1˚C	QNH	1026hPa		

1.7.2 The METAR for FAOR on 28 June 2021 at 0930Z was as follows: FAOR 280930Z 33013KT CAVOK 17/M01 Q1025 NOSIG=

Wind Direction	330˚	Wind Speed	13 knots	Visibility	+ 10 km
Temperature	17˚C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	-1˚C	QNH	1025hPa		

1.7.3 When the pilot was cleared to land Runway 35 by ATC, he was provided with the prevailing wind at the time which was 360° at 16 knots.

1.8. Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA). There were no records that indicated that the navigation system was unserviceable prior to or during the flight.

1.9 Communication

1.9.1 The aircraft was equipped with standard communication equipment as approved by the Regulator.

1.9.2 The pilot was in contact with Flight Information Centre (FIC) North on the very high frequency (VHF) 127.40 megahertz (MHz).

1.9.3 The aircraft was fitted with a transponder and the pilot was allocated a squawk code 7342.

1.9.4 The pilot was in contact with ATC at FAGM on the VHF 118.70MHz. The aircraft was cleared to land Runway 35 at 0921Z.

1.9.5 The pilot broadcasted ‘Mayday Mayday Mayday’ on the FAGM tower frequency at 0924Z.

1.10 Aerodrome Information

1.10.1 The accident occurred 2.5nm south of the threshold of Runway 35 at FAGM.

Aerodrome Location	Rand Aerodrome (FAGM)
Aerodrome Co-ordinates	26°31'14.21" South 028°09'04.88" East
Aerodrome Elevation	5 483 feet AMSL
Runway Designations	11/29 17/35
Runway Dimensions	1 579 x 15m 1 197 x 15m
Runway Used	35
Runway Surface	Asphalt
Approach Facilities	Runway lights, Approach lights, VOR/DME
Aerodrome Status	Licensed

Note: An aerodrome chart is attached to this report as Annexure A.

1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor were these required by regulation to be fitted on this aircraft.

1.11.2 The aircraft was equipped with a Garmin GNS 430 unit. This unit did not contain any non-volatile memory and, therefore, could not be downloaded.

1.12 Wreckage and Impact Information

1.12.1 The pilot landed in a swampland on an open area between dense reed facing north-east. The pilot was unable to maintain diretional control and the aircraft veered off to the right, approximately 80m after touchdown and came to rest in a left-wing low attitude facing south.

Figure 4: The open area on which the pilot landed.

Figure 5: The open area view past the accident site.

Figure 6: The aircraft as it came to rest.

Figure 7: The front view of the aircraft showing one of the propeller blades.

1.13 Medical and Pathological Information

1.13.1 To pilot was issued a Class 2 aviation medical certificate on 24 August 2019 with an expiry date of 31 August 2024.

1.14 Fire

1.14.1 There was no evidence of a pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 The accident was survivable as the aircraft cockpit and cabin area remained intact and all four occupants were properly restrained by making use of the aircraft equipped safety harnesses.

1.16 Tests and Research

1.16.1 To be discussed in the final report.

1.17 Organisational and Management Information

1.17.1 This was a private flight conducted under the provisions of Part 91 of the Civil Aviation Regulations 2011 as amended. The pilot was also the owner of the aircraft.

1.17.2 The last mandatory periodic inspection (MPI) that was carried out on the aircraft ZS-MZV prior to the accident flight was certified on 20 August 2020 at 3 932.1 airframe hours. The AMO that certified the inspection was in possession of an AMO approval certificate No. 875 that was issued by the SACAA on 31 July 2020 with an expiry date of 30 April 2021.

1.18 Additional Information

1.18.1 Emergency Landing without Engine Power

Source: Owner's Manual, Section 3, Emergency Procedures

"If an emergency stoppage occurs, establish a flaps-up glide at 80 mph. If time permits, attempt to restart the engine by checking for fuel quantity, proper fuel selector valve

position, and mixture control setting. Also check that engine primer is full in and locked and ignition is properly positioned.

If all attempts to restart the engine fail, and a forced landing is imminent, select a suitable field and prepare for landing as follow:

1. *Pull mixture control to idle cut-off position.*
2. *Turn fuel selector valve handle "OFF".*
3. *Turn all switches "OFF" except the master switch.*
4. *Approach at 80 mph.*
5. *Extend wing flaps as necessary within gliding distance of the field.*
6. *Turn master switch "OFF".*
7. *Unlashed cabin doors prior to final approach.*
8. *Land in a slightly tail-low attitude.*
9. *Apply heavy braking while holding full up elevator."*

1.19 Useful or Effective Investigation Techniques

1.19.1 To be discussed in the final report.

2. Findings

2.1 General

From the evidence available, the following preliminary findings were made with respect to this accident. These shall not be read as apportioning blame or liability to any particular organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusions heading:

- **Findings —** are statements of all significant conditions, events or circumstances in this accident. The findings are significant steps in this accident sequence, but they are not always causal or indicate deficiencies.

2.2 Provisional Findings

Although the investigation is on-going, the following provisional findings were made:

The pilot

2.2.1 The PIC was in possession of a Private Pilot Licence (PPL) that was issued on 26 March 2021 with an expiry date of 31 March 2022. According to the pilot's logbook, he had flown a total of 115.5 hours, of which 42.7 hours were on the aircraft type.

2.2.2 The PIC was issued a valid Class 2 aviation medical certificate on 24 August 2019 with an expiry date of 31 August 2024.

2.2.3 The pilot flew from the private game reserve, which was located 12nm north-east of FAHT. At FAHT, 55 litres of Avgas were uplifted onto the aircraft.

2.2.4 The pilot provided a weight and balance calculation for the flight, which indicated that the aircraft was 250lbs below the MTOW limitation of 2 950lbs (1 330kg) prior to take-off from FAHT.

2.2.5 The pilot had filed a flight plan prior to the flight and was allocated a squawk code (#7342) by ATC.

2.2.6 The last three flights the pilot conducted with this aircraft were not entered in the flight folio.

The ZS-MZV aircraft

2.2.7 The aircraft was issued a Certificate of Airworthiness on 7 June 1991 with an expiry date of 30 June 2021.

2.2.8 The aircraft was issued a Certificate of Release to Service on 20 August 2020 with an expiry date of 19 August 2021 or at 4 032.1 airframe hours, whichever comes first.

2.2.9 The aircraft was issued a Certificate of Registration on 16 February 2007.

2.2.10 The last scheduled maintenance inspection carried out on the aircraft prior to the accident flight was certified on 20 August 2020 at 3 932.1 airframe hours. The aircraft had accumulated a further 28.8 airframe hours since the said inspection.

2.2.11 The aircraft was fitted with long range fuel tanks, which allowed for a total useable fuel capacity of 79 US gallons (474lbs).

Environment

2.2.12 Fine weather conditions prevailed at the time of the accident. The ATC at FAGM had informed the pilot that the wind was 360° at 16 knots when she cleared the aircraft for landing.

Aerodromes

2.2.13 According to the CCTV footage obtained from FAHT, the aircraft took off from Runway 35 at 0740Z.

2.2.14 Hoedspruit Civil Aerodrome (FAHT) is not a licensed aerodrome.

2.2.15 The aircraft was cleared to land at FAGM at 0921Z by ATC.

2.2.16 On short final approach for Runway 35 at FAGM, the pilot aborted landing, stating that the approach was unstable.

2.2.17 While positioning for a second landing at FAGM, the engine stopped in operation and the pilot broadcasted a Mayday call at 0924Z on the tower frequency.

2.2.18 A helicopter that was engaged in training at FAGM circuit was dispatched to the scene of the accident. The pilot flew all four occupants to FAGM, two at a time.

2.2.19 The Rand Aerodrome (FAGM) is a licensed facility.

3. On-going Investigation

3.1 The AIID investigation is on-going and will look into all other aspects of this accident, which may or may not have safety implications.

4. Safety Recommendations

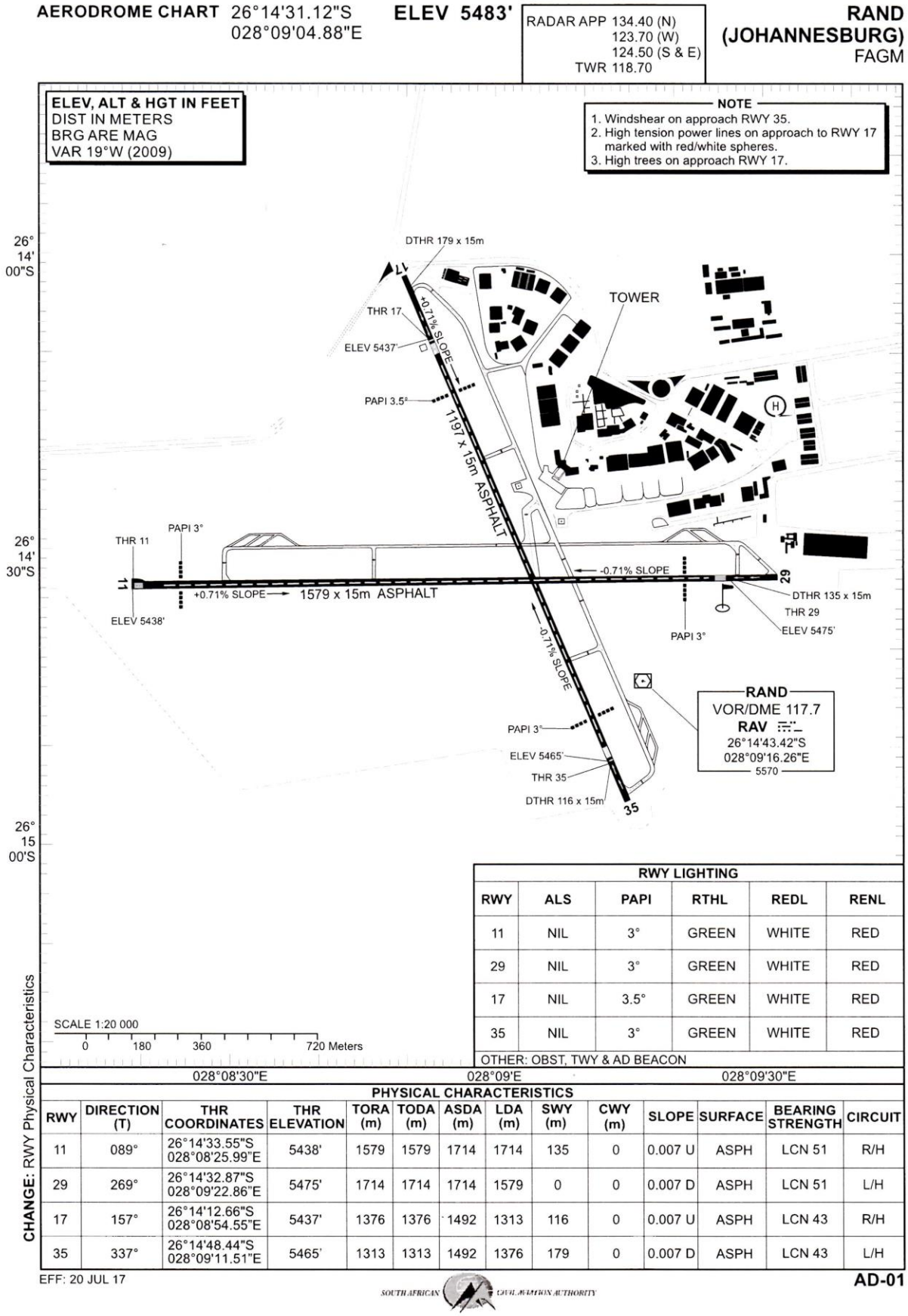
4.1 None.

5. Appendices

5.1 Annexure A (Aerodrome Chart for FAGM)

This report is issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa

ANNEXURE A



RWY LIGHTING

RWY	ALS	PAPI	RTHL	REDL	RENL
11	NIL	3°	GREEN	WHITE	RED
29	NIL	3°	GREEN	WHITE	RED
17	NIL	3.5°	GREEN	WHITE	RED
35	NIL	3°	GREEN	WHITE	RED

OTHER: OBST, TWY & AD BEACON

PHYSICAL CHARACTERISTICS

RWY	DIRECTION (T)	THR COORDINATES	THR ELEVATION	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	SWY (m)	CWY (m)	SLOPE	SURFACE	BEARING STRENGTH	CIRCUIT
11	089°	26°14'33.55"S 028°08'25.99"E	5438'	1579	1579	1714	1714	135	0	0.007 U	ASPH	LCN 51	R/H
29	269°	26°14'32.87"S 028°09'22.86"E	5475'	1714	1714	1714	1579	0	0	0.007 D	ASPH	LCN 51	L/H
17	157°	26°14'12.66"S 028°08'54.55"E	5437'	1376	1376	1492	1313	116	0	0.007 U	ASPH	LCN 43	R/H
35	337°	26°14'48.44"S 028°09'11.51"E	5465'	1313	1313	1492	1376	179	0	0.007 D	ASPH	LCN 43	L/H

CHANGE: RWY Physical Characteristics

EFF: 20 JUL 17

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