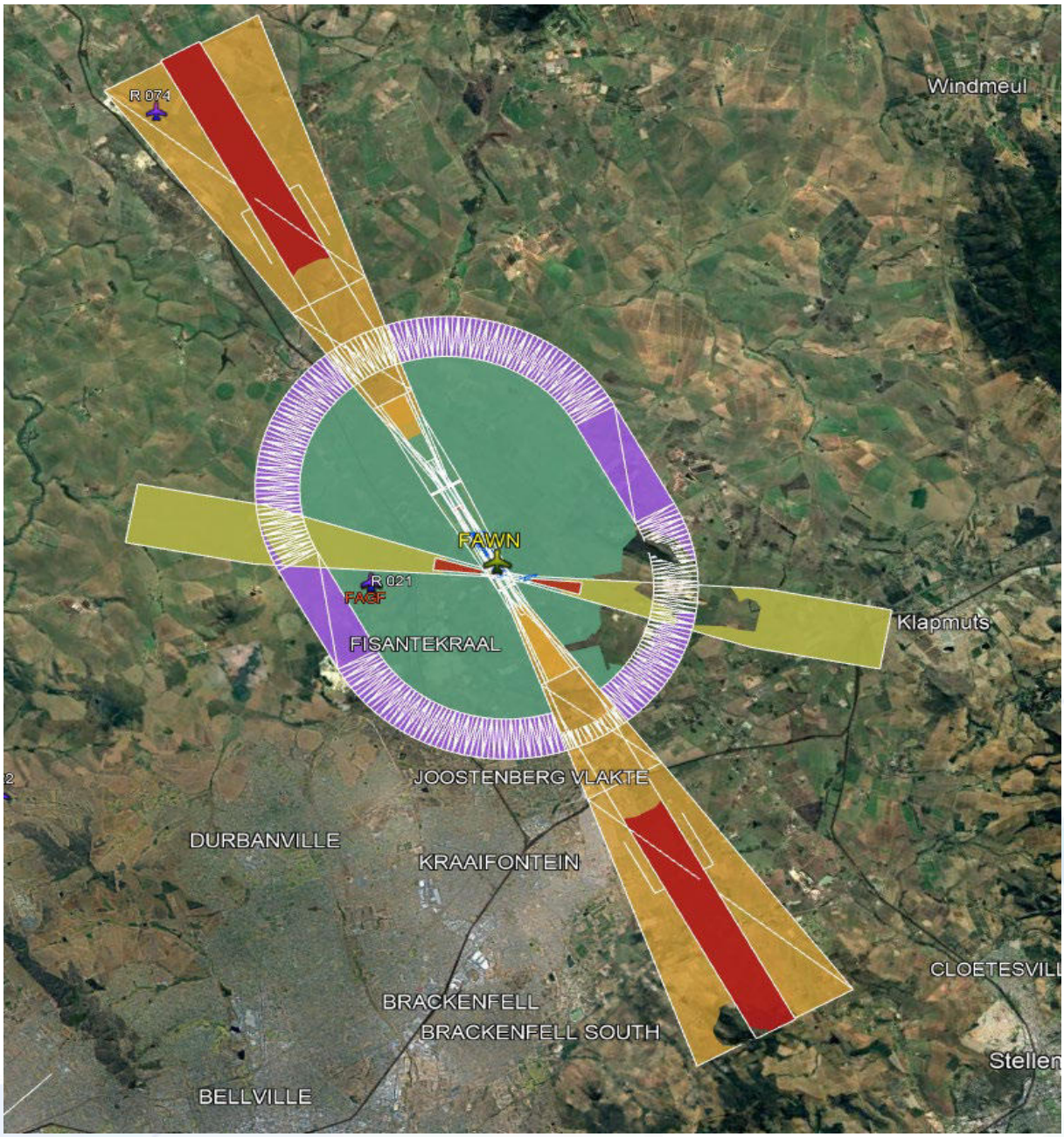
APPENDIX 18

OLS REPORT

ICAO AMENDED ANNEX 14 OBSTACLE ASSESSMENT REPORT, FOR CAPE WINELANDS AIRPORT ATNS/ANNEX 14 - 04/10/2022 ISSUE 2



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APPROVAL PAGE

TITLE	:	ICAO AMENDED ANNEX 14 OBSTACLE ASSESSMENT REPORT, FOR CAPE WINELANDS AIRPORT
REPORT NUMBER	:	ATNS/ANNEX 14 - 04/10/2022
CLASSIFICATION	:	CONFIDENTIAL
SYNOPSIS	:	This report contains the results of the ICAO Annex 14 Obstacle Assessment for Cape Winelands Airport, as part of ATNS' initial WGS84 survey project.
DISTRIBUTION	:	Refer to distribution page.
PREPARED BY	:	ATNS
COMPLETED BY	:	Graham Mondzinger (Obstacle Evaluator)
DATE	:	04 October 2022

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DISTRIBUTION:	Surveyors	ATNS
	Francois Coetzee	Senior Manager: AI (ATNS)
	Obstacle Evaluators	ATNS
	Data Integrity Specialists	ATNS
	Project Manager	FAWN

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1. INTRODUCTION

1.1 PURPOSE

1.1.1 This report details the Annex 14 obstacle assessment that was done concerning obstacles as surveyed by the survey team of ATNS, at Cape Winelands Airport, South Africa, as part of the initial WGS-84 survey project.

1.1.2 The report is based on all obstacles to investigate their influence on existing or future instrument procedures and wherther these obstacles will have any effect on the Annex-14 surfaces. All obstacles were considered for the assessment to determine the effect on the aerodrome environment.

1.1.3 The effective utilisation of an aerodrome may be considerably influenced by natural features and man-made constructions inside and outside its boundary. These may result in limitations on the distance available for take-off and landing and on the range of meteorological conditions in which take-off and landing can be undertaken. For these reasons certain areas of the local airspace must be regarded as integral parts of the aerodrome environment. The degree of freedom from obstacles in these areas is very important.

1.1.4 An obstacle is defined as:

a. Any object that stands on, or stands above, the specified surface of an obstacle restriction area which comprises the runway strips, runway end safety areas, clearways and taxiway strips; and.
b. Any object that penetrates the ICAO Annex 14 Obstacle Limitation Surfaces (OLS), a series of surfaces that set the height limits of objects, around an aerodrome.

1.1.5 The method of assessing the significance of any existing or proposed obstacle within the aerodrome boundary or in the vicinity of the aerodrome is to establish the defined ICAO Annex 14 Obstacle Limitation Surfaces (OLS) particular to a runway and its intended use. In ideal circumstances all the ICAO Annex 14 Obstacle Limitation Surfaces (OLS) will be free from obstacles, but when a surface is infringed, any safety measures required by the RSA CAA will have regard to:

a. The nature of the obstacle and its location relative to the surface origin, to the extended centreline of the runway or normal approach and departure paths and to existing obstructions
b. The amount by which the surface is infringed;
c. The volume and type of air traffic at the aerodrome; and
d. The instrument approach procedures published for the aerodrome.

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1.2 DATA USED

1.2.1 WGS-84 Survey Report for Cape Winelands Airport (ATNS Survey of 2022).

1.3 ELECTRONIC DATA

1.3.1 Obstacle data was obtained from ATNS Obstacle Evaluators Server **(V:\Obstacle Evaluators\ Obstacle Evaluations\ Other Airports\ FAWN\ FAWN 2022)**. All this data was geodetically positioned into an an eTOD and Microstation drawing file. This file was then established as the base drawing for the project.

1.4 UNITS USED

- All heights used in this design are in meters, unless specified otherwise.
- All bearings are true bearings, unless otherwise specified.

1.5 PROPOSED RUNWAY COORDINATES

TABLE 1: RUNWAY DATA

Name	Latitude	Longitude	Elevation
THR-RWY01	S 33° 46’ 29.97”	E 018° 44’ 30.22413”	124.06m
THR-RWY19	S 33° 44’ 44.23444”	E 018° 43’ 57.49363”	94.35m
THR-RWY14	S 33° 46’ 15.44262”	E 018° 44’ 20.84196”	121.708m
THR-RWY32	S 33° 46’ 26.02905”	E 018° 44’ 48.37863”	124.59m

1.6 PROPOSED NAVIGATIONAL AIDS

1.6.1 The following proposed navigation facilities will be installed at this airport:

- ILS (RWY 01)
- ILS (RWY 19)

2. ICAO ANNEX 14 EVALUATION

2.1 PURPOSE

2.1.1 The purpose of the Annex 14 Obstacle Limitation Surfaces (OLS) is to define the volume of airspace that should be ideally kept free or safeguarded from obstacles, and to take the necessary measures to ensure the safety of aircraft, and thereby the passengers and crews aboard them, while taking-off or landing, or while flying in the vicinity of an airport.

2.1.2 This is achieved by a process of checking proposed developments so as to:

- Protect the blocks of air through which aircraft fly, by preventing penetration of these surfaces' lower limits;
- Protect the integrity of radar and other electronic aids to air navigation, by preventing reflections and diffractions of the radio signals involved;
- Protect visual aids, such as Approach and Runway lighting, by preventing them from being obscured, or preventing the installation of other lights which could be confused for them;

2.1.3 Under the terms of their license, as issued by the RSA CAA, airports are normally required to prevent new developments or extensions to existing structures from infringing the OLS. The OLS completely surrounds the aerodrome, but those surfaces aligned with the runway(s) used to protect aircraft landing or taking-off can be more limiting than those surrounding the rest of the aerodrome, particularly as you get closer to the aerodrome.

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2.2 ANNEX 14 OBSTACLE LIMITATION SURFACES (OLS)

2.2.1 In ideal circumstances all the surfaces will be free from obstacles, but when a surface is infringed, any safety measures required by the RSA CAA will have regard to:

- The nature of the obstacle and its location relative to the surface origin, to the extended centreline of the runway or normal approach and departure paths and to existing obstructions;
- The amount by which the OLS is infringed;
- The gradient presented by the obstacle to the surface origin;
- The volume and type of air traffic at the aerodrome; and
- The instrument approach procedures published for the aerodrome.

It is for this reason that accurate information on the location and height of the proposed development is required.

2.2.2 The specifications for the individual requirements are related by a two element reference code. In addition, specifications will vary with the designation of a runway as an instrument runway if it is served by one or more non-visual aids to approach and landing or as a visual runway, if it is not served by any non-visual aids to approach and landing. This ensures that the facilities and characteristics of an aerodrome are effectively related and match the needs of the aircraft for which the aerodrome intends to cater.

2.2.3 To determine the extent of the lateral, longitudinal, and sloping planes of the airspace and ground surfaces surrounding each runway that should be kept free of obstacles, a reference code is established. This code comprises of:

- A number determined by selecting the higher value of the declared TODA or ASDA.
- A letter which corresponds to the wingspan or main gear outer-wheel span, whichever is the more demanding, of the largest aircraft likely to be operating at the aerodrome.

2.2.4 The determination of a runway's reference code is for the identification of the horizontal and vertical parameters of the Obstacle Limitation Surfaces (OLS) associated with that runway, and are not intended to influence the pavement strength.

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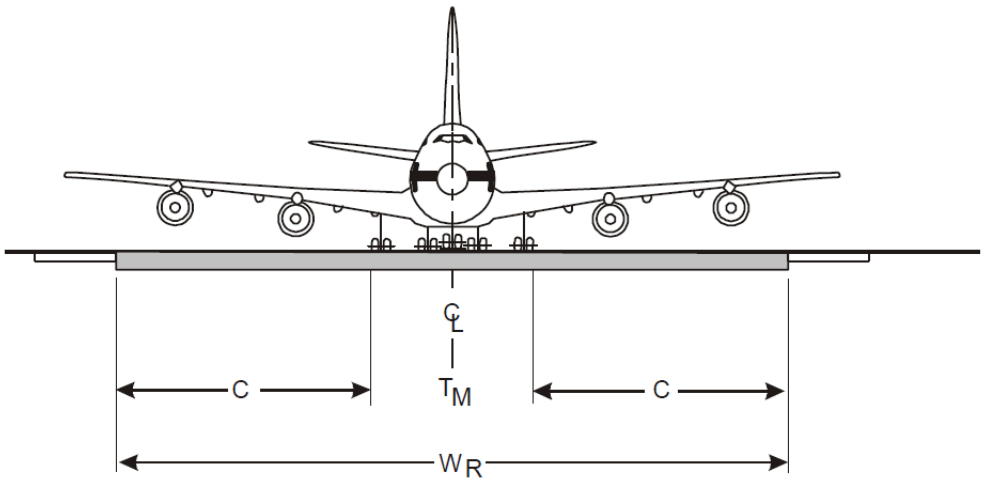
2.3 **AERODROME (RUNWAY) REFERENCE CODE**

TABLE 2: AERODROME REFERENCE CODES

Code element 1		Code element 2		
Code number (1)	Aeroplane reference field length (2)	Code letter (3)	Wingspan (4)	Outer main gear wheel span[a] (5)
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4.5 m
2	800 m up to but not including 1 200 m	B	15 m up to but not including 24 m	4.5 m up to but not including 6 m
3	1 200 m up to but not including 1 800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m
4	1 800 m and over	D	36 m up to but not including 52 m	9 m up to but not including 14 m
		E	52 m up to but not including 65 m	9 m up to but not including 14 m
		F	65 m up to but not including 80 m	14 m up to but not including 16 m

a. Distance between the outside edges of the main gear wheels.



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2.3.1 **RUNWAYS**

2.3.1.1 A runway is a rectangular area on a land aerodrome prepared for the landing and taking-off of aircraft. Separate criteria apply to a runway serving as a visual runway and to a runway serving as an instrument runway. The ability to meet the criteria will determine what length of runway may be declared for what purpose.

2.3.1.2 The length of runway provided is not directly determined by the Code. The aerodrome authority should declare distances for each runway direction. The declared distances are to be approved and promulgated by the RSA CAA.

2.3.2 **Width**

2.3.2.1 Runways both paved and unpaved should have the following minimum widths:

TABLE 3: RUNWAY WIDTHS

Code number	Code letter A	B	C	D	E	F
1[a]	*18 m*	*18 m*	*23 m*	–	–	–
2[a]	*23 m*	*23 m*	*30 m*	–	–	–
3	*30 m*	*30 m*	*30 m*	*45 m*	–	–
4	–	–	*45 m*	*45 m*	*45 m*	*60 m*

a. The width of a precision approach runway should be not less than 30 m where the code number is 1 or 2.

2.3.2.2 The combinations of code numbers and letters for which widths are specified have been developed for typical aeroplane characteristics.

2.3.2.3 The width of a precision approach runway should be not less than 30 m where the code number is 1 or 2.

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2.4 INFRINGEMENT OF OLS

2.4.1 The aerodrome operator must monitor the OLS applicable to the aerodrome and report to the RSA CAA any infringement or potential infringement of the OLS.

Note: Aerodrome operators need to liaise with appropriate planning authorities and companies that erect tall structures, to determine potential infringements. Every effort should be made to implement the OLS standards and limit the introduction of new obstacles.

2.4.2 When a new obstacle is detected, the aerodrome operator must ensure that the information is passed on to pilots, through NOTAM, in accordance with the standards for aerodrome reporting procedures.

2.5 ANNEX 14 OBSTACLE LIMITATION SURFACES ASSESSMENT – FAWN

Annex-14 surface parameters: RWY 01/19 and RWY 14/32

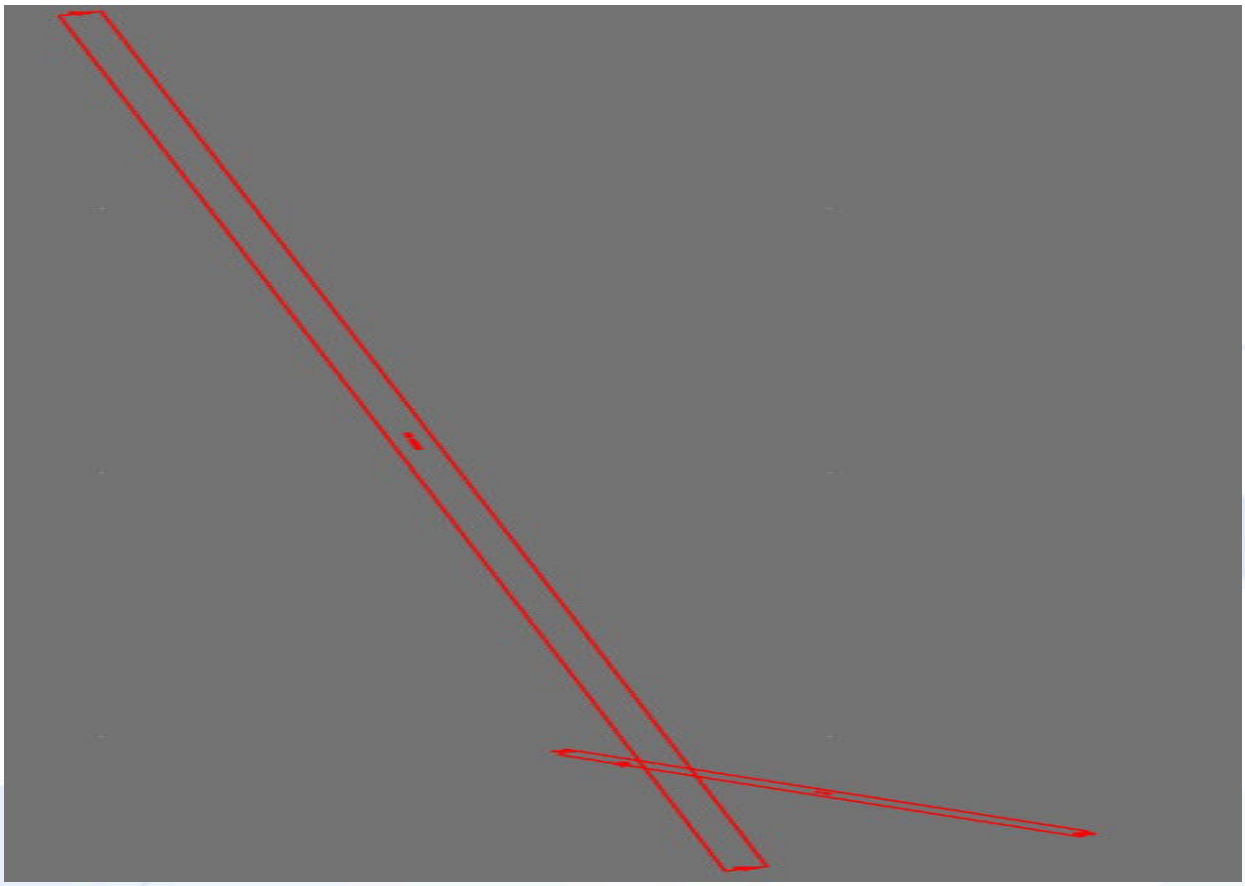

FIGURE 1: PROPOSED RUNWAY LAYOUT AT CAPE WINELANDS AIRPORT

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The following OLS are defined for Precision Runways:

- Strip
- Conical Surface
- Inner Horizontal Surface
- Outer Horizontal
- Inner Approach Surface
- Approach Surface
- Transitional Surface
- Inner Transitional Surface
- Balked Landing Surface
- Take Off Climb
- Take Off Path Area (TOFPA)

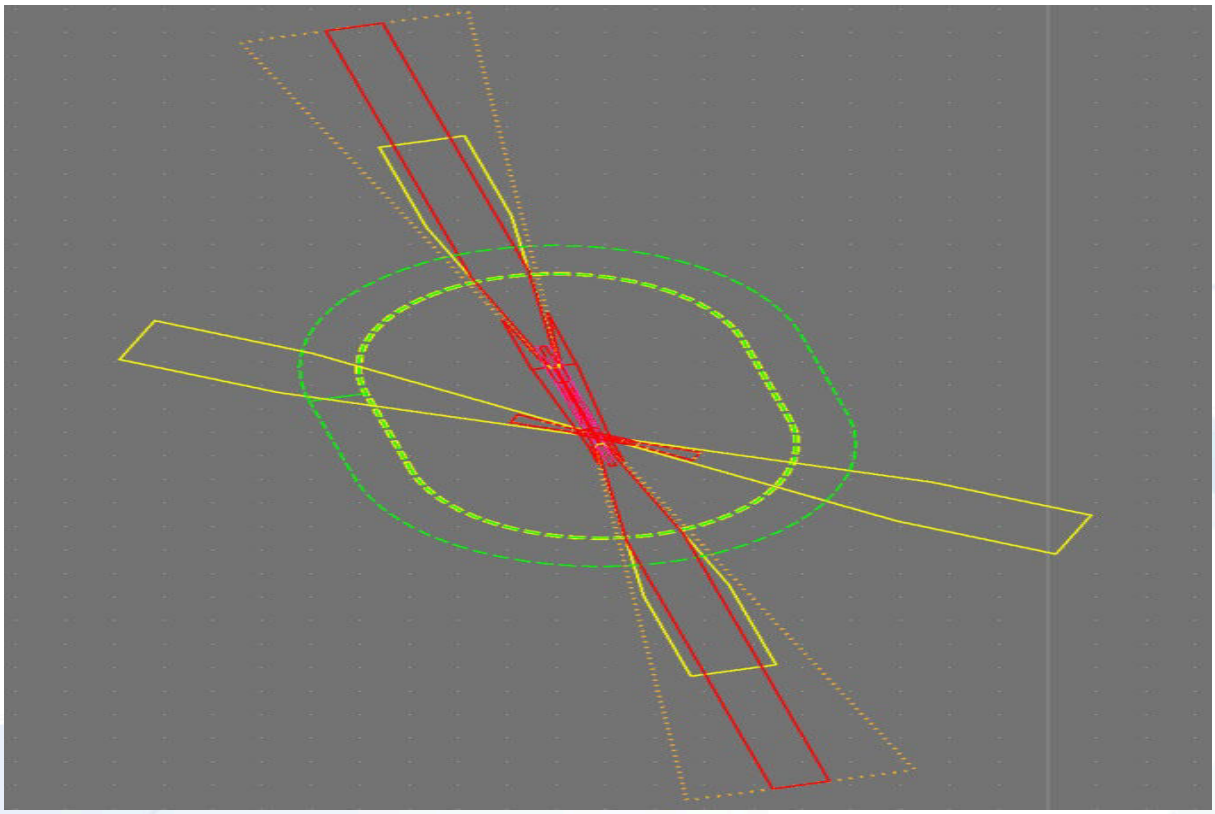

FIGURE 2: ANNEX 14 OBSTACLE LIMITATION SURFACES (OLS) AT CAPE WINELANDS AIRPORT

2.5.1 **Runway data: RWY01**

TABLE 4: RUNWAY 01 DIMENSIONS

RWY 01 (FAWN)	
Code	4
THR01	
Latitude	S 33° 46’ 29.97”
Longitude	E 018° 44’ 30.22413”
Elevation	124.06m
END01	
Latitude	S 33° 44’ 44.23444”
Longitude	E 018° 43’ 57.49363”
Elevation	94.35m
Aerodrome	
Datum elevation	94.35m
Code letter F	No
Parameters	
Approach type	Precision
Departure Track Heading Change > 15°	No
Criteria applied	ICAO

Annex-14 surface parameters:

The broad purpose of the OLS is to define a volume of airspace that is ideally kept free of obstacles in order to minimise the danger to aircraft during the final visual segment of an instrument approach procedure.

TABLE 5: RUNWAY 01 OLS DIMENSIONS

Strip	
Length	3120 m
Width	280 m
Conical	
Slope	5 %
Height	100 m
Inner Horizontal	
Height	45 m
Radius	4000 m
Outer Horizontal	
Height	150 m
Radius	15000 m

Inner Approach	
Width	120 m
Distance from THR	60 m
Length	900 m
Slope	2 %
Approach	
Length of inner edge	300 m
Distance from THR	60 m
Divergence (each side)	15 %
First Section	
Length	3000 m
Slope	2 %
Second Section	
Length	3600 m
Slope	2.5 %
Horizontal Section	
Length	8400 m
Total length	15000 m
Transitional	
Slope	14.3 %
Inner Transitional	
Slope	33.3 %
Balked Landing	
Length of inner edge	120 m
Distance from THR	1800 m
Divergence (each side)	10 %
Slope	3.33 %
Take Off Climb	
Length of inner edge	180 m
Distance from runway end	60 m
Divergence (each side)	12.5 %
Final width	1200 m
Length	15000 m
Slope	2 %

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2.5.2 **Runway data: RWY19**

TABLE 6: RUNWAY 19 DIMENSIONS

RWY 19 (FAWN)	
Code	4
THR19	
Latitude	S 33° 44’ 44.23444”
Longitude	E 018° 43’ 57.49363”
Elevation	94.35m
END19	
Latitude	S 33° 46’ 29.97”
Longitude	E 018° 44’ 30.22413”
Elevation	124.06m
Aerodrome	
Datum elevation	94.35m
Code letter F	No
Parameters	
Approach type	Precision
Departure Track Heading Change > 15°	No
Criteria applied	ICAO

The following OLS are defined for Precision Approach Runway 19:

TABLE 7: RUNWAY 19 OLS DIMENSIONS

Strip	
Length	3120 m
Width	280 m
Conical	
Slope	5 %
Height	100 m
Inner Horizontal	
Height	45 m
Radius	4000 m
Outer Horizontal	
Height	150 m
Radius	15000 m
Inner Approach	
Width	120 m
Distance from THR	60 m
Length	900 m
Slope	2 %

Approach	
Length of inner edge	300 m
Distance from THR	60 m
Divergence (each side)	15 %
First Section	
Length	3000 m
Slope	2 %
Second Section	
Length	3600 m
Slope	2.5 %
Horizontal Section	
Length	8400 m
Total length	15000 m
Transitional	
Slope	14.3 %
Inner Transitional	
Slope	33.3 %
Balked Landing	
Length of inner edge	120 m
Distance from THR	1800 m
Divergence (each side)	10 %
Slope	3.33 %
Take Off Climb	
Length of inner edge	180 m
Distance from runway end	60 m
Divergence (each side)	12.5 %
Final width	1200 m
Length	15000 m
Slope	2 %

The following OLS are defined for Non-Instrument Runway:

- Strip
- Conical Surface
- Inner Horizontal Surface
- Approach Surface
- Transitional Surface
- Take Off Climb
- Take Off Path Area (TOFPA)

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2.5.3 **Runway data: RWY14**

TABLE 8: RUNWAY 14 DIMENSIONS

RWY 14 (FAWN)	
Code	1
THR14	
Latitude	S 33° 46’ 15.44262”
Longitude	E 018° 44’ 20.84196”
Elevation	121.708m
END14	
Latitude	S 33° 46’ 26.02905”
Longitude	E 018° 44’ 48.37863”
Elevation	124.59m
Aerodrome	
Datum elevation	121.708m
Code letter F	No
Parameters	
Approach type	Non-Instrument
Departure Track Heading Change > 15°	No
Criteria applied	ICAO

The following OLS are defined for Non-Instrument Runway 14:

TABLE 9: RUNWAY 14 OLS DIMENSIONS

Strip	
Length	900 m
Width	150 m
Conical	
Slope	5 %
Height	75 m
Inner Horizontal	
Height	45 m
Radius	4000 m
Approach	
Length of inner edge	150 m
Distance from THR	60 m
Divergence (each side)	15 %
First Section	
Length	3000 m
Slope	3.33 %
Transitional	
Slope	14.3 %

Take Off Climb	
Length of inner edge	180 m
Distance from runway end	60 m
Divergence (each side)	12.5 %
Final width	1200 m
Length	15000 m
Slope	2 %

2.5.4 **Runway data: RWY32**

TABLE 10: RUNWAY 32 DIMENSIONS

RWY 32 (FAWN)	
Code	1
THR32	
Latitude	S 33° 46’ 26.02905”
Longitude	E 018° 44’ 48.37863”
Elevation	124.59m
END32	
Latitude	S 33° 46’ 15.44262”
Longitude	E 018° 44’ 20.84196”
Elevation	121.708m
Aerodrome	
Datum elevation	121.708m
Code letter F	No
Parameters	
Approach type	Non-Instrument
Departure Track Heading Change > 15°	No
Criteria applied	ICAO

The following OLS are defined for Non-Instrument Runway 32:

TABLE 11: RUNWAY 32 OLS DIMENSIONS

Strip	
Length	900 m
Width	150 m
Conical	
Slope	5 %
Height	75 m
Inner Horizontal	
Height	45 m
Radius	4000 m

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Approach	
Length of inner edge	150 m
Distance from THR	60 m
Divergence (each side)	15 %
First Section	
Length	3000 m
Slope	3.33 %
Transitional	
Slope	14.3 %
Take Off Climb	
Length of inner edge	180 m
Distance from runway end	60 m
Divergence (each side)	12.5 %
Final width	1200 m
Length	15000 m
Slope	2 %

2.5.5 **Assessment Results: OBSTACLES**

TABLE 12: THE OBSTACLES IN THE TABLE BELOW PENETRATE THE ANNEX-14 SURFACES FOR FAWN

SURAFCE	TARGET	OBSTACLE	PENETRATION	LATITUDE	LONGITUDE	ELEVATION
Balked Landing	01	_RWY21 PP5	-15.043	S 33° 45' 32.9882''	E 018° 44' 10.2920''	124.161
Inner transitional	01	_HANGER_A1	-4.492	S 33° 46' 15.2485''	E 018° 44' 29.1453''	133.502
Inner transitional	01	_PP1	-9.011	S 33° 45' 54.6489''	E 018° 44' 22.1157''	126.789
Strip	01-19	_FUEL FARM	-10.055	S 33° 46' 15.8166''	E 018° 44' 31.0346''	130.433
Strip	01-19	_HANGER_2	-5.676	S 33° 46' 13.9655''	E 018° 44' 29.9791''	125.507
Strip	01-19	_HANGER_A1	-13.381	S 33° 46' 15.2485''	E 018° 44' 29.1453''	133.502
Strip	01-19	_MET STATION	-14.495	S 33° 46' 04.8552''	E 018° 44' 23.1048''	131.535
Strip	01-19	_PP1	-12.493	S 33° 45' 54.6489''	E 018° 44' 22.1157''	126.789
Strip	01-19	_PP2	-11.716	S 33° 45' 55.5070''	E 018° 44' 23.9162''	126.341
Strip	01-19	_RWY21 PP2	-12.826	S 33° 45' 34.6972''	E 018° 44' 18.0334''	121.635
Strip	01-19	_RWY21 PP3	-14.229	S 33° 45' 34.0683''	E 018° 44' 15.1213''	122.707
Strip	01-19	_RWY21 PP4	-15.732	S 33° 45' 33.5537''	E 018° 44' 12.8416''	123.945
Strip	01-19	_RWY21 PP5	-16.242	S 33° 45' 32.9882''	E 018° 44' 10.2920''	124.161
Strip	01-19	_RWY21_TREE1	-25.23	S 33° 45' 44.8538''	E 018° 44' 18.5602''	136.744
Strip	01-19	_T64_BLD	-7.88	S 33° 45' 53.9976''	E 018° 44' 22.6102''	122.033
Strip	01-19	_T65_BLD	-7.875	S 33° 45' 51.4390''	E 018° 44' 19.5945''	121.182
Strip	01-19	_TREE_1	-14.034	S 33° 46' 16.9969''	E 018° 44' 32.0501''	134.781
Strip	01-19	_TREE_2	-16.232	S 33° 46' 16.9874''	E 018° 44' 32.1565''	136.983

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Strip	01-19	_WINDSOCK MID	-9.089	S 33° 46' 19.7678''	E 018° 44' 25.8315''	130.212
Transitional	01	_HANGER_3	-6.551	S 33° 46' 14.7972''	E 018° 44' 32.4135''	129.829
Transitional	01	_PP3	-10.472	S 33° 45' 55.9201''	E 018° 44' 25.9506''	126.209
Transitional	01	_RWY21 PP1	-4.867	S 33° 45' 35.3422''	E 018° 44' 20.9663''	119.841
Transitional	01	_TANK_2	-0.22	S 33° 46' 13.7969''	E 018° 44' 34.6868''	132.567
Transitional	01	_TREE_3	-8.038	S 33° 46' 17.0056''	E 018° 44' 34.0187''	135.272
Transitional	01	_WATER TANK	-2.685	S 33° 46' 11.0727''	E 018° 44' 32.7418''	130.280
Transitional	01	_HANGER_A4	-4.349	S 33° 46' 12.4504''	E 018° 44' 31.5988''	126.649
Transitional	01	_OFFICE	-5.433	S 33° 46' 11.9595''	E 018° 44' 31.7976''	128.865
Balked Landing	19	_PP1	-1.249	S 33° 45' 54.6489''	E 018° 44' 22.1157''	126.789
Balked Landing	19	_RWY21_TREE1	-21.698	S 33° 45' 44.8538''	E 018° 44' 18.5602''	136.744
TOFPA	19	_W_RESEVOIR	-3.994	S 33° 47' 33.2716''	E 018° 44' 46.1067''	151.944
Transitional	19	_HANGER_3	-6.551	S 33° 46' 14.7972''	E 018° 44' 32.4135''	129.829
Transitional	19	_PP3	-10.472	S 33° 45' 55.9201''	E 018° 44' 25.9506''	126.209
Transitional	19	_RWY21 PP1	-4.867	S 33° 45' 35.3422''	E 018° 44' 20.9663''	119.841
Transitional	19	_TANK_2	-0.22	S 33° 46' 13.7969''	E 018° 44' 34.6868''	132.567
Transitional	19	_TREE_3	-8.038	S 33° 46' 17.0056''	E 018° 44' 34.0187''	135.272
Transitional	19	_WATER TANK	-2.685	S 33° 46' 11.0727''	E 018° 44' 32.7418''	130.280
Transitional	19	_HANGER_A4	-4.349	S 33° 46' 12.4504''	E 018° 44' 31.5988''	126.649
Transitional	19	_OFFICE	-5.433	S 33° 46' 11.9595''	E 018° 44' 31.7976''	128.865
Take-off Climb	14	_RWY32_TREE4	-11.374	S 33° 46' 28.5783''	E 018° 44' 52.6322''	141.078
Take-off Climb	14	_RWY32_TREE5	-4.528	S 33° 46' 28.3862''	E 018° 44' 53.6418''	135.288
Take-off Climb	14	_RWY32_TREE6	-2.914	S 33° 46' 28.0738''	E 018° 44' 55.0798''	135.154
TOFPA	14	_RWY32 F1	-1.487	S 33° 46' 26.0294''	E 018° 44' 49.0623''	126.269
TOFPA	14	_RWY32_TREE2	-15.309	S 33° 46' 28.8997''	E 018° 44' 50.7390''	141.005
TOFPA	14	_RWY32_TREE3	-15.126	S 33° 46' 28.7279''	E 018° 44' 51.7451''	141.078
TOFPA	14	_RWY32_TREE4	-14.901	S 33° 46' 28.5783''	E 018° 44' 52.6322''	141.078
TOFPA	14	_RWY32_TREE5	-8.857	S 33° 46' 28.3862''	E 018° 44' 53.6418''	135.288
TOFPA	14	_RWY32_TREE6	-8.368	S 33° 46' 28.0738''	E 018° 44' 55.0798''	135.154
TOFPA	14	_RWY32_TREE1	-9.958	S 33° 46' 29.1705''	E 018° 44' 49.1117''	135.239
Strip	14-32	_RWY32 F1	-1.679	S 33° 46' 26.0294''	E 018° 44' 49.0623''	126.269
Transitional	14	_TREE_1	-2.608	S 33° 46' 16.9969''	E 018° 44' 32.0501''	134.781
Transitional	14	_TREE_2	-4.519	S 33° 46' 16.9874''	E 018° 44' 32.1565''	136.983
Transitional	14	_WINDSOCK MID	-0.394	S 33° 46' 19.7678''	E 018° 44' 25.8315''	130.212
Approach	32	_RWY32_TREE4	-11.374	S 33° 46' 28.5783''	E 018° 44' 52.6322''	141.078
Approach	32	_RWY32_TREE5	-4.528	S 33° 46' 28.3862''	E 018° 44' 53.6418''	135.288
Approach	32	_RWY32_TREE6	-2.914	S 33° 46' 28.0738''	E 018° 44' 55.0798''	135.154
Transitional	32	_RWY32_TREE2	-9.558	S 33° 46' 28.8997''	E 018° 44' 50.7390''	141.005
Transitional	32	_RWY32_TREE3	-12.119	S 33° 46' 28.7279''	E 018° 44' 51.7451''	141.078

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Transitional	32	_TREE_1	-2.608	S 33° 46' 16.9969''	E 018° 44' 32.0501''	134.781
Transitional	32	_TREE_2	-4.519	S 33° 46' 16.9874''	E 018° 44' 32.1565''	136.983
Transitional	32	_WINDSOCK MID	-0.394	S 33° 46' 19.7678''	E 018° 44' 25.8315''	130.212
Inner Horizontal	FAWN	_RWY01_PYLON MID1	-6.241	S 33° 48' 03.3797''	E 018° 45' 25.0766''	145.591
Inner Horizontal	FAWN	_RWY01_PYLON MID2	-10.101	S 33° 48' 03.9818''	E 018° 45' 09.9010''	149.451
Inner Horizontal	FAWN	_RWY01_PYLON MID3	-7.808	S 33° 48' 04.5311''	E 018° 44' 56.6150''	147.158
Inner Horizontal	FAWN	_RWY32_TREE2	-1.655	S 33° 46' 28.8997''	E 018° 44' 50.7390''	141.005
Inner Horizontal	FAWN	_RWY32_TREE3	-1.728	S 33° 46' 28.7279''	E 018° 44' 51.7451''	141.078
Inner Horizontal	FAWN	_RWY32_TREE4	-1.728	S 33° 46' 28.5783''	E 018° 44' 52.6322''	141.078
Inner Horizontal	FAWN	_STEEL TANK	-3.989	S 33° 46' 48.8511''	E 018° 43' 58.7999''	143.339
Inner Horizontal	FAWN	_W_RESEVOIR	-12.594	S 33° 47' 33.2716''	E 018° 44' 46.1067''	151.944
Conical	FAWN	_TRANS_1 TWR	-83.139	S 33° 47' 21.1688''	E 018° 41' 46.3120''	247.647
Conical	FAWN	_TRANS_2 TWR	-87.374	S 33° 47' 14.2176''	E 018° 41' 41.2943''	254.510
Conical	FAWN	_TRANS_3 TWR	-81.581	S 33° 47' 18.4075''	E 018° 41' 32.9621''	260.895

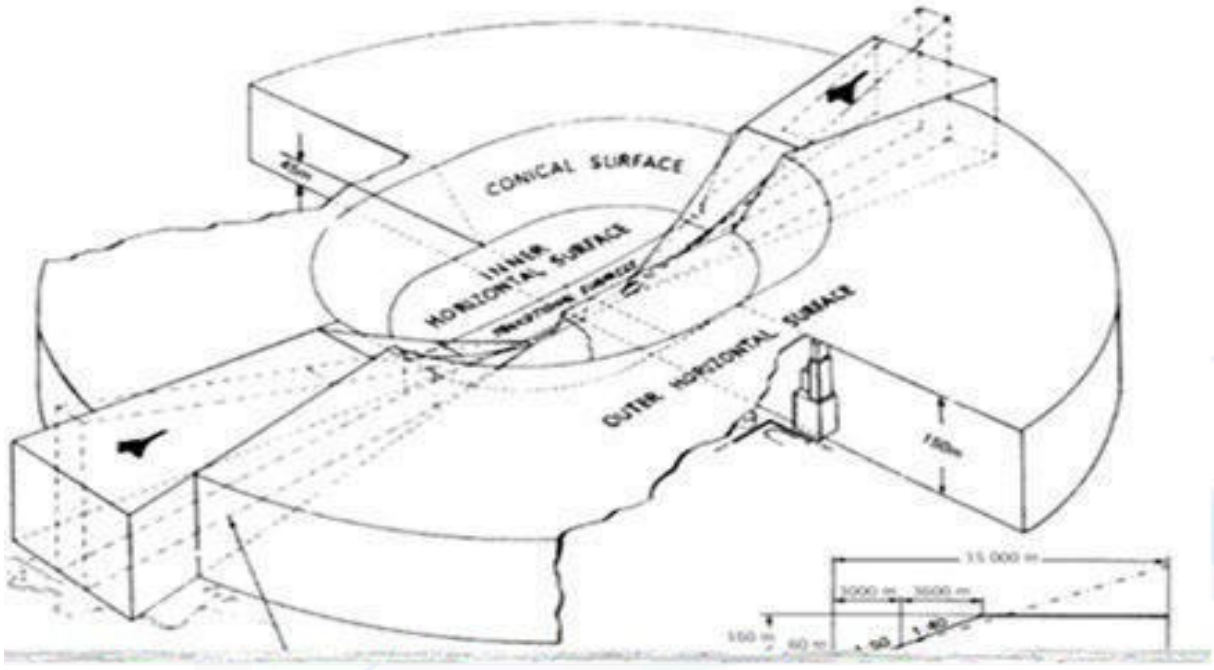

FIGURE 3: The Annex 14 volume 1 Obstacle Limitation Surfaces (OLS) shown in the picture above: protects aircraft for 15 KM radius around every aerodrome

3. FLIGHT PROCEDURES

3.1 OIS AND OLS

3.1.1 The PANS-OPS Obstacle Identification Surfaces (OIS) are generally above the Annex 14 OLS and are designed to safeguard an aircraft from collision with obstacles when the aircraft's flight may be guided solely by instruments in conditions of poor visibility. They apply minimum obstacle clearance (MOC) to structures, terrain or other natural features within the areas to determine the limiting altitude at which a manoeuvre can be safely executed. As a result, PANS-OPS surfaces cannot be infringed under any circumstance.

3.1.2 In this respect, the OLS and PANS-OPS surfaces provide protection for aircraft operations in two quite different circumstances, the first when the pilot can see if there is an obstacle and the second when the pilot cannot.

3.1.3 The newly surveyed obstacles were evaluated against the present and newly designed procedures and found not to have any impact.

3.2 INFORMATION ON ANY NEW OBSTACLE MUST INCLUDE:

- The nature of the obstacle — for instance structure or machinery;
- Distance and bearing of the obstacle from the start of the take-off end of the runway, if the obstacle is within the take-off area, or the ARP;
- Height of the obstacle in relation to the aerodrome elevation; and
- If it is a temporary obstacle — the time it is an obstacle.

3.3 VISUAL AIDS FOR DENOTING OBSTACLES

3.3.1 The marking and/or lighting of obstacles are intended to reduce hazards to aircraft by indicating the presence of the obstacles. It does not necessarily reduce operating limitations which may be imposed by an obstacle.

3.3.2 Aeronautical Ground Lighting (AGL) provides flight crew with location, orientation and alignment information in adverse visibility conditions and at night. Below is a textual explanation of a Precision Approach Path Indicator (PAPI), as used by the pilot during final approach to land. The units are normally installed on the left hand side of the runway, viewed from the approach; a right hand installation is permitted if it is not practicable to position them on the left or if a second set is required.

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3.4 **PRECISION APPROACH PATH INDICATOR (PAPI).**

3.4.1 These are protected by:

- Preventing them from being obscured;
- Preventing the installation and display of other lights, particularly street lighting, in a pattern or colour which could be mistaken for visual aids;
- Preventing a high level of background lighting which could diminish their effectiveness;
- Preventing other lights which could confuse pilots.

3.4.2 All structures and buildings in and around an airport, treated as an obstacle, should be clearly marked and identified in accordance with the requirements of ICAO Annex 14, Chapter 6. Below is a textual explanation of the day and night markings of buildings and obstacles, in accordance with Annex 14.

3.5 **DAYLIGHT MARKINGS**

3.5.1 Steady burning, red, aeronautical low intensity type "A" obstruction lights must be fitted to the masts, to clearly define the outline of the structures, in accordance with the requirements of ICAO Annex 14, Chapter 6. The obstacles should be clearly marked for day and night operations as an obstruction, as per ICAO Annex 14 requirements.

4. CONCLUSION

4.1 All the obstacles listed in this report are **not clear** of the annex-14 surfaces, and need to be addressed (in terms of Annex-14 Lighting and Marking) to ensure that the proposed/future procedures at Cape Winelands Airport will be addressed.

4.2 We would like to recommend that this office be consulted on a regular basis before any installation of new structures in and around the aerodrome so that Annex-14 obstacle assessment can be done prior to installations.

4.3 Also, the PANS-OPS office should be consulted when there are modifications, painting and surface reconstructions at all airports.

This concludes the ICAO Annex 14 Obstacle Assessment done for Cape Winelands Airport.

This report was compiled by:

Graham Mondzinger
grahamm@atns.co.za
T: 011 607 1132

5. ATTACHMENT A

A.1 ALL SURVEY OBSTACLE DATA

Obstacle	WGS-84 Lat.	WGS-84 Long.	Height MSL(m)	Description
COMMCO TWR	S334721.29248	E0184218.463	135.047	Measured on ground level. 43.454m AGL to top of lightning conductor.
CTC MAST_FISANTEK	S334720.34056	E0184247.09688	117.985	Measured on ground level. 26.904m AGL to top of lightning conductor.
DEEPKLOO_HANGER	S334610.61777	E0184435.54492	127.895	Measured on ground level. 6.700m AGL to top of hanger
FLOOD_L1	S334706.47227	E0184303.40684	135.777	Measured on ground level. 40.124m AGL to top of lightning conductor.
FLOOD_L2	S334714.66681	E0184256.83674	138.45	Measured on ground level. 40.336m AGL to top of lightning conductor.
FUEL FARM	S334615.81656	E0184431.03463	130.433	Measured on ground level. 8.100m AGL to top of tank.
HANGER_1	S334609.10341	E0184436.34158	124.426	Measured on ground level. 3.800m AGL to top of roof.
HANGER_2	S334613.96552	E0184429.97911	125.507	Measured on ground level. 3.500m AGL to top of hanger.
HANGER_3	**S334614.79724**	**E0184432.41353**	**129.829**	**Measured on ground level. 7.300m AGL to top of hanger.**
HANGER_4	S334615.40594	E0184438.52656	126.625	Measured on ground level. 4.000m AGL to top of hanger.
HANGER_4 N	S334614.85803	E0184433.72924	127.804	Measured on ground level. 5.000m AGL to top of roof apex.
HANGER_5 N	S334615.41126	E0184435.08827	126.599	Measured on ground level. 3.800m AGL to top of roof apex.

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HANGER_5 S	S334616.98842	E0184438.64063	126.668	Measured on ground level. 3.800m AGL to top of roof apex.
HANGER_A1	S334615.24846	E0184429.14526	133.502	Measured on ground level. 11.000m AGL to top of hanger.
HANGER_A8	S334608.84758	E0184433.53343	124.998	Measured on ground level. 3.800m AGL to top of roof.
MET STATION	S334604.85519	E0184423.10485	131.535	Measured on ground level. 11.500m AGL to top of lightning conductor.
PP1	**S334554.64887**	**E0184422.11569**	**126.789**	**Measured on ground level. 8.600m AGL to top of power line pole.**
PP2	S334555.507	E0184423.9162	126.341	Measured on ground level. 9.100m AGL to top of power line pole.
PP3	**S334555.92009**	**E0184425.95057**	**126.209**	**Measured on ground level. 9.500m AGL to top of power line pole.**
PP4	S334556.53244	E0184429.01251	125.148	Measured on ground level. 8.700m AGL to top of power line pole.
PP5	S334556.46701	E0184429.185	125.138	Measured on ground level. 8.700m AGL to top of power line pole.
PP6	S334555.3199	E0184432.04617	125.036	Measured on ground level. 8.700m AGL to top of power line pole.
PP7	S334553.49624	E0184433.47765	124.315	Measured on ground level. 9.200m AGL to top of power line pole.
PP8	S334551.70701	E0184434.88406	124.113	Measured on ground level. 9.4\00m AGL to top of power line pole.
PP9	S334549.76158	E0184436.42592	123.498	Measured on ground level. 8.700m AGL to top of power line pole.
RWY01_PYLON MID1	**S334803.37967**	**E0184525.07657**	**145.591**	**Measured on ground level. 22.500m AGL bto top of pylon.**
RWY01_PYLON MID2	**S334803.98179**	**E0184509.90096**	**149.451**	**Measured on ground level. 22.100m AGL bto top of pylon.**

RWY01_PYLON MID3	**S334804.53109**	**E0184456.61499**	**147.158**	**Measured on ground level. 21.500m AGL bto top of pylon.**
RWY01_PYLON MID4	S334805.19188	E0184439.89617	130.342	Measured on ground level. 21.500m AGL bto top of pylon.
RWY14 F1	S334612.12747	E0184416.25047	122.679	Measured on ground level. 1.700m AGL to top of fence.
RWY14 F2	S334612.31205	E0184416.18311	122.71	Measured on ground level. 1.700m AGL to top of fence.
RWY32 F1	**S334626.02941**	**E0184449.06228**	**126.269**	**Measured on ground level. 1.700m AGL to top of fence.**
RWY21 PP1	**S334535.34217**	**E0184420.96631**	**119.841**	**Measured on ground level. 9.100m AGL to top of power line pole.**
RWY21 PP2	S334534.69724	E0184418.03338	121.635	Measured on ground level. 9.100m AGL to top of power line pole.
RWY21 PP3	S334534.06829	E0184415.12133	122.707	Measured on ground level. 9.100m AGL to top of power line pole.
RWY21 PP4	S334533.5537	E0184412.84157	123.945	Measured on ground level. 9.100m AGL to top of power line pole.
RWY21 PP5	S334532.98821	E0184410.29199	124.161	Measured on ground level. 9.100m AGL to top of power line pole.
RWY21_TREE1	**S334544.8538**	**E0184418.56021**	**136.744**	**Measured on ground level. 21.800m AGL to top of tree.**
RWY32_TREE2	**S334628.89975**	**E0184450.73903**	**141.005**	**Measured on ground level. 15.800m AGL to top of tree.**
RWY32_TREE3	**S334628.72793**	**E0184451.7451**	**141.078**	**Measured on ground level. 15.800m AGL to top of tree.**
RWY32_TREE4	**S334628.57828**	**E0184452.63218**	**141.078**	**Measured on ground level. 15.800m AGL to top of tree.**
RWY32_TREE5	**S334628.38623**	**E0184453.6418**	**135.288**	**Measured on ground level. 10.000m AGL to top of tree.**

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RWY32_TREE6	**S334628.07383**	**E0184455.07977**	**135.154**	**Measured on ground level. 10.000m AGL to top of tree.**
RWY32_TREE1	**S334629.1705**	**E0184449.11172**	**135.239**	**Measured on ground level. 10.000m AGL to top of tree.**
TANK_2	S334613.7969	E0184434.68682	130.847	Measured on ground level. 10.000m AGL to top of water tank.
SENTEC TWR	S334201.75182	E0184227.4831	189.462	Measured on ground level. 117.644m AGL to top of tower.
STEEL TANK	**S334648.8511**	**E0184358.79987**	**143.339**	**Measured on ground level. 23.600m AGL to top of tank.**
T64_BLD	S334553.99756	E0184422.6102	122.033	Measured on ground level. 4.600m AGL to top of building.
T65_BLD	S334551.43899	E0184419.59449	121.182	Measured on ground level. 3.800m AGL to top of building.
T66_BLD	S334555.85039	E0184428.48304	120.26	Measured on ground level. 4.100m AGL to top of building.
TRANS_1 TWR	**S334721.16879**	**E0184146.31199**	**247.647**	**Measured on ground level. 150.000m AGL to top of tower.**
TRANS_2 TWR	**S334714.21765**	**E0184141.2943**	**254.51**	**Measured on ground level. 150.000m AGL to top of tower.**
TRANS_3 TWR	**S334718.40755**	**E0184132.96212**	**260.895**	**Measured on ground level. 150.000m AGL to top of tower.**
TREE_1	**S334616.99688**	**E0184432.05008**	**134.781**	**Measured on ground level. 12.000m AGL to top of tree.**
TREE_2	**S334616.98738**	**E0184432.15648**	**136.983**	**Measred on ground level. 14.300m AGL to top of tree.**
TREE_3	**S334617.00559**	**E0184434.01872**	**135.272**	**Measred on ground level. 12.000m AGL to top of tree.**
W_RESEVOIR	**S334733.27165**	**E0184446.10675**	**151.944**	**Measured on ground level. 27.854m AGL to top of lightning conductor.**

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WATER TANK	**S334611.07268**	**E0184432.74179**	**130.28**	**Measured on ground level. 8.700m AGL to top of tank.**
WINDSOCK MID	**S334619.76778**	**E0184425.83146**	**130.212**	**Measured on ground level. 7.400m AGL to top of pole.**
TANK_2	**S334613.7969**	**E0184434.68682**	**132.567**	**Measured on ground level. 10.000m AGL to top of water tank.**
HANGER_A3	S334611.05434	E0184432.33481	125.596	Measured on groun level. 4.000m AGL to top of hanger roof.
HANGER_A4	**S334612.45042**	**E0184431.59879**	**126.649**	**Measured on ground level. 4.600m AGL to top of hanger roof.**
OFFICE	**S334611.95953**	**E0184431.79759**	**128.865**	**Measured on ground level. 6.900m AGL to top of office roof apex.**

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